Green Growth Background Paper

Draft Final Report

Green Growth and Biodiversity in India

Supported by

Global Green Growth Institute

The Energy and Resources Institute

...towards global sustainable development

Suggested format for citation

T E R I. 2015.
Green Growth and Biodiversity in India.
New Delhi: The Energy and Resources Institute. 13 pp.

Author Yogesh Gokhale, Fellow, TERI

Email: yogeshg@teri.res.in

Reviewer Prodipto Ghosh, Distinguished Fellow, TERI

Email: prodipto@teri.res.in

Pia Sethi, Fellow, TERI

Email: pias@teri.res.in

For more information

Project Monitoring Cell
T E R I
Darbari Seth Block
IHC Complex, Lodhi Road
New Delhi – 110 003
India

Tel. 2468 2100 or 2468 2111
E-mail pmc@teri.res.in
Fax 2468 2144 or 2468 2145
Web www.teriin.org
India +91 • Delhi (0)11

Table of contents

List of Tables

List of Figures

1 Introduction

The efforts in restricting the loss of global biodiversity have remained insufficient; also the targets being set at the Convention on Biological Diversity in 2010, have not resulted in the expected response from the member countries. As a result a fresh set of defined conservation targets – Aichi Targets 2020 have been launched as a part of Strategic Plan for Biodiversity for the period 2011-2020 by the Convention on Biological Diversity. Biodiversity has been threatened due to number of reasons, nationally and globally. In the context of green growth, there is a need to understand the national contribution in addressing the issue of loss of biodiversity across local, national and global causal factors which would be proposed or ongoing activities, policy provisions, strengthening of institutions / governance, etc. to tackle the prevailing risks / threats to biodiversity in India. Hence, in the context of green growth it is important to understand the prevailing risks / threats to biodiversity in India and how green growth can help reduce these risks.

In India developmental projects have posed risks for wild ecosystems and habitats resulting in survival of number of species of flora and fauna. Important sectors such as mining and power have posed major risks for wild ecosystems and species. These risks have continued over past many decades predominantly in mineral rich states such as Jharkhand, Orissa and Chhattisgarh.

The degradation of ecosystems and habitats primarily due to anthropogenic pressures is increasingly becoming evident. There has been a continuous increase in area under the open forest category (as evidenced in the reports of Forest Survey of India). With regards to biodiversity, the data relating to the threatened species under the International Union for Conservation of Nature (IUCN) red data list (2013) is indicative of the existing risk to biodiversity and surrounding ecosystems. According to IUCN red data list Mammals (95 species), Birds (80 species), Reptiles (52 species), Amphibians (74 species), Fishes (213 species), Molluscs (6 species), other invertebrates (128 species), plants (325 species) are categorised as threatened species for India (IUCN 2013).

Along with anthropogenic risks and threats to biodiversity there have been other risks which have emerged. These include biological and climatic risks. In case of biological risks such as weaker genetic make-up due to inbreeding which is known for species such as Indian One Horned Rhino, Asiatic Lion where the wild population of these species is below minimum viable population to survive any possible outbreak of disease. These species are threatened due to isolation of wild habitats leading to homogenous meta-population susceptible to possible epidemics. There are other risks posed by the living modified organisms (LMOs) or genetically modified organisms (GMOs) by tampering with the genetic make-up of the natural organisms. The impacts of such risks are unknown.

The changing climate has also been responsible for altering the species distribution ranges of number of species and making many species extinct locally in various parts of India. But unfortunately there has been very poor documentation done to understand the climatic risks.

Global markets have also posed a serious threat to domesticated biodiversity. The commercialization of agriculture and animal husbandry caters to global demands related to only few domesticated varieties, like in the case of rice, 'basmati' variety would be preferred due to market demand for cultivation over the local rice variety in northern India leading to the extinction of local varieties in due course of time.

In case of biodiversity, the traditional knowledge associated with species is useful and aids conservation activities, while providing for sustainable utilization of biodiversity. It helps in ensuring equitable benefits sharing at time of commercial utilization. However, there are inadequate safeguard mechanisms for traditional knowledge. There is a rise in number of cases of bio-piracy reported from India and elsewhere leading to illegal commercialization of products based on traditional knowledge of use of species.

