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**India’s**

**National Capacity Needs Self-Assessment**

**Report & Action Plan**

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**Ministry of Environment and Forests**

**Government of India**

**2009**

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**Executive Summary**

**O**ne of the biggest tasks for addressing the challenge of sustainable development is the need to develop and strengthen technical, financial and institutional capacities at different levels. Capacity assessment and capacity development often are the single main interventions cited to effectively implement any activity related to environment and development.

Recognizing this, the Global Environment Facility (GEF), the financial mechanism of the multi-lateral environmental conventions, undertook a scoping exercise during 2000 to come up with a Capacity Development Initiative (CDI) that addressed the then needs and priorities. Based on the outcomes of the consultations held to develop the CDI, Parties to the Rio Conventions suggested GEF establish the National Capacity Self-Assessment (NCSA) projects through the enabling activity window, which was approved by the GEF Council in May 2001.

Initiated in 2004 in India, NCSA aims at analyzing the country’s strengths, constraints and needs in effectively implementing 3 Rio Conventions, namely the Convention on Biological Diversity (CBD), the UN Framework Convention on Climate Change (UNFCCC) and the UN Convention to Combating Desertification (UNCCD) and, recommend capacity development actions to address the identified gaps. One of the innovative elements of the NCSA project is the focus on undertaking synergistic capacity assessments for all the three Rio Conventions, so that the relevance of implementing national actions can be enhanced.

The NCSA process had five major components; inception, stocktaking, thematic assessments, crosscutting analyses and NCSA report and action plan. UNDP is the GEF implementing agency for NCSA India project and in consultation with UNDP, the Ashoka Trust for Research in Ecology and the Environment (ATREE), Winrock International (WII) and Institute of Economic Growth (IEG) were selected to prepare thematic reports on biodiversity, climate change and land degradation respectively. Thereafter, the task of preparing cross-cutting report was assigned to Prof Damodaran from IIM Bangalore. While taking into account the consultant’s report and the inputs from the thematic divisions of the Union Ministry of Environment and Forests, also the national focal point of the 3 Rio Conventions, the present report has been complied.

**Main findings and recommendations**

Recommendations for action are included in each individual section of the report and are also summarized below:

Biodiversity Conservation:

Some of the major capacity constraints in addressing biodiversity conservation concerns and solutions suggested are as follows:

* Effective implementation of Biological Diversity Act by building capacity of NBA, SBBs and BMCs,
* Biodiversity concerns need to be further mainstreamed into the planning process through inter-sectoral coordination among programs and activities of various departments,
* Need to strengthen capacities for formulating and implementing demonstrative participatory sustainable use models at the ground level,
* Need to extend management practices to handle large scale bio-geographical and thematic units,
* Survey efforts in the documentation of marine biodiversity needs to be strengthened,
* Need to develop the capacity of taxonomists and create opportunities for extending the facilities to increase the availability of trained personnel in this field,
* Targeted research on invasive alien species and cross-sectoral integration for their effective management are limited and there is a need at improving the institutional and individual capacities for assessing current and potential threats caused by invasive alien species,
* Need to strengthen the documentation of traditional knowledge outside the extent of codified traditional knowledge systems domain of Indian medicine. Also, the documentation on ethnobiology uses of plants, animals and microbial resources needs to be strengthened,
* Need to review and strengthen the management of marine PA management network,
* Impact of climate change on biodiversity conservation has been studied in a limited manner and needs to be strengthened and integrated with planning process,
* There is a limited ex situ conservation capacities in terms of infrastructure and funds requirements, which needs to be addressed,
* Expertise of monitoring land use change needs to be strengthened,
* Need to follow international guidelines for unifying biological database in the country,
* There is under representation of social science aspects in education, research and training related to biodiversity conservation,
* The capacity in socio-economic assessment of GM crops needs to be strengthened, and,
* The capacity and resources for handling, packaging and identification of LMOs needs to be strengthened.

Climate Change:

Some of the major capacity constraints in addressing climate change concerns and solutions suggested are as follows:

* There is a need to integrate and contextualize the research efforts to focus on climate change issues,
* There is a need to improve the quality of national GHG inventories, regional and sectoral assessment of vulnerabilities, and adaptation response, and communication of information on a continuous basis. The major concern to meet this requirement is non availability of data for some specific inventory sub categories especially for informal and less organized sectors of the economy. Briefly, there is a need to strengthen the R&D component for climate change, which is proposed to be addressed by NAPCC with the setting of a climate Science Research Fund,
* The LULUCF sector in India has the potential to be a major sources or sink of CO2 in the future for which the capacity needs to be developed. The Prime Minister’s Green India campaign for the afforestation has already been announced,
* Beyond the sectoral and scientific or technological capacity needs on climate change, the critical need in India is to integrate the diverse scientific assessments and link them with policy making. There is a need to develop the capacity to implement the integrated assessment models,
* There is inadequate financial mechanism for supporting CDM activities, which needs to be addressed,
* There is a need for building the capacity of bundlers for small scale projects. The capacity of municipalities to develop CDM projects needs to strengthened. The capacity to develop CDM forestry projects is limited and needs to be developed, and,
* There is a need to develop innovative technical and financial mechanisms through public private partnerships to address the issue of climate change mitigation as well as adaptation. NAPCC provides to address this issue through Venture Capital Fund.

Land Degradation:

Some of the major capacity constraints in addressing land degradation concerns and solutions suggested are as follows:

* There is a need to strengthen the enabling legislation framework to assist the implementation of UNCCD processes,
* The coordination mechanism to implement NAP needs to be strengthened,
* The inter-linkages between adverse climatic variations and land degradation needs to be assessed,
* Need to promote the application of GIS data as a tool for community based early warning systems,
* Need to strengthen technical capacity at PRI level,
* Need to strengthen backward forward linkages for sustainable lives and livelihoods,

There is already a considerable amount of capacity development being done under specific conventions. The NCSA is unique in its focus on cross-cutting capacity issues i.e. issues that ‘cut across’ or are ‘common to’ multiple conventions. It also identifies ways to promote linkages among convention thematic areas and synergies in implementing the conventions. Based on the capacity priorities identified by the three thematic reports, the cross-cutting report identified areas and strategies for extending the scope of thematic capacity building exercise to include cross-cutting dimensions. Some of the major capacity constraints in addressing cross-cutting concerns across the 3 Rio conventions are as follows:-

* There is a need for reviewing sectoral plans for incorporating crosscutting issues into national planning exercise,
* There is a need to strengthen the education and awareness capacity at different levels,
* Risk assessment capacities needs to be strengthened
* Need to develop methodology and tools for project monitoring and evaluation to analyze the trade off of specific global environmental benefits,
* Need to develop the capacity to evaluate the role of traditional knowledge in addressing environmental concerns, and,
* There is a need to build the statistical capacity of the relevant institutions in the country to develop a robust, regularly updated database especially of a cross cutting nature to support the national planning process.

To conclude,many of the identified capacity gaps and the proposed action plans are known as these have been detailed out in various national level documents including, National Environment Policy, National Action Plan on Climate Change and National Biodiversity Action Plan. Action on many of the capacity gaps has been undertaken as part of the several GEF projects being conceptualized and developed. However, much more needs to be done to a) develop capacities to understand and address cross-cutting aspect of the environmental and developmental concerns; and b) to institutionalize capacity building initiatives both at the national and local levels.

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The report has been long delayed and still needs improvement on various aspects. We are happy to share it.

Thank you!

GEF India Team

**Abbreviations**

ASCI Administrative Staff College of India

BEE Bureau of Energy Efficiency

BSI Botanical Survey of India

CAZRI Central Arid Zone Research Institute

CBD Convention on Biological Diversity

CBP Cartagena Protocol on Biosafety

CDI Capacity Development Initiative

CDM Clean Development Mechanism

CFRI Central Fuel Research Institute

COP Conference of Parties

CRZ Coastal Regulation Zone

DOE Designated Operational Entity

DBT Department of Biotechnology

DNA Designated National Authority

DST Department of Science and Technology

EMPRI Environmental Management and Policy Research Institute

ENVIS Environmental Information System

EPTRI Environment Protection Training & Research Institute

GEF Global Environmental Facility

GHG Greenhouse Gas Emission

GoI Government of India

IARI Indian Agriculture Research Institute

IMD Indian Metrological Department

IPCC [Intergovernmental Panel on Climate Change](http://www.ipcc.ch/)

IPR Intellectual Property Right

IRADe Integrated Research and Action for Development

IREDA Indian Renewable Energy Development Agency Ltd

JFM Joint Forest Management

LMOs Living Modified Organisms

LULUCF Land Use, Land-Use Change and Forestry

MDGs Millennium Development Goals

MEA Multilateral Environmental Agreements

MNRE Ministry of New and Renewable Energy Sources

MoEF Ministry of Environment and Forests

MoF Ministry of Finance

MoP Ministry of Power

MoRTH Ministry of Road Transport and Highways

NABARD National Bank for Agriculture and Rural Development

NATCOM National Communications

NBAP Draft National Biodiversity Action Plan

NCA National CDM Authority

NCSA National Capacity needs Self Assessment

NEERI National Environment Engineering Research Institute

NEP National Environment Policy

NGO Non-governmental Organization

NIO National Institute of Oceanography

NPL National Physical Laboratory

NTFP Non - Timber Forest Products

PAs Protected Areas

PBRs People’s Biodiversity Registers

TKS Traditional Knowledge Systems

UNCCD United Nations Convention to Combat Desertification

UNDP United Nations Development Programme

UNFCCC United Nations Framework Conventions on Climate Change

V&A Vulnerability and Adaptation

WII Wildlife Institute of India

ZSI Zoological Survey of India

**“One way of seeing development is in terms of the expansion of the real freedoms that citizens enjoy to pursue the objectives they have reason to value. Poverty of life lies not merely in the improvised state in which the person actually lives, but also in the lack of real opportunity to choose other types of living. Poverty is ultimately a matter of capability deprivation.”**

*Jean Dreze and Amartya Sen (1995)*

**“Long-term development should be a nationally led and managed process that builds upon existing capacity in designing and implementing effective strategies to further boost capacity development. Our approach integrates capacity diagnostics and strategies into the heart of that process. Capacity development must be taken into the core of development planning, policy and financing if it is not to be an ineffective add-on or after-thought.”**

 *Kemal Derviş, UNDP Administrator (2006)*

CHAPTER: 1

**Introduction**

**I**t is hard to overstate the importance of the environment to sustainable development. It is the bedrock on which our survival lies. Over the years it has become clear that capacity building is central to the quest for sustainable development. The ability of a country to follow sustainable development paths is determined to a large extent by the capacity of its people and its institutions as well as by its ecological and geographical conditions. Capacity building is an essential step to deal with long-term challenges, rather than concentrating only on immediate problems.

* 1. The Earth Summit recognized capacity-building as a key means of implementation for realizing the goals of Agenda 21, which were strongly reaffirmed at the World Summit on Sustainable Development (WSSD). Paris Declaration, 2005 highlighted the importance of capacity building in all areas of sustainable development and calls for better resourced, more effective, coordinated and complementary capacity-building activities in poverty alleviation and sustainable development programs. This has also been highlighted in our Five Year Plans, the National Environment Policy, the National Action Plan on Climate Change and National Biodiversity Action Plan.
	2. India is committed towards integrating the principle of sustainable development into country policies and programs while reversing the loss of environmental resources and ensuring environmental sustainability. It is widely recognized that strengthened national capacity is the key to sustainability of development investments. However, building the national capacity to plan, manage, implement and monitor for better environmental management is a challenge. The multi-stakeholder character of environmental issues and continuous developments in the field of environment, make it necessary to have a continuing focus on capacity building in all concerned institutions.
	3. This report is the outcome of the national capacity assessment exercise undertaken by the Union Ministry of Environment and Forests (MoEF) and UNDP in consultation with a wide range of stakeholders to analyze the country’s capacity status, strengths, constraints and needs to effectively implement the three ‘Rio Conventions’ – Convention on Biological Diversity (CBD), United Nations Framework Convention on Climate Change (UNFCCC) and United Nations Convention to Combat Desertification (UNCCD) as well as issues cutting across these conventions. This exercise was supported by the Global Environment Facility (GEF), a multi-lateral international funding mechanism,[[1]](#footnote-1) under a global project on ‘National Capacity Needs Self Assessment (NCSA)’. Implemented in more than 150 countries, the NCSA is a GEF enabling activity for countries to analyze their capacity needs to address national and global environmental challenges.[[2]](#footnote-2)
	4. The implementation and the follow up of the capacity actions proposed under NCSA is a responsibility of the respective countries by mobilizing resources from other (existing and/ or new) resources besides GEF – thus, mainstreaming the component of capacity assessment and development as an integral part of national development planning.
	5. The MoEF is the nodal agency for handling the multilateral environmental agreements including CBD, UNFCCC and UNCCD. The NCSA exercise in India has not adopted ‘a clean slate’ approach. It is significantly rooted in existing policies and programs and seeks to build upon the experiences of major programs and projects initiated in India in the past, including those supported by the GEF. Based on a careful process of stocktaking of the existing programs, the NCSA identifies critical interventions that could plug in gaps and deficiencies and provide a renewed paradigm of capacity building that seeks to embrace not only key thematic areas but also cross-cutting themes hitherto not adequately addressed. In the ultimate analysis the NCSA ensures greater convergence of national programs of sustainable development with global environmental priorities. India’s approach to the NCSA is thus based on a careful balancing of India’s core environmental policy concerns with global environmental obligations. NCSA India also recognizes that capacity development is not just a responsibility of the government alone. It also concerns the private sector, non-government entities and civil society.

**What is capacity development and why does it matter?**

* 1. Capacity development, like sustainable development, encompasses a wide range of aspects, including the human, technological, organizational, financial, scientific, cultural and institutional. It is not easy to define. UNDP (2007) defines capacity as “the ability of individuals, institutions and societies to perform functions, solve problems, and set and achieve objectives in a sustainable manner.” In other words, capacity building is the process and means to develop the necessary skills and expertise to manage natural resources in a sustainable manner as part of daily routine.
	2. NCSA defines a country’s capacity as the ability of individuals, groups, organizations and institutions to address the priority environmental issues as part of efforts to achieve sustainable development. In order to meet MEA responsibilities, each country will need the capacity to manage the following functions:
1. To mobilize information and knowledge;
2. To build consensus and partnerships among all stakeholders;
3. To formulate effective policies, legislation, strategies and programs;
4. To implement policies, legislation, strategies, programs and projects, including mobilizing and managing human, material and financial resources; and,
5. To monitor, evaluate, report and learn.
	1. For a country to perform these functions successfully, it needs capable individuals and effective institutions and organization to work together in a well functioning political, economic and social system – also called as ‘the enabling environment’. Capacity development is a primarily endogenous and domestically driven process – which depends on clearly answering questions like, the capacity for what and for whom. Capacity development is an inherently political and complex process that cannot be rushed, and outcomes cannot be expected to evolve in a controlled and linear fashion.
	2. While analyzing capacity needs and suggesting capacity actions, the NCSA exercise in India focused upon the following basic tenants:
* Capacity development is a long term process, not amendable to delivery pressures, quick fixes and short term results. Engagement for capacity development needs to have a reliable, long term time horizon;
* There are no blue prints. Capacity building means learning, which is a voluntary process that requires genuine commitment and interest. Knowledge cannot be transferred, it must be acquired;
* Build upon existing capacities rather than create new ones;
* External inputs need to correspond to national demand and respond to national needs and possibilities. Where national systems are not strong enough, they need to be reformed and strengthened, not bypassed; and,
* Provide incentives for capacity development;
* Capacity development is not power neutral, and challenging vested interests is difficult. Establishing frank dialogue and moving to a collective culture of transparency is essential to overcoming these challenges; and,
* Capacity building approaches need to be accountable to ultimate beneficiaries. This is also the final test for effective capacity development action plan and its importance has been duly recognized by India’s Eleventh Five Year Plan (2007 – 2012), which emphasizes on monitoring the outcome instead of outlays as done in the past. However, it is important to understand that performance and capacity are interrelated, but not synonymous. While performance may be one indicator of capacity, it may be achieved by capacity substitution. Indicators need to be developed that provide more detail on progress with regard to organizational and institutional capacities as well as with regard to important process variables such as leadership, ownership, and inclusiveness.
	1. The Government of India (GoI) has been implementing several projects that address environmental concerns as part of it continued commitments towards protecting the environment both at the national and global levels. There is greater need for identification and characterization of the critical capacity constraints and prioritize capacity needs in the area of global environment management. Such an improved understanding will assist the government in allocating available resources more efficiently and in prioritizing future bilateral and multilateral assistance in the environmental management sphere.

**Methodology and Processes**

* 1. There is unlikely to be a single concept of capacity development that each country finds suitable. As a result, the GEF has not provided any specific guidelines either for the preparation of proposals for GEF funding of NCSAs, or for undertaking the NCSAs themselves. The countries have been encouraged to choose methodologies better suited to their national situations and preferences. However, the GEF in collaboration with the United Nations Institute for Training and Research (UNITAR) has prepared a ‘Guide for Self-Assessment of Country Capacity Needs for Global Environmental Management’ which suggest methodologies for assessing capacity building needs and is based on both national and international experiences on the subject. The methodologies and processes are detailed out in Annexure: 3 of this report.
	2. Briefly, as part of the NCSA exercise initiated by the MoEF and the UNDP, an effort has been made to develop ‘sectoral’ thematic reports related to three major conventions, as mentioned earlier. National Level Research Institutions working on the respective Conventions prepared thematic reports. These reports catalogued different governmental and non-governmental programs, schemes and projects in the areas of land degradation, climate change and biodiversity and have also documented the role of different Governmental and Non-governmental organizations in addressing the issues related to the three Conventions. The thematic reports also brought out principal gaps in capacities and capabilities at the national level to address the issues. Based on the inputs provided by the thematic reports, an effort was made to identify commonalities amongst different conventions. Another National Level Institute initiated a crosscutting report. This report identified points of convergences amongst different conventions in the light of the priorities identified in the National Environment Policy 2006 and India’s National Action Plan Reports and Communications to the UNCCD, CBD and UNFCCC. Based on the capacity priorities identified by the three thematic reports, the cross-cutting report identified areas and strategies for extending the scope of thematic capacity building exercises to include cross cutting dimensions. Thereafter, the NCSA Capacity Action Plan was drafted.
	3. The NCSA project was housed in MoEF and the GEF Operational Focal Point India was the National Project Director. The NCSA exercise was guided by a senior officer from each of the three thematic divisions (also acting as the focal points for CBD, UNFCCC and UNCCD in India), on a day to day basis. A National Steering Committee headed by the Additional Secretary, MoEF with members drawn from the three thematic divisions of MoEF, Department of Economic Affairs, GoI (GEF Political Focal Point India) and UNDP provided the overall guidance to the project.

**Chapterization**

* 1. Chapter: 2, 3 and 4 presents the capacity strengths, gaps and needs to address national and global environmental challenges, particularly in the area of biodiversity, climate change and land degradation respectively. The last chapter presents the crosscutting analysis of capacity needs to effectively implement these three conventions while developing a National Capacity Action Plan as the core strategy to strengthen India’s environmental management framework.

**To conclude**

* 1. Capacity and capacity development issues have been on the development agenda for decades now. The multi-stakeholder character of environmental issues and continuous developments in the field of environment makes it necessary to have an institutionalized focus on capacity building. This initial NCSA is not intended to be definitive and final, which depends on a number of factors including emerging scientific and technological information, collective decisions through global environmental Conventions, and the development of national policy frameworks. The identification of country’s capacity needs is an ongoing process, beyond this initial NCSA to be conducted at a regular interval to strengthen country’s environmental management framework.

**……………..**

CHAPTER: 2

**Biodiversity: Capacity Needs & Action Plan**

**B**iodiversity, the natural biotic capital of the earth, is fundamental to the fulfillment of human needs[[3]](#footnote-3) and vital for the survival of this planet. Biodiversity thus is life insurance for life itself. However, biodiversity is being increasingly threatened globally due to habitat fragmentation, shrinking genetic diversity, invasive alien species, declining forest resource base, climate change and desertification, overexploitation of resources and impact of pollution/ development projects. The current rates of species extinction on our planet in the 21st century exceed the extinction rates experienced over the past hundreds of millions of years of geologic time by factors of 100 to 1,000 times. The environmental cost of the dangerous trend is staggering, as is the impact on the human communities that depend upon these natural plant and animal resources for the sustenance. Thus, conserving biodiversity is basic to our survival and well-being and using it sustainably forms part of the Indian culture and lifestyle.

* 1. India has a long history of conservation and sustainable use of natural resources. Formal laws, policies and programs for conservation and sustainable utilization of bio-resources date back to several decades. Over the years, India has developed a stable institutional structure and strong legal and policy framework for protection of environment in the country. India has participated in all the major international events related to biodiversity conservation over the past decades and has ratified all the major biodiversity related global conventions. India became a Party to the Convention on Biological Diversity (CBD) in February 1994 which aims at conservation of biodiversity, sustainable use of its components and fair and equitable sharing of benefits arising out of the use of these resources. The Cartagena Protocol on Bio-safety (CPB), which was adopted in 2000 under the aegis of the CBD, addresses the safe transfer, handling and use of Living Modified Organisms (LMOs) that may have adverse affects on the conservation and sustainable use of biological diversity, taking also into account risks to human health while specifically focusing on trans-boundary movements. CBD together with CPB places biodiversity concerns at the centre of global, regional, national and local efforts for alleviating poverty, meeting 2010 targets of CBD and global Millennium Development Goals (MDGs) goals. Sustainable conservation and use of biological diversity is essential for achieving the monitorable targets of India’s 11th Five Year Plan.
	2. The Union Ministry of Environment and Forests (MoEF), the nodal agency for implementing the provisions of CBD in India, developed a national strategy for biodiversity conservation at the macro-level in 1999 and enacted the Biological Diversity Act in 2002 followed by the Rules thereunder in 2004. In 2008 the National Biodiversity Action Plan (NBAP) was approved by the Indian Cabinet which seeks to achieve balance and harmony between conservation of biological resources and development process in a time bound manner. Now the challenge is to implement NBAP in a comprehensive manner. NCSA exercise not only identifies the capacity gaps (ranging from technical, financial etc) in implementing the provisions of NBAP while suggesting an action plan to meet these capacity constraints at different levels.
	3. Some of the major challenges to implementing the CBD as identified by India’s 3rd National Report to CBD (2006) are: meeting the increasing demand for biological resources caused by population growth and increased consumption, while considering the long-term consequences of our actions; increasing our capacity to document and understand biodiversity, its value, and threats to it; building adequate expertise and experience in biodiversity planning; improving policies, legislation, guidelines, and fiscal measures for regulating the use of biodiversity; adopting incentives to promote more sustainable forms of biodiversity use; promoting trade rules and practices that foster sustainable use of biodiversity; strengthening coordination within governments, and between governments and stakeholders; securing adequate financial resources for conservation and sustainable use, from both national and international sources; making better use of technology; building political support for the changes necessary to ensure biodiversity conservation and sustainable use; and, improving education and public awareness about the value of biodiversity. The Government of India (GoI) has taken a number of policy and legislative initiatives for biodiversity conservation that are implemented through an institutional framework coordinated by the MoEF. However, in a vast and bio-geographically diverse country like India, there still remain capacity gaps which make the implementation of these initiatives a challenge.
	4. Recognizing this constraint, the Global Environment Facility (GEF), the funding mechanism of CBD has financed NCSA to identify capacity gaps and develop capacity building actions plan for biodiversity conservation in India. The MoEF facilitated the appointment of the Ashoka Trust for Research in Ecology and the Environment (ATREE), an NGO through UNDP, as the thematic consultant for coordinating the biodiversity component of the NCSA exercise. The consultant’s report was taken into account while drafting this chapter, wherein the part I focuses on the status, trends and legislative and institutional framework for biodiversity conservation in India. The second section presents the capacity gaps and action plan for effective implementation of CBD in the country. The concluding section while summarizing the major capacity building recommendations for India also proposes an institutional arrangement for implementing these suggestions. National Environment Policy (NEP: 2006), India’s Third National Report to CBD (2006), NBAP and India’s 11th Five Year Plan provides the basic framework for the assessment under following sections.

**PART: 1**

**Status of Biodiversity in India**

* 1. India, a mega-diverse country with only 2.4 % of the land area, accounts for 7 to 8 % of the recorded species of the world spread over 45,500 species of plants and 91,000 species of animals that have been documented so far. Systemic surveys of flora and fauna of the country covering all the ecosystems started with the establishment of the Botanical Survey of India (BSI) in 1890 and the Zoological Survey of India (ZSI) in 1916. Almost 70 percent of the country’s land area has been surveyed. Nearly 6,500 native plants are still used prominently in indigenous healthcare systems. It has been estimated that another 400,500 species may exist in India which need to be recorded and described. A wide variety in physical features and climatic situations has resulted in a diversity of habitats and eco-systems such as forests, grasslands, mountains, wetlands, coastal and marine (mangroves and coral reefs) and deserts. India is also one of the eight Vavilovian centers of Origin and Diversity of Crop Plants, having more than 300 wild ancestors and close relatives of cultivates plants. India is also rich in traditional knowledge associated with biological resources. This traditional knowledge is both coded, as in the texts of India systems of medicine such as Ayurveda, Unani and Siddha; and non-coded in which case it exists in the oral undocumented traditions. In addition, nearly 140 breeds of domesticated animals are also found here.
	2. India’s strategy for conservation and sustainable utilization of biodiversity focuses on according special status and protection to biodiversity rich areas by declaring them as national parks, wildlife sanctuaries, biosphere reserves, and ecologically fragile and sensitive areas. A total of 614 Protected Areas (PA) covering approximately 4.74 % of the total geographical area of the country are under in situ conservation through a PA network of National Parks (99), Wildlife Sanctuaries (515), and Conservation Reserves (3) established under the Wildlife (Protection) Act.
	3. The National Wildlife Action Plan (2002-16) envisages that 10 % of the geographical area of the country be under PA coverage. Though the extent of the formal PA network in India is limited to 4.8 %, it is noteworthy to point out that almost all government owned forests and other important ecosystems, which are outside the PA network (around 20 % of the geographical area of the country), are under some kind of conservation planning. The management planning in such areas do take into account the broad principles of conservation. Similarly, there are several examples of community driven conservation initiatives in the country. If all these are taken into account, it can be seen that around one-fifth of the geographical area of the country is under some kind of broad based conservation planning. In order to strengthen and consolidate the existing wildlife conservation/management efforts, the Central government has launched a modified national Scheme - titled ‘Integrated Development of Wildlife Habitats’ in 2008. Apart from providing support to Protected Areas, the Scheme extends financial and technical support to high value biodiversity formations outside the formal PA network (traditional and customary conservation practices like Community Conserved Areas in all types of tenurial status) and also provide for initiating recovery programs for select critically endangered species.
	4. Substantial chunk of India’s biodiversity exists outside PA network, which are owned and managed by the local communities. The livelihood security of these communities is intricately interwoven with the prudent resource management and conservation status of these areas. Further, any future plans to expand the PA network in India would depend significantly in recognizing such Community Conserved Areas. Through an amendment to the Wildlife (Protection) Act, 1972 in 2003, India has provided for the establishment of two more categories of PAs – Conservation Reserves and Community Reserves. These are largely community oriented PA governance initiatives. So far, India has established 43 Conservation Reserves and 4 Community Reserves.
	5. India has special flagship programs for the conservation of Tiger and Elephants. These programs operate on a large landscape and have led to the recovery these species along with the conservation of their habitats. India currently has 37 Tiger Reserves and 26 Elephant Reserves. India has established a National Wildlife Crime Control Bureau in 2007 to combat illegal trade in wildlife and its derivatives. The country also has 14 Biosphere Reserves of which four – the Sunderbans, Gulf of Mannar, Nilgiri and Nanda Devi – are also included in the World Network of Biosphere Reserves. Twenty-five Ramsar wetlands have been designated in the country. The endemism of Indian biodiversity is also very high, with about 33 percent of the country's recorded higher flora being endemic to the country and concentrated mainly in the Northeast, Western Ghats, North-West Himalayas, and the Andaman and Nicobar archipelago. India has been divided into ten bio-geographic zones on the basis of eco-climate, topography, geomorphology, and vegetation biomes as provided in table: 2.1.

Table: 2.1: The bio-geographic zones of India

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Zone** | **Bio-geographic Zone** | **Percentage Area [[4]](#footnote-4)****(Sq Km)** | **Zone** | **Bio-geographic Zone** | **Percentage Area (Sq Km)** |
| 1 | Trans Himalaya | **5.6** | 6 | Deccan Peninsula | **42.0** |
| 2 | Himalaya | **6.4** | 7 | Gangetic Plain | **10.8** |
| 3 | Desert | **6.6** | 8 | Coasts | **2.5** |
| 4 | Semi-Arid | **16.6** | 9 | North East | **5.2** |
| 5 | Western Ghats | **4.0** | 10 | Islands | **0.3** |

* 1. The country has had a long history of conservation and sustainable use of natural resources and, over a period of time, has developed a stable and enabling organizational framework for environment protection. The Constitution of India contains specific provisions for biodiversity conservation (articulated in the Directive Principles of State Policy (48-A) & Fundaments duties (51-A (g)). It states that “the state shall endeavor to protect and improve the environment and safeguard the forests and wildlife in the country” and it is a duty of every citizen “to protect and improve the national environment including forests, lakes, rivers and wildlife and to have compassion for living creatures.” Under the system of democratic decentralization of responsibilities enshrined in the 73rd Constitutional Amendment (1993), local bodies consisting of elected representatives, one third of who are women, have been entrusted with the responsibility of safeguarding environmental resources at the local level.
	2. Numerous and wide ranging policies, programs and projects are in place, which directly or indirectly serve to protect, conserve and sustainably use the country’s biological resources. As a party to the CBD, India has taken wide ranging steps towards developing policies, enacting legislations and implementing programs towards conservation and sustainable use of its biological resources.
	3. At the Central Government level, MoEF is the nodal ministry for biodiversity conservation. However, biodiversity being a multi-disciplinary subject, several other Ministries/ Departments and affiliated agencies at the central and state levels are also undertaking biodiversity related programs. At the central level, the Ministry of Agriculture, Health, Water Resources, Rural Development, Power, Industry, New and Renewable Energy, Urban Development, Science and Technology and the Planning Commission have important programs relating to biodiversity. Some of the key policy documents addressing biodiversity concerns in India are listed in Table 2.2.

Table: 2.2: A brief outline of policies, plans and strategies dealing with biodiversity

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| **Policies, Plans and Strategies** | **Brief outline of priorities** |
| National Forest Policy, 1988 | Outlines national goals and guidelines relating to area under forests, afforestation, social forestry and farm forestry, management of state forests, rights and concessions, diversion of forest lands for non-forest purposes, wildlife conservation, tribal people and forests, shifting cultivation, damage to forests from encroachments, fire and grazing, forest-based industries, forest extension, forestry education, forestry research, personnel management, forest survey and database, legal support and infrastructure development and financial support for forestry. |
| National Conservation Strategy and Policy Statement for Environment and Sustainable Development, 1992 | Evaluates the nature and dimensions of environmental problems in India, as well as actions taken and constraints and agenda for action. Priorities and strategies dealing with human control and conservation of natural resources are outlined. Development policies form environmental perspective relating to agriculture and irrigation, animal husbandry, forestry, energy generation and use, industrial development, mining and quarrying, tourism, transportation and human settlements are dealt with. This strategy incorporates sections on international cooperation as well as support policies and systems relating to sustainable development. |
| National Policy & Macro level Action Strategy on Biodiversity, 1999 | Outlines a series of macro-level statement of policies, gaps and strategies needed for conservation and sustainable use of biodiversity. |
| National Agricultural Policy, 2000 | Seeks to actualize the vast untapped growth potential of Indian agriculture, strengthen rural infrastructure to support faster agricultural development, promote value addition, accelerate the growth of agro-business, create employment in rural areas, secure a fair standard of living for the farmers and agricultural workers and their families, discourage migration to urban areas and face the challenges arising out of economic liberalization and globalization. |
| National Seeds Policy, 2002 | Thrust areas include varietal development and plant variety protection, seed production, quality assurance, seed distribution and marketing, infrastructure facilities, transgenic plant varieties, import of seeds and planting material, export of seeds, promotion of the domestic seed industry, strengthening of the monitoring system. |
| National Wildlife Action Plan (2002 – 2016) | Calls for adoption and implementation of strategies covering the following parameters: strengthening and enhancing the PA network, effective management of PAs, conservation of wild and endangered species and their habitats, restoration of degraded habitats outside PAs, control of poaching, and illegal trade in wild animal and plant species, monitoring and research, human resource (HR) development and personnel planning, ensuring people’s participation in wildlife conservation awareness and education, wildlife tourism, domestic legislation and international conventions, enhancing financial allocation for ensuring sustained fund flow to the wildlife sector and integration of the National Wildlife Action Plan with other sectoral programs. |
| Comprehensive Marine Fishing Policy, 2004 | Aims to maximize yield from marine fishery resources while balancing the development needs of the various categories of fishing communities. It does this by outlining guidelines for the harvest of marine resources, post harvest operations, resource management, fishermen’s welfare, environmental aspects, fishery infrastructure development, legislative support and policy guidelines for development of fisheries in the Andaman and Nicobar and Lakshadweep Islands. |
| National Environment Policy, 2006  | Directly concerns itself with environmental governance. Stated objectives include: 1) conservation of critical environmental resources; 2) intra-generational equity and livelihood security for the poor; 3) inter-generational equity; 4) integration of environmental concerns in economic and social development; 5) efficiency in environmental resource use; 6) environmental governance; 7) enhancement of resources for environmental conservation.  |
| National Forest Commission Report (2006) | Set up to review the existing organizational structure and function of forestry sector, the Commission has made over 350 recommendations, for the improvement of the forestry sector. |
| 11th Five Year Plan | Calls for an inclusive development strategy that is sensitive to growing environmental concerns.  |
| National Forestry Action Program | Envisages developing a proper coordinated program for the sustainable management of forests and forest lands to meet the environmental, socio-economic and cultural needs of the present and the future generations. |
| National Biotechnology Development Strategy (draft) | Prioritize key policy recommendations and interventions relating to HR development, infrastructure development and manufacturing, promotion of industry and trade, issues relating to biotech parks and incubators, regulatory mechanisms and public communication and participation.  |
| National Biodiversity Action Plan (2008) | National Biodiversity Action Plan while identifying major threats to biodiversity conservation in India proposes a clear time-bound action plan to handle these threats.  |

* 1. India has also enacted the Biological Diversity Act, 2002, which was developed through an extensive and intensive consultation process initiated in 1994. This Act primarily aims at giving effect to the provisions of the CBD including regulating access to Biological resources and associated traditional knowledge so as to ensure equitable sharing of the benefits arising out of their use, in accordance with the provisions of the Article 15 of CBD. The government has also promulgated the Biological Diversity Rules in 2004.
	2. Some other legislations dealing with different aspects of biodiversity conservation include the Water (Prevention and Control of Pollution) Act, 1974, as amended up to 1988, The Air (Prevention and Control of Pollution) Act, 1981, as amended by Amendment Act, 1987, The Air (Prevention and Control of Pollution) Rules, 1982, The Environment (Protection) Act, 1986 amended in 1991, The Environment (Protection) Rules, 1986, National Environment Tribunal Act, 1995, The Environment Impact Assessment Notification, 1994, and National Environment Appellate Authority Act, 1997. A number of Rules have been framed under the EP Act, 1986 which inter alia include, bio-safety were notified in 1989. In addition, a number of notifications have been issued under EPA Act. Legislation such as the Coastal Regulation Zone Notification, 1991, the Environment Impact Assessment Notification, 2006, the Right to Information Act, 2005 and the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 has significant provisions for biodiversity conservation.
	3. NBAP proposes to design actions based on the assessment of current and future needs of conservation and sustainable utilization, and of physical and fiscal instruments, with particular reference to implications and impact of such instruments on short and long term basis. Considering the multidisciplinary nature of biodiversity, the actions identified in the NBAP are aimed towards integration of the three objectives of the CBD into relevant sectoral or cross-sectoral plans, programs and policies. The NBAP takes into account ecosystem approach, where appropriate, and promotes mainstreaming of gender considerations.
	4. NBAP identifies some of the key capacity constraints in addressing these challenges as: biodiversity information base; implementation of Biological Diversity Act and safeguarding traditional knowledge; new and emerging biotechnologies; economic valuation and natural resource accounting; policy, legal and administrative measures; and institutional support. Thus, there is an urgent need for building and strengthening individual, institutional and systemic capacities.

**PART: 2**

**Capacity Gaps and Action Plan**

* 1. Although the Parties to the Convention are required to implement all the provisions of the CBD and CPB however, for the purpose of the NCSA substantive relevant articles of CBD and CPB were analyzed from the capacity building perspective.
	2. The following matrix details the capacity status, gaps and action plans to strengthen the conservation and management of biological diversity in India, as per CBD requirements. At a broader level, this action plan is a suggestive core strategy to strengthen country’s biodiversity conservation and management framework.

**BIODIVERSITY: Capacity Gaps and Action Plan**

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| **CONVENTION REQUIREMENT: 1****Undertaking National Biodiversity Conservation Planning****CAPACITY STATUS & STRENGTHS:**India has had a long history of conservation and sustainable use of natural resources. Over a period of time a stable organizational structure for environment protection has been developed. Strategies and plans for the conservation and sustainable use of biological resources based on local knowledge systems and practices are ingrained in the Indian ethos and way of life. Environment protection is enshrined in Article 48 A and Article 51 A (G) of the Directive Principles of State Policy of the India Constitution, which states that ‘the State shall endeavour to protect and improve the environment and to safeguard the forests and wildlife in the country’, and ‘to protect and improve the national environment including forests, lakes, rivers and wildlife, and to have compassion for living creatures.’ A focused articulation of these concerns in programs and policies began to be seen in the wake of the Stockholm Conference (1972), which got further sharpened after the Rio Summit (1992). Between these two summits, at the national level, legislations, policies and programs evolved, which directly or indirectly serve to protect, conserve and sustainably use the country’s biological resources. India’s strategies for conservation and sustainable utilization of biodiversity in the past have comprised providing special status and protection to biodiversity rich areas by declaring them as national parks, wildlife sanctuaries, biosphere reserves, or ecologically fragile and sensitive areas; off loading pressure from reserve forests by alternative measures of fuel wood and fodder need satisfaction; afforestation of degraded areas and wastelands; creating ex situ conservation facilities such as gene banks etc.The major central acts relevant to biodiversity are: Indian Forest Act, 1927, Wildlife (Protection) Act, 1972, Forest (Conservation) Act, 1980, Environment (Protection) Act, 1986 and Biological Diversity Act, 2002. These acts have been amended from time to time and are supported by a number of state laws and statues concerning forests and other natural resources. The policies, strategies and action plans directly relevant to biodiversity include: National Forest Policy, 1988, National Conservation Strategy and Policy Statement for Environment and Sustainable Development, 1992, National Agricultural Policy, 2000, National Land Use Policy, National Fisheries Policy, National Policy and Macro level Action Strategy on Biodiversity, 1999, National Wildlife Action Plan, Environmental Action Plan, National Forestry Action Program and National Environment Policy (NEP), 2006. NEP seeks to achieve balance and harmony between conservation and development. The policy is intended to mainstream environmental concerns in all developmental activities. The dominant theme of this policy is that while conservation of environmental resources is necessary to secure livelihoods and well being of all, the most secure basis for conservation is to ensure that people dependant on particular resources obtain better livelihoods from the fact of conservation, than from degradation of the resources.At the central level besides, the Ministry of Environment and Forests, Government of India, which is the nodal ministry for handling CBD related issues – the other concerned departments/ ministries include, the Department of Biotechnology (DBT), Department of Science and Technology, Ministry of Agriculture, Ministry of Water Resources, Ministry of Rural Development, Ministry of Coal, Ministry of Urban Development among others. Subjects relating to environment and forests are on the Concurrent List of the Indian Constitution. Both Centre and State Governments legislate and formulate policies and programmes on this subject. Capacities for implementing large-scale programmes and strategies exist to a certain extent across systemic, institutional and individual levels. There is an active involvement of both governmental and non-governmental sectors in conserving biological diversity. Since late 1980s, there has been a paradigm shift, wherein the planning is issue specific, technical, progressive and all inclusive with a primary objective of promoting sustainable use of biodiversity. While developing species oriented plans, people and livelihoods are included as essential variables for sustainable conservation efforts (For example, the report of the Tiger Task Force, 2005). Joint Forest Management (JFM) which was initiated during this period was a major shift towards promoting decentralization and sustainable use of natural resources in the state-led programs. The National Wildlife Action Plan (2002 – 2016) incorporates sustainable use and participatory planning while an amendment to the Wildlife (Protection) Act, 1972 in 2002 recognizes communities’ usage of resources as well as the role they play in conservation. Such initiatives have marked a shift from traditional policy making procedures and set the tone for a more inclusive and decentralized view on conservation. Some Acts such as the Indian Forest Act 1927, the Panchayat (Extension to Scheduled Areas) Act 1996 (PESA), and the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 provide extensive scope for inclusion of clauses relating to decentralized natural resource management through local institutions. At the cross-sectoral level, recent policies such as the National Agricultural Policy (2000) and Comprehensive Marine Fishing Policy (2004) incorporate sustainable use components. Other recent legal instruments such as the Right to Information Act (2005) aim at providing more transparency and scope for improvement with respect to environmental governance. Some of the good practices initiatives taken by the Ministry of Environment and Forests include rationalizing and streamlining the processes for environmental and forestry clearances for achieving greater transparency and inducting expertise in decision making and for ensuring that decisions within a fixed time frame on each proposal. In addition, some developmental schemes of the Ministry have provision for supplementary and alternative livelihood support, and creation of minor infrastructure like paths and roads, jetties, drinking water, medicinal and health, irrigation facilities with the objective of improving the quality of life of people living in and around forests and other biological resources. |
| **Capacity Gaps** | **Brief Description of Capacity Gaps** | **Priority** | **Capacity Development Action** | **Time** | **Target Institutions** | **Financial System** |
| Biodiversity concerns need to be further mainstreamed into the planning process through inter-sectoral coordination among programs and activities of various departments | Although, a number of policy, legal and administrative measures are in place to address various aspects of biodiversity conservation, there is a need to promote greater harmony and synergy in these measures. Another major identified gap is lack of effective enforcement of existing laws. Further, the role of macro-economic policies and measures on biodiversity is least understood. Policies, which directly or indirectly work as incentives for indiscriminate use of biodiversity, are insensitive to biodiversity concerns. The role of macro-economic policies and measures on biodiversity is not researched sufficiently resulting in limited understanding and knowledge of the relationship of biodiversity conservation principles with developmental goals across sectors and among both planners and officials involved in implementing policies. As stipulated by the NEP, a ‘holistic and integrated approach to the management of environmental and natural resources, explicitly identifying and integrating environmental concerns in relevant sectoral and cross-sectoral policies, through review and consultation’ needs to be taken.Availability of adequate funds is a major constraint in the implementation of various policies and programs in the country. The Biological Diversity Act, which was enacted in 2002 has provisions that are yet to be fully and effectively implemented. This progressive legislation has the potential to address the lacunae in several aspects relating to conservation and management of biodiversity and associated traditional knowledge. However, its implementation is proving to be a challenge. | High | A two step processStep 1: A review of sectoral policies and goals to be carried out to identify specific areas of contradiction between sustainable use and conservation of biodiversity. The impact of existing policies and the roles played by monetary as well as non-monetary policies need to be identified along with suitable mechanisms to hold ministries and departments accountable as also stipulated by the NEP and NBAP. Step 2: Individual ministerial sectors could then be targeted with specific capacity building exercises that include training and awareness programmes on environmental components and policy reform. Sectors with greater overlap with biodiversity to be targeted first.  | Step 1:ShortStep 2:Medium, with periodic assessments and refresher courses. | Review could be facilitated by the MoEF and assisted by a selected group of experts. The review process could be assisted by the National Biodiversity Authority and/or National Knowledge Commission. Capacity building to be targeted at central govt. ministries, departments, and training institutions (e.g. Indira Gandhi National Forest Academy). The Research and Training Division of the MoEF can undertake training with inputs from the expert group.  | This will be a relatively low-budget exercise as the capacity action involves a review by experts. With GEF assistance, MoEF and NBA has developed a project to strengthen the capacity of NBA, SBBs and BMCs in effectively implementing the provisions of the Biological Diversity Act as well as to work on the ABS provisions.  |
| Capacity limitations in formulating and implementing demonstrative participatory, sustainable use models at the ground level. | Specific capacities that need to be improved include awareness and knowledge with respect to guidelines for the application of policies and mechanisms that deal with participatory and sustainable use models of conservation and those that incorporate traditional knowledge and rights. The contextualisation of the national/ state level policies at an appropriate scale of action is necessary for macro-level plans to be effective at the ground level. Local bodies such as Panchayati Raj institutions are under-utilised and have only limited capacities to oversee participatory schemes. The efficacy of other models such as community forest management in Orissa and Uttaranchal point towards the significance of region specific initiatives.A review of the provisions suggested in NEP and NBAP (that seek to balance sustainable livelihoods and development objectives with biodiversity conservation) and the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 need to be undertaken. With respect to implementing various policies and programmes, the inadequacy of funds has been a major constraint; additionally, increased horizontal co-operation and partnerships among stakeholders could go a long way in improving capacities.  | High | A review of existing sustainable use laws, policies and models to enhance effectiveness and applicability of recent laws and policy instruments. Guidelines to be developed for implementing agencies to facilitate stakeholder participation which could be incorporated into environmental decision making. A specific objective of the guidelines should be to develop frameworks for the capacity building of field staff, Panchayati Raj institutions (especially with reference to monitoring and compliance as suggested by the NEP) as well as NGOs working at this level. This review process should involve multiple stakeholders particularly grassroots organizations. The review process could be accompanied by specific projects aimed at identifying and developing effective participatory models of agro-forestry, Community Forest and Wildlife Management and Joint Forest Management.  | Long term | The JFM Cell, IIFM, CISED, WII, ICFRE and several other CSOs, research institutions and national networks.  | Ongoing programmes of the government can support this capacity action.  |
| Need to extend management practices to handle large-scale bio-geographical and thematic units are limited. | Specific policy frameworks and strategies relating to some bio-geographic areas and certain thematic aspects are limited. There is disparity between available research outputs and policies and environmental governance across the regions. The gaps in knowledge with respect to ecosystem-based approaches to management also hamper the development of regional strategies. Additionally, research outputs do not get incorporated into appropriate regional/thematic strategies or policies at a pace that is necessary to bring about change. For a diverse country like India different approaches to meet the demands of a particular region needs to be developed.  | Medium | Specific action plans to be developed for: (a) arid and semi-arid regions (b) marine and coastal wetlands, coral reefs and mangrove ecosystems (c) mountain ecosystems - Trans Himalaya, Himalaya, Western Ghats and the north eastern region (NER), (d) biodiversity outside the formal PA network (d) urban biodiversity (e) ecosystem goods and services (f) lower taxa, (g) key approaches for PA prioritization, (h) invasive species, (i) critically endangered species (j) Environmentally Sensitive Zones with ‘Incomparable Value’ (identify, adopt legislative measures and formulate area development plans). It has to be noted that some of these have already been commissioned (e.g. report of the Task Force on Mountain Ecosystems), and existing projects need to be augmented instead of starting afresh. | Short | GBPIHED, CISED, BSI, ZSI, CAZRI, WII and representative local institutions from each area. | Ongoing programmes of the government can provide some funds through the Environment Research Programme of the Ecosystem Research Scheme, and the Eastern and Western Ghats Research Programme, National Natural Resource Management System, the National Wetlands Conservation Programme, Indian Coral Reefs Monitoring Network, All India Coordinated Project on Coastal and Marine Diversity, and Mangrove Ecosystem Information Service, schemes such as Project Tiger, Integrated Development of Wildlife Habitats and Project Elephant etc Support from ongoing projects like Global Mangrove Database and Information System can be explored.  |
| **CONVENTION REQUIREMENT: 2****Identifying and Monitoring Biodiversity and its Conservation****CAPACITY STATUS & STRENGTHS:**The BSI and ZSI are primarily responsible for the survey and inventorization of flora and fauna of the country. The Survey organizations have covered 70 percent of the country’s terrestrial areas by field surveys and published, over the years, documents on flora and fauna at national, state and, in some cases, district levels and for selected ecosystems. Besides, extensive reports on inventories of resources indicating levels of biodiversity in selected areas have also been brought out. The Surveys have also published Red Data Books on threatened species.Programmes of inventorization of floral components at ecosystem level for forest ecosystem, grassland ecosystem, wetland ecosystem, coastal and marine ecosystem, mangrove ecosystem, and desert (both hot and cold) ecosystem; and faunal components at ecosystem level for Himalayan ecosystem, freshwater ecosystem, estuarine ecosystem, marine ecosystem, tropical rainforest ecosystem, desert ecosystem and island ecosystem have been initiated. Genetic level studies have been undertaken mainly for crops and their wild relatives, selected domesticated animal species, and some large mammals. The Forest Survey of India assesses forest cover periodically; the Space Application Centre, NRSA and IIRS contribute to forest cover mapping and remote sensing. The Fisheries Survey of India and CMFRI (for exploited fish species, both under the Ministry of Agriculture), NIO and Integrated Marine Area Management project address issues related to biodiversity in marine systems. Institutions such as NBAGR, NBPGR and the NBFGR are involved in large-scale surveys of traditional use and wild relatives of plants and livestock. Population census and monitoring of large mammals such as the tiger are carried out by the State Forest Departments with inputs from different organizations which include the NTCA.Biodiversity characterization is monitored at the landscape level by using remote sensing and GIS tools in biodiversity rich areas of the country. Some programmes have been undertaken for monitoring key threats to biodiversity. Studies are underway for using indicators at the national level for monitoring biodiversity. An all India Coordinated Project on Taxonomy is presently being implemented for building capacity in taxonomy for identified gap areas. Bilateral and regional collaborative programmes in inventorization and capacity building have also been initiated. Databases and clearing houses include the NCL’s Centre for Biodiversity Informatics (NCBI) and the ENVIS system. Others include the Biodiversity Information System of the IIRS and the TKDL of the CSIR. Other work on documented knowledge systems includes contributions by NISCAIR on Ayurveda, Siddha, and Unani) and the NBRI esp. AICPRE. The Peoples’ Biodiversity Registers, which are developed with the help of various stakeholders, especially the local communities, are a unique way of recording traditional knowledge and information.Besides, governmental institutions and a few NGOs are also working in the field of identification and monitoring of biological diversity across ecosystem, species and genetic levels. High diversity areas and hotspots within India have been identified under global frameworks such as hotspots and eco regions. National institutions such WII, SACON have prioritized ecosystems (based on criteria such as diversity, fragility or threat) where they focus additional efforts. NGOs are also involved in identifying important areas for biodiversity conservation. The past two decades has also seen inputs from a number of smaller NGOs, universities, community organizations and networks in this respect. Work on endangered species and ecosystems forms the focus of organizations such as the WII. Large-scale conservation evaluations of key charismatic species such as the tiger have also been undertaken. Institutions such as CCMB, CDFD, TIFR, NII, NCBS, IISc, and NIPGR have advanced capacities to carry out work on genetics. Universities that work on these issues include MKU and JNU, Delhi. Monitoring capacities are comparatively lower than survey and documentation. For the marine realm, the Global Ocean Observing System, and the Coastal Ocean Monitoring and Prediction System (COMAPS) and the Indian Coral Reef Monitoring Network are important. Nationwide assessments and reviews on protected areas have been carried out by the WII.At the central level, the Ministry of Agriculture (specifically DAC and DARE) and the MoEF are concerned with alien invasive and their impacts. Through the ICAR over 90 institutions and 100 universities deal with various aspects of invasive. The agencies which are responsible for issuance of certificate for export/import of Bio-resources are Plant Quarantine Division, NBPGR, Department of Animal Husbandry and Dairying, Directorate General of Foreign Trade (DGFT), National Biodiversity Authority, MoEF and the Plant Protection Adviser for plant products. The Plant Quarantine (Regulation of Import into India) Order (PQO), 2003 of the Destructive Insects and Pests Act, 1914 and more recently, the Biological Diversity Act 2002 incorporates legislative safeguards against the introduction of exotics. The introduction of invasive through ballast water from ships is controlled by regulations of the IMO and CITES. International trade in wild fauna and flora is also regulated through the provisions of CITES. |
| **Capacity Gaps** | **Brief Description of Capacity Gaps** | **Priority** | **Capacity Development Action** | **Time** | **Target Institutions** | **Financial System** |
| Limited survey efforts in the documentation of marine biodiversity. | So far, almost 70 percent of the country’s land area has been surveyed. It is estimated that about 400,000 more species may exist in India which need to be recorded and described. The baseline data on species and genetic diversity, and their macro-and micro-habitats, is inadequate. Marine areas within the Exclusive Economic Zone (EEZ) are also poorly surveyed. Surveys efforts for lower taxa and ecosystems are inadequate. Institutional capacities are limited in many aspects including funding, infrastructure and trained personnel.Although, a number of organizations/agencies are working on various aspects of biodiversity, the information on the subject is scattered and not yet integrated into a national database. Some of the databases being developed are not up to the standard, primarily because of lack of infrastructure, skilled manpower and coordination among experts in different fields. The different sectoral networks therefore need to establish a nationwide information system with a uniform format for collection, retrieval and dissemination of data. The information on biodiversity of freshwater, coastal and marine areas of the country is highly fragmentary, although it has vast economic potential. Nearly 50 percent of the aquatic plants of the world are recorded from the Indian subcontinent, but only few have been studied in detail, probably because of inconvenience and inaccessibility.There are wide gaps in knowledge relating to hydrological parameters, ecosystem processes and taxonomy of aquatic systems. Data on several basic parameters such as area, depth and hydrological parameters are scanty.  | Medium | Institutional capacities (funding, infrastructure and training) to be scaled up specifically with reference to lower taxa and ecosystem level identification and monitoring in regions of high diversity and endemism as well as susceptibility to climate change. More regional institutions or cells of national level institutions to be established (contingent on availability of funds) in these regions especially for marine biodiversity. Large institutions need to incorporate capacity development of NGOs and other institutions situated within the region as part of their extension activities. | Long term | BSI, ZSI, NIO, Forest Survey of India, WII, ICFRE institutions, CMRFI, Fisheries Survey of India, State Agriculture Universities.  | Ongoing government programs for the institutions involved in large-scale surveys.  |
| Limitations in the field of taxonomy and availability of trained personnel. | Taxonomy, the science of identifying and documenting biodiversity, despite receiving recent attention from policy makers and institutions still has major capacity gaps Despite having large institutional set ups such as the Botanical Survey of India (BSI) and the Zoological Survey of India (ZSI), and recent co-ordinated efforts by the MoEF, a significant percentage of India’s fauna and flora (especially lower taxa) remain unexplored. Information on several taxa is insufficient to categorize them as extinct, endangered, vulnerable or rare. This is mainly because of the lack of expertise on specific groups, lack of funding to work on groups having only scientific importance, lack of coordination in exchanging data, and lack of proper technology in culturing/growing the organisms. It is evident that the existing constituency of taxonomists are either aging or declining in number and there is lack of expertise in identification of several groups of organisms mainly because of failure in transferring the capacity in taxonomic identification to the next generation. Similarly, the frontline forestry and wildlife staff requires training for example in snorkeling and scuba diving, for equipping them for undertaking research and monitoring activities. | Medium | Increased capacity building for taxonomy with additional funding, training and efforts towards motivation of personnel are necessary. Taxonomic initiatives relating to lower taxa (e.g., reptiles and amphibians, insects and microbes, and lower-plant taxa) should be funded in all bio-geographic zones. The All India Coordinated Project on Taxonomy (AICOPTAX) project of the MoEF is an important initiative in this direction. Institutional capacities for better surveys, collection, documentation and preservation need to be improved and expanded. Para-taxonomy should be encouraged at the individual level. Assessment exercises such as the CAMP workshops that involve multiple stakeholders need to be encouraged. | Long term | A regulatory body such as the National Biodiversity Authority (NBA) along with experts involved with AICOPTAX should develop a framework to facilitate access to already existing collections and evaluate current limitations in terms of permissions and intellectual property rights.  | Funding as well as additional projects for this capacity action can be sourced from schemes such as AICOPTAX.  |
| Targeted research on invasive alien species and cross-sectoral integration for their effective management are limited  | There has been improved coordination, stronger databases and widened networking in recent years on invasive alien species and recommendations have been developed for actions to be taken at the national, state and grassroots levels. However, much more funding and policy support is required to address this important issue. There is a need to develop regulations of introduction of invasive alien species and their management. | Medium | A programme aimed at improving institutional and individual capacities for assessing current and potential threats caused by alien invasive (with special reference to climate change) should be initiated. Key regions and themes to be targeted include marine systems, freshwater systems, mountains and agricultural systems. With the help of key institutions, training workshops (along the lines of the ‘Eradication of the Invasive Weeds and Habitat Restoration’ carried out by the MoEF) can be conducted for the State Forest Departments to build their capacities to adequately deal with invasive in their focal areas.  | Medium | Capacity building for research and training should be for key organisations such as WII, ICFRE, agricultural universities and NGOs working on exotics Funding for training forest officials needs to be provided. | Funding to be sourced from the ‘Control of Weeds and Invasive Species’ project of ICFRE.  |
| Monitoring has received less attention than species level identification. | Regular and long-term monitoring parameters have not been adequately established by researchers for terrestrial or marine realms. Exceptions include the periodical forest cover mapping carried out by the Forest Survey of India (FSI). Long-term thinking needs to be encouraged. Monitoring changes, particularly qualitative parameters, in urban systems and other areas outside formal protected areas has not received sufficient attention. In addition, the loss of biodiversity and the corresponding loss of ecosystem goods and services are also poorly understood.  | Medium | A monitoring strategy to be developed for endangered species and the following high priority bio-geographic and thematic areas: Mountains (Himalaya, North Eastern Region, Western Ghats), Coastal and Marine environments (coastal areas and wetlands, coral reefs, Andaman and Nicobar Islands), freshwater systems, urban areas, forest cover within and outside the formal PA network and long term monitoring and environmental impact assessment to determine the impact of existing development projects. Capacity building should focus on training personnel in new techniques of monitoring and integration with particular attention to standardized monitoring protocols. There is an urgent need to fund projects along the lines of projects mentioned in the Third National Report to the CBD. | Long term | NEHU, WII, BSI, ZSI, FSI, NCF, GBPIHED (units in both Western Himalaya and NER), Agriculture Universities, CMFRI, NIO, TISS (for socio-economic monitoring) and various universities. | Ongoing government programs such as Ecosystem Research Scheme.  |
| Limited documentation of traditional knowledge outside the extent of codified traditional knowledge systems domain of Indian medicine. Limited documentation on ethnobiology uses of plants, animals and microbial resources. | India has a strong base of indigenous knowledge on various aspects of biodiversity including that of coastal and marine biodiversity. This traditional knowledge has to be in many cases scientifically validated through screening of biological diversity for commercially valuable products, so as to make bio-prospecting useful and effective.Knowledge about agricultural biodiversity, medicinal plants and other NTFPs exist in India but much of this remains to be documented in a systematic manner.  | High | Increased number of programmes along the lines of the All India Coordinated Project of Ethnobiology (AICRPE) and NGO initiatives such as the Peoples’ Biodiversity Registers, which are ideal prototypes. The requirement is to scale up the number of projects that incorporate these components. Effective partnerships need to be developed between the NGO and the government sector.  | Long term | TBGRI, FRLHT, CIKS, DDS and other selected NGO networks. | Increased funding needs to be provided through ongoing programmes such as AICPRE and TKDL.  |
| **CONVENTION REQUIREMENT: 3*****In situ* Conservation, including Protected Area Management****CAPACITY STATUS & STRENGTHS:**India’s major strength in *in situ* conservation lies in its impressive Protected Area Network. The Monitoring Committee of the National Wildlife Action Plan (2002 – 2016) periodically monitors the status of establishment and management of PAs in the country. At present the extent of marine PAs is less than 5000 sq. km and there is a need to scale up the extent and quality of management in these areas. The central Government is working with GEF agencies to mainstream the elements of coastal and marine biodiversity in Production Sectors as well. The Central government also provides financial and technical assistance to the State governments for the management and conservation of PAs, under various schemes such as Project Tiger, Integrated Development of Wildlife Habitats and Project Elephant etc.The MoEF along with the concerned State government plans, promotes and coordinates all the forestry and wildlife programmes focusing on biodiversity conservation in different thematic and geographical areas. For further strengthening the conservation efforts, the national wildlife legislation has been amended from time to time to address the specific needs and necessities. India has adopted the World Commission on PA Management Effectiveness Evaluation (MEE) framework for 30 National Parks & Wildlife Sanctuaries, 28 Tiger Reserves and two World Heritage Sites, Kaziranga NP and Keoladeo NP. Efforts are on towards integrating broader landscapes into conservation activities and incorporating biodiversity concerns within EIA frameworks, protection of wildlife outside the PAs, recovery programmes for critically endangered species etc. The National Wildlife Action Plan (2002-16), codifies India’s strategy of the effective management of its biodiversity. Efforts are also going on for *in situ* conservation of biodiversity through some of the innovative schemes like, National Lake Conservation Plan (NLCP) and ongoing dialogues over creation of trans-boundary PAs. The eco-development activities have emerged as a powerful tool for the better management of PAs in India. Over the last two decades, Eco-development Committees (EDCs) have been formed around many PAs with an objective of creating alternative livelihoods for dependent communities and thereby reducing their negative impacts on the forests and biodiversity. India had successfully implemented the GEF supported India Eco-development Projects (1996-2004) in seven states with focus on building capacities for PA management to conserve biodiversity through participatory methods. Programmes for conservation of wetlands, mangroves and coral reefs; special regional development programmes in Garo Hills and Western Ghats; Non timber Forest Produce (NTFP) based species conservation programmes in states of Madhya Pradesh, Orissa, West Bengal and Jharkhand; species conservation programmes like Project Tiger, Project Elephant and focussed efforts for the conservation of hangul, snow leopard, crocodilians, Musk deer and the Asiatic lion are examples of other *in situ* conservation initiatives.  Organizational support to promote *in situ* conservation is currently being strengthened at both governmental and non-governmental levels. For example, apart from the conservation programmes undertaken through the respective Forest and Wildlife Departments, the GoI and the state governments have set up bodies like the National Tiger Conservation Authority (NTCA), and Wildlife Crime Control Bureau, National Biodiversity Authority (NBA), State Biodiversity Boards (SBB), National Medicinal Plants Board (NMPB), State Medicinal Plants Boards, National Afforestation and Eco-development Board (NAEB), National Coastal Zone Management Authority (NCZMA), Indian Coral Reef Monitoring Network (ICRMN) etc. International efforts for *in situ* conservation are also underway in the region with the recognition of the Himalaya, the Western Ghats, the Andaman Islands and the Nicobar Islands as among the 34 Global Biodiversity Hotspots of the world. The MoEF has also linked up with international initiatives like the designation Ramsar and World Heritage sites.  |
| **Capacity Gaps** | **Brief Description of Capacity Gaps** | **Priority** | **Capacity Development Action** | **Time** | **Target Institutions** | **Financial System** |
| Regional limitations and discrepancies within the PA network (focal regions requiring attention are mentioned in the description). | Despite the countrywide existence of an impressive number of PAs, *in situ* conservation suffers from some inadequacies in the existing PA network. The planning, management and monitoring of the PA network can benefit by adopting more up-to-date scientific tools and methods. There is a necessity to scale up scientific approach in the PA network strategy to strengthen the bio-geographic approach of PA network. Some regions (like the Eastern Ghats) and ecosystems (e.g., riverine, grasslands, and broad-leaved oak forests of the mid-elevation Western Himalaya) are currently under-represented in the PA network. The current status of marine PAs and freshwater systems also need to be evaluated. Current limitations also relate to lack of precautionary proactive measures that can ideally be developed based on the specific properties of priority ecosystems and thematic areas (e.g. the potential effects on climate change on mountain ecosystems or coral reefs). | High | A bio-geographic gap analysis needs to be undertaken by a designated set of national level institutions to determine the adequacy and representativeness of the PA network. Criteria to evaluate this should include ecosystems, biomes, and landscapes, and socio-ecological parameters apart from flagship or keystone species. A review of management practices within selected PAs should evolve from the above exercise. Recommendations related to formal notification and demarcation of PAs can also be derived from this.In order to carry out this exercise, capacity development in the form of technical support is required for training of policy makers, field managers, ecologists, and social scientists alike in tools of spatial analysis and prioritisation exercises. | Short | WII, IIRS, NRSA, FSI to improve capacities for gap analysis and to work with the State Forest Departments as well as universities and NGOs.  | Funding to be provided through ongoing government programs for institutions involved in the gap analysis exercise.  |
| Need to review the establishment and management of marine PAs | Existing marine PAs in the country are declared under the Wildlife (Protection) Act, 1972 which largely follows a terrestrial approach to marine conservation both in terms of the implementation structure as well as conservation design. Protection should take into account the ecological characteristics of the marine realm, the biological characteristics of species (e.g. higher mobility and migration) as well as the existing multiple uses of these ecosystems. Similarly, by design, the existing marine PA model conservation may not be in a position to handle the myriad problems that that might arise in the wake of the rapid developmental processes taking place in such regions. Further, the current Marine Protected Area (MPA) management approaches are not sufficiently inclusive and this often creates an atmosphere of conflict with resource dependent communities. More participatory approaches and that aim at mainstreaming biodiversity conservation in production sectors must be encouraged and supported as models that can inform the MPA framework of the country. | Medium | A revision of the legal framework for MPAs is necessary. This can be carried out by the MoEF along with the assistance of a multi-disciplinary advisory group. The MoEF needs to review the applicability of the WLPA for multiple objective MPAs and develop an MPA policy Programme aimed participatory approaches and those aim at mainstreaming biodiversity conservation in production sectors need to be identified and developed. MoEF can take a lead role in this with technical assistance from national regional and international bodies and financial assistance from GEF. The MoEF can further solicit proposals from various organizations (including CSOs and academic institutions) for developing these components. | Medium | The MoEF and the advisory group for the review. Specific organizations to be targeted for project assistance based on a call for proposals. | As part of the programmatic approach on the conservation of marine and costal ecosystem and mainstreaming it with production sectors, which is currently under development by MoEF.  |
| The impact on climate change on biodiversity and protected areas has been studied only on a limited scale and needs to be integrated with protected area prioritization techniques and management actions. | The potential impacts of climate change are poorly understood for fragile ecosystems such as mountains and coastal and marine environments. Management actions within protected areas in these regions need to include climate change as a critical component. However, in the current scenario baseline information as well as adequate PA management actions has to be developed from cross-cutting perspective. There is a capacity limitation for identification and monitoring of biodiversity and socio-economic markers, the capacity development actions need to be targeted for developing guidelines for PA management in relation to climate change. | High | A viable long-term strategy would be the establishment of large-scale integrated monitoring programmes in the Himalaya, the Western Ghats, Andaman and Nicobar Islands (terrestrial and marine) and the Lakshadweep islands (marine) to measure and monitor species as well as ecosystem responses to climate change and to develop management techniques and policy guidelines for PAs within these regions. Study sites should be selected carefully encompassing sufficient heterogeneity (e.g. a diversity of habitats encompassing altitudinal, salinity and moisture gradients). The research teams should include biologists, social scientists and Forest Department staff working within the region. Information on key sociological aspects especially factors such as impacts on food security and changes in the migration of human labour should also be focussed on as they will in the long term have effects on biodiversity. A project that aims at both research and development and institutional capacity building can be envisaged. Such a project could have similar components as that of the Natural Resources Data Management System (NRDMS) initiative of the Department of Science and Technology. Associated infrastructure development could include the establishment of a network of field and weather stations and permanent plots, depending on the requirement in the region. Since these will be large budget projects, a number of institutions should be allowed to benefit from them. It is important that MoUs and guidelines for data sharing, sharing of resources and publishing guidelines are in place. Such a programme can also be developed as a cross-cutting initiative with relevant inputs from climate change and land degradation issues. | Long-term | Selected institutions within regions.Capacities for Forest Department staff also need to be improved.  | Funding from the existing schemes like Project Tiger, Integrated Development of Wildlife Habitats and Project Elephant etc can be leveraged. GEF’s operational programmes on Biodiversity as well as Climate Change can be utilised for this purpose.  |
| Inadequate infrastructure, technical expertise and related capacities with respect to PA management. | There is limited technical expertise and infrastructure available to protect and manage wildlife along with habitats from various retrogressive factors such habitat loss, degradation, poaching, human induced fires, livestock grazing, illegal trade in timber, unsustainable extraction of NTFPs, unregulated tourism, mining & quarrying, encroachments from human settlements and development projects, human-wildlife conflicts and also to effectively address the socio-economic aspects of conservation. The loss of biodiversity due to alien species is also not properly understood and effectively addressed.The Biosphere Reserve programme was started in 1986 with UNESCO for integrating social, cultural and ecological value of ecologically rich landscapes. Primary focus was on monitoring and designing conservation strategies on a wider landscape.. Scarcity of technical expertise and limited infrastructure are the biggest constraints in the current capacities of the State Forest Departments. The problem is compounded by the inadequate ability of frontline staff to work in tandem with the local communities.Low motivation of the staff for defending and championing the case for PAs and biodiversity conservation along with limited financial resources, technical expertise and inadequate understanding of conservation needs among field staff contribute to this capacity gap.  | High | Strategic investments are required to strengthen the infrastructural capacity and technical expertise of the implementing agencies especially the State Forest Departments. In addition to overall infrastructure development, important elements to be targeted include: a) training programmes for forest officers in rapid assessment techniques for biodiversity documentation and monitoring particularly with respect to standardized methodologies for the preparation of working/management plans and other management strategies, b) training in basic taxonomy, c) emerging interdisciplinary strategies in protected area management especially those relating to socio-economic factors, d) legal procedures related to wildlife and biodiversity conservation. | Long term | State Forest Departments to be targeted for capacity building. Institutions such as WII and National/State Forestry Colleges for improving training facilities. CSOs with expertise should also be involved in these initiatives. | Essential infrastructure development by the forest department to be supported by increase in annual budgets and through schemes such as Project Tiger, Integrated Development of Wildlife Habitats, Project Elephant, Integrated Forest Protection Scheme, etc. The Biosphere reserve program could be used to re-inforce the information and strategic back up for management of protected areas in the core of biosphere reserves. The program could also focus on cross-sectoral linkages between bio-resources and human livelihood. |
| Limitations in capacities to involve local people and to develop partnerships among stakeholders. | There is a need to promote people’s participation and, solicit their cooperation, particularly of those living inside the PAs and fringe areas. | Medium | Capacity building project for State Forest Departments for facilitating long-term participatory management. Additionally, potential benefit sharing protocols need to be incorporated wherever appropriate as incentives. A framework for rehabilitation of displaced people from PAs may be developed. | Medium | State Forest Departments and PRI institutions.Judicial institutions to be targeted for evaluating displacement and rehabilitation. Institutions to be involved along with institutions with expertise in biodiversity to develop capacity building exercises. | Apart from the existing Schemes such as Project Tiger, Integrated Development of Wildlife Habitats and Project Elephant additional Funds can be commissioned from the Planning Commission on a case to case situation. Frameworks for rehabilitation can be evaluated on a standard protocol developed by MoEF. |
| **CONVENTION REQUIREMENT: 4*****Ex situ* Conservation of Biodiversity****CAPACITY STATUS & STRENGTHS:***Ex situ* conservation of biodiversity in India has been institutionalized with the establishment of botanical gardens and zoological parks with the major objective of conserving components of biological diversity. The tradition of setting up of botanical gardens dates back to over 200 years when large spaces within major cities in India were set aside for the purpose. The Indian Botanical Garden at Kolkata was established in 1787. It is now spread over an area of 110 hectares and has around 15,000 plants belonging to 2,500 species. Besides, the number of privately owned gardens, there are 33 government managed and 33 university botanical gardens in the country. BSI is attempting to network these gardens. The Indian Botanic Gardens Network (IBGN) was launched in 2003. A national Botanic Garden is presently being set up in Noida, Uttar Pradesh.*Ex situ* conservation of wild animals in the country is largely mandated and articulated through legislations and policies including the Wildlife (Protection) Act, 1972 [Chapter IV A], National Zoo Policy, 1988, Recognition of Zoo Rules, 1992, and the Recognition of Zoo (Amendment) Rules, 2004. Species-oriented captive breeding programmes have been initiated in many of these zoos throughout the country. Exclusive crocodile and turtle breeding parks have been established. The Central Zoo Authority (CZA) was set up by the MoEF in 1992 as a statutory umbrella body to provide guidelines to zoos and monitor their activities. It also oversees the functioning the zoos to sensitive visitors about the need for protecting wildlife and habitats, and carry out planned breeding of endangered species for augmenting their population in the wild. Currently, the CZA recognises 164 zoos in the country. In total, there are 275 zoos, aquaria, safari & deer parks, and mini-zoos, though a majority of them do not qualify as captive breeding facilities.Captive Breeding Specialist Groups exist for a wide range of organisms. Besides, the number of zoos and aquaria in India that conserve animals *ex situ*, NGOs have contributed by maintaining large collections of crocodiles, turtles/ tortoises, snakes and lizards. Important NGO maintained reptile parks in India are Chennai Snake Park, Madras Crocodile Bank, Pune Serpentarium and Calcutta Snake Park. The NGO, Zoo Outreach Organisation (ZOO) adds to the *ex situ* capacity strength of India. Traditional practices of involvement of local people include the community-run hatcheries of Olive Ridley sea turtles, along the Orissa, Andhra, Chennai, Kerala and Goa coasts. *Ex situ* conservation measures for local flora have also been initiated by organisations such as the Gurukula Botanical Garden in Wyanad and the Community Gene Banks for local landraces by women self-groups in Andhra Pradesh, and Village Herbal Gardens to propagate medicinal plants under *ex situ* conditions by FRLHT.Projects have been initiated for the re-introduction of threatened species into their natural habitats under appropriate conditions. Examples include mass propagation of pitcher plant, mangrove species, and the effort towards translocation of Asiatic Lions in Madhya Pradesh. India has taken measures to regulate and manage the collection of biological resources from natural habitats for *ex situ* conservation purposes so as not to threaten ecosystems and *in situ* populations of species, under the provisions of the Wild Life Protection Act and the Biological Diversity Act.  |
| **Capacity Gaps** | **Brief Description of Capacity Gaps** | **Priority** | **Capacity Development Action** | **Time** | **Target Institutions** | **Financial System** |
| Limited *ex situ* conservation capacities in terms of strategies, infrastructure and funds. | Strong national systems of ex situ conservation supported by a network of botanical gardens and zoological parks have been developed. There is increasing coherence of policies and programs on conservation and sustainable use of bio-resources but more fund mobilization and infrastructure development is required.Zoo infrastructure and capacities are inadequate in terms of collection planning, conservation and captive breeding as well as regarding their role as facilitators of public awareness and education. Zoo infrastructure for conservation and captive breeding of endangered species of wild animals is limited. Scarcity of funds, understaffed facilities, uncontrolled breeding of animals, severe space constraints, inappropriately designed enclosures, insufficient conservation education programmes and lack of trained field-staff and wildlife veterinarians are the primary capacity constraints for successful *ex situ* programmes in India.  | Medium | A national strategy for *ex situ* conservation of endangered wild animals is to be developed and implemented as per IUCN guidelines. It is important to categorise *ex situ* institutions as primarily aimed at captive breeding, awareness and educational facilities or repositories (or a combination of these functions) and to develop capacities related to the relevant primary function. | Long-term | CZA, CMFRI, NBRI and other organizations dealing with *ex situ* conservation including existing zoos and botanical gardens. *Ex situ* initiatives of NGOs should also be involved in the strategy development process.  | This capacity development action needs to be funded and coordinated through the CZA. CZA funding allocation for the capacity building of captive breeding centres, e.g. recent allotments for breeding of vultures.  |
| Captive breeding is constrained by lack of data on the biology of the species. | Captive breeding plans of endangered animal species suffer from a paucity of vital scientific data on breeding ecology of the species. Captive breeding and species recovery programmes are also not available for a large number of threatened species.Though the Central Zoo Authority (CZA) has introduced the international zoo record-keeping practices in Indian zoos, these records and studbooks which are vital for inter-institutional coordination for selection of mates are usually not maintained owing to shortage of staff and lack of proper training. | Medium | Basic infrastructure including trained and skilled human resources in all the captive facilities and zoos needs to be improved. State-of-the-art infrastructure including highly trained and skilled staff should be provided to zoos which are chosen as ‘national conservation breeding centres’ for select species, and these specialised centres should house adequate numbers of target species whose genetic origins are known and they represent sufficient genetic variation..Captive facilities for aquatic mammals are to be set up for *ex situ* breeding of endangered species like Gangetic dolphin. | Long-term | CZA, CMFRI, NBRI and other organizations dealing with *ex situ* conservation including existing zoos and botanical gardens. CSOs involved with *ex situ* conservation e.g., ZOO should also be involved. | Ongoing government programs for captive breeding centres and to specific cells such as the CBZM Cell at the Wildlife Institute of India. |