In the Indian context green growth needs to consider these risks and their associated impacts. This paper reviews various ways of responding to such risks / threats to biodiversity, both at the national and state levels.

2 Status of biodiversity in India

Biological diversity or 'biodiversity' refers to the variety and variability of life on earth. Biodiversity is expressed at three levels on earth; a) genetic diversity, b) species diversity and c) ecosystem diversity. Its direct and indirect services are crucial for the sustenance of life on this planet. Biodiversity ensures security of food, fuel, shelter, medicines and other products which are vital for our survival.

India is a megadiverse country with only 2.4% of the world's land area, and harbours 7-8% of all recorded species, including over 45,000 species of plants and 91,000 species of animals. Of the 34 global biodiversity hotspots, four are present in India i.e. the Himalaya, the Western Ghats, the North-east, and the Andaman and Nicobar Islands. From a network of 54 National Parks covering 21,003 km² and 373 Sanctuaries covering 88,649 km², giving a combined coverage of 1, 09,652 km²or 3.34% of the country's geographical area in 1988, the network has grown steadily, and as of 2014 there are 690 Protected Areas (PA) comprising of 102 National Parks, 527 Wildlife Sanctuaries, 572 Conservation Reserves and 4 Community Reserves) covering 1, 66,851 km² or 5.07% of the country's geographical area. The country has 23 marine Protected Areas (PAs) in peninsular India and 106 in the islands (Fifth National Report to CBD, 2014).

2.1 Biodiversity Hotspots

A biodiversity hotspot is a bio-geographic region with a significant reservoir of biodiversity that is threatened with destruction. The concept was introduced in 1998 to identify important ecosystems with need for conservation measures[1]. Since then 34 regions, covering

[1] To qualify as a biodiversity hotspot on Myers 2000 edition of the hotspot map, a region must meet two strict criteria—it must contain at least 0.5% or 1500 species of vascular plants as endemics, and it has to have lost at least 70% of its primary vegetation. Although the list of hotspots is based on specific regions covering one or more countries, the hotspots are distributed across North and Central America (4), South America (5), Europe and Central Asia (4), Africa (8), and Asia-Pacific (13). These hotspots harbour 150 000 endemic plant species—over 50% of the world's plant species and 42% of all terrestrial vertebrate species are endemic to the 34

1.4% of the earth's land surface, [2] have been identified as hotspots. India, has four identified hotspots—Western Ghats (along with parts of Sri Lanka), the Himalayas, Indo-Burma and Sundaland (www.biodiversityhotspots.org) as depicted in figure 1.

Figure 1 Distribution of biodiversity hotspots in India

Source: www.biodiversityhotspots.org

2.2 Traditional knowledge and community-based biodiversity conservation

A vast base of traditional knowledge in form of ethnobiology evolved over the period. Rich base of local health traditions organised in form of Indian Systems of Medicine (such as Ayurveda and Siddha). India has developed a safeguarding mechanism against wrong patenting of traditional knowledge based on the Indian Systems of Medicine by Traditional Knowledge Digital Library.

Traditional Knowledge Digital Library (TKDL) - It involves documentation of the traditional knowledge available in public domain in the form of existing literature related to Ayurveda, Unani, Siddha and Yoga, in digitized format in five international languages i. e. English, German, French, Japanese and Spanish. Traditional Knowledge Resource Classification (TKRC), an innovative structured classification system for the purpose of systematic arrangement, dissemination and retrieval has been evolved for about 25,000 subgroups against a few subgroups that were available in an earlier version of the International Patent Classification (IPC), related to medicinal plants, minerals, animal resources, effects and diseases, methods of preparations, and mode of administration. TKDL provides patent information on traditional knowledge existing in the country, in languages and format understandable by patent examiners at International Patent Offices (IPOs), so as to prevent the wrongful grant of patents. TKDL thus, acts as a bridge between the traditional

biodiversity hotspots (Source <*http://envfor.nic.in/funding/chap4.pdf*>, last accessed on 1 September 2008 and <*http://www.biodiversityhotspots.org/xp/Hotspots/hotspotsScience/Pages/default.aspx*>, last accessed on 23 July 2008