| **CONVENTION REQUIREMENT: 5****Utilizing Environmental Impact Assessment for Biodiversity Conservation****CAPACITY STATUS & STRENGTHS:**Environment Impact Assessment essentially is one of the tools for integrating environmental considerations including biodiversity aspects in the developmental projects right at the stage of their planning itself. Towards this the Ministry has made environment impact assessment a mandatory requirement for the certain categories of developmental activities through EIA notification issued on 26th January 1994 under the Environment (Protection) Act, 1986. Environmental clearance based on EIA is mandatory for certain categories of developmental projects in the sectors of industry, thermal power, river valley and hydro electric power, mining, infrastructure, nuclear power, and new construction projects and industrial estates. Ecologically Sensitive Areas are notified under the Environment (Protection) Act 1986 to impose restrictions on industrial operations and other developmental activities that have a detrimental effect on the environment of that region. It also provides for restoration of denuded areas, management of catchments and watershed areas for planned development, while ensuring sustainable livelihoods for local communities and stakeholders. To address biodiversity related issues in EIA, the baseline status of biodiversity and its components are ascertained and information on habitat resilience is also collected for assessing the likely significant impacts of proposed developmental activities.Subsequently, the Ministry had undertaken an exercise of re-engineering of Environmental Clearance Process and thus brought out a new EIA notification on 14th September 2006. The objective of the new notification is to have a transparent more efficient, effective and time bound environmental clearance process. The new notification also provides for a structured, public hearing process and also with certainty in time frame at different stages of EC process. The new notification also categorizes the developmental activities decentralization into category ‘A’ and category ‘B’. The category ‘A’ projects are appraised at Central level while category ‘B’ projects are appraised at State level by the State Level Environment Impact Assessment Authorities/ State Level Expert Appraisal Committees to be constituted by the Central Government in consultation with the State Governments under the EP Act, 1986. Under the new notification the transparency of entire EC process has been ensured by making it mandatory to place the Terms of Reference, draft EIA report, public hearing proceedings, final EIA report and the environmental clearance letter on the website of the concerned regulatory authorities.Through its six regional offices, MoEF is monitoring the impact of development on the environment on a regular basis. To further strengthen the legal capacity, the National Environment Appellate Authority (NEAA) was constituted under the NEAA Act, 1997. The MoEF also proposes to set up a central and several regional Environment Tribunals for judicial trial of environmental damage suits. The MoEF has also created Hazardous Substances Management Division (HSMD) to deal with the issue of environmental impacts of hazardous chemicals and wastes. A wide network of national institutes under the aegis of CSIR, ICFRE, MoEF, ICAR, and DST has moderate capacities to undertake various EIA studies. India is a party to the Rotterdam Prior Informed Consent Convention on Hazardous Chemicals, Stockholm Convention on POPs, and Basel Convention on Trans Boundary movement of hazardous wastes. Policies and programmes are in place for management of chemical emergencies, hazardous waste and solid waste. Planning and overseeing the implementation of policies and programmes on management of chemicals emergencies and hazardous substances, including hazardous chemicals and hazardous wastes, in order to avoid damage to health and environment is also a priority.  |
| **Capacity Gaps** | **Brief Description of Capacity Gaps** | **Priority** | **Capacity Development Action** | **Time** | **Target Institutions** | **Financial System** |
| Limited expertise and monitoring for land use change | Inadequate initiatives on monitoring responses of biodiversity to changes in land use and development patterns. Scarcity of expertise in the various categories of biodiversity issues (particularly a poor understanding of biodiversity loss and its long-term consequences) accentuates this capacity weakness. There are limited synergies at the national level, especially insufficient inter-sectoral coordination which does not allow for a strategic and comprehensive development framework that seriously addresses environmental sustainability and facilitates the mainstreaming of environmental concerns into development planning. For example, though post-EIA monitoring of environmental compliance is emphasised at the policy level, institutions lack adequate capacities to track and monitor various projects. | High | There is a need to have capacity building in terms of both institutional strengthening and impart training to all concerned stakeholders including officials from MoEF/ SEIAA/ SEAC, SPCBs, EIA consultants and project authorities. While undertaking such capacity building exercise, we need to ensure that all the aspects relating to environmental impacts including biodiversity are addressed properly. Such training exercises should be based on location specific case studies as also training modules and training packages. We also need to have core group of trained professionals through training of trainers who in turn could impart training to the trainees. However, this has to be on the basis of an institutional mechanism rather than on ad hoc basis. In order to improve the quality of EIA outputs, the MoEF along with Quality Council of India (QCI) has undertaken a registration scheme for EIA consultant organizations.  | Medium | MoEF, State Environmental Appraisal Authorities, and other national institutions involved in conducting EIAs. | A suggested mechanism is to finance an independent authority (as recommended by the Planning Commission) which derives funds directly from project proponents to function independently and to maintain objectivity. |
| Limitations in the engagement of EIA guidelines with the public. | Public hearings, an important component of EIA process, are often done hastily, and sometimes marked by limited transparency. Typically, it is construed that such shortcomings aim to benefit the project agencies. The new Notification potentially has a weakness as it does not give clear guidelines regarding the composition of local stakeholders, and public hearings can be weakened as no quorum is prescribed. Most of the EIA reports and related documents are not readily and easily accessible for public scrutiny, despite Government’s recent efforts to bring in legislation and administrative measures for more transparent governance. | Medium | Efforts should be made both at the level of executing organisations and decision-making government bodies to make the entire EIA report accessible in electronic media for public scrutiny. | Short | MoEF, State Departments of Environment, Pollution Control Boards, universities PRIs and local NGOs. | Since this component will be largely cross-sectoral, funds could be sourced from the target institutions. |
| **CONVENTION REQUIREMENT: 6****Managing Information notably through Clearing House Mechanisms****CAPACITY STATUS & STRENGTHS:**The MoEF has established ENVIS, an open-access information exchange network for biodiversity. Currently there are 72 ENVIS centres. ENVIS is the national CHM for the CBD. The CHM for the Biosafety Protocol has also been established. The NBRI is India’s nodal agency for the Asia Pacific Traditional Medicine Network and is also involved with the Global Biodiversity Information Facility (GBIF). Similarly, the IHBT is the national partner for Global Forest Information Service. NISCAIR has developed the TKDL, an open-access information resource and exchange forum. The NIF has also been active in documentation and dissemination of Traditional Knowledge Systems (TKS), particularly in apiculture. Other platforms include the Indian Coral Reef Monitoring Network (ICRMN), the Bay of Bengal Programme for Inter-Governmental Organisation (BOBP- IGO, launched by India, Bangladesh, Sri Lanka, and Maldives), models for collaboration of multiple stakeholders such as the Western Ghats Forum (WGF), information networks such as the Biodiversity Informatics division of National Chemical Laboratories (NCL), Indian Bio-resources Information Network (IBIN) of Department of Biotechnology (DBT), and Bioinformatics Cell of NBRI also perform the role of clearing houses.India has extensive networks among institutions across the country for information exchange. Some of these have developed mechanisms with international organizations for facilitating exchange of publicly available information towards implementation of the Convention. The information on TKDL on Ayurveda is being shared with many countries in Asia, Africa and Europe who have shown interest in replicating the model for patent granting process in their respective countries. India is a member of Asia Pacific Traditional Medicine Network and participates in database development and sharing of TK. India has established linkages with the international Legume Database and Information System and Global Network of Botanical Gardens. |
| **Capacity Gaps** | **Brief Description of Capacity Gaps** | **Priority** | **Capacity Development Action** | **Time** | **Target Institutions** | **Financial System** |
| Need to follow international guidelines for unifying database in the country | Most of the existing databases and information networks do not follow international database norms [like Dublin Core or Federal Geographic Data Committee (FGDC) Metadata Standards], and this lack of structure considerably delays integration of national databases with the global information networks. Absence of metadata standards (like the Dublin Core or FGDC norms) among most of the existing national biodiversity databases and information resources poses a severe systemic problem for their integration with global information networks. | Medium | Technical support should be given to institutions to build their own metadata standards to make existing biodiversity databases of the country compatible with global networks and databases. In addition, the MoEF could further expand the existing Environmental Information System (ENVIS) network and also encourage the development of such platforms by NGOs. The proposed state-wide databases of the State Forest Departments (as outlined in the Report of the Working Group on Research, Education, Training, Capacity Building and Information Management for the Environment and Forests Sector, submitted to the XIth Five Year Plan) should be integrated with the wider Knowledge Management System co-ordinated by the Indira Gandhi National Forest Academy. | Medium | Existing ENVIS centres, NISCAIR, IGNFA, NBRI, WII, and several other institutions. Capacity building for State Forest Departments with regard to developing state-wise forestry databases. | Some funds could be utilised from ongoing government programs. A portion of funds could also be derived from the National Forestry Database Management System, National Natural Resource Management System to standardise data arising out of its projects, AICPRE, AICOPAX, and the All India Coordinated Project on Coastal and Marine Biodiversity.  |
| **CONVENTION REQUIREMENT: 7****Providing Scientific and Technical Education and Training****CAPACITY STATUS & STRENGTHS:**India has established a number of research and training institutions that have comprehensive programmes and activities relating to conservation of biodiversity. These include both government as well as non-government organizations. Nine Centres of Excellence have been supported by the MoEF with a view to strengthening awareness, research and training in priority areas of environmental science and management. The country has a well defined agenda to promote and encourage research in conservation and management of biodiversity.Technical and scientific cooperation is encouraged for various biodiversity programmes by ministries like the MoEF, Ministry of Agriculture, and Ministry of Science and Technology. The capacity strength of the MoEF in forestry training is showcased by the IGNFA and the State Forest Service training colleges. ICFRE, with its network of three advanced centres and eight institutes (including FRI) has been entrusted with research and training in forestry sector. Currently, the MoEF has several autonomous research institutes which have state-of-the-art infrastructure for research and training. IIFM as well as regional research and training institutes such as the GBPIHED, EPTRI, GUIDE, GIDR and KFRI have been established. For marine aspects CMFRI, CIFE and CIFT have been established. A large network of central and state universities are involved in research, education and training.The MoEF is the nodal agency in the GoI for various environment related multilateral agreements and protocols, as well as bilateral and multilateral matters related to biodiversity. In addition, the Ministry of Science and Technology undertakes several programmes to promote international technical and scientific cooperation covering various aspects of conservation and sustainable use of biological diversity.  |
| **Capacity Gaps** | **Brief Description of Capacity Gaps** | **Priority** | **Capacity Development Action** | **Time** | **Target Institutions** | **Financial System** |
| Inadequate training of frontline staff | Training of frontline field staff in conservation practices of wild biodiversity is virtually lacking. Inadequate training opportunities for field-staff in various conservation practices of wild biodiversity weakens the institutional capacity of state FDs. | High | Technical and financial support for training field-staff in conservation practices of wild biodiversity should be adequately provided. In this regard, a role for conservation NGOs in training should be envisaged; for example, the Wildlife Trust of India (WTI) is successfully conducting a series of training programmes for lower and middle level forest staff in PAs, and this model can be emulated through an increased FD-NGO cooperation. | Medium | IGNFA (in-service training of IFS officers), Regional Forest Academies and staff from the State Forest Departments (to be trained). WII’s training programmes need to be enhanced in terms of their thematic as well as geographic coverage. Capacities to be improved for a number of leading conservations (govt. and NGOs). | The Planning Commission Working Group Report on Environment and Forests Sectors 2006 has allotted funds for the proposed composite scheme called ‘Capacity Building in the Forestry Sector’ with specific training components. |
| Under representation of social science aspects in education, research and training. | The field of biodiversity conservation is heavily natural science dominated, despite the increased emphasis on community based conservation and management in the policy discussions. There are only a handful of organisations that undertake social science research on conservation related issues.Thereare no institutions which are dedicated to promoting social science research or training in biodiversity conservation. Many of the country’s leading biodiversity research institutions mentioned in this article, do not have robust departments for the social sciences, and this remains an outlier in most institutions. An additional capacity limitation is the lack of knowledge regarding ecosystem-based management. | High | Adequate funds should be provided to the MoEF and state governments to fund research in the social sciences pertaining to conservation. Along with funding for conservation projects, natural science research projects and educational programmes, the MoEF, DST and similar institutions should institute research grants for social science projects and also encourage inter-disciplinary and trans-disciplinary research. | Long term | TISS, IIPA, CISED, WII, MSSRF, Universities, and several other agencies. | Grant-in-aid funds to be provided to professional societies and organisations involved in social science research.  |
| **CONVENTION REQUIREMENT: 8****Preserving Indigenous and Local Knowledge, Innovation and Practices****CAPACITY STATUS & STRENGTHS:**India is rich in traditional knowledge associated with biological resources. This traditional knowledge is both coded, as in the texts of Indian systems of medicine such as Ayurveda, Unani and Siddha; and non coded, which exists in the oral undocumented traditions. India has strong and well-developed indigenous knowledge systems on sustainable utilisation of biodiversity components, and the existing community models of common property resource use add to the fundamental capacity strength of the country.The 73rd Constitutional Amendment of 1993 enshrines democratic decentralization of responsibilities, wherein local bodies consisting of elected representatives, one third of whom are women, are entrusted the responsibility of safeguarding local stocks of environmental capital. As envisaged in this amendment, the Biological Diversity Act, 2002 provides for setting up of Biodiversity Management Committees (BMCs) for conservation, sustainable use and documentation of biodiversity and chronicling traditional knowledge. Mandatory consultation of BMC by NBA and State Biodiversity Boards ensures involvement of local communities in decision making related to Access and Benefit Sharing. Implementation of the JFM scheme has enabled local communities to avail some amount of shared benefits out of sustainable extraction of biodiversity components especially relating to traditional knowledge. Eco-development and ecotourism initiatives have provisions for direct economic incentives to local communities. NISCAIR has developed the TKDL, which is hosted on the web as an open-access information resource and exchange forum. The NIF has also been active in documentation and dissemination of Traditional Knowledge Systems (TKS), particularly in apiculture.Field studies on the status, trends and threats related to the knowledge, Innovation and Practices (KIP) of indigenous and local communities are undertaken by several institutions and organizations in the country. Involvement of local communities and support to them for studies on KIP is being encouraged through the preparation of People’s Biodiversity Registers (PBRs) under the Biological Diversity Act, 2002. The MoEF has funded and supported the preparation of PBRs by the Indian Institute of Science for 52 sites in 8 states. The PBRs are aimed at building an open and transparent information system on biodiversity resources from village level upwards. As an effort to promote traditional practices and value systems in conservation of biodiversity rich areas, MoEF assisted by other organizations is undertaking maintenance of a large number of sacred groves across the country.In addition, several measures, mechanisms and programmes are in place to promote effective participation of local communities. These *inter alia* include: a) Strengthening traditional livelihood systems of desert communities through agro-forestry and horticulture practices; b) Development of Traditional Knowledge Digital Library for preservation of traditional knowledge; prevention of misappropriation of traditional knowledge by breaking the language and format barriers of traditional knowledge systems and providing access of these knowledge systems to patent examiners in five international languages; c) Setting up of (TKDL) Biodiversity Digital Library by Council for Scientific and Industrial Research (CSIR) and BSI for digitization of plant resources including genetic resources; d) a comprehensive computerized database on Indian Medicinal Plants developed at FRLHT; e) A methodology for documentation and rapid assessment of local health traditions for supporting the local knowledge about native plant names and their use; and, f) building of the country’s first bio-geo-cultural repository of natural resources for use by Indian systems of medicine. India is not only supporting initiatives for the protection of traditional knowledge and ensuring access and benefit sharing, but has also been engaged in the ‘promotion’ and ‘teaching’ of traditional knowledge since 1950 through a large number of educational institutes across the country. Some prominent national NGOs are active in promoting sustainable use and associated innovations based on indigenous knowledge.  |
| **Capacity Gaps** | **Brief Description of Capacity Gaps** | **Priority** | **Capacity Development Action** | **Time** | **Target Institutions** | **Financial System** |
| Limited utilization of traditional conservation knowledge and practices | India’s rich traditional knowledge and practices on biological conservation needs to be systematically documented and utilized. Several localised systems of self-regulation and monitoring of extraction of common property resources have been documented. For example, it has been proposed that the traditional *Van Panchayat* model is more suited to the Western Himalayan states than the JFMs.Traditional practices of sustainable use of common property resources among local communities are only now being gaining limited recognition at both policy and implementation levels. Current policies do not adequately reflect the potential within indigenously managed systems for enabling sustainable utilisation or accord adequate recognition to these practices. In many instances, policies insufficiently capture the richness and diversity of these practices. | Medium | The requirement is to recognise and promote traditional systems of sustainable utilisation of biodiversity resources through adoption of these mechanisms in the current policy and field-initiatives.Initiatives to strengthen traditional village level institutions for natural resources management should also be carried out. The involvement of local communities through PRIs needs to be encouraged especially with respect to the contributions of women.Social science research in the subjects pertaining to community perceptions, management and use of resources should be promoted and integrated with policy making exercises. | Long term | NGOs and selected universities can carry out research on these aspects. Policy formulation and mainstreaming of these findings to be undertaken by a working group derived from these institutions. | Funds to be obtained from ongoing government programs such as the All India Coordinated Project on Ethnobiology, the National Afforestation and Eco-development Board (NAEB) Scheme. This can also be dovetailed with GEF’s existing projects such as ‘Mainstreaming Conservation and Sustainable Use of Medicinal Plant Diversity in Three Indian States’.  |
| Preparation ofPeople’s Biodiversity Registers | The development of Peoples’ biodiversity Registers (PBRs) is central to the objectives of the Biodiversity Act, 2002. The preparation of PBRs across the country is an enormous task. The program is being implemented in a phased manner. However, in addition to enormous efforts required to develop such a large-scale database, guidelines and clear definitions of concepts are required. Multiple formats and standardisation should accommodate diversity in understanding and recording such knowledge. Besides the development of the PBRs themselves, currently there are few safeguards to protect the knowledge and information from being misused. The benefit sharing mechanisms (both monetary and non monetary) should also be developed as a priority. | Medium | The institutes/ agencies which have already initiated such programs should be strengthened to complete the task in States where the program has made some progress. SBBs and BMCs should be set up in all the States and local bodies, respectively.There is the need for an All-India Coordinated Project on Traditional Knowledge. Such a project can incorporate elements from the Traditional Knowledge Digital Library and other such initiatives. The twin priority areas of such a project should be the development of context-specific formats for PBRs as well as the development of safeguards and benefit sharing arrangements and mechanisms. | Long-term | CES, IISc. DDS, NIC, NCL, CSIR, NBA.  | New funds required |
| Limitations regarding ecotourism initiatives. | Ecotourism initiatives, which enable local communities to share the economic profits of regulated and sustainable nature tourism, are not backed by a proper legislation or statutory mechanism except ‘Policy and Guidelines for Ecotourism in India, 1998’. This leads to a severe under-representation of ecotourism in the Management Plans of Protected Areas. | Medium | Measures to grant statutory status to guidelines of ecotourism are to be taken up so that all the PAs will be encouraged to involve local communities in sustainability-based tourism enterprises.Certain civil society groups are working together to develop guidelines and certification systems for eco-tourism. These must be encouraged and mainstreamed into the biodiversity management policies. Training should be provided to forest officials and managers located near tourism sites, to understand well and incorporate fully eco-tourism principles in their initiatives. | Medium | MoEF along with Ministry of Tourism to coordinate and build capacities and also involve PRIs, relevant NGOs and community-based organisations. | Options for obtaining funding from other ministries and tourism industry federations should be explored over the longer term. |
| Limited incentives for conservation of traditional agro-biodiversity systems. | There are limited incentives provided for conservation of traditional agro-biodiversity systems in comparison to incentives that high input agriculture receives.  | Medium | Additional capacity building initiatives need to be taken up to document and devise frameworks for traditional as well as innovative agro-biodiversity and sustainable farming practices. Traditional Knowledge Systems should be duly recognised and integrated within the framework of frontier research on conservation of agro-biodiversity. | Long term | All institutions involved in agricultural research and outreach along with those working in trade and knowledge systems in the biodiversity sector.  | New funds required |
| **CONVENTION REQUIREMENT: 9****Regulating the Commercialization and Ensuring Benefit Sharing from Genetic Resources****CAPACITY STATUS & STRENGTHS:**India being rich in biological resources and associated traditional knowledge, has taken three significant legislative measures for opertionalisation of the access and benefit sharing provisions. These are the Biological Diversity Act, 2002 and Biological Diversity Rules, 2004; PVPFRA, 2001, and the Patent Amendment Act 2005. The Biodiversity Act primarily aims at regulating access to biological resources and associated traditional knowledge so as to ensure equitable sharing of benefits arising out of their use, in accordance with the provisions of the CBD. For implementation of the Act, a three tiered structure with a NBA, State Biodiversity Boards and Biodiversity Management Committees at local self government level has been envisaged. The PVPFRA, 2001 and the PVPFR Rules, 2003 deal primarily with the protection of plant breeder’s right over the new varieties developed by them and the entitlement of farmers to register new varieties and also to save, breed, use, exchange, share or sell the plant varieties, which the latter have developed, improved and maintained over many generations. The use of GURTS is prohibited and state of the art containment facilities and diagnostics tools have been developed towards effective implementation of the provision. The second and third amendments to the Patent Act, 1970 provide for mandatory disclosure of the source and geographical origin of the biological material in the patent application when used in the invention. These legislative measures with appropriate institutional mechanisms are important in ensuring regulated access to the genetic material with a view to promote conservation and sustainable use. |
| **Capacity Gaps** | **Brief Description of Capacity Gaps** | **Priority** | **Capacity Development Action** | **Time** | **Target Institutions** | **Financial System** |
| Insufficient monetary and IPR benefits to traditional knowledge holders and practitioners | Currently there are insufficient monetary and IPR benefits to practitioners of Traditional Knowledge Systems with respect to transfer of technology or knowledge regarding genetic resources of agro-biodiversity.  | Medium | Explore fiscal, monetary and other market oriented measures to regulate commercialization and benefit sharing through inter-sectoral synergies. Measures should be taken to ensure that transfer of technology or ethno-biological knowledge from local communities to executive agencies brings in adequate monetary and IPR benefits to the practitioners of Traditional Knowledge Systems. A system of providing adequate incentives (particularly monetary or IPR benefits) need to be devised and made available to the practitioners of Traditional Knowledge Systems. A framework needs to be developed based on consultations with representatives from agricultural and pharmaceutical biotech segments. | Medium | MoEF, Ministry of Commerce and Industry to coordinate this aspect. FICCI and CII to be targeted for inter-sectoral regulation. | Ongoing programmes of the government such as funds through the National Bio resource Development Board, Ocean Biodiversity Research Group and Drugs from the Sea Programme can support this capacity development action.  |
| **CONVENTION REQUIREMENT: 10****Accessing Financial Resources****CAPACITY STATUS & STRENGTHS:**A large part of the funding for the country’s biodiversity-related programmes comes through Central and State budgetary allocations in various geographic and thematic areas. The Union government’s expenditure on ‘biodiversity conservation projects’ during 2002-03 was Rs. 46.38 crores, which constituted about 10 percent of the total R & D investment. This was spent on 334 biodiversity-related projects. An analysis of the thematic patterns of expenditure revealed that agro-biodiversity projects received 31 percent of the total grant, while 24 percent of the allocation was meant for wild biodiversity projects. Donors like SIDA, Department for International Development, Ford Foundation, the Darwin Initiative, IFAW, NORAD, ICEF, DANIDA, DIFDI and several others are supporting implementation of CBD. The multilateral channel of the GEF, through UNDP, UNEP, FAO, IFAD and the World Bank is also assisting in the implementation of CBD. Funds are also generated through various financial instruments like sale of forest products including timber and NTFPs, entry fees to Protected Areas and ecotourism, and institutional charges. |
| **Capacity Gaps** | **Brief Description of Capacity Gaps** | **Priority** | **Capacity Development Action** | **Time** | **Target Institutions** | **Financial System** |
| Financial allocation for biodiversity conservation needs to be streamlined  | At the national level, inadequate mainstreaming of biodiversity issues into other sectors has affected the overall budgetary allocation to this component. While it appears that several areas of biodiversity conservation could benefit from enhanced resources, the basis of financial allocation is not clear. Readily accessible information on financial needs of various sectors and their expenditures is limited. This is essential to generate reliable data on annual expenditure by national and state governments, multi-lateral and bilateral agencies and private institutions at the national level.  | High | A country wise exercise should be undertaken to compute the amount of money expended on natural and social science research projects, awareness programmes and capacity building efforts. As a start all websites of major public institutions and NGOs could clearly make available information on the projects and expenditure for each of these, to even compute the country’s spending on biodiversity. Country wide computations should also take into account the benefits from ecosystem services as well as benefit sharing information if any. Standardised environmental accounting practices in the preparation of statutory financial statements for large industrial enterprises to ensure greater transparency need to be encouraged as suggested by the NEP, 2006.This financial allocation requires prioritisation based on justifiable scientific criteria (e.g. high diversity and endemism as well as the degree of threat should be used to prioritise resource allocation). In addition projects that facilitate future benefit-sharing options should be given priority. | Short | MoEF to oversee this exercise with a team of representatives from selected government and non governmental organizations. | Ongoing programmes of the government can support the evaluation exercise preferably through an allocation by the Planning Commission to a specific working group. Additional funds for capacity building can be sourced from international organisations such as the UNDP. NGOs and individuals can focus on private funding agencies and philanthropic organisations for funds (especially for focal species, regions and thematic areas).  |
| **CONVENTION REQUIREMENT: 11****Raising Understanding and Awareness****CAPACITY STATUS & STRENGTHS:**Conservation and sustainable use of biodiversity is one of the thrust areas of the Government for public education and awareness. MoEF interacts actively with the Ministry of Human Resource Development, University Grants Commission, National Council for Educational Research and Training, the All India Council for Technical Education and State Education Departments, for integration of content related to environmental concepts and issues in the curricula of schools and colleges. The MoEF has been managing the National Environmental Awareness Campaign (NEAC) that involves over 7,500 NGOs across the country. Environment Studies has been introduced as a mandatory subject in schools and colleges in India. In the area of formal education, the National Policy on Education, 1986 stresses on creating consciousness about the environment including biological diversity. MoEF has taken initiatives to generate awareness regarding the need to conserve and sustainably utilize biological resources through mass media such as TV, radio and the press.The Indian Council of Forestry Research and Education (ICFRE) is the premier organization which imparts education, creates awareness and undertakes research and extension activities on forestry and environmental issues, through its institutes located in various regions of the country. The Indian Institute of Forest Management imparts education and training in forest management. The Wildlife Institute of India imparts training on wildlife management and undertakes research on various related issues. The National Museum of Natural History is devoted to environment education and creation of conservation awareness among public through exhibit gallaries, mobile museums, discovery rooms and various other activities. MoEF has established Centres of Excellence in EE. Centre for Environmental Education (CEE) is the premier organisation in the country dealing with public education and awareness of environment. The ENVIS, an open-access information network (currently with 72 centres) has been established for various thematic areas. The presence of about 275 zoos, aquaria, and safari and deer parks in the country under the jurisdiction of CZA is major capacity strength of the existing infrastructure in conservation education. The role of NGOs in public education and awareness of forest, aquatic and marine biodiversity conservation is quite exemplary in India, often complementing governmental efforts. |
| **Capacity Gaps** | **Brief Description of Capacity Gaps** | **Priority** | **Capacity Development Action** | **Time** | **Target Institutions** | **Financial System** |
| Human resource development for scientific management of biodiversity needs to be strengthened | This gap is there because of inadequate infrastructure for research and development, shortage of organizations capable of imparting technical skills (keeping in view the emerging challenges) for various stakeholders.There are a number of Ministries/ Departments, agencies, and organizations which are supporting research relating to biodiversity. Coordination among these organizations needs to be enhanced. There is also a need to effectively integrate findings of research projects into policy making and implementation of programs. | High | The current efforts needs to be strengthened to highlight the importance of conservation and sustainable use of biodiversity especially focusing on new and emerging issues such as bio-safety, invasive alien species, climate change and bio-fuels. There is a need to look at the profile of ongoing education, training and extension programs to lay directed focus on biodiversity conservation.There is a need for capacity building in the field of livelihood diversification opportunities for local communities to meet their economic needs compatible with ecological sustainability.Participation of private sector in R&D also needs to be encouraged. | Medium - Long | Central and State Government Institutes, Agricultural Universities, Private Sector, Academic and Research Institutes and NGOs | Dovetailing with ongoing programs with a focus on biodiversity conservation |
| Limited capacities for school level education and awareness. | School curriculum for environmental studies, a newly introduced subject, is still found wanting in some aspects of wild and agricultural biodiversity. Limited number of trained teachers to teach environmental studies in schools and availability of limited opportunities for teachers’ training is a major institutional constraint. | High | Extensive teachers’ training programmes should be conducted to increase the capacity of teachers to teach environment and biodiversity conservation. In particular, capacity building of rural schools should be implemented on a priority basis. In this regard, the current activities of NGOs need to be encouraged as these agencies are able to augment existing funds with independent grants and develop appropriate programmes. Importance should be placed on regional capacity building programmes in the vernacular language. | Short and medium term | CEE as well as NGOs involved in the educational sector to be targeted. | Ongoing programmes of the government such as the National Green Corps Programme and the National Environmental Awareness Campaign can continue to support training activities.  |
| Low level of awareness and interest among the general public. | In general, concerns for biodiversity remain low among lower and middle-level judiciary, policy makers, and administrators including civil service. The same applies to a large section of the Indian public and even personnel who are directly involved or employed in the environment sector. This is largely due to a lack of mainstreaming of biodiversity issues into other sectors. Capacities for implementing these limitations is currently lacking but can be improved with moderate effort. | High | Awareness programmes through the mass media are relatively cost effective and reach a very large section of the population. With the help of a central institution like CEE, and with assistance from NGOs, a well thought out awareness initiative targeting television, newspaper and radio audiences should be developed as a priority. In addition, general capacity building measures can be addressed to meet the requirements outlined by the Planning Commission Working Group Report on Environment and Forests Sectors 2006. | Long-term | CEE and regional and local NGOs involved with Conservation Education and Environmental Education. | Ongoing government programmes such as the National Environmental Awareness Campaign and GLOBE Programme can be extended.  |
| **CONVENTION REQUIREMENT: 12****Developing and Introducing Economic and Social Incentives****CAPACITY STATUS & STRENGTHS:**Incentives to promote and provide an enabling environment for different stakeholders to participate actively in conservation activities are an effective tool in ensuring conservation and sustainable use of biodiversity. Conservation policies and laws in India have treated ‘incentive measures’ mostly as livelihood benefits (indirect gains) but little in terms of direct monetary rewards. More recently, the creation of National, State, and Local biodiversity funds under the aegis of the NBA and SSBs, and provision of a National Gene Fund under the PPVFR Act, 2001 has had positive impacts. The Biological Diversity Act, 2002 has suitable provisions to impose IPR cess on commercial utilisation of all usufructs. Implementation of the JFM and Eco-development schemes has enabled local communities to avail of shared benefits. There are currently over 80,000 Village Forest Committees across the country.Besides, initiatives by NGOs, academic institutions and civil society, corporate sector has taken initiatives on a voluntary basis, under Corporate Social Responsibility for environment protection, especially green accounting, auditing, eco-labelling and, in some cases, through green lending practices.A combined approach of positive incentives, disincentives and removal of perverse incentives is under development towards ensuring adequate incorporation of market and non-market values of biodiversity into plans, polices and programmes. The NEP 2006 envisages setting up of mechanisms and processes to identify entities of ‘Incomparable Value’ in different regions. Sacred groves, biodiversity hotspots, forests with high indigenous genetic diversity and environmentally sensitive areas are to be treated as possessing Incomparable Values. NEP also seeks to prepare and implement an action plan on the use of economic instruments for environmental regulation in specified contexts, including those relating to unsustainable production and consumption. It also envisages creation of a National Environment Restoration Fund from the proceeds of economic instruments, user fees for access to specified natural resources and voluntary contributions. The Funds may be used for restoration of environmental resources, including clean up of toxic and hazardous waste legacies and other such activities for conservation of Biodiversity.  |
| **Capacity Gaps** | **Brief Description of Capacity Gaps** | **Priority** | **Capacity Development Action** | **Time** | **Target Institutions** | **Financial System** |
| Limited efforts in developing designing and implementing socio-economic benefits | Limited expertise among many institutions to design and implement social and economic incentives compatible with the dual objectives of biodiversity conservation and poverty reduction. The limited availability of technical expertise is the result of a lack of effective synergies and cooperation across sectors (international, national and inter-institutional) and subsequent insufficient mainstreaming of biodiversity into other sectors. As a consequence of all these factors, there are few effective partnerships between stakeholders and benefit-sharing from incentives is still more of a concept than a practical application.In addition, the few instances where fiscal and economic and incentives for conservation exist, these need evaluation in terms of their efficacy. | Medium | Within specific sectors, successful models to be identified (and in their absence, developed) that have demonstrated successful conservation benefits. Policy initiatives need to be taken up for various incentives with respect to the conservation of agro-biodiversity and sustainable farming. A review of agricultural subsidies is necessary to identify conflicts with biodiversity conservation. Region-specific incentive measures should be considered to promote sustainable practices. Incentive programmes that have worked well in a region should be identified and expanded. | Long term | All executive bodies and institutions responsible for various conservation policies and programmes (personnel to be trained). Technical support to be provided by a multi-disciplinary team identified by the MoEF. | Funding can be routed through ongoing government schemes such as the All India Coordinated Project on Ethnobiology, and programmes such as the ECOMARK Certification Scheme. Additionally, inputs from projects such as the externally aided BCRLIP and India Eco-development.  |
| **CONVENTION REQUIREMENT: 13****Implementing the Cartagena Protocol on Bio-safety****CAPACITY STATUS & STRENGTHS:**Genetic manipulation is not new. For ages, farmers have relied on selective breeding and cross-fertilization to modify plants and animals to improve food production and satisfy other human needs. Over the past 30 years, however, our ability to alter life forms has been revolutionized by modern bio-technology. Scientists have learned to extract and transfer strands of DNS and entire genes from one species to another. The results are known as living modified organisms (LMOs) or, more popularly, genetically modified organisms (GMOs). While modern bio-technology may have great potential in both agriculture and health care there are concerns about the potential risk associated with their use to human health, environment and biodiversity. Risks in the use of GMOs can be carefully contained in research, healthcare and some industrial applications by well defined risk management techniques but their actual use in the field as in agriculture involves exposure species, the possibility of adverse impact on non target species, the potential for weediness in genetically modified crops and the stability of the inserted gene.To address the above concerns, bio-safety regulations have been developed by many countries involved in transgenic research and commercialization. There have also been initiatives to harmonize biosafety regulations by international organizations. The most ambitions attempt to produce a globally harmonized regime for the biosafety has been under the Convention of Biological Diversity (CBD). Article 19 of the CBD committed members to a protocol on biosafety specifically addressing transboundary movement of GMOs. The Cartagena Protocol on Bio-safety (CPB) was negotiated and adopted under the aegis of CBD on January 29, 2000. The objective of the Protocol seeks to ensure adequate level of protection in the field of the safe transfer and handling of LMOs resulting from modern biotechnology that may have adverse effect on the conservation and sustainable use of biological diversity, taking into account the risk to human health. It specifically focuses on transboundary movement, handling and use of all LMOs. The Protocol has come into force on 11th September 2003. Government of India (GoI) has ratified the Protocol on 17th January 2003. Presently, 143 countries are Party to the Protocol.The text of the Protocol has 40 articles. Some of the important elements of the Protocol include, advanced informed agreement procedure (Article 7), Decision procedure (Article 10), separate procedure for LMO-FFP (Article 11), Risk Assessment and Risk Management (Article 15 and 16), Handling, Transport, Packaging and Identification (Article 18), Biosafety clearing house mechanism (Article 20), Capacity building (Article 22), Liability and redress (Article 27), Relationship with other agreements (Article 32), Monitoring and Reporting (Article 33), Compliance (Article 34) and Assessment and Review (Article 35). Even though the text of the Protocol has been adopted, some aspects of the Protocol’s regime remain to be elaborated. In due compliance with the commitment under the Protocol, parties are required to put in place several administrative, legal and procedural measures. First and foremost requirement is the enactment of a national biosafety law.In matter of biosafety law and policies, India was one of the early movers in the developing world, having introduced the national biosafety rules even before the CBD was adopted at Rio de Janeiro in 1992. The introduction of the biosafety rules in 1989 spelling out the implementation mechanism involving various committees at institutional, district, state and central levels was a pioneering step that was enabled by the Environment (Protection) Act, 1986. By 2007, a constellation of legislations cognate to biosafety regulations have come into existence. This included the National Biodiversity Act 2002, the Plant Quarantine Order 2004, Food Safety and Standards Act, 2006 including, Recombinant DNA safety guidelines 1990, revised guidelines for research in transgenic plants, guidelines for toxicity and allergenicity evaluation of transgenic seeds, plants and plant parts (1988), guidelines for generating pre-clinical and clinical data for rDNA vaccines, diagnostics and other biologicals (1999).Capacity building is a key pre-requisite for the effective implementation of the CPB. The Protocol promotes international cooperation to help developing countries and countries with economies in transition to build human resources and institutional capacity in biosafety. Parties are encouraged to assist with scientific and technical training and to promote the transfer of technology, know how, and financial resources.Parties are also expected to facilitate private sector involvement in capacity building (Article 22). The first meeting of COP-MOP in 2004, adopted two decisions to promote capacity building for the effective implementation of the Protocol, through the establishment of a roaster of experts on biosafety (Decision BS-I/4) and an Action Plan for building capacities (Decision BS-I/5).Recognizing the importance of capacity building, GoI through its various ministries / departments (Ministry of Environment and Forests, Department of Biotechnology, Ministry of Agriculture and Ministry of Health and Family Welfare) has initiated several capacity building activities. With the support of the GEF/ World Bank, a capacity building project to enhance national capacity for implementing national bio-safety framework related to the transboundary movement of the LMOs has been completed. Four research institutions have been strengthened in terms of institutional and technical capacities for detection and identification of LMOs. Information sharing and networking within the country was facilitated through various publications and documents including a Biosafety Newsletter. A separate Biosafety Clearing House (BCH) mechanism (<http://indbch.nic.in>) has been set up for providing information on various aspects of biosafety including decisions on LMOs. An International Conference on the implications of the CPB was organized in New Delhi in November 2006 to identify the emerging areas for capacity building while sharing national and regional experiences with a wide range of stakeholders.Training being one of the key elements for effective implementation of the CPB, MoEF carried out a training need assessment survey to identify the capcity building gaps and prioritize areas of training and institutional strengthening. The findings of the survey indicate that a multi-pronged approach is required for human resource development in the country. Risk assessment and management, detection of LMOs, prevention of un-intentional transfer LMOs, public awareness, training of trainers and regional cooperation have been identified as the priority areas for capacity building.With the rapid advancements being made in the areas of modern bio-technology there is a need for a continuous sharing of best practices in biosafety regulations to ensure effective implementation of the Protocol. India being a vast and diverse country, additional cooperation and financial resources are required for building capacity of its personnel for implementation of the various provisions of the Protocol and harmonizing it with domestic and international biosafety regulations. To address this issue, MoEF, the nodal Ministry for implementing the CPB is developing a GEF Phase II project on capacity building. |
| **Capacity Gaps** | **Brief Description of Capacity Gaps** | **Priority** | **Capacity Development Action** | **Time** | **Target Institutions** | **Financial System** |
| Limitations in Risk Assessment (Article 15) and Risk Management (Article 16) | The general principles, methodological steps and points to consider in the conduct of risk assessment have been elaborated in Annex: III of the Protocol. Risk Assessment is also referred to in the context of LMOs intended for direct use as food or feed or processing (LMO-FFP) in Annex: II of the Protocol.India’s experience in risk assessment and management is limited to Bt cotton, the only transgenic crop approved for commercial cultivation in the country. In view of the biotechnological advancement, several private and public institutions are in the advanced stage of developing several GM crops. The information on basic ecology and experience with both modified and non-modified organisms needs to be thoroughly considered in risk assessment. Since risk assessment is carried out on a case by case the information needed will vary and there may often be limitation to information for particular type of organisms and the receiving environment. Insufficient relevant scientific information and knowledge regarding the extent of potential adverse effect of a specific use of biological diversity are the major constraints in the risk assessment process.  | High | Review of existing procedures and guidelines to confirm whether India is compliant with the provisions of the risk assessment as outlined in Annex: II and Annex: III of the Protocol.Development of crop specify biology and ecology document.Studies for development of baseline data and presence of wild relatives.Development of guidelines and procedures for specific types of risk associated with specific traits.Post market monitoring of LMOs.Basic research on risk assessment and risk management.The training to enhance competence in undertaking risk assessment and risk management. | Medium | Institutions involved in the research, development, monitoring and regulation of LMOs | Ongoing/ New funding |
| Limited capacity in Socio- Economic Assessment of GM Crops (Article 26) | Article 26 of the CBP requires parties to take into account, socio-economic considerations arising from that import of LMO on the conservation and sustainable use of biological diversity, especially with regard to the value of biological diversity to indigenous and local communities.In a country like India with agrarian economy, socio-economic assessment is an important element for evaluating the benefits of GM technology in agriculture. However, experience on socio-economic assessment of GM crops is limited and development of guidelines for the same is in the nascent stage. | Medium | Development of guidelines and methodology for socio-economic assessment of GM crops (pre and post commercialization stage).Development of questionnaire for socio-economic survey.Skills and methods for risk benefit analysis of LMOs.Skills for integration of socio-economic considerations in decision making regarding LMOs. | Medium | MoEF, DBT, MoA and ICAR | New funding |
| Limited capacity and resources for handling, packaging and identification of LMOs (Article 18) | In respect of Article 18 (2) (a) the ‘Curitiba Rules’ requests parties to take measures to ensure that documentation accompanying LMO-FPP in commercial production clearly states that the shipment ‘contains’ LMO-FPP in cases where the identify the LMO is known through means such as identify preservation systems. In cases, where the identify of the LMOs is not known through identify preservation systems, the declaration that the shipment ‘may contain’ one or more LMO-FFP, would apply.As a developer / exporter, the phasing out ‘may contain’ language would require:* Setting up infrastructure for identifying preservation system;
* Specialized grain handling system;
* Labelling and Traceability;
* Notification of referral laboratories for confirming the LMO identify.

As an importer continuing with ‘may contain’ language require:* Setting up thresholds
* Infrastructure for detection of GMO particularly at port of entry
* Sampling strategies for GMO detection and / or quantification
* Notification of referral laboratories for verification of the declaration.
 | High | Methods and systems for identification, detection and traceability of LMOs.LMO testing laboratories and equipment.Border control and LMO inspection facilities.Training of inspectors and customs officials in LMO identification systems.Ability to use analytical methods to detect and quantitatively assess the transgenic traits (e.g. PCR, ELISA and other methods)Testing or validation system to identify the presence or concentration of LMOs.Policy and guidelines on labelling of GM plants products.Documentation systems for LMO shipments.National systems for inspection of LMO shipments.Feasibility study on measures to be taken for putting in place an ‘identify preservation system’ for handling of LMOs in agriculture.Review of sampling strategies for LMO detection, quantification and certification from select GM importing / exporting countries (EU, Japan, the Philippines, USA, Canada) and identify best practices suitable for India. | High | MoEF, DBT, MoA, MoH&FW, MoC, Food Safety and Standards Authority Customs and Plant Quarantine Departments, NBPGR, ICAR and Public institution laboratories etc. | New funding |
| Scientific Technical and Institutional Collaboration  | Biotechnology and regulation of GM products is resource intensive and therefore there is a need for sharing of resources and expertise at the institutional and regional level. | Medium | Standardized methodology/ techniques and guidelines for risk assessment.Networking of laboratories and sharing facilities between neighbouring countries.Establishing or strengthening biosafety information exchange mechanism in the region. | Medium | MoEF, DBT, ICAR, MoA, MoH&FW, Food safety and standards authority and Public institution laboratories.  | Ongoing/ New funding  |
| Training of Trainers | Under GEF WB Phase I program, a series of workshop and training programs for sensitizing the State agencies, custom officials, plant quarantine officials and other stakeholders on biosafety issues have already been carried out. Therefore, general awareness program on biosafety may not be necessary. However, there is a need for developing structured and issue based training programs. | Medium | Preparation of training modules/ manuals and training of trainers for carrying out risk assessment and management.Preparation of training modules/ manuals for trainings of trainers for monitoring field trials of GM crops and compliance evaluation.Preparation of training modules/ manuals for training of customs and plant quarantine officials for enhancing the enforcement mechanism at the port of entry. | Medium | Central and State Government Institutions | Ongoing/ New funding |
| Public Awareness and outreach | Public awareness programs are required to educate and provide working knowledge to various stakeholders. Massive, audience and language friendly communication tools, training methods and modules need to be developed in order to reach out to maximum targets. Implementation of regulations also requires great awareness at the grassroots level and a strong extension network, which can carry forward the message. This requires capacity building in terms of both infrastructure and human resource development at the both grassroot levels. | Medium | Innovative outreach program for risk communication both through print and electronic media.Development of TV, radio educational program on biosafety issues in collaboration with the local as well as national level agencies.Primers/ brochures/ booklets/ FAQs/ Glossary of Terms targeting various stakeholders and in different languages to be extensively circulated.Mechanism for communicating regulatory decision on LMOs. | Medium | Central and State Government Institutions | Ongoing/ New funding |

**BOX**

**BD R & D Facts**

NCSA exercise also examined the broad level of R & D funding to biodiversity-related projects across regions and states in India. The National Science and Technology Management Information System Division of the Department of Science and Technology has been collating and analyzing the information on sponsored research and development projects on year to year basis since 1990 – 91. The Directory of extra-mural R&D projects approved for funding by selected Central Government agencies/ departments during 2002 – 2003 is the most recently available directory, which has details of 2718 sponsored R&D projects worth Rs 448.69 crores out of which 334 (12 percent) were biodiversity-related projects worth Rs 46.38 crores (10 percent). These projects fall within the broad guidelines of the CBD, and include identification and monitoring, and ecotourism among others. (For details, refer to figure B.2.1 and B.2.2) It was further observed that the projects relating to agro-biodiversity, as a broad area including testing organic inputs, bio-fertilizers and bio-pesticides, received 31 percent of the funding, and those relating to forest biodiversity received 24 percent.

Figure: B.2.1: Bio-geographic zone wise R & D expenditure (2002 – 03)



Figure: B.2.2: State wise allocation of R & D projects related to Biodiversity (2002 – 03)



It’s apparent that the highest funding is received by Kerala (17 percent) followed by Maharashtra (11 percent), Karnataka (9 percent) and Uttar Pradesh including Uttaranchal (9 percent). In other words, 60 percent of the total funding received for biodiversity related projects was utilized by six states (Kerala, Maharashtra, Karnataka, Uttar Pradesh, Tamil Nadu and West Bengal), while all the eight states in the north-east together received just 9 percent of the total R&D funding on biodiversity-related issues. It is revealing that the NE states, inspite of this region being a hotspot of biodiversity. This perhaps reflects the lack of institutions and organizations in the region with capacities to utilize adequate resources. Desert and mountain ecosystems together received only 6 percent of the R&D funding on biodiversity-related projects, inspite of occupying a vast proportion of India’s land mass and are also rich with unique ecosystems and endemics. It again reflects either the lack of institutions focused on these biomes or lack of focus by institutions that already existing within these regions. This brief analysis however, does not reveal anything about extent or quality of impacts of the R&D funding.

**PART: 3**

**Conclusion**

* 1. There is a need to mainstream biodiversity concerns with the overall national policy and regulatory frameworks by developing a better understanding of the all inclusive nature of the concept biological diversity per se. The specific capacity building measures for biodiversity conservation are as follows:
* Information and knowledge:
	+ Strengthen information capacity and knowledge-base of the country’s biodiversity;
	+ Promote taxonomy and application of modern tools of bio-systematic; and,
	+ Improve access to information and technology.
* Planning, policy and decision making:
	+ Encourage multi-disciplinary and participatory approach involving stakeholders in policy planning & decision making processes;
	+ Strengthen, rationalize, and harmonize the existing policies, laws, and acts on biodiversity conservation; and,
	+ Develop and implement strategies to mainstream biodiversity concerns among ministries and departments.
* Implementation of management actions:
	+ Strengthen institutional infrastructure & human resources;
	+ Aid capacity building of local institutions and communities; and,
	+ Promote public-private partnerships in biodiversity conservation.
* Monitoring and Evaluation:
	+ Establish monitoring mechanisms for conservation policies and programs and strengthen evaluation criteria of EIAs; and,
	+ Promote incentives for compliance with principles of sustainable development.
	1. The Government of India is implementing a number of programs/ projects to develop the national capacity for biodiversity conservation and appropriate use of new technologies. To supplement these efforts, India has developed a robust project portfolio with GEF assistance. Recently, two GEF projects a) to strengthen the implementation of the Biological Diversity Act by developing the capacity of the National Biodiversity Authority, State Biodiversity Boards and Village level committees (BMCs); and b) to strengthen the capacity to implement the provisions of CPB in India. Such efforts need to be strengthened by mobilizing more resources as well as strategically using the available resources to built country’s capacity to conserve, manage and use biological resources, sustainably.

**……………..**

CHAPTER: 3

**Climate Change: Capacity Needs & Action Plan**

**C**limate change is a global challenge emanating from accumulated greenhouse gas emissions in the atmosphere, anthropogenically generated through unsustainable human activities such as intensive and long term industrial growth, consumption lifestyle among other factors in developed countries. According to the 4th Report of the Intergovernmental Panel on Climate Change (IPCC, 2007), the GHG emissions have grown since pre-industrial times, with an increase of 70 percent between 1970 and 2004. The Report has stated that it is likely that climate change can slow down the pace of progress towards sustainable development either directly through increased exposure to adverse impact or indirectly through erosion of the capacity to adapt. There is growing recognition worldwide that climate change poses a major threat to economic growth and poverty alleviation in developing countries, who have not, contributed to the problem.

* 1. Recognizing threats posed by climate change, the international community negotiated the United Nations Framework Convention on Climate Change (UNFCCC), which was signed at the Rio Earth Summit in June 1992 and came into force in March 1994. UNFCCC is the key global instrument to stabilize GHG concentrations in the atmosphere at levels that would prevent dangerous anthropogenic interference with the global climate system. UNFCCC mentions that Parties to the Convention should protect the climate change system for the benefit of present and future generations of humankind on the basis of equity and in accordance with their ‘common but differentiated responsibilities and respective capabilities’. The Convention specifically notes that “per capita emissions in developing are still relatively low and ….the share of global emissions originating in developing countries will rise to meet their social and development needs.” The Convention also recognizes that “economic and social development and poverty eradication are the first and overriding priorities of the developing country parties.” To reinforce the goals of the Convention, the parties to the UNFCCC adopted Kyoto Protocol in 1997, calling for legally binding limits on the emission of GHG by Annex 1 Parties (i.e. industrialized countries). The Kyoto Protocol also introduced three ‘flexibility mechanisms’ to assist Annex 1 countries in meeting their emission reduction commitments in a cost effective manner. The Clean Development Mechanism (CDM) is one of these three instruments. The CDM supports the implementation of sustainable and environmentally friendly technologies in developing countries and thereby, facilitating industrialized countries in meeting their emission reduction obligations in a cost-effective manner. India ratified the Convention on 1st November 1993 and the Kyoto Protocol to the Convention in August 2002.
	2. India with 17 percent of the world’s population, contributes only 4 percent of the total global GHG emissions. In terms of per capita GHG emissions it is about 23 percent of the global average. Around 45 percent of India’s population still does not have access to commercial energy. The challenge now is to ensure that these measures for sustainable development are implemented. The responsibility for achieving UNFCCC goals rests largely with the countries themselves. Under the Convention, governments are required to develop national action plans/ programs, and to integrate these into broader national plans for environment and development. The Government of India attaches great importance to climate change issues and has recently released its National Action Plan on Climate Change (NAPCC) on 30th June 2008 outlining its strategy to meet the challenge of climate change. The National Action Plan advocates a strategy that promotes, firstly, the adaptation to climate change and secondly, further enhancement of the ecological sustainability of India’s development path.
	3. Due to capacity gaps at various levels, the implementation of climate friendly initiatives remains a challenge in developing countries. Recognizing this constraint, the Global Environment Facility (GEF), the funding mechanism of UNFCCC has financed NCSA to identify capacity gaps and suggest capacity building actions to address climate change issues in India. The MoEF facilitated the appointment of the Winrock India International (WII), an NGO through UNDP, as the thematic consultant for coordinating the climate change component of the NCSA exercise. The consultant’s report was looked into while drafting this chapter, wherein the part I focus on the impacts of climate change on India and national legislative and institutional framework for addressing climate change. The second section presents the capacity gaps and action plan for effective implementation of UNFCCC in the country. The concluding section while summarizing the major capacity building recommendations for India also proposes an institutional arrangement for implementing these suggestions. National Environment Policy (NEP: 2006) and India’s 11th Five Year Plan provides the basic framework for the assessment under following sections, which suggest ways to strengthen the development actions, which also yields co-benefit for addressing climate change effectively and mainstreaming the adaptation strategies into national planning process for poverty reduction and sustainable economic development.

**PART: 1**

**Climate Change and India: The Challenge**

* 1. India is a vast country covering 3.28 million square km with diverse surface features. It is endowed with varied soils, climate, rich biodiversity and ecological regimes. Areas in the north have a continental climate with high summer temperatures and cold winters temperatures, which at times go below freezing point. In contrast are the coastal regions, where the temperature is more even throughout the year and rains are more frequent. The most important feature of India’s climate is the seasons of concentrated rain called the ‘monsoon’. The southwest monsoon (May to September) is the most important feature of the Indian climate, with large variations in the amounts of rainfall received in different parts of the country. The different climate regimes of the country vary from humid in the northeast (about 180 days rainfall in a year) to arid in Rajasthan (20 days rainfall in a year). A semi arid belt in the peninsular region extends in the area between the humid west coast and the central and eastern parts of the country.
	2. Though the decadal population growth rate has steadily declined as a result of the various policies of the Government of India (relating to family welfare, education, health and women empowerment) however there is extreme stress on the land use, due to high population density (among other factors) across the country. Presently, 23 percent of the total land area is under forest and tree cover and 44 percent is net sown area on which 64 percent of the population thrives. The remaining one third is roughly equally distributed between fallow land, non-agricultural land and barren land. Crop production in India takes place in almost all land types, namely, dry, semi dry, moist, sub humid, humid and others. Agriculture will continue to be important in India’s economy in the years to come as it feeds a large and growing population, employs a large labor force and provides raw material to agro-based industries. Climate Change may alter the distribution and quality of natural resources such as fresh water, arable land, and coastal and marine resources. With an economy closely tied to its natural resource base and climate-sensitive sectors such as agriculture, water and forestry, India faces a major threat due to projected changes in the climate.
	3. Though, Indian economy has made enormous strides since 1947, achieving self sufficiency in food, increasing per capita GDP, reducing illiteracy and fertility rates, creating a strong and diversified industrial base, building up infrastructure, developing technological capabilities in sophisticated areas and establishing growing linkages with the world economy however, much remains to be achieved. India with over a billion people, today only produces 660 billion KWh of electricity and over 600 million Indians, a population equal to the combined population of USA and EU, have no access to electricity, and limited access to clean, modern fuels such as LPG and kerosene. This constrained energy access is reflected in the relatively low Human Development Index of India. Enhancing energy supply and access is therefore a key component of the national development strategy. Since GHG emissions are directly linked to economic activity, India’s economic growth will necessarily involve increase in GHG emissions from the current extremely low levels. Any constraints on the emissions of GHG by India, whether direct, by way of emission targets, or indirect, will reduce growth rates. The Planning Commission of India has established monitorable targets for poverty alleviation for the 11th Five Year Plan and beyond. Accomplishing these monitorable targets would require significant specific physical investments in creation of new infrastructure, and provision of services. In turn, these will involve additional energy requirements and consequent increased emissions of CO2.

**Impact of Climate Change on India**

* 1. Climate variations may alter the distribution and quality of country’s natural resources thus adversely affecting the lives and livelihoods of its population. According to National Action Plan on Climate Change (2008) – “With an economy closely tied to its natural resource base and climate sensitive sectors such as agriculture, water and forestry, India may face a major threat because of the projected changes in climate.” Some projections of climate change over India for the 21st century are as follows: (NAPCC: 2008)
* Annual mean surface temperature rise by the end of century, ranging from 3 to 5 degree centigrade under A2 scenario and 2.5 to 4 degree centigrade under B2 scenario of IPCC, with warming more pronounced in the northern parts of India;
* There are indications that Indian summer monsoon intensity may increase beginning from 2040 and by 10 percent by 2100 under A2 scenario of IPCC;
* Changes in frequency and / or magnitude of extreme temperature and precipitation events expected;
	1. The possible impacts of the projected climate change include: a) long term implications on the quality and quantity of water of the river systems of the Brahmaputra, the Ganges and the Indus; b) food production in India is climate sensitive and greater loss in the Rabi crop, lower yields from diary cattle and decline in fish breeding, migration and harvests are expected. It is estimated that every 1 degree centigrade rise in temperature reduces wheat production by 4 to 5 million tons; c) climate change may also alter the distribution of important vector species and may increase the spread of such diseases to new areas; d) studies indicate that due to climatic variations, there might be shift in forest types and associated biodiversity loss; e) vulnerability to extreme events may increase; and f) a mean sea level rise of 15 to 38 cm is projected along India’s coast by 21st century and of 46 to 59 cm by 2100.
	2. All these findings point towards the need to take climate change concerns seriously, increase awareness of the likely impacts, and enhance interaction between policy makers, scientists and other stakeholders is required. The poor are the most vulnerable to climate change. The 11th Five Year Plan emphasize rapid economic growth is an essential prerequisite to reduce poverty and also, an effective strategy for climate change adaptation.

**Legislative and Institutional Framework**

* 1. India has probably the most comprehensive framework of legal and institutional mechanisms in the region to respond to the tremendous environmental challenges. India is probably the first developing country, which has incorporated into its Constitution the specific provisions for environmental protection. Article 48A of the Constitution provides that ‘the State shall endeavor to protect and improve the environment and to safeguard the forests and wildlife of the country’. Similarly, Article 51A (g) makes it obligatory for every citizen of India ‘to protect and improve the natural environment including forests, lakes, rivers and wildlife, and to have compassion for living creatures’. Government of India’s initiative for the diffusion of renewable energy and energy-efficient technologies, joint forest management, water resources management, agricultural extension services, web-enabled services for farmers and rural areas, and environmental education in schools and colleges represent a broad spectrum of efforts to integrate climate change concerns in sustainable development.
	2. The National Environment Policy, 2006, provides the basis for the integration of environmental considerations in the policies of various sectors. The Integrated Energy Policy, 2006 sets a goal of 25 percent reduction in India’s energy intensity from current levels through several policy measures and programs for promoting demand and supply side energy efficiency measure, policy mechanisms for aggressively promoting renewable energy sources, and an emphasis on providing a clean transport system. The Policy Statement for Abatement of Pollution, 1992, stresses the prevention of pollution at the source based on the “polluter pays” principle. The Forest Policy, 1988, highlights environmental protection through preservation and restoration of the ecological balance. The policy seeks to substantially increase the forest cover in the country through afforestation programs. National Electricity Policy, 2005 provides guidelines for accelerated development of the power sector. Rural Electrification Policy, 2006 establishes a national goal for universal access assigns responsibilities for implementation and creates new financing arrangements. National Urban Transport Policy, 2006 encourages integrated land use and transportation planning in cities. National Tariff Policy, 2006 provide guidance on establishing power purchase tariffs by State Electricity Regulatory Commissions.
	3. The statutory framework for the environment and energy efficiency includes the Indian Forests Act, 1927, the Water (Prevention and Control of Pollution) Act, 1974, the Air (Prevention and Control of Pollution) Act, 1981, the Forest (Conservation) Act, 1980, and the Environment (Protection) Act, 1986. Other enactments include the Public Liability Insurance Act, 1991, the National Environment Tribunal Act, 1995, the National Environment Appellate Authority Act, 1997, the Energy Conservation Act, 2001, and the Electricity Act, 2003. Accelerated Power Development and Reforms Program, 2001 establishes intervention strategies for distribution reforms in the power sector.
	4. MoEF is the national focal point for UNFCCC and also houses the Designated National Authority that approves all CDM projects in India. As climate change cut across different sectors of the economy, a number of other Central Government ministries are consulted such as: Ministry of Power, Coal, Petroleum and Natural Gas, New and Renewable Energy, Bureau of Energy Efficiency among others.
	5. Despite the fact that India’s contributions to greenhouse gas emissions are very small; the Government of India has taken many measures to improve the situation in this regard. India has initiated several climate-friendly measures, particularly in the area of renewable energy. It has one of the most active renewable energy programmes besides having perhaps, the only dedicated Ministry for New Energy Sources in the world. The Renewable Energy Plan 2012 calls for achieving a 10 percent share for renewable energy in incremental power capacity by adding about 10,000 MW of new renewable energy based generation.
	6. Specific Energy Sector initiatives include: a) Introduction of CNG for public and private transport in metropolitan areas; b) Improving quality of transportation fuels; c) Raising share of public transport, building Delhi Metro – Bangalore, Hyderabad and others to follow subject to resource availability; d) A major bio-diesel programme. Five per cent blending of ethanol in petrol – to increase in the next phase; e) Increasing forest and tree cover to 25 per cent by 2007 and 33 per cent by 2012; f) Electricity for all by 2012 – decentralized power based on local resources; g) Cleaner fuels for power generation. Raising thermal efficiency of coal plants; h) National programme on coal washing, in-situ coal gasification, Integrated Gasification Combined Cycle (IGCC), Coal bed and Mine-mouth methane and Hydrogen energy; I) 50,000 MW hydropower initiatives including over 50 per cent from Run of River Operation (ROR) projects to be accomplished by 2012. Besides, the Government of India has also taken a number of steps in recent years that has the co-benefit of mitigating climate change, some of which are: a) Improving energy efficiency and conservation as well setting up of Bureau of Energy Efficiency; b) Power sector reforms; c) Promoting hydro and renewable energy; d) Reduction of gas flaring; and e) Environmental quality management. The outcomes of all these initiatives are that there has been effective de-linking of energy sector growth from economic growth. India also successfully hosted the Eighth Conference of Parties (COP 8) in 2000, which brought the concerns on technology transfer and adaptation on forefront. . India has submitted the Initial National Communication to the UNFCCC in June 2004, which includes an inventory of national GHG emissions, discusses impacts and vulnerability, and provides recommendations for activities to mitigate climate change. India is now preparing its second national communication to UNFCCC with the GEF support.
	7. Coal forms the resource base of two-thirds of the country’s total installed electricity generation capacity. The electricity production from renewable sources has been on the rise due to legislative mandate for its procurement. The Electricity Act, 2003, requires State Electricity Regulatory Commissions to specify a percentage of electricity that the electricity distribution companies must procure from renewable sources. As a result, about 2,000 MW of renewable-electricity capacity is being added in India every year. India now has the fourth largest installed wind capacity in the world. The National Hydro Energy Policy has resulted in the accelerated addition of hydropower in India, which is now over 35,000 MW.
	8. In addition, the Electricity Regulatory Commissions are also linking tariffs to efficiency enhancement, thus providing an incentive for renovation and modernization. Furthermore, almost all fluorescent tube lights sold in India, and about two-thirds of the refrigerators and air conditioners, are now covered by the labeling program launched in 2006, to provide information about the energy consumption of an appliance, and thus enabling consumers to make informed decisions. In March 2007, the conduct of energy audits was made mandatory in large energy-consuming units in nine industrial sectors. These units, notified as “designated consumers” are also required to employ “certified energy managers”, and report energy consumption and energy conservation data annually. An Energy Conservation Building Code (ECBC) was launched in May, 2007, which addresses the design of new, large commercial buildings to optimize the building’s energy demand.
	9. Addressing climate change mitigation and adaptation involves many stakeholders, cuts across short and long time frames, and requires that all development projects be assessed for their sensitivity to climate concerns. This integration of climate concerns in the development process has been mainstreamed in India through high-level multi-stakeholder committees. A coordination committee chaired by Prime Minister called Prime Minister’s Council on Climate Change was constituted in June 2007 to coordinate national action for assessment, adaptation and mitigation of climate change. The Government has set up the Expert Committee on Impacts of Climate Change on 7th of May 2007 under the Chairmanship of Dr. R. Chidambaram, Principal Scientific Adviser to Government of India to study the impacts of anthropogenic climate change on India and to identify the measures that we may have to take in the future in relation to addressing vulnerability to anthropogenic climate change impacts. The Expert Committee includes eminent persons from academia, science and also from various Ministries and Departments concerned. This shows the highest level of attention being given to climate change related issues in the country.
	10. India’s National Action Plan stresses that maintaining a high growth rate is essential for increasing living standards of the vast majority of people of India and reducing their vulnerability of the impacts of climate change. Eight National Missions which form the core of the National Action Plan represent multi-pronged, long term and integrate strategies for achieving key goals in the context of climate change.
1. The National Solar Mission aims at increasing the share of solar energy in the total energy mix through development of new solar technologies, while attempting to expand the scope of other renewable and non fossil options such as nuclear energy, wind energy and biomass.
2. The National Mission on Enhanced Energy Efficiency comprises of four new initiatives, namely, a market based mechanism for trading in certified energy savings in energy-intensive large industries and facilities, accelerating the shift to energy efficient appliances in designated sectors, demand side management programmes in all sectors by capturing future energy savings, and developing fiscal instruments to promote energy efficiency.
3. The National Mission on Sustainable Habitat attempts to promote energy efficiency in buildings, management of solid waste and modal shift to public transport including transport options based on bio-diesel and hydrogen.
4. The National Water Mission has, as its objective, the conservation of water, minimizing wastage and ensuring more equitable distribution both across and within states.
5. The National Mission for sustaining the Himalayan Ecosystem is aimed at evolving management measures for sustaining and safeguarding the Himalayan glacier and mountain eco-system.
6. The National Mission for a Green India focuses on enhancing eco-system services and carbon sinks through afforestation on degraded forest land in line with the national policy of expanding the forest and tree cover to 33% of the total land area of the country.
7. The National Mission for Sustainable Agriculture would develop strategies to make Indian agriculture more resilient to climate change new varieties of thermal resistant crops, new credit and insurance mechanisms and improving productivity of rainfed agriculture.
8. The National Mission on Strategic Knowledge for Climate Change is intended to identify the challenges of, and the responses to, climate change through research and technology development and ensure funding of high quality and focused research into various aspects of climate change.

Apart from the eight National Missions, the National Action Plan also envisages other initiatives including, research and development, mainstreaming disaster risk reduction strategies among others. The National Missions are to be institutionalized by the respective Ministries and will be organized through inter-sectoral groups. Appropriate mechanisms including public-private partnership and civil society actions, will be devised, as suited, for effective delivery of each individual Mission’s objectives. Comprehensive Mission documents detailing objectives, strategies, plan of action, timelines and monitoring and evaluation criteria of all eight Missions and Other Initiatives are to be developed by December 2008 and submitted to the Prime Minister’s Council on Climate Change. The work is to be coordinated by the Ministry of Environment and Forests.

* 1. As already mentioned, GoI has taken a number of policy and legislative initiatives for a balanced emphasis on economic development and cleaner and greener environment. However, much needs to be done. The single most constraint will be the huge and significant additional resources required. India needs technology innovations for reduction of energy use by industry and other user sectors. There is a need to protect country’s coastal areas. Action is required to protect glaciers that feed our river systems. There is a need to create knowledge partnerships across countries to collaborate on climate change action. A whole gamut of development action needs to be planned and funded. The 11th Five Year Plan has articulated strategies in many of these areas for India. India is planning to link all the academic institutions that work on climate change on a national knowledge net and also identify key knowledge institutions that become centers of excellence in climate change related research. GoI is also considering setting up a Venture Capital Fund to promote green technologies. To accomplish all these tasks, the capacity of the concerned stakeholders needs to be built and strengthened.
	2. While climate change is a global environmental issue, different countries bear different levels of responsibility for increase in atmospheric GHGs concentrations. The poorest of the poor in developing countries like India are most vulnerable to the impacts of climate change as they are almost totally reliant on natural resources for their food, shelter and incomes. They are already experiencing the impacts of climate change like diminishing water tables, climate variability and frequent natural disasters, with few resources to cope. Current government expenditure on adaptation to natural climate variability already exceeds 2 percent of the GDP, with agriculture, water resources, health and sanitation, forests, coastal-zone infrastructure and extreme weather events, being specific areas of concern. This is a significant amount for a developing country like India with competing claims on its limited resources.

**PART: 2**

**Capacity Gaps and Action Plan**

* 1. The following matrix details the capacity status, gaps and action plans to the mitigation options and mainstreaming the adaptation strategies into national planning process in India, as per UNFCCC requirements. At a broader level, this action plan is a suggestive core strategy to strengthen country’s environmental management framework.

**CLIMATE CHANGE: Capacity Gaps and Action Plan**

|  |
| --- |
| **CONVENTION REQUIREMENT: 1****Institutional capacity building, notably through Secretariats or focal points****CAPACITY STATUS & STRENGTH**The issue of climate change crosscuts various sectors and falls within the ambit of several central government ministries – Ministry of Coal, Ministry of Power, Ministry of Petroleum and Natural Gas, Ministry of New and Renewable Energy, Ministry of Home amongst others. The Ministry of Environment and Forests (MoEF) is the nodal Ministry for the planning, promotion, coordination and overseeing the implementation of environmental and forestry programs. It is the focal point for UNFCCC and all climate change activities in India. MoEF also houses the Designated National Authority (DNA) that accords host country approval for all Clean Development Mechanism (CDM) projects in India.Integrated Energy Policy, 2006, Rural Electrification Policy, 2006, National Urban Transport Policy, 2006, National Tariff Policy, 2006, National Electricity Policy, 2005, Electricity Act, 2003, Energy Conservation Act, 2001, Accelerated Power Development and Reforms Program, 2001 are some of the important energy related laws and policies. The Forest Policy, 1988, highlights environmental protection through preservation and restoration of the ecological balance. The statutory framework for environment and energy efficiency includes the Indian Forests Act, 1927, the Water (Prevention and Control of Pollution) Act, 1974, the Air (Prevention and Control of Pollution) Act, 1981, the Forest (Conservation) Act, 1980, and the Environment (Protection) Act, 1986. There has been attempt to integrate climate change concerns in the development process in India through high-level multi-stakeholder committees. The Expert Committee on Impacts of Climate Change is chaired by the Principal Scientific Advisor to GoI, and includes meteorologists, climate modelers, hydrologists, energy economists, as well as representatives of key Ministries. The Committee is evaluating the impact of climate change on key development activities, and assessing options to mitigate climate risks. At the national level, the integration of climate change in national development is guided by the Prime Minister’s Council on Climate Change, which includes representation of key Ministries, as well as experts, and representatives of industry and of media. The Council provides overall strategic guidance on mainstreaming climate change in development, identifies key intervention priorities, and monitors the implementation of these interventions.Various bilateral and multilateral agencies are working in capacity building of institutions in the area of Vulnerability & Adaptation, CDM and clean technology. Many national level as well as state level NGO’s are also working in this sector. This awareness and capacity has developed because of their individual interest, media interest and also through seminars organized by different Central Government Ministries, state governments and bilateral and multilateral organizations.  |
| **Capacity Gaps to be Addressed (Broad Areas)** | **Brief Description of each Capacity Gap Identified** | **Prioritize Capacity Development Requirement** | **Specify, Capacity Development Actions** | **Time Frame (Short Medium and Long)** | **Target Institutions for Capacity Building (at National, State and Local level)** | **Financial Systems** |
| Strengthen Institutional Framework | Strategies to deal with the potential threats and impacts of climate change need to be based on better understanding of the issues, treading the optimal and efficient use of resources and impact of environmental stresses on the life of common man.A clear legal authority and more budget allocation for implementing agencies. Need for a better coordination between government agencies on one hand and government ministries and other agencies like private sector on the other hand, in designing and implementing clean energy initiatives.Need for more intensive training in detailed design of implementing rules and regulations for clean energy programs.  | High | Capacity is required to account climate change as one of the potential risk factors affecting the outcome of any development program or process in long run. Along with MoEF, other concerned ministries / departments need work in close coordination so that climate change concerns are integrated with their respective programs. Strengthening of secretariat & appropriate focal point in various concerned ministries addressing the issue of climate change at systemic level is required. Establishment and strengthening of climate change cell in state level institutions. Need to strengthen the institutional memory in the stakeholder institutes. There is also a need to develop a national Centre for Excellence on Climate Change. Capacity building of national and state level disaster management organizations to increase preparedness for climate change related disaster. Development of technical capacity of the stakeholder institutes in identified and prioritized sectors/ arenas.  | Long term | Central and State level Ministries and departments, Financial Banks, Universities, Industries, research and academic institutions, NGOs, etc. | Dovetailing the activities of the line ministries / departments |
| Limited availability and accessibility of Data/ Information  | India’s climate change concerns are reflected in its National Environment Policy, 2006. However, there is a need to develop better early warning systems, understanding of the processes, which could show discernible changes well before the actual impact starts, is essential. | High | Development of infrastructure & technical resources at institutional level to access and handle large amount of data is required for this purpose. Development of synergies among various ministries to develop system level resources.Capacity development for transferring knowledge acquired so far on climate change for implementation at the national, state, community as well as at the institutional and individual levels. | Long term | Central and State level Ministries and departments, Financial Banks, Universities, Industries, academic and research institutions, NGO’S etc. | New funding as well as dovetailing |
| **CONVENTION REQUIREMENT: 2****Enhancing the enabling environment****CAPACITY STATUS & STRENGTH** Climate change interfaces with diverse societal and natural processes and, consequently, with the development processes. The development and climate paradigm, also alternatively referred to as ‘development first’, views development as a tool to address the challenges posed by climate change, the key to overcoming vulnerability and enhancing our capabilities for adaptation to its adverse impacts. In this paradigm, the development itself – i.e. building capacities, institutions and human capital in developing countries – emerges as the key factor for enhancing adaptive and mitigation capacities. The policies in India have been driven by the imperatives of sustainable, and have, as a co-benefit, led to a decline in the intensity of energy use and carbon dioxide emissions as well. This decline has been made possible by a range of factors, including India’s historically sustainable patterns of consumption, enhanced competitiveness, proactive policies to promote energy efficiency and more recently, the use of Clean Development Mechanism to accelerate the adoption of clean energy technologies.The Government of India is committed to the UNFCCC and the Kyoto Protocol, and played an important role in the adoption of the Delhi Declaration at COP 8. Being a non-Annex I country, India does not have an emission reduction target under the Kyoto Protocol. The Government of India is conscious that its pursuit of economic development is sustainable. Further, India as a responsible country take appropriate measures as per national development priorities and also according to the principles enshrined in the UNFCCC especially the principle of ‘Common but Differentiated Responsibilities and Respective Capabilities’.  |
| **Capacity Gaps to be Addressed (Broad Areas)** | **Brief Description of each Capacity Gap Identified** | **Prioritize Capacity Development Requirement** | **Specify, Capacity Development Actions** | **Time Frame (Short Medium and Long)** | **Target Institutions for Capacity Building (at National, State and Local level)** | **Financial Systems** |
| Limited market development and technology transfer | There is an inadequacy in the transfer of the environmentally friendly and financially viable technologies from developed world to India. Lack of harmonized technical standards and limited institutions for supporting such standards.Consumer skepticism about actual benefits from clean energy technologies. | High | Strengthen the design and implementation of policies and programs that support technology R&D and import for market application.Collaborative R & D between developed and developing countries for the development of environmental friendly technologies.Establish working groups to develop common standards and protocols for clean energy technologiesStrengthen government leadership and support for public-private sector initiatives.Promote case studies documenting consumer benefits. | Medium | Central level Ministries and State level departments, Financial Banks, Industries | New / Additional Funding and Dovetailing with ongoing projects |
| Limited access to Financing | The transfer of financial resources as envisaged in the Convention has been limited, so far. The processes for loan agreements or grants with multilateral banks or financial institutions are cumbersome.Project sponsors lack experience at preparing and packaging loan/ funding requestsInadequate staffing and technical resources in banks to promote or analyze clean energy and adaptation related activities/ projects | High | Strengthening the implementation of the Convention on financial transfer.Design and implement training for banks (financial sector, including insurance), and develop ‘financing protocol’ to facilitate evaluation of clean energy loans. | Medium | Central level Ministries and State level departments, Financial Banks, Industries | New / Additional Funding |
| Need to strengthen institutional mechanism | There is a need for initiatives, as India has done in the case of setting up of National CDM Authority (NCDMA), to address the issue of vulnerability & adaptation aspect, mainstreaming climate change concerns at national/ state level planning and projects and in climate change modeling particularly at the regional level. | High | Reviewing and strengthening of existing enabling institutional mechanism at central, state and local level. Government may consider for preferential tax treatment for cleaner energy technologies. The rate of growth in renewable energy production can be increased if non-taxed public sector organizations can be included (e.g. schools, hospitals and government agencies). Incentives should apply across technology categories, be consistently applied, and be available over long durations to sustain the interest of financial institutions and investors.Education about the tax incentive programs could aid in the success of promoting energy efficient options. | Medium | Central level Ministries and State level departments,  | New / Additional Funding |
| Inadequate GHG inventorization | Focus on project-based GHG reporting.Limited knowledge and capacity for GHG measurement and accounting as a management tools for corporations | High | Develop a common national GHG reporting system that can be used and accepted in country’s planning process.Develop corporate interest in training courses for GHG measurement and accounting as a risk management tool. | Medium  | Automobile Industries, financial institutions, research institutions, policy makers, etc. | New funding |
| Inadequate modeling opportunities at local level | Institutional setup for climate change modeling at local, national and regional level is required | High | More focus on climate change modeling at regional scale | Long  | Governments, Research and academic institutions, NGOs, financial institutions, industries, etc. | New funding as well as dovetailing with NATCOM as well as other ongoing programs. |
| Inadequate information database on climate change | Limited national information network for policymakers to stay up to date on effectiveness of different clean energy technologies and designs. Limited private sector input in the design and oversight of clean energy policies and programs.There is a need of training and access to information and data in the climate change area at the individual level | High | Establish national, ‘virtual’ Center of Excellence on clean energy technologies and their performance and application.Training government officials in mechanisms for program enforcement and compliance.Develop a national association of public – private sector organizations dedicated to clean energy. Promote south - south transfer of technology | Long  | Research and academic institutions, NGOs, financial institutions, industries, etc. | New funding |
| **CONVENTION REQUIREMENT: 3****Preparing national communications****CAPACITY STATUS & STRENGTH**The Union Ministry of Environment and Forests submitted its initial National Communication (NATCOM) to the UNFCCC on June 22, 2004. India has prepared first NATCOM report in 2004 with 1994 as base year. Further preparations are underway for the second NATCOM report with a base year of 2000 which is expected to be submitted in 2011. The basic philosophy of the NATCOM process was "learning by doing" this concept has helped Indian creating an enabling environment in India for organized study and research in climate change and related issues. It presents an inventory of anthropogenic emissions of GHGs from various sources and their removal by sinks. As a UNDP project funded under GEF, NATCOM meets the commitment under UNFCCC (Articles 4 and 12). Preparation of NATCOM in India involved 350 scientific personnel representing multi-disciplinary institutes and organizations. This also reflects the contribution of the NATCOM process in building the capacity of institutions in India for GHG Inventorization and climate change impact studies. A network of more than 108 institutions working in this sector.The NATCOM process comprised of comprehensive scientific and technical exercises for estimating GHG emissions from different sectors, reducing uncertainties in current estimations, developing sector and technology specific emission co-efficient pertinent to India, assessing the adverse impacts of climate change, and developing strategies for adapting to these impacts. NATCOM also provided the general description of steps taken or envisaged to implement the convention. The NATCOM process also initiated efforts to identify areas of targeted research on climate change according to India’s sustainable development plans. |
| **Capacity Gaps to be Addressed (Broad Areas)** | **Brief Description of each Capacity Gap Identified** | **Prioritize Capacity Development Requirement** | **Specify, Capacity Development Actions** | **Time Frame (Short Medium and Long)** | **Target Institutions for Capacity Building (at National, State and Local level)** | **Financial Systems** |
| Inadequate funding | Limited resources are made available by the GEF to prepare national communications in a comprehensive manner as well as to sustain the effort in future furnishing of information and implementation is a continuing obligation. | Medium | Development of new funding options for sustainability of the NATCOM process | Medium  | Central and State Government and Financial Institutions | New / Additional funds  |
| Inadequate institutional framework as well as insufficient database for climate change issues | An institutional structure needs to be developed to avoid inconsistency in top down and bottom up data sets and availability of data for informal sector of the economyThe NATCOM team feels the need to enhance technical and institutional capacity of the participating institutions across the country to produce better and more accurate estimationsThere is a need to strengthen the institutional arrangements for data sharing in the country. | High | Enhance technical capacity of the participating institutions to produce a more accurate estimate. Provide motivation to the personnel and staff training in an organized manner.NATCOM is an unique opportunity of learning by doingCapacity buildingexercises like NATCOMand NATCOM networks;and workshops along with reports related to GHG emissions, energy efficiency and sea level riseSensitization and involvement of stakeholders in the project towards climate change. Increasing technical and institutional capacity of the stakeholder institutions | Long  | Central level Ministries and state level departments, academic and research institutes, NGOs, financial institutions, etc. | Dovetailing with NATCOM as well as new funding |
| **CONVENTION REQUIREMENT: 4****Developing national climate change programs****CAPACITY STATUS & STRENGTH**A policy framework that would lead to a national climate change programs in India is under preparation. National Strategy Study for CDM implementation in India is a commendable effort, similar study on other aspects of climate change like vulnerability and adaptation in different geographical locations, different interventions like technological, social etc needs to be developed in India. This requires a major research study in India, before mainstreaming Vulnerability & Adaptation concerns in the national planning and projects. Commendable institutional structure, infrastructure and technical resources have been dedicated to disaster management related to climate variability; the national climate change program needs to develop a synergy with existing institutions and integration. In India, the Department of Economic Affairs, also the GEF Political Focal Point is the nodal agency to formulate and monitor country's economic policies and programmes having a bearing on internal and external aspects of economic management. Various institutions have been continuously studying different aspects of climate change.  |
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| Integration of climate change issues into policy and programs for mitigation and adaptation | There is a need to implement long term climate change programs at national & regional level in India to formulate adaptation plans at the country, state and community levels to reduce the adverse impacts of climate changeCapacity building of sustained programmatic support at systemic level is required to formulate national climate change programs in IndiaThe capacity of various government ministries/ departments needs to be enhanced and should also enable the setting up of new institutions in India.  | High | Integration of findings from policy research at programmatic levelIntegration of findings of individuals from academic institutions on policy research on climate change should be encouraged in India this will motivate academicians at an individual level to carry out similar researchDesign of pilots for integrating climate change concerns in projects and programs of various agencies.Development of methodology and tools to integrate climate change concerns in all developmental projects.Technical capacity and skill levels of individuals needs to be developed through training and improving access to information | Long term | Central level ministries and state level departments, etc. | New funding as well as dovetailing with ongoing programs |
| **CONVENTION REQUIREMENT: 5****Preparing and managing greenhouse gas inventories, including emission database management****CAPACITY STATUS & STRENGTH**Some system level resources have been provided during the preparation of India's initial NATCOM. The main mandate of NATCOM is to report India's GHG emission inventory. However, there is a potential for setting up of institutional network for GHG inventorization. The initiatives like, National Road Transport Policy, 2005 inter alia aims at efficient use of energy while providing capacity building in implementing alternate fuel technology like biofuels, hydrogen, etc. in the transport sector. Energy Conservation Act, 2001 provides for efficient use of energy and its conservation and for matters connected therewith or incidental thereto. Electricity Act 2003 aims to consolidate the laws relating to generation, transmission, distribution, trading and use of electricity and generally for taking measures conducive to development of electricity industry. Further steps have been taken to increase efficiency/use of renewable energy in this sector helps in the mitigation aspect of climate change. At institution level, NATCOM involved participation of various ministries for GHG estimation. Such synergy needs to be enhanced. Initiatives like “Monitoring of Greenhouse gases and Aerosols that affect global warming for study of fog over north India and also transport and evolution of aerosol, ozone etc., ” by NPL, “Indo-US Workshop on Modeling of Transport of Air Pollutants – capacity building in various modeling tools, which help in estimating the distribution of atmospheric pollutants” organized by NEERI, Nagpur and “Road Traffic and Environmental Impacts - Measurement and modeling of air pollution due to automobiles” by CRRI addresses the issue of GHG inventorization in India as well as provides information for institutional research and database exchange in this sector. CRFI, Central Mining Research Institute, CRRI, Central Rice Research Institute, IIP, NCL, NPL, NCL, NEERI, National Dairy Research Institute are continuously working in the area of GHG inventorization and reduction in sectors like transport, cement and other energy intensive industries, agriculture like rice cultivations, livestock, oil and gas, etc.  |
| **Capacity Gaps to be Addressed (Broad Areas)** | **Brief Description of each Capacity Gap Identified** | **Prioritize Capacity Development Requirement** | **Specify, Capacity Development Actions** | **Time Frame (Short Medium and Long)** | **Target Institutions for Capacity Building (at National, State and Local level)** | **Financial Systems** |
| Limited database for GHG Inventorization | Lack of established programs and practices for national GHG monitoring and reporting. The focus is on project based accounting tailored to the monitoring and reporting requirements of the CDM. However there has been a limited reporting of GHG emissions at sectoral and national levels to develop baselines and monitor overarching impacts of GHG mitigation activities.The availability and access to information on activity data, sequestration of CO2 is limited and the uncertainty of the data is high with a time lag of 10 years due to resource constraint both human and finance There is a need of training activity for data generating institutions in GHG inventory methodology and data formatThere is a need to institutionalize linkages of inventory estimations with broader perspectives of climate change researchThere is a need for well defined institutional arrangements for data sharing | High | Management and accountability of GHG related data and availability of data in electronic format is requiredStrengthen the capacity of the state level institutions for GHG inventorization.Better management and accountability framework needs to be formulated to develop a system of managing and utilizing GHG inventories and emission databaseFacilitation of various policies like the Electricity Act, Energy Conservation Act, etc. for effective implementation.Availability, accessibility and organization of data need to be strengthened along with better management and accountability frameworkDevelopment of more precise emission coefficients for various activities | Long  | Research Institutions, financial institutions, academics, NGOs, Universities, Industries, etc. | New funding and dovetailing with NATCOM |
| Inadequate climate change modeling tool | There is a need for systemic resources to facilitate availability, accessibility and organization of data needs to be strengthened in the country. Institutional capacity needs to be developed at state level as well, to provide a more detailed and accurate GHG inventoriesThere is a need for improving the quality of national GHG inventories and generates exhaustive data on a regional and sectoral scale | High | Capacity building in database management, modeling tools in various sectors as well as monitoring of GHG emission and aerosols measurement can be built upon. Guidelines for measuring the impact energy efficiency measures undertaken especially in transport sector. Promotion of R&D in the transport sector leading to improved automobiles and road transport system. More institutions need to develop human and information resources to participate in development of emission inventory and database management in the NATCOM process in the country. Training and motivation of individuals to generate India specific emission coefficient should be encouraged. Capacity development of data generating institutions in GHG inventory methodology and data formats | Long  | Research Institutions, financial institutions, academics, NGOs, Universities, Industries, etc. | New / Additional Funds |
| **CONVENTION REQUIREMENT: 6****Assessing vulnerability and adaptation****CAPACITY STATUS & STRENGTH**India is a large developing country with nearly two-thirds of the population is rural, whose dependence on climate sensitive natural resources is very high. Its rural populations depend largely on the agriculture sector, followed by forests and fisheries for their livelihood, which is highly vulnerable to climate variability and change. The assessment of climate change impacts and vulnerability and adaptation to climate change, require a wide range of physical, biological and socio-economic models, methods, tools and data. This is due to uncertainties in regional climate projections, unpredictable response of natural and socio-economic systems and the inability to foresee future technological developments.The Delhi Declaration adopted at CoP-8 of UNFCCC called for integration of policies and measures to protect the climate system against human-induced change. It also stated that national sustainable development strategies should integrate climate change objectives in key areas such as water, energy, health, agriculture, and biodiversity. Government of India, conscious of the developing scenario, is trying to mainstream these concerns in its relevant sector policies, like the National Policy on Agriculture, the National Water Policy, the National Forest Policy, the Disaster Management Act, and the Biological Diversity Act among others. The Government of India has formulated detailed plans for dealing with contingencies that arise in the wake of natural calamities including droughts, floods, and cyclones. The total government expenditure on adaptation related programs has increased from 7 percent in 1997 – 98 to 12.85 percent in 2006 – 07. Expenditure on crop improvement and research, forest conservation, disaster management, drought proofing and flood control, rural education and infrastructure, risk financing, and health for the review period have been taken into account. Among the adaptation components, poverty alleviation and livelihood preservation currently account for bulk of the spending (45%) on all adaptation activities, followed by rural education and infrastructure (27%), health (11%) and crop improvement (6%)Several ongoing efforts address some of these vulnerability concerns, although they are primarily driven by the objective of sustainable livelihoods and poverty alleviation. There is a strong need to replicate and augment these measures that present opportunities that not only address specific sustainable development objectives but also strengthen coping capacities and enable adaptation to climatic variability and change in the long run. Various projects to assess the impacts of climate change on sea level variability, water resources, forests, agriculture, health, energy, industry and transport. Institutions like the Kerala Forest Research Institute, Malaria Research Institute, NIO, etc have been studying the various impacts of climate change on forests, ocean biosphere and mangrove forests, coastal zones, etc.  |
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| Inadequate policy framework in place on V&A aspect of climate change | The methods for assessing the vulnerability, impact and adaptation are gradually improving, but are still inadequate to help policy makers formulate appropriate adaptation measures. There is a need to identify the magnitude of resources required to address the issue of adaptation to climate change | High | The scientific assessment measurement, models, national research agenda needs to be developed at the national level. Systematic efforts are required to study the impact assessments of different climatic parameters. Studies about future projections of changing regional climate provide insights for methodological developments, including models for integrated assessment and GIS based computer algorithms for supporting policy assessments at regional levels.Locale specific databases, scenarios and assessment, local monitoring networks need to be developed.There is a need to develop targeted R&D, technology transfer protocols, demonstration / pilot studies into large scale projects.The monitoring, observation skills at the local level needs to be developed. There is a need for building awareness about the potential impacts among the concerned people. | Long  | Various departments of Central, State and Local Government, Research Institutions, financial institutions, academics, NGOs, Universities, Industries, etc. | New funding as well as dovetailing with ongoing programs |
| **CONVENTION REQUIREMENT: 7****Developing and implementing adaptation plans and measures****CAPACITY STATUS & STRENGTH**Though planning process in India aims at ensuring energy, food, water, environmental and social security, which is fundamental to sustainable development however, integrating these priority concerns with climate change policies, is limited. Even though India has sound environmental policy framework the capacity of the institutions to address the adaptation related issues is limited. The structure and technical resources of the institutions working towards the implementation of adaptation measures needs to focus at national, state, local level needs to be promoted and effectively implemented. Various bilateral and multilateral agencies are currently working in capacity building of institutions in the area of V&A, CDM and clean technology. There is a tremendous scope for developing the institutional structure for increasing the coping capacity of vulnerable community due to climate change. |
| **Capacity Gaps to be Addressed (Broad Areas)** | **Brief Description of each Capacity Gap Identified** | **Prioritize Capacity Development Requirement** | **Specify, Capacity Development Actions** | **Time Frame (Short Medium and Long)** | **Target Institutions for Capacity Building (at National, State and Local level)** | **Financial Systems** |
| Limited financing options for V&A | There is a need to assess the magnitude of climate change impacts and the financial requirements to address of the adaptation issue, which should be mainstreamed in country’s planning process. Policy formulation on adaptation measures has to relate to the complex sectoral interdependence and inter-relationships in climate change impacts – an area, which has been scarcely researched in the Indian context. Market would not respond until there is clarity in cause effect. The equity issues and development constraints for market response needs to be comprehensively addressed. | High | Capacity building in assessing the cost of V&A in the Indian context. Development of economic instruments like insurance and R & D funds on adaptation | Long | Various Departments of Central, State and Local Governments, Financial Institutions, research institutions, etc. | New funding and Dovetailing the adaptation component with the ongoing developmental schemes |
| Inadequate methodology to design adaptation interventions | Lack of design methodologies, trained manpower and financial resources for adaptation. | Medium | Lessons learnt from vulnerability and adaptation projects to be converted into design, methodologies and guidelines. Develop tools of cost and benefit estimation | Medium | Central level Ministries and state level departments | New funding |
| **CONVENTION REQUIREMENT: 8****Assessing mitigation options****CAPACITY STATUS & STRENGTH**Climate change, resulting from anthropogenic emissions of a suite of gases due to fossil fuel use, certain agricultural and industrial activities, and deforestation, leading to their increasing concentrations in the atmosphere, has the potential, over the next few generations, to significantly alter global climate. India contributes only 3 percent of the total global GHG emissions and in terms of per capita emissions it is about 23 percent of the total global average. India’s share of renewable energy at 36 percent is far higher than industrialized countries. Since GHG emissions are directly linked to economic activity, India’s economic growth will necessarily involve increase in GHG emissions from the current extremely low levels. Around 55 percent of our population still doesn’t have access to commercial energy. Any constraints on the emissions of GHG by India, whether direct, by way of emissions targets, or indirect, will reduce growth rates. India’s policies for sustainable development, by way of promotion of energy efficiency, results in a relatively GHGs benign growth path.India has one of the largest programs for promoting renewable energy in the world, covering all major renewable energy technologies, such as, biogas, biomass, solar energy, wind energy, small hydropower and other emerging technologies. The Ministry of New and Renewable Energy Sources (MNRE) is actively involved in the promotion for development, demonstration and utilization of these technologies. The commercialization of several renewable energy systems and products are currently underway. Bureau of Energy Efficiency (BEE) is dedicated to the cause of promoting energy efficiency in India. The policies and programs to promote energy efficiency and renewable energy is leading to low level of CO2 emissions. For instance, the Electricity Act, 2003, requires State Electricity Regulatory Commissions to specify a percentage of electricity that the electricity distribution companies must procure from renewable sources. Several Commissions have already operationalized this mandate, and also notified preferential prices for electricity from renewables. This has contributed to acceleration in renewable-electricity capacity addition, and over the past three years, about 2,000 MW of renewable-electricity capacity has been added in India every year, bringing the total installed renewable capacity to over 11,000 MW. Of this, a little over 7,000 MW is based on wind power; India now has the fourth largest installed wind capacity in the world. The National Hydro Energy Policy has resulted in the accelerated addition of hydropower in India, which is now over 35,000 MW. In addition, the Electricity Regulatory Commissions are also linking tariffs to efficiency enhancement, thus providing an incentive for renovation and modernization. New plants are being encouraged to adopt more efficient and clean coal technologies. An energy labeling programme for appliances was launched in 2006, provide information about the energy consumption of an appliance, and thus enable consumers to make informed decisions. An Energy Conservation Building Code (ECBC) was launched in May, 2007, which addresses the design of new, large commercial buildings to optimize the building’s energy demand. Over 700 CDM projects have been approved by the CDM National Designated Authority, and about 300 of these have been registered by the CDM Executive Board. The registered projects have already resulted in over 27 million tones of certified CO2 emissions reductions, and directed investment in renewable energy and energy projects by reducing the perceived risks and uncertainties of these new technologies, thereby accelerating their adoption.Various bilateral and multilateral agencies are working in capacity building of institutions in the area of V&A, CDM and clean technology. Many national level as well as state level NGO’s are working with stakeholders like industries, financial institutions, researchers, etc. in various sectors to promote energy conservation and efficiency initiatives.  |
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| There is a need to develop in house low cost mitigation technologies  | Many required technologies based on resource endowments of developing countries do not yet exist, or are too expensive because of IPR protection. There is a need to reach an agreement on IPRs on technologies necessary for mitigation efforts in developing countries. Bridging the technology gap between the developed and the developing countries may be addressed through collaborative R&D between the institutions of these countries. The climate change deliberations on technology have mostly addressed the issue transfer of environmentally sound and low emission technologies from the developed to the developing countries. While these are critical issues there is a need to extend the focus on technology development, adoption and diffusion along with a streamlined process for technology transfer. Developing in house capacity and capability to develop and absorb technologies needs to be focused upon.The global thrust on climate friendly technologies is focused on climate change mitigation, which is much needed. However, there is a need to develop low cost technologies that are compatible with local government and socio-economic situations for faster adaptation as well. | High | In the global context, a concept of ‘Venture Technical Capital Fund’ could be proposed for sharing of IPRs with contributions from both the developed and developing countries.Government has a crucial supportive role in providingappropriate enabling environment, such as, institutional,policy, legal and regulatory frameworks, to sustaininvestment flows and for effective technology transfer– without which it may be difficult to achieve emissionreductions at a significant scale. Mobilizing financingof incremental costs of low-carbon technologies isimportant.  | Medium as well as long term | Central and State Government, NGOs and other concerned stakeholders | New funding |
| Inadequate financial framework | Individuals from the financial sector needs to understand the issues related to climate change | High | Information and technical resources of the financial sector needs to be developed so that they can finance projects on a proactive basis that would lead to mitigation options. | Long  | Financial institutions | New funding |
| **CONVENTION REQUIREMENT: 9****Research and systematic observation of climate and other functions****CAPACITY STATUS & STRENGTH**The Government of India attaches high priority to the promotion of R&D in climate change. MoEF is the nodal ministry for the subject of climate change in India. Several central government ministries/ departments (like, Ministry of Science and Technology (MST), Ministry of Agriculture (MoA), Ministry of Water Resources (MoWR), Ministry of Human Resource Development (MHRD), Ministry of New and Renewable Energy Sources (MNRE), Ministry of Defence (MoD), Ministry of Health and Family Welfare (MoHFW) and the Indian Space Research Organization) promote, undertake and coordinate climate and climate related research activities and programs in India through various departments, research laboratories and universities. The MoEF, MST, MHRD and MoA are operated under the umbrella of coordinate premier research laboratories and universities such as the Council of Scientific and Industrial Research (CSIR) under MST, Indian Council of Agricultural Research (ICAR) under MoA. There are three institutions under DST, which are working on atmospheric science – the Indian Meteorological Department, the National Centre for Medium Range Weather Forecast and the Indian Institute of Tropical Meteorology. Research at autonomous institutions like the Indian Institute of Management (IIMs), Indian Institutes of Technology (IITs) and Indian Institute of Science (IISC) and NGOs and private organizations provide synergy and complementary support. India has invested heavily in scientific infrastructure with the view that a strong science and technical base is crucial for sustainable development and self reliance. India now has one of the largest scientific manpower in the world, which serves as a backdrop for understanding the potential of Indian science to address climate change research and assessment. Indian researchers have significantly contributed to the IPCC global assessment reports.  |
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| Need to integrate and contextualize the research efforts to focus on climate change issues.  | The collaborative activities among different research organizations as mentioned above are rarely catalyzed by institutional or programmatic structures. Although efforts have been undertaken to bring research groups together to solve common problems but much still needs to be done. | High | There is a need to review and link the research activities with the national developmental strategy.India is a diverse country requiring region specific (customer driven) research based solutions. The local population may be involved in such initiatives which not only create awareness among them but also provide them alternative livelihood option. Various sectors like water resources, agriculture, terrestrial and marine ecosystems, human health, human settlements, energy and industry have their unique adaptation requirements and there is a need for research to understand the extent of climate change impacts and the possible sectoral adaptation measures.A common website/ newsletter could be developed, which will provide all these research institutions a platform to share and showcase their respective work and learn from others. | Long  | CMDRI, IITs, CPRI, IISc, NEERI, IARI, ICAR, NEERI, IITs, CPCB, SPCB, State Universities. | New funding |
| **CONVENTION REQUIREMENT: 10****Improved decision making, including assistance for participation in international negotiations****CAPACITY STATUS & STRENGTH**India is a party to the UNFCCC, which came into force on 21st March 1994. It has been India’s stand not to agree to any commitments related to reducing greenhouse gas emissions. In order to meet the demands of rising standards of living and providing access to commercial energy to those lacking it, the total emission of green house gases is bound to increase in India and also in other developing countries. Developed countries, being responsible for the problem, owing to their historical as well as current emissions, are required to stabilize and reduce their emissions of GHGs. Hence, developed countries should come forward and take further deeper commitments beyond the year 2012. This would give a clear direction for Clean Development Mechanism through which developing countries can take part in mitigation measures and sustainable development. India believes that the appropriate burden sharing formula (GHG emissions rights) is the ‘equal per capita principle’. India has also been trying to impress upon developed countries to transfer environmentally sound and cleaner energy technologies into the limited public domain for use by developing countries for early adoption, diffusion and deployment accompanied with transfer of financial resources. India had also called for early operationalization of the Adaptation Fund and Special Climate Change Fund under the UNFCCC for addressing Climate Change issues in the developing countries. The GoI, in its National Environmental Policy envisages India’s commitment to clean environment as well as towards making a positive contribution in the international efforts.  |
| **Capacity Gaps to be Addressed (Broad Areas)** | **Brief Description of each Capacity Gap Identified** | **Prioritize Capacity Development Requirement** | **Specify, Capacity Development Actions** | **Time Frame (Short Medium and Long)** | **Target Institutions for Capacity Building (at National, State and Local level)** | **Financial Systems** |
| Strengthen enabling environment for participation in the international negotiations  | There is a scope to strengthen the enabling environment to ensure effective participation in the international negotiations.  | Medium | The technical human resource base in the already existing consultative mechanism of MoEF needs to be expanded, developed and strengthened. Fresh and new ideas/ outlooks may be encouraged. There is also a need to train interested and capable manpower within the Ministry or from MoEF’s centre for excellence in the international negotiations.There is a need for an active and regular coordination and brainstorming between different conventions based division of MoEF.Besides, file system, which is an effective mode of ensuring institutional memory in the government sector, there is a need to develop a comprehensive website on India and UNFCCC (could be a part of MoEF main website). This one link will provide Indian Government perspective, strategy, programs and projects on Climate Change. | Medium to Long  | Central level ministries and departments, and others | Dovetailing |
| **CONVENTION REQUIREMENT: 11****Working with the Clean Development Mechanism****CAPACITY STATUS & STRENGTH**CDM has received good policy level support in India. GoI along with various multilateral & bilateral agencies have provided good system level resources to the mechanism. Various ministries are working in synergy with each other to promote and facilitate the mechanism. The National CDM Authority has been housed in MoEF and other ministries like, MEA, MoF, MoP, and Planning Commission are its members.Good institutional structure has developed with the formation of National CDM Authority and state level CDM cells in Arunachal Pradesh, Uttaranchal, Tamil Nadu, Chattisgarh, Himachal Pradesh, West Bengal, Madhya Pradesh, Gujarat, Orissa, Goa, Jharkhand, Uttar Pradesh, Haryana and Bihar. Many state level institutes like State Renewable Energy Development agencies along with municipalities are increasingly playing a proactive role in the mechanism & are dedicating human, technical and financial resources to the cause. MNRE has been proactive in the area of CDM component and has done substantial work in developing baselines for CDM implementation in India. Development of renewable energy can be considered as a mitigation option to climate change. Institutional structure of consultants who help the project developers in developing documents for availing carbon credit has been streamlined. Many brokerage firms are active in India. These firms help the project developers in selling their CERs. Adequate number of DOE who initiate the process of validation and verification are accessible to the project developers in India. Many NGO’s are working in this sector.  |
| **Capacity Gaps to be Addressed (Broad Areas)** | **Brief Description of each Capacity Gap Identified** | **Prioritize Capacity Development Requirement** | **Specify, Capacity Development Actions** | **Time Frame (Short Medium and Long)** | **Target Institutions for Capacity Building (at National, State and Local level)** | **Financial Systems** |
| Inadequate financial mechanism for supporting CDM activities | There is a need for further sensitizing Banks and Financial Institutions for appraising CDM projects and to take cognizance of CER revenue  | High | Capacity building of commercial banks and financial institutions to appraise CDM projects and enhance their credibility. | Short  | Banks, Financial Institutions, etc. | New funding |
| Inadequate Bundlers/ Programme Coordinators for small scale projects | There is a need for identification of national/ state/ private sector/ Industry Association as institutions that can act as a bundling agencies for small scale projects | High | Agencies identified can enhance preparedness for CDM project identification, development and implementation.  | Short | Project developers, other agencies/ institutions to be identified | New funding |
| Limited capacity of Municipalities to develop CDM projects | There is a need for encouraging Municipalities to develop CDM projects and become climate change friendly. | High  | Capacity development of municipalities to promote MSW and energy efficiency as CDM projects. | Medium | Municipalities, Local Civil Society Representatives, interested parties in private sector etc. | New Funding and Dovetailing with Municipalities programs/ projects. |
| Limited capacity to develop CDM Forestry Projects | There is a need to create more awareness about the potential of forestry projects for both mitigation and adaptation amongst field functionaries, civil society organizations, village level institutions and Government functionaries.Build capacity to prepare CDM projects. | Medium | The CDM Forestry models need to be developed and tested on field for mainstreaming at the forestry policy and programmatic level. Developing capacity of the Forest Officials to develop and implement a CDM Forestry project through training, preparation of pilot projects in different agro-climatic zones and preparation of awareness generation material.Develop a project to delineate potential CDM sites to develop pilot projects.Encourage Joint Forest Management and CDM projects in the LULUCF sector. Develop suitable methodologies for estimation of growing stocks of Indian tree species, soil carbon etc. | Medium | State Forest Departments, Private Sector etc. | Dovetailing with ongoing Forestry Programs.Besides, new fund like CDM Facilitation Fund could be set up to accelerate the program of Afforestation and Reforestation CDM projects. |
| **CONVENTION REQUIREMENT:12****Education , training and public awareness****CAPACITY STATUS & STRENGTH**Environmental protection and sustainable development are India’s key national priorities. This commitment is reflected through outreach and education efforts undertaken by the government, civil society organizations, academic and research institutions, industry associations and the media.The Government of India has created a mechanism for increasing awareness on climate change related issues through its outreach and education initiatives like the web enabled system ‘Environmental Information Systems’ (ENVIS) set up in 1982 and providing information on environmental issues including, chemical waste and toxicology, ecology and ecosystems, flora and fauna, environmental law and trade, environmental economics and environmental energy management among other subjects.As a party to the UNFCCC, India had the privilege of hosting the Eight Conference of Parties (COP8) in New Delhi in 2002 and to create awareness among various stakeholders on climate change issues, the MoEF organized several events ranging from a cartoon exhibition on climate change to workshops and seminars on CDM, mitigation and adaptation strategies. The MoEF regularly supports other initiatives that in some way, direct or indirect, are significant in the context of climate change vulnerability, adaptation and emission abatement. Most of these have an education, training or outreach component.Many academic institutions are including a chapter on global warming in their course. Several civil societies initiatives have sought to build capacity and create awareness about climate friendly issues. Numerous awareness workshops and seminars on issues concerning climate change have been conducted across the country over the last decade. A vital aspect of this process has been the participation by the central and state government agencies, research institutions, NGOs and industry.  |
| **Capacity Gaps to be Addressed (Broad Areas)** | **Brief Description of each Capacity Gap Identified** | **Prioritize Capacity Development Requirement** | **Specify, Capacity Development Actions** | **Time Frame (Short Medium and Long)** | **Target Institutions for Capacity Building (at National, State and Local level)** | **Financial Systems** |
| Need to strengthen existing programs and initiatives |  Present need is to go beyond current efforts by strengthening, expanding and sustaining outreach and capacity building efforts. It is necessarily not only to create a requisite level of awareness and set up information systems, but also to establish and institutionalize adequate mechanisms to ensure access to information, and also to build the capacity required for taking necessary action. Therefore, the task requires a multi-pronged and multi-layered approach, linking together of several players and stakeholders and adequate sustained financial resources, | Medium | Need to develop the link between research output and outreach input.There is a need for a focused inclusion of climate change in academic curricula at various levels.There is a critical need to integrate climate change concerns into consumer education.The initiatives to create awareness among the industry also need to be stepped up to reach every industrial estate and unit in the country. | Long  | Vulnerable communities, grass root level NGOs, administrative officers at local level, etc | New funding |
| **CONVENTION REQUIREMENT: 13****Information and networking, including database****CAPACITY STATUS & STRENGTH**National Conservation Strategy and Policy Statement on Environment and Development, 1992 provides a database of information for the stakeholders and are also promotes research on environment and development. MoEF under National Environment Policy has taken some initiatives on sharing of information and data among various environmental nodal agencies at the centre and state level. The Integrated Energy Policy by the Planning Commission, GoI facilitates information sharing and data exchange as well as setting up of institutional network for GHG inventorization. However, more planning assistance in the area of climate change is required to facilitate information and networking including establishment of databases. The Indian Meteorological Department, DST has been actively collecting climate related data for last 200 years. Hence, institutional capacity on data generation exists in India. However, accessibility and improper computing facility and ability to handle large amount of data acts as a barrier to majority of institutions willing to work in the climate change sector.Science and technology council provides exchange of scientific knowledge with national and international scientific institutions to promote and disseminate scientific and technological innovation; however they have not included climate change in their vision. Development of renewable energy can be considered as a mitigation option to climate change. Therefore, actions taken by organizations like MNRE, IREDA, etc. can be considered as a step towards mitigation measure, one of the commitments of India towards UNFCCC. Also, WBREDA, CREDA, Forests& Environment Department, Government of Gujarat are all working in the area of CDM and provides capacity building in the area. Currently the stakeholders in India are working in relative isolation on the subject of climate change. |
| **Capacity Gaps to be Addressed (Broad Areas)** | **Brief Description of each Capacity Gap Identified** | **Prioritize Capacity Development Requirement** | **Specify, Capacity Development Actions** | **Time Frame (Short Medium and Long)** | **Target Institutions for Capacity Building (at National, State and Local level)** | **Financial Systems** |
| Unavailability of relevant data | System level resources need to be dedicated to develop institutional structure of collecting and undertaking long term analysis of data to understand the phenomena of climate change at a country level in IndiaA better institutional framework needed to facilitate the sharing of information and data among the stakeholders | High | Formation of databases of information about various policies and new technology in SME sector which can be further developed for availing the CDM benefitsEstablishment of easily accessible scientific databasePromote data management skills, facilities and infrastructureDevelopment of institutional structure of collecting and undertaking long term analysis of data to analyze the phenomena of climate change at country and regional level | Long  | Central level ministries, state level departments, NGOs, research and financial institutions, academia, etc. | New funding as well as dovetailing with ongoing projects |
| Inadequate coordination and networking | There is a need of coordination and networking between various state level departments like municipality, transport and forest departments, pollution control board in order to address the issues arising due to climate changeResearchers working on the subject of climate change have often faced barriers in the area of access to information | High | Activities like workshops, seminars, research paper and publication on climate change related issues promote information sharing and networkingCapacity need for strong network of stakeholders for facilitating sharing of data and informationOrganizing specific programmes that would increase coordination and facilitate information flow among various concerned institutions/ organizations | Long | Central level ministries, state level departments, NGOs, research and financial institutions, academia, etc. | New funding as well as dovetailing with ongoing projects |

**PART: 3**

**Conclusion**

* 1. To deal with climate change challenges, India needs to build and strengthen its capacity in the following areas:
* There is a need to improve the quality of national GHG inventories, regional and sectoral assessment of vulnerabilities, and adaptation responses, and communication of information on a continuous basis. The major concern to meet this requirement is non availability of data for some specific inventory sub categories especially for informal and less organized sectors of the economy. In some sectors, data non-accessibility is also a problem. To capture national circumstances there is a need to generate India-specific emission coefficients by undertaking in-situ measurements in some key sources categories for which the technical capacity of the concerned institutions need to be strengthened. Briefly, there is a need to strengthen the R&D component for climate change, which is proposed to be addressed by NAPCC with the setting of a Climate Science Research Fund;
* The LULUCF sector in India has the potential to be a major source or sink of CO2 in the future for which the capacity needs to be developed. The Prime Minister’s Green India campaign for the afforestation of 6 m hectares has already been announced;
* Beyond the sectoral and scientific or technological capacity needs on climate change, the critical need in India is to integrate the diverse scientific assessments and link them with policy making. There is a need to develop the capacity to implement the integrated assessment models; and,
* There is a need to develop innovative technical and financial mechanisms through public private partnerships to address the issue of climate change mitigation as well as adaptation. NAPCC provides to address this issue through venture capital fund.
	1. Presently, efforts are being made to address some of these capacity needs through different programs/ schemes of the Government of India and State Governments as well as by other stakeholders like GEF.
	2. To conclude, the proposed plan of action is consistent with the national goal and strategy as well as with UNFCCC requirements to address climate change concerns from both mitigation and adaptation perspective. Together, it will make a substantial contribution to implementing most of the Millennium Development Goals, particularly environmental sustainability and poverty reduction, while meeting the priorities identified by the COP of the UNFCCC.

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CHAPTER: 4

**Land Degradation: Capacity Needs & Action Plan**

**L**and degradation (primarily, desertification and deforestation) damages ecosystem functions and services, thereby risking livelihoods, economies and societies. Despite the importance of the issue and its close link to economic survival of the poorest populations, land degradation does not receive adequate attention often because of the complex challenges it poses and the need for a better understanding of the issue. The UN Convention to Combat Desertification (UNCCD), 1994 is the key global instrument towards adopting sustainable land management practices by breaking the nexus between land degradation and poverty. India signed the Convention in 1996. The Convention places the land degradation concerns at the centre of the international and national efforts for achieving sustainable development, poverty alleviation and Millennium Development Goals.

* 1. Land degradation has been addressed systematically in India since the Second Five Year Plan (1956 – 61). The Government of India (GoI) and the State Governments have taken a number of policy and legislative initiatives for addressing the land degradation and desertification process that are implemented through an institutional framework coordinated by the Ministry of Environment and Forests (MoEF). However, in a vast and agro-climatically varied country like India, there still remain capacity gaps which make the implementation of these initiatives a difficult task. Recognizing this constraint, the Global Environment Facility (GEF), a funding mechanism of UNCCD has financed NCSA to determine national priorities for capacity development to better address global and national environmental concerns.
	2. The MoEF facilitated the appointment of the Institute of Economic Growth (IEG), a research institute through UNDP, as the thematic consultant for coordinating the land degradation component of the NCSA exercise. The consultant’s report was taken into account while drafting this chapter, wherein the part I focus on the status, trends and legislative and institutional framework for land degradation in India. The second section presents the capacity gaps and action plan for effective implementation of UNCCD in the country. The concluding section while summarizing the major capacity building recommendations for India also proposes an institutional arrangement for implementing these suggestions.
	3. Sustainable land management (SLM) is defined by the GEF, as the use of land resources (soils, forests, rangelands, water, animals and plants) for the production of goods to meet human needs while assuring the long-term productive potential. SLM is the foundation of sustainable agriculture and land use, and a strategic component of sustainable development and poverty alleviation. It addresses the often conflicting objectives of intensified economic and social development, while maintaining and enhancing ecological and global life support functions of land resources. Practicing SLM principles is one of the few options for land users to increase income without destroying the quality of the land as a basis of production. This definition is in alignment with the National Environment Policy (NEP), 2006, India’s Third National Report to UNCCD (2007) and India’s 11th Five Year Plan and forms the basis of the NCSA exercise in India.
	4. NCSA India Land Degradation Thematic Assessment report focuses on the status and trends of land degradation and desertification while identifying the capacity gaps and suggesting ways to address these gaps in the effective implementation of UNCCD in India. The following section provides a broad scale assessment of the status and priorities for land degradation related issues as outlined in national obligations as well as key policies, plans and legislations. The second section presents the capacity gaps and action plan in ensuring the better implementation of UNCCD in the country as well as suggesting ways to strengthen SLM practices and processes ensuring sustainable livelihoods and reduced poverty as a whole in India.

**PART: I**

**Status of Land Degradation in India**

* 1. India has 2.4 percent of the total world’s land of which about 69.5 percent (i.e. 228.3 million hectares - mha) is dryland. The National Bureau of Soil Science and Land Use Planning classified dryland regions of India as arid (50.8 mha), semi arid (123.4 mha) and dry sub humid regions (54.1 mha). In arid and semi arid regions the temperatures rises to 40 degree celsius with large areas susceptible to water and wind erosion, salinization, water logging, drought and desertification. Per capita land availability in India has also declined from 0.89 ha (1951) to 0.3 ha in 2001. Per capita availability of agriculture land has declined from 0.48 ha in 1951 to 0.14 ha in 2001. Per capita land resources are further exacerbated by degradation and desertification of land. About 107.43 mha (32.75 percent) of the total geographical area of the country is affected by various forms and degree of land degradation.

Table: 4.1: Types and Degree of Land Degradation in India

|  |  |  |
| --- | --- | --- |
| **Type of Degradation** | **1990 - 1999** | **2000 - 2003** |
| **mha** | **% of total area** | **mha** | **% of total area** |
| Water erosion | 107.12 | 61.7 | 57.15 | 17.42 |
| Wind erosion | 17.79 | 10.24 | 10.46 | 3.18 |
| Ravines | 3.97 | 2.28 | 2.67 | 0.81 |
| Salt affected | 7.61 | 4.38 | 6.32 | 1.92 |
| Water logging | 8.52 | 4.9 | 3.19 | 0.97 |
| Mines and industrial waste | X | X | 0.25 | 0.08 |
| Shifting cultivation | 4.91 | 2.82 | 2.37 | 0.72 |
| Degraded forests | 19.49 | 11.22 | 24.89 | 7.58 |
| Special problems | 2.73 | 1.57 | 0.11 | 0.3 |
| Coastal sandy areas | 1.46 | 0.84 | X | X |

* 1. The degradation of land, through soil erosion, alkali salinization, water logging, pollution and reduction in organic matter content has several proximate underlying causes. These include: loss of forest and tree cover (leading to erosion by surface water run offs and winds), unsustainable grazing, excessive use of irrigation (in many cases without proper drainage, leading to leaching of sodium and potassium salts), improper use of agricultural chemicals (leading to accumulation of toxic chemicals in the soil), diversion of animal wastes for domestic fuel (leading to reduction in soil nitrogen and organic matter), and disposal of industrial and domestic wastes on productive land. The loss of arable soil and forests affects both economic and ecological functions.
	2. The country has been divided by the Indian Council of Agricultural Research (1979) into 15 agro-climatic zones on the basis of climate, soil and other factors that affect the agriculture in the region. India has also been divided into 20 agro-ecological regions and 60 sub regions on the basis of physiography, soils, climate, growing period and also taking into account available water capacity of the soil. The agro-ecological regions fall into 6 major climatic regions which are arid, semi-arid, dry sub humid, moist sub humid, humid and per humid. The major categories of land use are presented in the table below.

Table: 4.2: Land Use Pattern in India

|  |  |
| --- | --- |
| **Land Use** | **Area (mha)** |
| Total Land Area | 328.73 |
| Forests | 67.84 |
| Area under Non-Agricultural Use | 21.8 |
| Barren and Un-Culturable Land | 19.4 |
| Permanent Pastures and Grazing Lands | 12 |
| Fallow Lands | 24 |
| Cropped Area | 142.5 |
| Area under Food Grain Cultivation | 123.5 |
| Area under Rainfed Farming Systems  | 89 |

* 1. Forestry is an important part of land use. Forests occupy a recorded area of about 77.47 mha constituting 23.6 percent of the total geographical area of the country. However, the actual forest cover is only 67.84 mha out of which 28.78 mha is open forest and 4.03 mha is under scrub vegetation. The forest range from tropical rainforest to dry thorn forests and to mountain temperate and alpine forests. In India, the per capita availability of forest land is one of the lowest in the world, a meager 0.08 ha, against an average of 0.5 ha for developing countries and 0.64 ha for the world. Though the rate of deforestation in the country has been considerably reduced however, the extent of dense forest in almost all the major states has been reduced. Due to Government of India’s afforestation efforts since 1980 onwards, the total area of natural and plantation forests increased from 58.26 mha in 1980 to 65 mha in 1995.
	2. Agriculture contributes 30 percent of India’s GDP. The major part of agriculture is rainfed, extending to 89 mha (61 percent of the net cultivated area of 123.5 mha). A large percentage of cultivated areas growing coarse cereals (90 percent), pulses (81 percent), oil seeds (76 percent), cotton (65 percent) and rice (50 percent) is rainfed. Expansion of irrigation has played an important role in development of agriculture. Full irrigation potential of the country has been estimated to be 139.5 mha, comprising 58.5 mha from major and medium schemes, 15 mha from minor irrigation schemes and 66 mha from groundwater usage. It is estimated that even after achieving the full irrigation potential, substantial part of the total cultivated area will remain rainfed.
	3. About 93 percent of the available water resources are used for agriculture and only 4 percent for industrial purposes. The total water requirement by 2050 is expected to grow to 1,180 billion cubic meters. The national average of annual per capita availability of water is about 1,829 cubic meters, which may decline to 1,557 cubic meters by 2015 due to increase in population. Further, due to heavy extraction of groundwater and its limited recharge, groundwater is getting depleted in the drylands in Punjab, Haryana, Uttar Pradesh, Rajasthan, Andhra Pradesh, Karnataka, Orissa and Maharashtra.
	4. The GDP from livestock sector is estimated around 5.5 percent (1999 – 2000) at current price. Livestock in India is characterized by very large numbers and very low productivity. The cattle health in the country, in general, in poor due to constraints of fodder availability, which is only about one third of the prescribed maintenance ratio. The current and future estimates indicate that production of fodder in the country falls short of the requirement, and the shortage of green fodder is more acute than that of dry fodder. Forest Policy (1988) aims at creating self-reliant village communities in respect of fodder resources. Simultaneously, the policy restricts grazing on common property resources (CPRs). Overgrazing by herds far larger than what the land can sustain, year after year, has progressively rendered the CPRs to marginal or waste lands, grossly eroded.

**Legislative and Institutional Framework**

* 1. Planning in India is based on a process of interaction between the centre, state and local bodies. At the national level, the country’s priorities are projected in the Five Year Plans. Land degradation has been addressed systematically in India since the second Five Year Plan (1956 – 61). Since the fifth Five Year Plan, there has been a paradigm shift wherein the planning is issue specific and all inclusive with an objective of promoting sustainable land use management.
	2. MoEF adopted the National Conservation Strategy and Policy Statement on Environment and Development in June 1992. The strategy and policy statement lays down, inter alia, comprehensive action points for agriculture, irrigation, animal husbandry, forestry, energy generation, industrial development, mining and quarrying, tourism, transportation and human settlements to ensure that conservation of environment is undertaken while achieving sustainable development.
	3. The Environment (Protection) Act, 1986 is an umbrella legislation that empowers GoI to take measures necessary to protect and improve the quality of environment. The Constitution of India also enables the centre and states to enact laws to carry out duties of preservation, afforestation and conservation of natural resources (Article 33). NEP (2006) with the aim of conserving environmental resources while securing livelihoods suggests the following initiatives to reverse the growing trends of degradation and desertification:
* Encourage adoption of science based and traditional sustainable land use practices, through research and development, extension of knowledge, pilot scale demonstrations, large scale dissemination and access to institutional finance;
* Promote reclamation of wasteland and degraded forestland, through formulation and adoption of multi-stakeholder partnerships;
* Prepare and implement thematic action plans incorporating watershed management strategies, for arresting and reversing desertification and expanding green cover;
* Promote sustainable alternatives to shifting cultivation, where it is no longer ecologically viable, ensuring that the culture and social organization of the local people are not disrupted; and,
* Encourage agro-forestry, organic farming, environmentally sustainable cropping patterns and adoption of efficient irrigation techniques.
	1. Some of the other union laws and acts relating to UNCCD activities include: the National Agriculture Policy (2000), the National Forest Policy (1988), the National Land Use Policy (1988), the National Water Policy (2002) among others. As such, there is no separate policy on drought. However, respective ministries/ sectors/ departments of agriculture, water, forestry, livestock management etc have addressed issues of drought management independently. The various acts include: the Indian Forest Act, 1927; the Wildlife (Protection) Act, 1980; the Forest (Conservation) Act, 1986; the Biological Diversity Act, 2002; the Water (Prevention and Control of Pollution) Act, 1974 (amended in 1988); the River Boards Act, 1956; the National Environmental Tribunal Act, 1995; the 73rd Constitution Amendment Act, 1992; the National Environment Appellate Authority Act, 1997; the Fiscal Responsibility and Budget Management Act, 2003; the Disaster Management Act, 2005; the Right to Information Act, 2005; the National Rural Employment Guarantee Act, 2005 among others. Some of the illustrative acts/ legislations adopted by the State Government are: Andhra Pradesh Water, Land and Trees Act (2002), Kerala Land Use Act (2002), Kharland Act, Maharashtra, Orissa Soil Conservation Act (1966), Punjab Land Improvement Scheme Act among others.
	2. Though MoEF is the nodal agency responsible for coordinating and implementing UNCCD related activities in the country however, the other main ministries dealing with land use related issues are: the Ministry of Agriculture and Cooperation (MoA), the Ministry of Rural Development (MoRD) and Ministry of Water Resources at the central level. Some of the other ministries / departments closely involved in execution of UNCCD processes are: Indian Metrological Department, Department of Space, Department of Women and Child Development, Ministry of Panchayati Raj and Ministry of Tribal Affairs. The research support on land management issues is provided by Ministry of Science and Technology, Indian Council of Agricultural Research, Indian Council of Forestry Research and Education, Indian Council of Medicinal Research, India Council of Social Science Research and State Agricultural Universities. Furthermore, to facilitate the implementation of NAP (2001), the National Coordinating Body (NCB) has been constituted by MoEF and includes members from the MoA, MoRD, Planning Commission, Ministry of Water Resources, Ministry of Panchayati Raj, MNRE and Ministry of Law and Justice.
	3. Besides, providing legislative and institutional support, the GoI is also implementing programs to combat desertification such as: National Afforestation Program (MoEF), Drought Prone Areas Program, Desert Development Program and Integrated Watershed Development Program (MoRD), River Valley projects (MoA) among others.
	4. GoI and the state governments are increasingly involving a large number of civil society organizations, the international donor community and the private sector. National RIOD India (a national NGO network) was set up in 1995 to work on the issues related with dryland conservation and management. Further with the 73rd Constitutional Amendment coming into force in 1992 empowered the Panchayati Raj Institutions (PRIs) to conserve and manage their natural resources. On the similar lines, the government programs made a conscious attempt to involve local communities by setting up user’s committees under programs like Joint Forest Management, Watershed Development among others.
	5. According to NEP (2006) the proximate causes of land degradation are primarily driven by implicit and explicit subsidies for water, power, fertilizer and pesticides. Grazing lands are usually common property resources, and insufficient empowerment of local institutions for their management leads to overexploitation of the biomass base. The absence of conducive policies and persistence of certain regulatory practices reduces people’s incentives for afforestation and leads to reduced levels of green cover. This has also been acknowledged by the 11th Five Year Plan, which aims at rationalizing rules and procedures under environmental laws to expedite investment, production and employment growth. There is a need to review, develop and strengthen an enabling environment to combat land degradation and desertification in India with the active involvement of the PRIs, civil society organization and corporate sector.

**PART: 2**

**Capacity Gaps and Action Plan**

* 1. The following matrix details the capacity status, gaps and action plans to strengthen SLM practices and processes in India, as per UNCCD requirements. At a broader level, this action plan is a suggestive core strategy to strengthen country’s environmental management framework.

**LAND DEGRADATION: Capacity Gaps and Action Plan**

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| --- |
| **CONVENTION REQUIREMENT: 1****Capacity to conceptualize and formulate policies, legislations, strategies and programs****CAPACITY STATUS & STRENGTH:** Subject related to Land Management is on the Concurrent List of the Indian Constitution. Both the Central and State Governments legislate and formulate policies and programs on this subject. Capacity for implementing large scale programs and strategies exist to a large extent at the institutional, community and individual levels. There is an active involvement of Government and NGO sectors in protecting and conserving sustainable land resources managements.Historically, India’s land management policy was to treat land for production related activities. Since the 5th FYP, there has been a paradigm shift wherein the planning is issue specific and all inclusive with an objective of promoting sustainable land use management. In 1959, under UNESCO’s arid zone project Desert Afforestation and Soil Conservation Station (DA & SCS) was reorganized and named CAZARI. As far as recommendation made by the State Land Utilization Committee of Government of Rajasthan, a Desert Development Board (DDB) was constituted in 1996 under the chairmanship of Secretary, Ministry of Agriculture, GoI and comprising representative of Central Ministries and nominees from Rajasthan, Gujarat and Haryana. As per the recommendation of the DDB, an integrated pilot project for desert development was initiated in 20 districts nationwide during 1977 – 1978. Similarly, dryland farming projects were initiated during the 2nd FYP (1956 – 61) subsequently expanded in the 4th FYP. The Mid Term Appraisal of the 4th FYP redesigned the Dryland Farming Program into Drought Prone Area Program (DPAP). During the 5th FYP, the DPAP focused on restoration of ecological balance through integrated development on watershed basis. In order to make Desert Development Program (DDP) and DPAP ecologically sustainable drought proofing and combating desertification were brought into focus during the 7th FYP. In pursuance of the recommendations made by C H Hanumantha Rao Committee a common approach for watershed development was jointly formulated by MOA and MORD with a view to ensure full involvement of beneficiaries in watershed development planning as well as implementation. The NWDPRA was launched in 1990-91 with the following objectives: a) Conservation, development and sustainable management of natural resources including their use; and, b) Restoration of ecological balance in the degraded and fragile rainfed eco-systems by greening these areas through appropriate mix of trees, shrubs and grasses. The Common Guidelines on Watershed Development have been further revised by the Parthasarthy Committee.At the central level, MoEF, MOA, MORD and MOWR are major actors in formulating policy, planning, implementation and monitoring of land based programs. Some of the major programs are National Afforestation Program, NWDPRA, DDP, DPAP, and IWDP – with a change in the implementation strategy and institutional mechanism has been strengthened by introducing two tier institutional structures at village and district level. The National Forest Policy (1988), National Environment Policy (2006), Environment Protection Act (1986), National Agriculture Policy (2000), National Water Policy (2002), National Land Use Policy Guideline (1988), Indian Forest Act (1927), National Biological Diversity Act (2002), National Disaster Management Act (2005), Panchayati Raj Act (1992) and Forest Conservation Act (1988) at the Central level are some of the major policies and legislations laying the broad principles for the sustainable land management in the country. These efforts are supplemented by the State specific complementary legislations. MoEF has prepared State of Environment Report for most of the Indian States, which not only describe the environmental management but also the status of land quality |
| **Capacity gap** | **Brief description of each capacity gap identified** | **Priority** | **Specify,****Capacity Development Actions** | **Time frame** | **Target Institutions** | **Financial Systems** |
| Absence of universally agreed definition of Land Degradation | Land Degradation is defined by MoA, MORD and MoEF in a different view as per their mandated responsibilities. MOA defines land degradation in terms of loss of soil productivity, MoRD defines in terms of wasteland outside forest area and MoEF defines it as degraded forest land in terms on canopy cover. As a result, the policies at the national level are not cohesive enough to address the core issue of sustainable land management.  | High | Develop an inclusive definition of Land Degradation based on bio-physical and socio-economic indicators.Develop the vulnerability index to map the extent of Land DegradationConstitution of a National Mission for Assessment of Land DegradationCollate, analyze data on poverty levels, land degradation induced migration and land degradation of common property resources | ShortLong | PC, MoEF, MOA, MoRD and MoWRNRSA, SAC, AISULUB etc.State Remote Sensing Agencies, NRSA, SAC, IITMPC, ICSSR, its Institutes and others  | Dovetailing the activities of the line ministries / departments on land degradation Additional / New funding |
| Inadequate data on Land Degradation  | Data on physical, biological and socioeconomic aspects of the process of desertification and drought is required. Data on poverty levels, land degradation induced migration and land degradation of common property resources is to be collected.  |
| Absence of National Land Use Policy, Grazing Policy, Grassland Ecosystems, Combating Desertification Policy | There is no legislative back up to draft land use policy as it involves wide scale consultations with the State. Similarly, grazing policy requires consultations with MOEF and State Governments as major grazing area falls within the forest. Though there are number of polices and acts complementing and supplementing the UNCCD implementation processes however there is an absence of national level policy framework to combat desertification with legal backup.  | High | Consultation with the stakeholders and formulate policy and legislation.  | Short | PC, MoA, MORD, MOEF, MOLJ, MOTA, State govts and R&D institutions (IGFRI, NCRAF, ICFRE, FSI, and Space Application Centre) | From the available internal resources of the target institutions.  |
| **CONVENTION REQUIREMENT: 2****Capacity to Implement National Action Program to Combat Desertification****CAPACITY STATUS & STRENGTH:** NAP to combat desertification was prepared in 2001 as an obligation to UNCCD. This action plan was the result of wide scale consultation with all stakeholders. The document outlines the activities to be undertaken in consensus with the UNCCD objectives. MoEF is the national coordinating body (NCB), which interacts with donor agencies for the mobilization of bilateral and multilateral assistance for combating land degradation. The implementation of programs related to land degradation is entrusted to MOA, MORD, and MOWR. Besides this, MOEF is implementing program relating to regeneration of degraded forest land and adjoining areas. The NAP has not been reviewed and updated since 2001.  |
| **Capacity gap** | **Brief description of each capacity gap identified** | **Priority** | **Specify,****Capacity Development Actions** | **Time frame** | **Target Institutions** | **Financial Systems** |
| Absence of enabling legislation / Policy Framework to assist the implementation of UNCCD processes | Though there are large number of polices and policy framework complementing implementation of UNCCD processes, a uniform inclusive policy/ legislation addressing NAP implementation is lacking. | High | Formulation of National Policy on Drought and Desertification taking into account climatic variations Formulation of National Drought Management Act and amendments in National Relief Code and Natural Calamity Relief Fund | Short | PC, MoEF, MORD, MOA, MoWR, State Governments IMD, For technical inputs – CSIR, ICAR, and others. | Dovetailing |
| Lack of effective coordination mechanism to implement NAP | Though there is a provision of National Steering Committee and National Project Coordination Committee to ensure inter-institutional coordination it has not been effectively materialized.Similarly, centre – state government coordination on implementation of NAP is required.  | High | MoEF to take initiative for regular holding of inter-institutional meetings including representative from State Governments.Nomination of State Focal Point for UNCCD activities and constitution of State Level Coordination Body  | Short | MoEF, MOA, MORD, MOWR, PC and State Governments | Dovetailing  |
| Lack of effective financial mobilization mechanism | Though there is large share of domestic resources mobilized for land reclamation program annually however, the NAP concerns have not been adequately reflected in these programs. | High | Constitution of National level and State level steering committee to oversee implementation of land reclamation programs as per NAP priorities  | Short | MoEF, MOA, MORD, MOWR, PC and State Governments | Dovetailing  |
| Lack of monitoring and evaluation mechanism for implementation of NAP | Though the respective programs have inbuilt M&E mechanism there is no accepted parameter to evaluate/ monitor the implementation of NAP processes.There is also no indicator for assessment of extent of land degradation and mainstreaming land degradation in national planning process including 11th FYP. | Medium | Develop process and impact indicators for assessment facilitating NAP implementation Guidelines should be developed for implementing agencies to facilitate NAP implementation by various stakeholders, which could be incorporated into NAP planning process.  | Medium  | PC, MoEF, MORD, MOWR, MOA | Dovetailing |
| **CONVENTION REQUIREMENT: 3****Capacity to Undertake International Cooperation and Develop Sub Regional and/ or Regional Action Program****CAPACITY STATUS & STRENGTH:** Over the years, India has developed adequate capacity in the area of technical, institutional and financial to undertake activities relating to international cooperation for combating desertification. India is among the first countries in South Asia to have a NAP under the framework of UNCCD. The country has already offered technical assistance to South Asian countries for the preparation of the NAP. Under the TPN 1 desertification status mapping for the entire country has been prepared on 1:50,000 scale. India is actively participating in Sub regional program to combat desertification since 2004. Under TPN 2, the country has developed a number of models of Agro-forestry. India is hosting the Thematic Area Program for Asia Pacific countries on Agro-forestry in arid, semi-arid and dry sub humid areas. A manual of best practices on Agro Forestry for Asia Pacific region has been prepared by GOI. India is also a member of TPN 4 (take title) and actively participated in TPN 5 and 6 launch meeting. Under the bilateral assistance, a large number of projects related to natural resource management focusing on watershed development, sustainable forest management, soil conservation and improving agricultural productivity are being implemented. Based on the experiences drawn from these projects the capacity of the stakeholders is strengthened for scientific management of land resources. |
| **Capacity gap** | **Brief description of each capacity gap identified** | **Priority** | **Specify,****Capacity Development Actions** | **Time frame** | **Target Institutions** | **Financial Systems** |
| Land degradation as a separate issue has not been adequately focused in the international environmental negotiations  | Though UNCCD focus on Land degradation, the amount of resources available to address these issues are limited especially for countries like India. Ecological dimension of land management is not been adequately addressed | High | There should be dedicated, predictable and timely fund flow to the country to address the issuesTechnology transfer should be done in a time-bound manner | Short | ICAR and ICFRE institutionsMoEF, MoRD, MoA | ODA requiredTechnical assistance and cooperation required |
| **CONVENTION REQUIREMENT: 4****Effective Early Warning and Advance Planning for Periods of Adverse Climatic Variations****CAPACITY STATUS & STRENGTH:** It is estimated that about 241 districts in 21 states are prone to multi-hazards and risks. Droughts are a recurring feature of the arid/ semi-arid tracts. The country has experienced 21 very severe droughts in the last 100 years. National Disaster Management Authority (NDMA) working in coordination with different ministries and agencies at the national, state and local level focuses on providing early warning systems, preparedness, strengthening coping capabilities of the communities through new initiatives in desertification control. India has developed an effective early warning system in place. The traditional knowledge has been playing an important role among rural communities throughout the country for advance planning of agricultural and horticulture activities. India has a number of institutions, which have the advance scientific capacity to forecast on weather and other climatic variations. Use of remote sensing satellite data, spatial data and other technology has been developed to understand and design informed response to land degradation problems. Land and water resource management map and plans have been developed for 174 chronically drought affected districts in the country. Groundwater potential map at district level using multi-spectral satellite data have been developed by ISRO. Participatory resource mapping approaches have been develo0ped and implemented, where the end users of land resources are able to add value to the mapping exercise. Integrating satellite data on watersheds with socio-economic data to provide action plans for the development of food, fodder and water resources have been developed b ISRO. Indian Meteorology Department issues Agro-Metrological advises every fortnight to the farmers for planning agricultural activities. It also has developed weather forecasting models. Krishi Vigyan Kendra’s (KVKs) and agricultural technology management activities (ATMA) of MoA provides technical know how to the people at a regular basis. GRAMSAT programs have been developed by Department of Space, wherein villagers are getting exposure to early warning systems, agro-meteorological predictions through satellite. In some states like Orissa, Andhra Pradesh, Madhya Pradesh and others the program is popular among the farming community. Private sector like ITC Group is promoting E-Chupal as an interactive forum to discuss problems of farming communities with the experts due to climatic variations. MoEF’s Centre for Excellences as well as ENVIS centers ensures linkages with all information sources and the creation of database on early warning etc. Innovative programs for education, capacity building of the local community for drought preparedness are undertaken. Contingency plans are formulated at state and district level to adverse climatic variations. The financial institutions are also extending insurance cover against selected adverse climatic variations like crop insurance, horticulture etc.  |
| **Capacity gap** | **Brief description of each capacity gap identified** | **Priority** | **Specify,****Capacity Development Actions** | **Time frame** | **Target Institutions** | **Financial Systems**  |
| Linkages between adverse climatic variations and land degradation remain under-assessed  | Though there are institutions like Tropical Metrology Institute, Pune, IMD, IITs however, they are working on specific issues and the priority given to analyzing adverse impact of climatic variation on land degradation has not been given due priority. Presently, there is no adequate scientific database to support the linkages between adverse climatic variations and land degradation | High | There should be a National level Institutional on the pattern of CSIR to address this issue considering the magnitude of the problemSpecific research programs should be undertaken to study the gravity of the problem | Short | New Institution | Supported by PC and MoEF |
| Lack of application of GIS data as a tool for community-based early warning systems | The State Remote Sensing Agencies (SRSA) undertake state level mapping activities while collaborating with national level institutions. However, in absence of district level counterpart agency the requirement of community to develop early warning system do not get adequate focus. Though, the country has an advance scientific capacity on early warning system for drought. However, the communities are unable to take maximum advantage of this system due to irregular time frame adhered by SRSA to display the maps. Also, the maps are too complex to comprehend from the common man perspective.  | High | Strengthen capacity of State Remote Sensing Agencies to develop user-friendly GIS mapping with close collaboration with NRSA, ISRO, FSI and others. | Short | SRSA, SAC, NRSA, ISRO, IMD | Additional resources |
| **CONVENTION REQUIREMENT: 5****Systems for Research, Training and Capacity Building****CAPACITY STATUS & STRENGTH:** India has established a number of research and training institutions that have comprehensive programs and activities relating to combating land degradation. These include both government as well as NGOs. Nine centers for excellences have been supported by the MoEF and seven regional centers have been supported by the NAEB with a view to strengthen awareness, research and training in priority area of land degradation. The country has a well defined agenda to promote and encourage research in conservation and management of land resources. A network of environment information centers to cover the broad subject areas of environment, with support from the MoEF, including one dedicated to desertification. ENVIS India has already established 81 partner nodes, including government departments, institutions and NGOs. The ENVIS centers and nodes are responsible for establishment of linkages with all information sources, and creation of data bank on selected parameters in the subject area assigned. Environmental education and outreach is a crucial element. Innovative programs for education, capacity building in the field of environmental education play a major role. Towards this end these programs endorse attitudes, strategies and technologies that are environmentally sustainable. ICAR and its institutions, ICFRE and its institutions, CSIR, State agricultural universities, ICSSR, NCAER, IGIDR, IITs and IIMs, BITS Pillani are undertaking research and development work related to conservation of land resources. Technical and scientific cooperation is encouraged for various land development programs by ministries like MoEF, MoA, MORD and MoWR. The capacity strength of MOEF in forestry training is show cased by the IGNFA, ICFRE and IIFM has been entrusted with research and training in forestry sector. Similarly, MOEF has separate similar research institutions to undertake regional research and training on land management (GUIDE, G B Pant institute, GIDR, KFRI are few e.g.).  |
| **Capacity gap** | **Brief description of each capacity gap identified** | **Priority** | **Specify,****Capacity Development Actions** | **Time frame** | **Target Institutions** | **Financial Systems**  |
| Inadequate technical capacity at the PRIs level | PRIs, entrusted with the management of land resources at the village level are not adequately briefed on scientific land management plan under their jurisdiction.  | High | Develop comprehensive training capsule at a regular interval for PRIs. Exposure visit to successful model sites | Short | NIRD, IRMA, SAU, State Forest Training Institutes. | Additional resources under ATMA of MOA and NAP of MoEF |
| Inadequate training of district level officials | The present focus of training is on Soil and Moisture Conservation practices rather than following an integrated approach including animal husbandry, water harvesting practices – treating land as an ecosystem. Training of district level staff in land conservation from UNCCD perspective is virtually lacking.  | High | Develop training package to meet the obligations of various MEAs, National Polices and Implementation Strategies | Short | NIRD, IRMA, SAU, State Forest Research Training Institutes  | A new scheme on NAPCD to provide financial support may be formulated. |
| **CONVENTION REQUIREMENT: 6****Technical and Scientific Co-operation****CAPACITY STATUS & STRENGTH:** Government of India has initiated technical programs and functional integrated projects to combat desertification. The integrated area development program of DPAP, DDP, NWDPRA, IWDP and programs of Natural Resource Management Division of MoA like soil conservation for enhancing the productivity of degraded lands in the catchments of RVP and FPR, Reclamation of Alkali Soils, All India Soil and Land Use Survey, Soil Conservation Training Centre, Damodar Valley Corporation etc. are important in the context of addressing land degradation and desertification. A National Forestry Data Base Management System is being developed with a view to strengthen technological institutional and human capabilities to ensure continuing and effective dissemination and use of forest statistics. The Standing Committee constituted by the Planning Commission on Bio-resources and Environment has identified 49 priority areas for taking up remote sensing based studies in tune with key environmental and ecological issues of the country. ICAR has developed different agro-forestry system considering the need of farming community of the dryland areas, wherein environmental issues related to global warming and climate change has bee adequately focused. A National Strategic Agricultural Research Fund has been established to stimulate responding to a well defined strategy of prioritization in National Agricultural Research System.Survey of India (SOI), Indian Space Research Organization (ISRO) and a large number of agencies associated with it, and other agencies such as the Forest Survey of India, National Atlas and Thematic Mapping Organization, NATMO etc currently use the best technologies and facilities to support the work on sound land and natural resource management. In addition, the global industry leaders in remote sensing technologies and spatial data management operate from India. The SOI currently operates one of the best digital mapping facilities and caters to the varied mapping needs in the management of land resources. The Indian academic and research institutions have developed exceptional capabilities in supporting the needs of controlling desertification. This is enhanced by active international research collaboration. The use of remote sensing satellite data and sophisticated computerized spatial data analysis technologies has been an important tool to understand and design informed response to land degradation problems. The major mapping efforts undertaken includes: a) land and water resource management maps and plans for 174 chronically drought affected districts in the country; b) desertification status mapping using satellite data; c) integrating satellite data for watersheds with socio-economic data to provide action plans for development of food, fodder and water resources; and, d) groundwater potential maps at district level, using multi-spectral satellite data. The new indigenous satellites – Cartosat and Resourcesat – deployed recently provide support for natural resource management and add entirely new dimensions in meeting the requirements of resource managers globally. For mapping the status of desertification in India, institutions such as India Metrological Department and National Bureau of Soil Survey and Land Use Planning have already furnished the maps and reports. SAC/ ISRO has standardized the indicators and classification system for Desertification Status mapping. Participatory resource mapping approaches have been developed and implemented, where the end users of land resources are able to add value to the mapping exercise. Recently, the Information Technology Enabled Services (ICT) such as on line access to agricultural markets for farmers to address information asymmetries and inequitable access to information technologies in the less endowed regions.  |
| **Capacity gap** | **Brief description of each capacity gap identified** | **Priority** | **Specify,****Capacity Development Actions** | **Time frame** | **Target Institutions** | **Financial Systems**  |
| Ineffective implementation of lab to land technology | Technology developed by institutions for sand dune stabilization, soil and moisture conservation, organic farming, improving land productivity, crop varieties are not reaching the people due to ineffective communication mode (local languages/ dialect not used)Modern technology conflict with the traditional practices still persists and ineffective integration of the two knowledge systems | High | Farmer to farmer ex-change, sharing of experiences, intensive field visit by the scientific community, vigorous farmer technical expert interactions at regular intervalsBlending of traditional and scientific knowledge without hurting community sentiments | Short | CSIR, ICAR and ICFRE, State level institutions, SAU | Dovetailing |
| **CONVENTION REQUIREMENT: 7****Promotion of Alternate Livelihoods including training in New Skills** **CAPACITY STATUS & STRENGTH:** The Government of India and State Governments have launched a number of schemes to promote alternate livelihoods by providing training in new skills. Some of the well-know schemes are: the National Rural Employment Guarantee Act (NREGA), the Swarn Jayanti Gram Swarojgar Yojana (SGSY), the Swarn Jayanti Rojgar Yojana (SGSY), Urban Self Employment Program (USEP) and Jawaharlal Nehru National Union Renewal Mission (JNNURM) amongst many others. Besides, several civil society organizations and private sector are working in this sector. |
| **Capacity gap** | **Brief description of each capacity gap identified** | **Priority** | **Specify,****Capacity Development Actions** | **Time frame** | **Target Institutions** | **Financial Systems**  |
| Facing a threat from the competitive market | Products generated through these alternative livelihood models are facing a competition from the mechanized products in terms of cost, technology and consumer acceptability. | Medium | Alternative livelihood system should respond to the technical requirements to suitably modify their products to generate automatic markets. Blending of modernity in the traditional skills for eco-friendly products. | Short |  | Dovetailing with existing resources  |
| Lack of adequate backward forward linkages | Lack of strong rural marketing network to support the alternative livelihoods | Medium | Develop rural marketing network | Medium | Central, state and local governments and departments | Additional funds and dovetailing with existing resources |
| Islands of sustainable livelihoods models.  | The models developed for promoting sustainable livelihoods remains limited to a geographical region. | High | Lessons learnt from the successful/ unsuccessful livelihood generation models need to be documented and disseminated through media, website and other locally viable communication modes. Exposure visits and interactive workshops for the project implementers to share and learn from each other. | Medium | Government, NGOs, Academia and Research Institutes | Additional funds and dovetailing with existing resources |
| **CONVENTION REQUIREMENT: 8****Developing Partnerships****CAPACITY STATUS & STRENGTH:** The Panchayati Raj System is strengthened with participatory approach in managing the livelihood resources by the initiation of many programs especially Joint Forest Management (JFM) and participatory watershed development. JFM is a system of managing forests as partnerships between forest department and local community. Under JFM, communities are assured of certain share of forest produce and income in return for taking the responsibility of protecting and managing the forests. JFM has been implemented in 28 states with 99,868 JFM committees established. The area covered is 21.44 mha which is equivalent to 28.17 percent of the total forest area. The participatory watershed program is based on a demand driven approach. It converges ongoing development programs with the cost shared by the community. Linkages are established with credit institutions and a flexibility in technology incorporated in the program for sustainable arrangements and post project maintenance. An inter-sectoral and multi-disciplinary National Policy and Coordination Committee (NPCC) under the chairmanship of Secretary, Ministry of Environment and Forests comprises of representatives from related ministries, departments, state governments, institutions and NGOs to integrate the objectives of UNCCD with the national development schemes under Five Year Plans. The National Environment Policy (2006) seeks to stimulate partnerships of different stakeholders, i.e. public agencies, local communities, academic and scientific institutions, investment community and international partners, in harnessing their respective resources and strengths for environmental management.Strong partnerships have been forged with the private sector and civil society organizations to address the issue of land degradation. RIOD international network of NGOs associated with UNCCD and there vibrant civil society initiatives can partner with other nations in developing innovative community-based responses. Afro-Asia Global NGO network has been very active. The private sector has been active in the process of combating desertification. Tata Trust, ITC Group, JK Paper Ltd., Ballarpur Industries Ltd. and Ambuja Foundation are focusing on increasing agricultural productivity, capacity building of SHGs, value added activities in regeneration of wastelands, social and agro/farm forestry, plantation drives, alternative livelihoods program and natural resources management. Similarly, a number of similar activities are being carried out in partnership with the financial and technical assistance of external donor agencies. India is a founder member of GEF and has recently, leveraged USD 30 million for ‘India: Sustainable Land and Ecosystem Management’ programmatic approach. This multi-focal programmatic approach addresses the issues including land degradation, climate change adaptation, agro-biodiversity and dryland biodiversity through the involvement and participation of multi-stakeholders.  |
| **Capacity gap** | **Brief description of each capacity gap identified** | **Priority** | **Specify,****Capacity Development Actions** | **Time frame** | **Target Institutions** | **Financial Systems**  |
| Lack of enabling legislative mechanism | There is no well defined national land acquisition policy though states have some legislation in this regard. There are no parameters defining the land use in a particular state/ region resulting in the large scale diversion of land for non agricultural purposes. Limited mechanisms exist which provide incentives to the states and local communities to conserve practice sustainable land management.  | Medium | There is a need to review the land use policy and parameters at the national, state and local level and devise an enforceable legislation on land use. The incentive mechanism to facilitate the usage of Sustainable Land Management practices need to be institutionalized particularly to facilitate public private partnership. Facilitating private sector involvement in land improvement by providing enabling policy and legal environment e.g. salinity problems (western India), agro-forestry on semi-arid tracts (southern India), wasteland development. | Medium | Central, state and local governments, private sector, NGOs and research institutions  | New / Additional Funding  |
| Need to strengthen institutional mechanism | The NPCC needs to be activated as presently, a number of central and state government ministries and departments are dealing with issues related to land management. There is no single window for providing guidance or to act as a clearance mechanism restricting the active involvement of the private sector and civil society organizations. | High | NPCC mandate and coordination mechanism needs to be reviewed and strengthened to promote better resource management. NPCC should emerge as the overarching guiding, approval and review body.Develop regional and trans-continental partnerships/ collaborative arrangements by building on each other’s strengths – know-how, expertise, solutions, institution building mechanisms etc. | Medium | Central, state and local governments, private sector, NGOs and research institutions | Dovetailing with ongoing activities. |

**PART: 3**

**Conclusion**

4.22 The degradation of land and its subsequent impacts on socio - economic and environmental systems call for integrated action.

4.23 Broadly speaking, the capacity needs that have emerged through this exercise are of three types.

* There are capacity needs relating to knowledge and awareness. There is a need to assess the nature and extent of land degradation, its causes and the linkages to the eco-system functions. There is a need to formulate appropriate strategy for the prevention of land degradation. There is also a need to share this knowledge with concerned stakeholders for determining the priorities for social action and concern;
* There are capacity needs relating to managerial structures and processes. There is a need to have policies and laws relating to land degradation that not only supplement with each other but also with policies and laws relating to other developmental sectors. There is a need to ensure that the process and institutions through which these policies are to be implemented and these laws enforced have the mandate as well as adequate capacity. At the national level, there is a need to review the inter-ministerial institution to integrate Sustainable Land Management (SLM) practices in their respective programs/ policies. Also, there is a need to have adequate financial resources and supporting infrastructure to implement the policies and to form strategic alliances with institutions within and outside the country; and,
* There are capacity needs relating to human resources. There is a need for trained and skilled persons who are in the right place at the right time and who are motivated and professional.

4.24 Several efforts are being made to address some of these capacities at the national level.

4.25 The GEF is also playing an active role although the funds available are not adequate to meet the requirements of a country like India. Recently, the GEF has approved ‘India: Sustainable Land and Ecosystem Management (SLEM)’ program of worth USD 330 million (with GEF grant of USD 30 million). SLEM provides an opportunity for a diverse group of stakeholders to share their skills and experiences to achieve land and ecosystem management objectives that are in line with both their economic interests and the agreed principles of sustainability reflected through integrating biodiversity conservation in agriculture and other natural resource based production systems, and through adapting farming systems to the consequences of climate change.

4.26 To conclude, the proposed plan of action is consistent with the national goal and strategy and with UNCCD requirements and MDG goal: 7 to arrest and reverse current trends in land degradation to ensure environmental sustainability and enhanced livelihoods.

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CHAPTER: 5

**Action Plan to Mainstream Capacity Building in National Developmental Planning**

**: Towards Sectoral and Cross-cutting Approach**

**T**he Action Plan to mainstream capacity building requirements builds upon India’s existing efforts to realize global environmental outcomes that are incremental to National Environmental Policy (NEP), 2006. In practical terms, this means formulation of capacity building initiatives that are NEP plus. Figure 5.1 illustrates the structural features of the NCSA in relation to economic development, global environmental priorities and national action plans.

Figure: 5.1

Scheme of Integration of Global Environmental Agreements into National Policy Process in India

**National Environment Policy 2006**

**Reduced Demographic Pressure on Natural Resources**

**Sustainable Livelihoods**

**Sustainable industrial projects**

**UNCCD**

**CBD**

**UNFCCC**

* 1. Figure 5.1 provides a schematic illustration of the dynamics of linkages between the NEP and the Multilateral Environmental Agreements of UNCCD, UNFCCC and the CBD. What is worthy of note in Figure is that the linkage of NEP to the global conventions is through the respective national communications and action plan reports submitted by India to the Conventions. The National Communications and Action Plan Reports filter out elements of the MEAs that are not readily incorporatable in India’s national plans and programs. At the same time the national communications and action plan reports also specify areas of action on the capacity building front that are NEP plus.
	2. NEP, which is to guide India’s environmental policy in the coming years, is based on the philosophy that while conservation of environmental resources is necessary to secure livelihoods and well-being of all, the most secured basis for conservation is to ensure that people dependent on particular resources obtain improved livelihoods from the fact of conservation, than from degradation of the resource. Implicit in this statement is the fact that environmental resources need to be turned into avenues of livelihood generation and enhancement. The corollary of the statement is that poverty should always be seen as arising from degradation of natural resources. These concerns have also been acknowledged by the 11th Five Year Plan. The NEP lays down the following objectives:
* Conservation of Critical Environmental Resources
* Intra-generational Equity: Livelihood Security for the Poor
* Inter-generational Equity
* Integration of Environmental Concerns in Economic and Social Development
* Efficiency in Environmental Resource use
* Environmental Governance
* Enhancement of Resources for Environmental Conservation
	1. The basic principles underline the NEP and which ideally guides its objectives are (a) human beings as the centre of sustainable development concerns; (b) the right to development that recognizes inter-generational equity and the coupling of environment and development concerns; (c) integration of environment protection and development process; (d) precautionary approaches which aim to address serious or irreversible damage to key environmental resources even in the wake of full scientific certainty; (e) economic efficiency which would underlay attainment of environmental conservation concerns by invoking the principles of ‘polluter pays’ and cost minimization; (f) recognition of entities with incomparable values; (g) equity; (h) legal liability; (i) public trust doctrine; (j) decentralization; (k) integration; (l) environmental standard setting; (m) preventive action and (n) environmental offsetting.
	2. The NEP also considers a variety of partnership options including Public - Community and Public - Private Partnerships, Public Private and Voluntary Organization alliances. The draft approach document to the Eleventh Plan also stresses on these models. The Bharat Nirman Program, the Jawaharlal Nehru Urban Renewal Mission, the National Highway Development Programs I and II are other initiatives have fundamental impacts on country’s infrastructure and employment generation efforts. Integration of environmental considerations in these programs can have a salutary effect in addressing pollution and in controlling GHG emissions besides minimizing biodiversity loss due to infrastructure development. The Eleventh Plan emphasis on industrial training and related capacity building need to be dovetailed with the NCSA process in the larger interests of spreading application of renewable energy and related clean technologies.
	3. The objectives of the NEP necessitate adoption of crosscutting approaches. This is due to the fact that conservation is a holistic term, which requires multi-media, approaches that cut across different resources in given ecosystems. Similarly the externalities of production and consumption activities on different natural resources need to be factored in through integrated cross cutting approaches. Coming to the principles, it is evident that cross cutting approaches are suggested particularly in the matter of the principles related to integration of environmental protection in development and precautionary approaches. Similarly cross cutting approaches are unavoidable in environmental standard setting and offsetting processes which require integrated approaches to determine recursive externalities.
	4. In other words, the NEP calls for substantial capacity building initiatives in order to address the cross cutting nature of its objectives and principles. When read in conjunction with NATCOM, India’s Third National Report to Convention on Biological Diversity and India’s National Action Program to Combat Desertification, 2001, a variety of cross cutting issues emerge which are critical for capacity building under the NCSA. It is apparent that the NCSA needs to focus on integrated approaches to address national and global environmental problems.
	5. A survey of different multilateral environmental agreements indicates that the concept of synergies has not been inherent to many of these agreements. This is more so, for the Rio Conventions of Climate Change and Biodiversity. In the case of the UNCCD, being a post – Rio Convention, there has been a clear recognition of the existence of the UNFCCC and CBD. Article 8 (1) of the UNCCD clearly states that the convention would coordinate its activities with the UNFCCC and CBD in order to derive maximum benefits arising from the activities under each agreement while avoiding duplication of efforts. Indeed Article 8 (1) of the UNCCD clearly mentions about the need to conduct joint programs in the fields of research, training, systematic observation and information collection and exchange.
	6. Synergies that crosscut global and national environmental concerns are also not reflected in national action plans and programs relevant to land degradation, climate change and biodiversity conservation. In some cases where crosscutting features are present in projects, it is more by way of coincidence than a matter of conscious design. The 11th Five Year Plan document recognizes this gap that the multi-dimensional nature of environmental issues has not yet been translated into policies and programs. Furthermore, crosscutting projects that require integrated approaches need integrated managerial capacities that are short in India. Project design capacities that call for crosscutting approaches and firm anchoring of projects in national policy are also limited. A critical need for India is capacities for assessment of externalities arising from biodiversity loss, climate variations and land degradation. There is a need for relevant, reliable, timely statistics to set policies, monitor progress and evaluate outcomes rather than just outlays as proposed in the 11th Five Year Plan.
	7. There is a need to build statistical capacity of the relevant institutions in the country to develop a robust, regularly updated database especially of a cross cutting nature. There is a need to develop capacity to collect, analyze and disseminate statistics to support the national policy making process. Following are some suggestions:
* Apart from data on physical, biological and socio-economic processes of desertification and droughts including data on price fluctuations for agricultural products, it may be desirable to extend the data scope by collecting information on rainfall / and evapo-transpiration ratios and the trade – off between carbon sequestration objectives and water balance impacts to factor in climate change issues. Similarly, data on biodiversity loss arising from desertification and livelihoods impacts on local communities could be utilized for factoring in biodiversity elements.

### Data on poverty levels, and migration in desertification prone areas to be collected along with data on endogenous drought proofing land and water management strategies to capture climate change impacts. Similarly documenting traditional knowledge regarding droughts management strategies in agriculture and animal husbandry will be useful.

* Apart from gathering data on technology, know-how and practices it will be useful to document traditional knowledge relevant to drought management and agricultural systems from the point of view of adaptations strategies that are important from the view point of climate change. Similarly data on sources of tacit and public domain knowledge could be added to bring in biodiversity elements.
* Data on number of stakeholders forming part of education and training target groups and cases of successful adaptation to climate change if coupled with data on curricula in the areas of biodiversity and forest management could be helpful in providing integrated approaches.
* Ecological energetic, ecological processes documentation for different habitats and systems and incidence of actual use of components of biodiversity and biological resources by local communities to enable generation of information relevant to realization of the requirements of Article 10 (a) of CBD.
* Data on threatened species in given habitats if supplemented with data on microclimate in areas concerned could provide a climate change impacts on threatened species. Similarly data on spread of LMOs in protected areas could be useful in addressing land degradation issues as well.
* Apart from collecting data on harvesting and bio prospecting of specimens, it will be useful to document impacts of these activities in terms of land / forest degradation with additional impacts on carbon budgets of such lands subjected to collection / harvesting activities.
* Catalogue research projects on biodiversity issues and its dissemination. Also collect information on number of projects that look at climate and land degradation impacts of biodiversity loss. Collect data on utilization of biological resources and their sustainability as reckoned in terms of land quality including biomass availability and carbon retention.
* Collect data on successful models of benefit sharing and impacts on land improvements, drought proofing and carbon sequestration.
* Collect data on (a) sui-generis and related modes of protection of traditional knowledge in different communities and (b) environmental impacts namely, biodiversity, climate change and land use of genetically modified crops and medicines.
* Collect data on outlays, expenditure and unmet financial needs for various biodiversity conservation projects. Segregate and compile separate data base on the financial outlays, effectiveness and expenditure incurred on cross cutting biodiversity projects that have positive climate change and land use impacts.
* Collection of data that establish resilience of eco-systems to climate change in terms of their biodiversity properties and ability to sustain the natural productivity of land. Also relate such data to the economic welfare of communities concerned as reckoned by income levels and / or utilization of real resources.
* Collect data on climate variability, biodiversity regimes and land use for vulnerable communities to develop integrated plans that are cross – cutting in nature. This will include data on agriculture, fisheries, common property resources and human and animal migration in potentially vulnerable areas in India including small islands, coastal zones and arid and semi-arid environments.
* Collation and preliminary analysis of climate related data base, land use systems and biodiversity inventory maintained by existing sectoral institutes.
* Data on regional variability in rainfall and transpiration ratios, biodiversity habitats including endangered flora and fauna and the process of land degradation as evidenced from data on waste lands, water-logged lands and degraded forest patches.
* Data on total environmental impacts of clean development mechanism projects including carbon sequestration, biodiversity impacts and land use impacts.
	1. Cross cutting approaches call for synergistic approaches amongst different conventions. However, synergies amongst multilateral environmental agreements have its pitfalls. They could lead to sub optimal flow of financial resources by tempting funding agencies to contribute less for synergistic projects and programs. Synergies need to be worked out or experimented at the national level before they can become the global norm. This is because synergies at the MEA level can potentially lead to specific thematic area projects losing out in terms of dedicated resources. Also it is likely that synergies at the global level can lead to the emergence of monolithic guidelines that could prove to be problematic for certain national programs that are not necessarily compatible with these guidelines, A case in point is the clash between wasteland development projects based on non timber biomass with timber based afforestation projects that may be more optimal from the carbon sequestration potential. India’s approach to the NCSA is thus based on a careful balancing of India’s core environmental policy concerns with global environmental obligations.
	2. There is already a considerable amount of capacity development being done under specific conventions. The NCSA is unique in its focus on cross-cutting capacity issues i.e. issues that ‘cut across’ or are ‘common to’ multiple conventions. It also identifies ways to promote linkages among convention thematic areas and synergies in implementing the conventions. Based on the capacity priorities identified by the three thematic reports, the cross-cutting report identified areas and strategies for extending the scope of thematic capacity building exercises to include cross cutting dimensions. The following table sums up the principal capacity building requirements for designing and implementing crosscutting projects in India.

**CROSSCUTTING ISSUES: Capacity Gaps and Action Plan**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Capacity Gaps** | **Brief Description of Capacity Gaps** | **Priority** | **Capacity Development**  | **Time** | **Target Institutions** | **Financial System** |
| Low priority for Crosscutting issues in National Development Planning | The present planning process is at best sectoral, lacking integration of crosscutting issues to achieve global environmental benefits | High | Review sectoral plans for the incorporation crosscutting issues.Coordinated capacity building through inter-ministerial, civil society and private sector involvement for inclusive sustainable development. In other words, there is a need to set up a high level body (like Prime Minister’s Council on Climate Change) to consciously integrate environmental concerns with the national development planning and process for concrete outcomes that are cross cutting in nature. Presently, the National Environment Council constituted by MoEF and chaired by the PM exists with members drawn from various Ministries. However, this Council meets on a yearly basis and is mainly an advisory body. It is important to review and enhance the mandate of the Council to include monitoring of the progress made in different sectors in integrating development and environmental concerns in a sustainable manner. And, on the basis of monitoring, the Council should direct the concerned Ministry/ Department/ State Government to act on a mandatory basis. The Council could be supported by the thematic Task Forces, which will work year round. NAEB, NBA and CDM Authority may provide support to National Environment Council on LD and BD issues. | ShortMedium - Long | Facilitated by MoEF and the Planning Commission through Task Forces | Additional / New funding |
| Capacity limitation in formulation and implementation of projects on pilot scale in select bio-geographic regions | Few pilot projects have been implemented (like, India Eco development) or under implementation (like, SLEM) using integrated approaches. However, there is a need for capacity to design similar projects for critical bio-geographic regions.  | High | Central, State and Local Government officials – i.e. policy planners and program implementing agencies capacity to be developed through preparation of case specific case approaches for a) reviewing policy guidelines; b) improving inter-departmental coordination; and, c) project implementation, review and assessment capacities.Building on the case study documentation, customized training modules, manuals and communication material could be developed.An innovative incentive package (comprising of both economic and non-economic instruments) could be developed to ensure effective implementation/ follow up of the above two measures for a) the formulation and implementation of pilots in select bio-geographic regions; and b) integration of sectoral projects/ programs to address local crosscutting issues generating national and global environmental benefits.  | Medium - Long | All concerned central, state and local government institutions to be the target group Research / Academic institutions, private sector as potential trainers.  | Additional / New funding |
| Strengthening Education and Awareness Building Initiatives | Several initiatives at various levels are being done to educate and create awareness on environmental issues however; the focus on ecological inter-linkages and interdependence is missing.National Environmental Awareness Campaign and other such initiatives are ongoing, which are broadly of two types: a) some of these programs are restricted to the task of awareness creation only, where taking action remains an elusive concept; b) some programs remain limited to creating awareness through one time action. Behavioral change needs to be affected for target groups. The impact of such efforts remains minimal. | Medium | The Environment Information System (ENVIS) started by MoEF for environmental information collection, collation and dissemination to policy planners, scientists and others needs to be made more visible and effective. There is a need to develop and regularly update customized training and evaluation modules for the different sections like school, college / university students, teachers, project implementation staff, development agencies amongst others.Trainings should be in-built as a regular activity linked to the personnel incentive policies for the governmental and development sector officials.  | Medium - Long | All concerned stakeholders including academic, research institutions, government, civil society, private sector and others.All concerned central, state and local government institutions to be the target trainees. Research / Academic institutions, private sector as potential trainers. | Dovetailing with existing resources and New/ Additional Funds |
| Risk assessment capacities are lacking arising from environmental incidents and developmental risks | Crosscutting projects could pose economic risks to regular developmental projects, which needs to be assessed for corrective measures | High | Risk analysis capacities. Risk assessment based on valuation of costs and benefitsVulnerability and adaptation capacity to risks in the case of national, state and local level academic/ research institutions to be developed. Specific training modules and manuals may be developed for this purpose.Training of central, state and local government representatives in risk and vulnerability issues and adaptive strategies.  | Medium - Long | Concerned stakeholders including academic, research institutions, government, civil society, private sector and others. | Additional/ New Funding |
| Limited Project Monitoring, Evaluation and Assessment Capacity | Presently, tools and methodology to evaluate developmental projects from a crosscutting perspective are non existent. It is likely that a developmental project, which is improperly designed, may secure one global environmental benefits at the cost of another (for instance, an LD project may not optimize BD outcomes). | High | To develop methodology and tools for project monitoring and evaluation to analyze the trade off of specific global environmental benefits, resulting in possible sub optimal global and national environmental outcomes. | Medium - Long | Academic/ Research Institutions, State Planning Boards/ Departments | Dovetailing with existing resources and New/ Additional Funds |
| Limited and non optimal use of Traditional Knowledge Systems | There is a general shortage of capacity in evaluating the role of traditional knowledge in developmental projects and more so in the case of crosscutting projects, which are yet to become pervasive in India. | Medium | Capacity to evaluate the role of traditional knowledge in addressing global environmental problems of climate change, biodiversity and land degradation.Methods of utilizing traditional knowledge in adapting processes.Communication models required for tapping traditional knowledge of local communities. Specific management training models need to be developed to initiate behavioral changes amongst developmental practitioners at different levels. | Medium - Long | Concerned stakeholders including academic, research institutions (especially, management institutes), government, civil society, private sector and others. | Dovetailing with existing resources and New/ Additional Funds |

* 1. Keeping in view the discussions so far, the Action Plan is based on a two track approach which accords priority not only for building sectoral capacities identified in the preceding sections but also for implementation of cross cutting projects that inter-link the three conventions to achieve integrated results. It is important to position cross cutting projects in the specific context of critical ecosystems in the country such coastal zones, mountains, semi-arid and arid zones and other vulnerable ecosystems that have issues relating to risks to development.
	2. Since the early 1990s, India has been addressing global environmental problems by way of initiatives that seek to optimize global environmental benefits within the framework of national policies and programs in the field of environment. Global Environmental Facility (GEF) projects undertaken in India in the 1990s were projects that combined these qualities. The GEF which was set up in 1991 to provide grant support for projects in six focal areas viz, biodiversity, climate change, international waters, land degradation, the ozone layer, and persistent organic pollutants. These focal areas correspond to the CBD, UNFCCC, UNCCD, the Montreal Protocol on Ozone Depleting Substances and the Stockholm Convention on Persistent Organic Pollutants. Recently, the GEF is increasingly focusing on addressing national and global environmental concerns from a crosscutting perspective. The programmatic guidelines for GEF 4 (2006 – 2010) identifies ‘sustainable forest management’, ‘adaptation to climate change’ and ‘sounds chemical management’, which require a separate strategy paper. Other inter-linkages between the focal areas are reflected in the respective focal area strategy papers. Thus, the strategic program on marine protected areas in biodiversity is linked to the strategic program on marine fish stocks and associated biodiversity in international waters; the strategic objective of mainstreaming biodiversity in biodiversity and the strategic program on balancing uses of water resources in international waters are both linked to the strategic program on sustainable agriculture and rangeland management in land degradation; the strategic program on sustainable energy from biomass in climate change is linked broadly to the focal areas of biodiversity and land degradation.
	3. A cross-cutting goal for the GEF is to ensure that capacity is left behind in countries following project completion - capacity that can be identified and measured using outcome indicators. This GEF will ensure by embedding capacity building elements in a coordinated manner in GEF projects by promoting programmatic approaches, where demanded. This will include activities that achieve better defined policy targets, data collection and indicator tracking systems, and use of quantitative metrics and analysis in policy formation and evaluation. This is in recognition that achieving good environmental performance depends overall upon level of development and good governance. The impact of this exercise would be strengthened institutional capacity that ensures continuation of global environmental benefit generation.
	4. India’s two notable GEF assisted projects with a crosscutting perspective include ‘India-Eco-Development Project’ (with focus on biodiversity conservation) and the recently approved ‘India: Sustainable Land and Ecosystem Management (SLEM)’ project (with focus on land degradation, agro and dry land biodiversity and Climate Change adaptation). While the former deals with sustainable livelihoods and prevention of degradation, the latter has the elements of climate change adaptation, biodiversity enhancement and livelihood concerns in-built. These are NEP plus projects.
	5. Some of the other suggestive themes that could be considered as NEP plus projects are as follows:

(a) **Eco-development Projects for Arid and Semi-Arid Zones**, which is a key priority area under our national programs as evidenced by the predominance by way of financial investments on Desert Development, Drought Prone Area and Wasteland Development Programs in five-year plans. However unlike the present focus of these programs which is on avoidance of land degradation and attainment of sustainable livelihoods, the focus of the GEF projects could look into cross cutting issues such as conservation of agro-biodiversity and wetlands and development of bio- fuel plantations. This extension could provide the necessary linkages to the UNFCCC and CBD. Monitoring capacities in the area of cross cutting themes are short and ought to form the focus of capacity building under the NCSA.

(b) **Integrated Development of Mountain Ecosystems**, which flows from the predominant role accorded in five year plans for eco-restoration of Western Ghats and the regionally disadvantaged Eastern Himalayas. While the predominant emphasis of the existing programs is on avoidance of soil and water loss and on promoting biodiversity conservation, the same could be extended to mapping soil carbon build up and vulnerability mitigation arising from flash floods and landslides in these ecosystems. The possibilities of building in small hydel energy generation component could provide impetus for renewable energy schemes in mountain areas. Two kinds of capacity constraints are noted with regard to Mountain Ecosystems. One, the ability to link natural resource loss to livelihoods and two, impact assessment capacities at the local community and organizational levels required to study issues relating to climate change and biodiversity loss. Since in all the three areas, capacity building is a major constraint GEF funding could critically increase the likelihood of success for interventions.

(c) **Vulnerability Assessment and Taxonomy**: Cross-Focal Capacity Building Initiatives across sectors or ecosystems involving advanced tools such risk assessment and biosystematics that are backed by cross country inputs and experiences.

* 1. Capacity building under NCSA is designed to secure inclusive sustainable development. The key sectoral level capacity building requirements that have been listed in the thematic assessment matrices for biodiversity, climate change and land degradation, which needs to be implemented in right earnest. However keeping in view the ecological interdependencies, some cross-cutting themes as well as managerial issues have been identified for implementation to strengthen country’s environmental management framework.
	2. MoEF has an important role of monitoring the development process and its environmental impact in perspective of sustainable development and to devise suitably regulatory structures to achieve desired results. The capacity of the various Centre for Excellences of MoEF needs to be upgraded and strengthened and through these Centers, the respective thematic divisions of MoEF could ensure the implementation of the NCSA recommendations.
	3. While MoEF’s role is important, it is also imperative that environmental concerns are internalized in policy making in number of sectors requiring actions which go well beyond the purview of MoEF. Thus, the responsibility of implementing the recommendations of NCSA exercise lies not only with MoEF but with all the identified target and potential stakeholders, who have stakes on renewable capacity of planet Earth, which is commonly share by all of us. And, we only have one and it is also non renewable, beyond a point.

**……………..**

**Annexure: 1**

Guidance from Conventions

In exploring guidance from Conventions (UNCCD, CBD and UNFCCC) regarding NCSA, the important issue is to locate the key provisions of the Conventions that seek to promote capacity building. Also of possible significance is perusal of reviews and assessment exercises connected to the Conventions that provide diagnosis of limitations and strategies in the area of capacity building.

Following are the three Conventions and their guidance on capacity building measures.

**Convention on Biological Diversity (CBD)**

Guidance for capacity building for the CBD can be traced to Articles 12 and 13 and is reiterated in COP meeting proceedings and the Strategic Plan document of the CBD. The text of the 2 Articles are as follows:

*Article 12*

*Research and Training*

 *The Contracting Parties, taking into account the special needs of developing countries, shall:
(a) Establish and maintain programs for scientific and technical education and training in measures for the identification, conservation and sustainable use of biological diversity and its components and provide support for such education and training for the specific needs of developing countries;*

*(b) Promote and encourage research which contributes to the conservation and sustainable use of biological diversity, particularly in developing countries, inter alia, in accordance with decisions of the Conference of the Parties taken in consequence of recommendations of the Subsidiary Body on Scientific, Technical and Technological Advice; and*

*c) In keeping with the provisions of Articles 16, 18 and 20, promote and cooperate in the use of scientific advances in biological diversity research in developing methods for conservation and sustainable use of biological resources.*

*Article 13.*

*Public Education and Awareness*

*The Contracting Parties shall:*

*(a) Promote and encourage understanding of the importance of, and the measures required for, the conservation of biological diversity, as well as its propagation through media, and the inclusion of these topics in educational programs; and*

*(b) Cooperate, as appropriate, with other States and international organizations in developing educational and public awareness programs, with respect to conservation and sustainable use of biological diversity.*

Unlike the UNCCD, the spirit of the two Articles of the CBD is on advanced skill building, which provides the wherewithal for tapping the knowledge base of advanced research in the area of biodiversity and to utilize the research in the areas of conservation and sustainable use of biological resources, which cuts across thematic areas, despite this being not explicitly stated.

In terms of decision VI/26 of COP 6, the COP of the Convention adopted the Strategic Plan for the CBD, which amongst the many important strategic focus areas listed the following capacity gaps and knowledge erosion issues for rectification:

These are

(a) Inadequate capacity to act due to institutional weaknesses

(b) Lack of human resources

(c) Lack of transfer of technology and expertise

(d) Loss of Traditional Knowledge

(e)Lack of adequate scientific research to support all objectives

Points (c) and (d) of the Strategic Plan requires adoption of cross cutting approaches towards capacity building programs that are inter-disciplinary.

**Bio-safety Protocol**

The focus of the Bio-safety Protocol is on co-operation for capacity building that is aimed at strengthening human resources for bio-safety management. A variety of stakeholders are to be covered including industry, R& D establishments, civil society groups and NGOs and trade regulating entities. Since bio-safety has multi-media and resource impacts, approaches to bio-safety call for cross cutting approaches in capacity building. Articles 22 and 23 of the Protocol which deal with capacity are detailed below.

*Article 22*

*Capacity Building*

*1. The Parties shall cooperate in the development and/or strengthening of human resources and institutional capacities in bio-safety, including biotechnology to the extent that it is required for bio-safety, for the purpose of the effective implementation of this Protocol, in developing country Parties, in particular the least developed and small island developing States among them, and in Parties with economies in transition, including through existing global, regional, sub-regional and national institutions and organizations and, as appropriate, through facilitating private sector involvement.
2. For the purposes of implementing paragraph 1 above, in relation to cooperation, the needs of developing country Parties, in particular the least developed and small island developing States among them, for financial resources and access to and transfer of technology and know-how in accordance with the relevant provisions of the Convention, shall be taken fully into account for capacity-building in bio-safety. Cooperation in capacity-building shall, subject to the different situation, capabilities and requirements of each Party, include scientific and technical training in the proper and safe management of biotechnology, and in the use of risk assessment and risk management for bio-safety, and the enhancement of technological and institutional capacities in bio-safety. The needs of Parties with economies in transition shall also be taken fully into account for such capacity-building in bio-safety.*

 *Article 23*

*Public Awareness and Participation*

*1. The Parties shall:*

*(a) Promote and facilitate public awareness, education and participation concerning the safe transfer, handling and use of living modified organisms in relation to the conservation and sustainable use of biological diversity, taking also into account risks to human health. In doing so, the Parties shall cooperate, as appropriate, with other States and international bodies;
(b) Endeavour to ensure that public awareness and education encompass access to information on living modified organisms identified in accordance with this Protocol that may be imported.
2. The Parties shall, in accordance with their respective laws and regulations, consult the public in the decision-making process regarding living modified organisms and shall make the results of such decisions available to the public, while respecting confidential information in accordance with Article 21.*

 In addition to the two Articles, Article 11 (9) of the Protocol invites Parties to indicate their needs for financial and technical assistance and capacity-building specifically with respect to LMOs intended for direct use as food or feed or for processing. Furthermore, the governing body of the Protocol (COP-MOP) is required, when giving its guidance with respect to the financial mechanism for the Protocol, to take into account the needs of developing country Parties in their effort to identify and implement their capacity-building requirements. This is a requirement as per Article 28 (4) and (5) of the Protocol.

As per decision BS-I/5 of the first meeting, the COP-MOP an Action Plan for Building Capacities for the Effective Implementation of Protocol was developed. The COP-MOP also considered a preliminary set of criteria and indicators for monitoring implementation of the Action Plan. Finally the COP-MOP decided to include capacity building as one of the standing items in its medium term work program. In its third meeting the COP-MPO adopted decision BS-III/3 and brought in a revised Action Plan for Building Capacities based on co-ordination and synergies between different capacity building initiatives. (http://www.biodiv.org/biosafety/issues/cap-build.shtml)

**United Nations Framework Convention on Climate Change (UNFCCC)**

The guidance of the UNFCCC is based on substantial international and inter-governmental coordination. Research capacities and capabilities in developing countries is focused apart from education, training and public awareness for national institutions and personnel. Coming to the Kyoto Protocol, it is seen that the focus is on upgrading capacities to achieve improved adaptation practices. The Conference of Parties to the UNFCCC and the members of the Kyoto Protocol have in recent years worked hard to provide capacity building frameworks based on cross cutting practices with a substantial focus on monitoring of programs and projects.

Two Articles (5 & 6) of the UNFCCC are important from the point of view of capacity building. These are discussed below.

*Article 5*

*Research and systematic observation*

(a) *Support and further develop, as appropriate, international and intergovernmental programs and networks or organizations aimed at defining, conducting, assessing and financing research, data collection and systematic observation, taking into account the need to minimize duplication of effort;*

*(b) Support international and intergovernmental efforts to strengthen systematic observation and national scientific and technical research capacities and capabilities, particularly in developing countries, and to promote access to, and the exchange of, data and analyses thereof obtained from areas beyond national jurisdiction; and*

*(c) Take into account the particular concerns and needs of developing countries and cooperate in improving their endogenous capacities and capabilities to participate in the efforts referred to in subparagraphs (a) and (b) above.*

*Article 6*

*Education, training and public awareness*

*In carrying out their commitments under Article 4, paragraph 1 (i), the Parties shall:*

*(a) Promote and facilitate at the national and, as appropriate, sub-regional and regional levels, and in accordance with national laws and regulations, and within their respective capacities:*

*(i) the development and implementation of educational and public awareness programs on climate change and its effects;*

*(ii) public access to information on climate change and its effects;*

*(iii) public participation in addressing climate change and its effects and developing adequate responses; and*

*(iv) training of scientific, technical and managerial personnel;*

*(b) Cooperate in and promote, at the international level, and, where appropriate, using existing bodies:*

*(i) the development and exchange of educational and public awareness material on climate change and its effects; and*

*(ii) the development and implementation of education and training programs, including the strengthening of national institutions and the exchange of personnel to train experts in this field, in particular for developing countries.*

**Kyoto Protocol**

The capacity building provisos of the Kyoto Protocol are contained in Article 10 which is as below:

*Article 10*

*All Parties, taking into account their common but differentiated responsibilities and their*

*specific national and regional development priorities, objectives and circumstances, without introducing any new commitments for Parties not included in Annex I, but reaffirming existing commitments under Article 4, paragraph 1, of the Convention, and continuing to advance the implementation of these commitments in order to achieve sustainable development, taking into account Article 4, paragraphs 3, 5 and 7, of the Convention, shall:*

*(d) Cooperate in scientific and technical research and promote the maintenance and*

*the development of systematic observation systems and development of data archives to reduce uncertainties related to the climate system, the adverse impacts of climate change and the economic and social consequences of various response strategies, and promote the development and strengthening of endogenous capacities and capabilities to participate in international and intergovernmental efforts, programs and networks on research and systematic observation, taking into account Article 5 of the Convention;*

The Articles of the UNFCCC and the Kyoto Protocol cited above provide the basic guidance on capacity building. However there are certain related articles that re germane to capacity building, such as Article 9 of the UNFCCC. Article 9 of the Convention requires the subsidiary body for implementation to provide advice on ways and means of supporting endogenous capacity building in developing countries while the Kyoto Protocol commits parties to work towards strengthening national capacity building (Article 10(e) of the Protocol). The cross cutting nature of capacity building has been stressed in many COP decisions and figured as a stand-alone agenda item in COP 5 held in Bonn in 1999. The Bonn meeting witnessed the COP deliberating on a framework for integrated capacity building, which was taken forward, at COP 7 (2001). In COP 10 held in 2004 key factors were identified to increase the effectiveness of these frameworks for capacity building and another comprehensive review is planned in the year 2007 – 08 to assess the needs of developing countries. As far as monitoring is concerned, it is proposed to factor in the GEF on this issue.

**United Nations Convention to Combat Desertification (UNCCD)**

The UNCCD’s guidance on capacity building is contained in Article 19 of the Convention. This Article lists a number of priority areas for capacity building and lists target groups and modalities of bringing about capacity building through institution networks. The text of Article 19 is as follows:

*Article 19*

*Capacity building, education and public awareness*

*1. The Parties recognize the significance of capacity building -- that is to say, institution building, training and development of relevant local and national capacities -- in efforts to combat desertification and mitigate the effects of drought. They shall promote, as appropriate, capacity- building:*

*(a) through the full participation at all levels of local people, particularly at the local level, especially women and youth, with the cooperation of non-governmental and local organizations;*

*(b) by strengthening training and research capacity at the national level in the field of desertification and drought;*

*(c) by establishing and/or strengthening support and extension services to disseminate relevant technology methods and techniques more effectively, and by training field agents and members of rural organizations in participatory approaches for the conservation and sustainable use of natural resources;*

*(d) by fostering the use and dissemination of the knowledge, know-how and practices of local people in technical cooperation programs, wherever possible;*

*(e) by adapting, where necessary, relevant environmentally sound technology and traditional methods of agriculture and pastoralism to modern socio-economic conditions;*

*(f) by providing appropriate training and technology in the use of alternative energy sources, particularly renewable energy resources, aimed particularly at reducing dependence on wood for fuel;*

*(g) through cooperation, as mutually agreed, to strengthen the capacity of affected developing country Parties to develop and implement programs in the field of collection, analysis and exchange of information pursuant to article 16;*

*(h) through innovative ways of promoting alternative livelihoods, including training in new skills;*

*(i) by training of decision makers, managers, and personnel who are responsible for the collection and analysis of data for the dissemination and use of early warning information on drought conditions and for food production;*

*(j) through more effective operation of existing national institutions and legal frameworks and, where necessary, creation of new ones, along with strengthening of strategic planning and management; and*

*(k) by means of exchange visitor programs to enhance capacity building in affected country Parties through a long-term, interactive process of learning and study.*

*2. Affected developing country Parties shall conduct, in cooperation with other Parties and competent intergovernmental and non-governmental organizations, as appropriate, an interdisciplinary review of available capacity and facilities at the local and national levels, and the potential for strengthening them.*

*3. The Parties shall cooperate with each other and through competent intergovernmental organizations, as well as with non-governmental organizations, in undertaking and supporting public awareness and educational programs in both affected and, where relevant, unaffected country Parties to promote understanding of the causes and effects of desertification and drought and of the importance of meeting the objective of this Convention. To that end, they shall:*

*(a) organize awareness campaigns for the general public;*

*(b) promote, on a permanent basis, access by the public to relevant information, and wide public participation in education and awareness activities;*

*(c) encourage the establishment of associations that contribute to public awareness;*

*(d) develop and exchange educational and public awareness material, where possible in local languages, exchange and second experts to train personnel of affected developing country Parties in carrying out relevant education and awareness programs, and fully utilize relevant educational material available in competent international bodies;*

*(e) assess educational needs in affected areas, elaborate appropriate school curricula and expand, as needed, educational and adult literacy programs and opportunities for all, in particular for girls and women, on the identification, conservation and sustainable use and management of the natural resources of affected areas; and*

*(f) develop interdisciplinary participatory programs integrating desertification and drought awareness into educational systems and in non-formal, adult, distance and practical educational programs.*

*4. The Conference of the Parties shall establish and/or strengthen networks of regional education and training centers to combat desertification and mitigate the effects of drought. These networks shall be coordinated by an institution created or designated for that purpose, in order to train scientific, technical and management personnel and to strengthen existing institutions responsible for education and training in affected country Parties, where appropriate, with a view to harmonizing programs and to organizing exchanges of experience among them. These networks shall cooperate closely with relevant intergovernmental and non-governmental organizations to avoid duplication of effort.*

Indeed India’s National Action Program to Combat Desertification (2001) lists the capacity gaps and capacity building requirements to implement the National Program. One of the important clauses of the UNCCD is 19(1) (f) which requires inter-disciplinary approaches in capacity building and thereby implicitly stresses on cross-cutting approaches.

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**Annexure: 2**

Potential areas of Inter-Convention Synergies between Multilateral Environmental Agreements

|  |  |  |
| --- | --- | --- |
| **Convention** | **Similarities with other Conventions** | **Potential Synergies** |
| Ramsar Convention on Wetlands | * The mandate of the Convention is to (a) conserve wetlands and waterfowl to ensure sustenance and development of marine species and (b) cultural diversity related to the water bodies.
* Encourages research and information sharing between members on the biodiversity supported by the wetlands, equivalent to inventorising bio-resources (Art4(3)).
* Provisions coincide with the mandate of the Convention on Biodiversity (CBD) to conserve all biological resources for future generations and respect and sustain cultural diversity related to bio-resources (in Preamble).
* Also coincides with the mandate of CITES to conserve endangered species of flora and fauna (Art 6 (2(d)).
* Convention also focuses on mitigating ‘droughts’, a mandate central to the UNCCD.
 | * Possible to envisage common research and action programs amongst the Ramsar, CITES (Convention on International Trade in Endangered Species of Flora and Fauna), CBD and UNCCD (UN Convention to Combat Desertification) Conventions for optimal utilization of resources and non- duplication of objectives.
* Convention has entered into Memorandum of Understandings with related conventions such as CITES, CBD, Convention on Migratory Species, World Heritage Convention and Memorandum of Co-operation with the UNCCD that can effectively promote technical and financial co-operation.
 |
| Convention on International Trade in Endangered Species of Flora and Fauna | * By regulating trade in faunal and floral species, the Convention aims to conserve biodiversity that is in line with the objectives of the CBD (Article (Art) 1 of CBD).
* Also in line with the objectives of the Ramsar Agreement, where sustenance of marine species is mandated.
 | * Promote sharing of information on trade and population stand and methods of assessment of biological resources between Conventions.
* Foster technical and financial co-operation between related Conventions
 |
| Vienna Convention / Montreal Protocol | * Annex 1 (c) of Vienna Convention gives guidelines for research studies on emissions influencing the climate
* This coincides with the mandate of the UNFCCC (UN Framework Convention on Climate Change) to identify and mitigate the influence of factors that have an adverse impact on the climate.
* The mandate of the Montreal Protocol coincides with that of the UNFCCC to arrest and reverse adverse impact to human health and environment due to changes in climatic conditions.
* The Kyoto Protocol to the UNFCCC also mandates curtailing the emission of Greenhouse Gases (GHGs) in a staggered fashion to meet the provisions of the UNFCCC.
 | * The UNFCCC also lists chlorofluorocarbons as Greenhouse gases. Hence, combined research efforts can be conducted by the two Conventions.
* Combined efforts, similar technologies and strategies can be designed for twinning solutions, which make good economic and practical sense.
* Calls for greater interaction and partnership between members of both conventions and between related international organizations and implementing agencies of the conventions.
 |
| United Nations Framework Convention on Climate Change (UNFCCC)/ Kyoto Protocol | * By regulating the production of GHGs (Art 3), the UNFCCC is similar in context to the Vienna convention and the Montreal Protocol that strive to reduce the destruction of the ozone layer in order to prevent hazards to life on the planet brought about by their influence on climatic parameters.
* By focusing on remedial measures to absorb the excess GHGs through sinks such as Forests, Land use changes and development of arid lands coincides with the mandate of the UNCCD to stem desertification of land.
* The principle of ensuring sustainable development (Art 3(4)) through the measures invoked to regulate GHGs coincides with the development objectives of UNCCD, the CBD.
* In setting guidelines for the curtailment of emissions of GHGs to ensure human health and that of the environment, the objectives of the Kyoto Protocol are in tandem with those of The Vienna Convention and Montreal Protocol.
* In providing for trading of emissions and phasing out of economic instruments to remove market imperfections such as subsidies in those industries producing GHGs (Art 2 a) and promoting development of substitutes for the GHGs, the principle is closer to that of the World Trade Organization (WTO) to ensure fair measures of trade between nations and promote innovation. In promoting clean development mechanisms and afforestation activities, the Protocol coincides with the principles of the CBD and the UNCCD.
 | * Interact closely with related Conventions in research collaborations and in sharing of information regarding methods of assessment, and containment of emissions
* Promote technical and financial co-operation through joint action programs
* Capitalise on the reach of institutions such as the Joint Liaison Group between CBD, UNCCD and UNFCCC to generate awareness, resources and develop innovative strategies among the different members.
 |
| United Nations Convention to Combat Desertification (UNCCD) | * By focusing on reclamation of arid lands, it enables development of “sinks” mandated in the UNFCCC.
* By emphasizing on sustainable development through involvement of local communities and other stakeholders, inventorization (Art 18) and validating local knowledge (Art 17) with concern for equitable sharing of benefits and property rights arising from the technology it relates to provisions of the CBD.
* In addition, it is related to the provisions of the Ramsar Agreement as the latter concerns with preservation of wetlands that serve as effective buffers from droughts and desertification.
 | * Promote technical, financial and extension co-operation among related Conventions.
* Foster technological innovations for joint solutions.
* Co-operate with other conventions in sharing information of relevance to each Convention.
 |
| Convention on Biodiversity (CBD) | The CBD relates to all the foregoing Conventions as its scope extends to cover exhaustive aspects of biodiversity and the environment. Hence, it relates * to the Ramsar Convention in its concern for marine biodiversity and habitats
* to the CITES in its concern for regulating trade in biodiversity resources
* to the UNCCD and UNFCCC, Vienna Convention in mandates to afforestate for purposes of combating desertification and drought and absorbing emissions through forest sinks respectively.
* By respecting the integrity of intellectual property rights, CBD also relates to the provisions of the TRIPS Agreement.
* CBD stresses on the need to involve local populations in decision-making and implementation of programs, which again is in line with the principles of conventions such as the UNCCD and the Ramsar Convention.
 | * Promote Joint action programs to foster information and resource sharing
* Evolve Technical and Financial co-operative mechanisms
* Foster Joint technological innovation programs
* Identify means to generate awareness on related issues between conventions to enable easy compliance to regulations.
 |
| Basel Convention on Control of Trans-boundary Movement of Hazardous Waste | The objectives of the Convention run close to those of the Vienna Convention, UNFCCC and Convention on Persistent Organic Pollutants in controlling and regulating the discharge into the environment of substances that are harmful to human health and to the environment. | * Solutions to reduce the impact of such substances can be jointly worked out. These could include development of “sinks” on landfills, which have been filled with waste treated in an environmentally sound manner. Promote research efforts and co-operation to generate awareness and transfer technology and financial resources between members of the different conventions.
 |
| Stockholm Convention on Persistent Organic Pollutants (POPS) | The Convention is similar in mandate to the UNFCCC and the Vienna Convention in trying to contain the use and develop alternatives to hazardous chemicals that harm human health and lead to environmental damage.  | * It is likely that several strategies for curtailment of GHGs, Ozone depleting substances and persistent chemicals are similar.
* Design suitable appropriate multi-pronged strategies to capitalize on the economies of scale it will create.
* Facilitate Joint research and extension programs
 |

*Source: Damodaran A and Suneetha M.S. .(2007)*

**Annexure: 3**

Methodology and Processes

NCSA India has been housed in the Ministry of Environment and Forests (MoEF), Government of India, which is also the nodal agency for handling the multi-lateral environmental agreements including CBD, UNFCCC and UNCCD in the country. The NCSA exercise was guided by a senior officer from each of the three thematic divisions also acting as the focal points for CBD, UNFCCC and UNCCD in India, on a day to day basis. A National Steering Committee (NSC) headed by the Additional Secretary, MoEF with members drawn from the three thematic divisions of MoEF, Department of Economic Affairs, GoI (GEF Political Focal Point India) and UNDP provided the overall guidance to the project. UNDP provided the administrative support to the program. To conduct thematic stocktaking and assessments and cross-cutting analysis, applications were invited (through an open process – as per UNDP norms and procedures) from interested and eligible individuals and/or institutions. The eligible candidates were shortlisted by UNDP and thereafter, these shortlisted made a presentation before NSC for final selection. In the process, four national level institutes/ NGOs were selected – Ashoka Trust for Research in Ecology and the Environment (ATREE) for biodiversity; Winrock International India (WII) for climate change; Institute of Economic Growth (IEG) for land degradation; and, Indian Institute of Management Bangalore (IIMB) for cross-cutting analysis and action plan.

Though there are no set GEF guidelines for undertaking NCSA exercise however, a five step approach is recommended by GEF, which was followed by NCSA India. As per our requirements, we combined step 2 and 3 and then, step 4 and 5. The strategy to conduct NCSA has been reviewed and revised as our national requirements, which were discussed and decided during various formal and informal discussions with officers from MoEF, UNDP, thematic and crosscutting consultants and NCSA Global Support Program.

**5 step approach:**

1. Inception and Stakeholder engagement:

During this stage the administrative, management and consultative arrangements for the NCSA were decided and organized and work plan prepared. A preliminary attempt was made to identify the key stakeholders of the NCSA process while drawing linkages with the past and on-going policies, programs and projects. The work done by other NCSA teams around the globe especially by the Philippines and Bhutan was shared with all the members of NCSA India team to develop a better perspective.

The outputs of this stage are two reports: inception workshop report and linkage study for the three thematic focal areas.

1. Stocktaking and 3. Thematic Assessments:

As part of NCSA India exercise, we found it useful to optimally combine the step 2 and 3. The thematic consultants used the National Reporting to the Conventions, National Environment Policy and India’s Five Year Plans as the base. The stocktaking is a ‘situation analysis’ that provides the baseline research for the next steps. Its objective is to ensure that the NCSA builds on other local or national work related to the conventions and on past capacity development efforts. The stocktaking involves identifying all national activities and documents that are relevant to the convention themes as well as core national environmental priorities. This step also involves reviewing past capacity assessments and assessing the strengths and weaknesses of previous capacity development efforts.

The main objective of the thematic assessment is to analyze the country’s obligations and opportunities from each MEA, and the country’s performance to date. Besides, presenting a picture of ‘where we are now’, the thematic assessments in India went a step further in suggesting a specific action plan for each of the capacity gap identified.

The outputs of this stage are two reports: stocktaking study and thematic assessments for the three thematic focal areas. Both these reports have been merged – constituting a separate thematic chapter of this report.

1. Cross-cutting Assessments and 5. Report and Action plan:

The objective of the cross-cutting analysis is to assess capacity issues, needs and opportunities that can across these three conventions. This includes identification of common needs and possible synergies that could be achieved in the country by addressing requirements across two or ore themes. A survey of different multilateral environmental agreements indicates that the concept of synergies has not been inherent to many of these agreements. This is more so, for the Rio Conventions of Climate Change and Biodiversity. In the case of the UNCCD, being a post – Rio Convention, there has been a clear recognition of the existence of the FCCC and CBD. Article 8 (1) of the UNCCD clearly states that the convention would coordinate its activities with the FCCC and CBD in order to derive maximum benefits arising from the activities under each agreement while avoiding duplication of efforts. Indeed Article 8 (1) of the UNCCD clearly mentions about the need to conduct joint programs in the fields of research, training, systematic observation and information collection and exchange.

As we had prepared three sectoral capacity action plans and a cross-cutting capacity action plan, there is no separate Action Plan matrix as such. The output of this stage is presented as the concluding chapter of this report.

**……………..**

**Annexure: 4**

Questionnaire

This questionnaire was used as one the tools for NCSA Stocktaking exercise. The questionnaire below was used by the biodiversity group. Similar questionnaires were also used by the other two thematic groups – climate change and land degradation for stocktaking exercise.

**NATIONAL CAPACITY SELF ASSESSMENT**

The Ministry of Environment and Forests (MoEF), Government of India is currently implementing a UNDP/GEF project on ‘National Capacity Needs Self Assessment (NCSA) in India. Presently, NCSA is being implemented in more than 150 countries. (For details: <http://ncsa.undp.org/>)

**Objectives:** The NCSA is an assessment and planning exercise to identify country level priorities and needs for capacity building to address global environmental issues. The NCSA is concerned with a country’s capacity – the abilities of individuals, groups, organizations and institutions to address the priority environmental issues as part of efforts to achieve sustainable development. The NCSA focuses on India’s capacity requirements to implement the three ‘Rio Conventions’ – biodiversity (CBD), land degradation (UNCCD) and climate change (UNFCC). In addition, the NCSA process aims to identify cross-cutting capacity issues and foster synergies among these MEAs.

**Expected Outcome:** Concluding in November 2006, the NCSA will come out with a NCSA Capacity Action Plan, which will draw on the assessment of priority thematic and cross-cutting capacity needs, to identify a program of capacity development actions. The Plan will recommend goals, objectives and strategies for national capacity development (including identified priority actions, the time frame, possible funding, responsibilities and means of monitoring implementation and evaluation of outcomes and impacts).

**Process:** The four stages leading to the preparation of NCSA Capacity Action Plan are: 1) Establish linkages amongst stakeholders through consultations and awareness generation; 2) Assess baseline and complete stocktaking; 3) Thematic assessments; and 4) Cross cutting assessments. Presently, we are at stage: 2 and besides using other assessment tools, we have designed this questionnaire to gather information. The questionnaire has been framed to assess institutional capacities based on the terms of reference of the NCSA. Efforts have been made to keep the questions simple and meaningful. We welcome any additional inputs in terms of additional material (please use extra sheets to provide this), annual reports, links to significant URLs, etc.

ATREE: Ashoka Trust for Research in Ecology and the Environment (ATREE), Bangalore, has been conferred with the responsibility of conducting this assessment for biodiversity conservation and related issues, by the MoEF and UNDP, to identify the strengths and gaps related to biodiversity conservation in India.

The NCSA is a nationally owned and led process and we need your invaluable time and knowledge/ experience in completing this process, which will be duly acknowledged. Kindly post (self-addressed stamped envelope enclosed)/e-mail the filled-in questionnaire or you may submit online at <http://www.atree.org/ncsa.html>.

We look forward to hearing from you soon.

Thank you for your kind cooperation.

**General Information**

**1. Name and address of the Institution:** ………………………………………………..

**2. Date of establishment:**………………………………………………………………….

**3. Type of institution (government, non-government, university):**

**4. Employee statistics**

a. Total number of employees: …………….

b. Number of staff with higher degrees (Masters degree and above):…………

c. Students/Interns:……………….

**5. Funding sources (rank 1-6 – 1 for maximum and 6 for least or nil)**

Government ( …) International donor agencies ( …)

Indian donor agencies ( …) Memberships/ Subscriptions ( …)

Other (specify) ( …) Donations ( …)

**Capacity Status – Thematic Issues**

**6. a. Please rate (High/Medium/Low) the contribution of your organization towards implementation of the Convention on Biodiversity issues given below:**

1. Participation in biodiversity conservation planning (**….)**

2. Identifying and monitoring biodiversity and its conservation **(….)**

3. *In-situ* conservation, including protected area system management **(….)**

4. *Ex-situ* conservation of biodiversity **(….)**

5. Environmental impact assessment for biodiversity conservation **(….)**

6. Managing information through clearinghouse mechanisms (e.g. ENVIS centres, nodal

centres for database initiatives, etc.) **(….)**

7. Providing scientific and technical education and training **(….)**

8. Raising public understanding and awareness **(….)**

9. Preserving indigenous and local knowledge, innovations and practices **(….)**

10. Regulating access to and transfer of genetic resources **(….)**

11. Biosafety, regulating the handling of living modified organisms **(….)**

12. Regulating commercialization and ensuring benefit-sharing from genetic resources **(….)**

13. Accessing financial resources **(….)**

14. Developing and introducing economic and social incentives **(….)**

15. Alien species and invasives **(….)**

16. Biological diversity and tourism **(….)**

17. Taxonomy initiatives **(….)**

18. Any other (please specify) **(….)**

Please provide any further useful information, if any: ………………………………………..

…………………………………………………………………………………………………………

……..……………………………………………………………………………………………………

…………………………………………………………………………………

**6. b. Rank the 5 most important points from the list above, in the order of their priority**

**within your institution, in the table given below.**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Rank | 1 (most important) | 2 | 3 | 4 | 5 (least important) |
| Point # |  |  |  |  |  |

**7. Please indicate if you have ongoing projects in the any of the following biomes/bio-geographic zones on the following taxonomic groups.**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| GeographicalCoverage OfTaxonomic Levels | Ecosystem /Habitat /Community | Species ortaxonomicgroup(specify a – h) | Fieldstudies(specifya – c) | Molecularstudies(specifya – i) | SociologicalStudies(specifya – f) |
| Islands |  |  |  |  |  |
| Coastal/MarineEcosystems |  |  |  |  |  |
| Eastern Himalaya& North-EastIndia |  |  |  |  |  |
| Trans-Himalaya,N-W,W & CHimalaya |  |  |  |  |  |
| Deccan Plateauand EasternGhats |  |  |  |  |  |
| Desert & Semi-Arid Ecosystems |  |  |  |  |  |
| Agro-Ecosystems |  |  |  |  |  |
| Western Ghats |  |  |  |  |  |
| Forests |  |  |  |  |  |
| Inland Waters |  |  |  |  |  |

Taxonomic group

(a) mammals (b) birds (c) amphibians (d) reptiles (e) fishes (f) invertebrates (specify groups)

(g) plants (h) fungi & lichens (i) other

Field studies

(a) Observational studies (b) capture and handling (c) collection (d) other

Molecular studies

Specify taxonomic group

Sociological studies

(a) policy (b) sociology (c) socio-economic (d) ecological economics (e) environmental history

(f) other

**Capacity Status – Enabling Environment**

**8. Please provide a self-assessment of *current* institutional capabilities. In the table, write**

**Adequate (AD), Inadequate and require funding (I) or Completely Absent and require establishment (CA). If the requirement does not exist, write Not Required (NR). Please elaborate where required.**

**Institutional**

|  |  |
| --- | --- |
| **Institutional Capability** | **R Rating** |
| **Infrastructure**Office spaceField stationsTransportationField EquipmentGIS facilitiesComputersSoftwareCommunication facilitiesLibraryHerbaria, MuseumsMolecular Biology LabsGermplasm and Tissue Culture Facilities/OtherrepositoriesOther (specify) |  |
| **Human Resources**Networking capabilitiesFund raising capabilitiesAdministratorsBiologistsTaxonomistsStatisticiansSocial scientistsTrainers & Outreach PersonnelLaboratory TechniciansResearch Fellows & StudentsField AssistantsSupport StaffPolicy GroupsAdvocacy GroupsOther (Specify) |  |
| **Inter Institutional Issues**Inter institutional collaborationsParticipation in networksEngagement with government (permits, etc) |  |
| **Outputs**DatabasesWebsitesPeer-reviewed publicationsOther publicationsConferences, Workshops, Symposia |  |

 **Rating**

**Other (Specify)**

Please provide any further useful information, if any: ………………………………………..

………………………………………………………………………………………………………………..…………

…………………………………………………………………………………………………………………………

…………………………………………………………………………………………

**Capacity strengths**

**9. What are your institution’s core competencies?**

1. .……………………………………………………………………………

2. .……………………………………………………………………………

3. .……………………………………………………………………………

**10. Please list the 5 most significant institutional contributions or outputs towards biodiversity conservation. These could be published outputs such as important peer reviewed publications, project reports, online databases, networks, economic incentive schemes or any other body of work.**

1. .…………………………………………………………………………………….

2. .…………………………………………………………………………………….

3. .…………………………………………………………………………………….

4. .…………………………………………………………………………………….

5. .…………………………………………………………………………………….

**Capacity constraints**

**11. What are the most important gaps /requirements for strengthening *your* institution for biodiversity conservation? Choose from the table in Question 8 or specify others.**

1. .………………………………………………………………………………………

2. .………………………………………………………………………………………

3. .………………………………………………………………………………………

4. .………………………………………………………………………………………

5. .………………………………………………………………………………………

**12. What according to you are the specific gaps in the systemic level in India/your area of work for implementation of the CBD? Systemic issues include overall political, economic, legislative, judicial, societal, policy, regulatory, incentive and accountability frameworks.**

1. .…………………………………………………………………………………….

2. .…………………………………………………………………………………….

3. .…………………………………………………………………………………….

**……………..**

**Annexure: 5**

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1. Support for country capacity development is an integral part of GEF with a focus on strengthening the capacities of countries to manage their priority environmental issues and contribute to global environmental benefits. GEF is a funding mechanism for the implementation of multi-lateral environmental agreements relating to biodiversity, climate change, land degradation, international waters, persistent organic pollutants and ozone layer depletion. Each of the GEF modes of delivery (Full and Medium-sized Projects; Small Grants; and Enabling Activities) aims to incorporate some form of capacity development. [↑](#footnote-ref-1)
2. In the 1990s, the international community reached unprecedented agreements on the need to implement the three multi-lateral environmental conventions addressing climate change, biodiversity and desertification/ land degradation issues. If implemented effectively, these Conventions will contribute significantly in achieving the goal of sustainable development. However, many parties to these agreements have somewhat limited capacity to fully implement the Conventions and to benefit from involvement in them. Recognizing this limitation, in May 1999 the GEF Council approved ‘Capacity Development Initiative (CDI)’, which made a broad assessment of capacity needs, particularly in the areas of biodiversity, climate change and land degradation, the extent and nature of bilateral and multilateral efforts to assist in meeting those needs, and a strategy and GEF specific action plan for enhancing those efforts. As a first step in implementing the CDI recommendations, the GEF Council in May 2001 approved funding for countries wishing to undertake ‘national self assessment of capacity building needs’. The purpose was to support a country driven consultative process of analysis and planning that will determine national priorities and needs for capacity development to protect the global environment. [↑](#footnote-ref-2)
3. Goods and Services provided by ecosystems include: provision of food, fuel and fiber, provision of shelter and building materials, purification of air and water, detoxification and decomposition of wastes, stabilization and moderation of the Earth's climate, moderation of floods, droughts, temperature extremes and the forces of wind, generation and renewal of soil fertility, including nutrient cycling, pollination of plants, including many crops, control of pests and diseases, maintenance of genetic resources as key inputs to crop varieties and livestock breeds, medicines, and other products, cultural and aesthetic benefits and ability to adapt to change. (Source: Secretariat of the Convention of Biological Diversity (April 2000) Sustaining life on Earth) [↑](#footnote-ref-3)
4. Represents percentage of the total geographic area of India: 3287263 sq. km (Source: MoEF (2007) Protection, Development, Maintenance and Research in Biosphere Reserves in India: Guidelines; Pg: 10) [↑](#footnote-ref-4)