[2] http:/ / www.biodiversityhotspots.org/ xp/ hotspots/ hotspotsscience/ Pages/ hotspots_defined.aspx> last accessed on 4 May 2009

knowledge information existing in local languages and the patent examiners at IPOs. However, the TKDL provides only defensive protection to traditional knowledge holder of and does not provide positive protection of license for commercial utilisation and benefit sharing.

Sacred groves are the patches of forests traditionally protected by local communities due to faith associated with these forests. These groves in India are 'treasure troves' of biodiversity with a recorded 23 000 sacred groves from about 19 states in India covering about 68 633 ha (Malhotra et al 2007). The distribution of sacred groves in India based on scientific surveys and the observation based reports is mapped and depicted in Figure 2. These represent ecosystems that act as 'refugia' for the endemic as well as endangered species. Studies suggest that about 3177 species have been reported from sacred groves from only seven states in India (Malhotra, Gokhale, Chaterjee, et al. 2007), reinforcing the fact that community conservation efforts outside the protected area (PA) network play a crucial role in biodiversity conservation in the country.

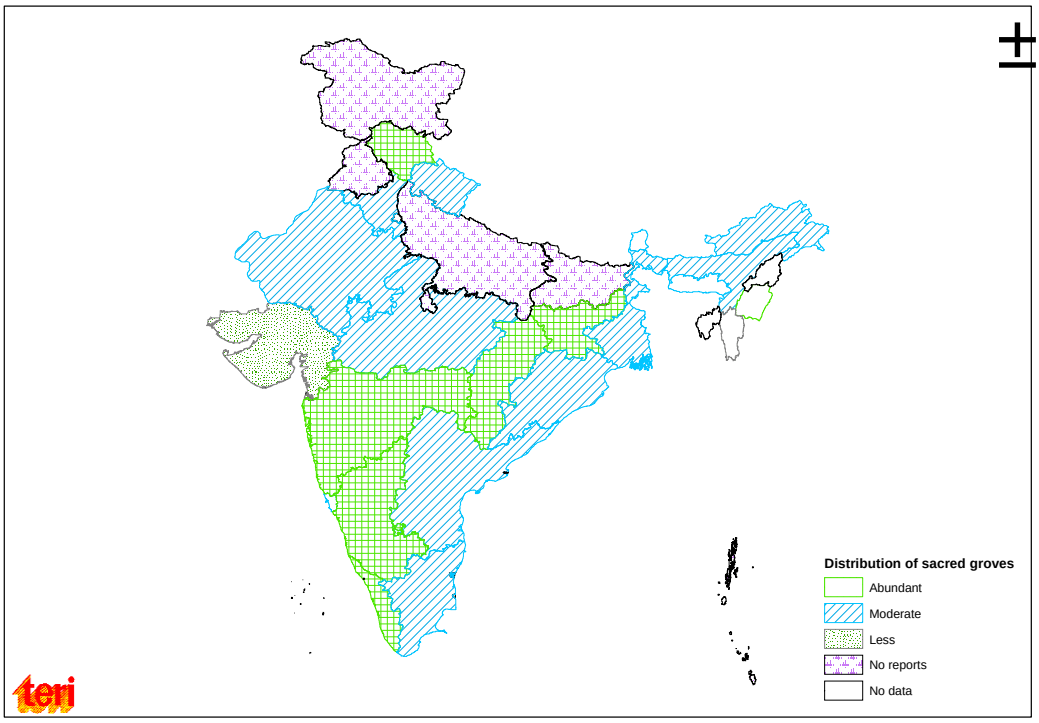

Figure 2 Distribution of sacred groves in India

Source: Gokhale and Gazdar 2015

2.3 Centre of domestication

India is one of the eight primary centres of crop origin and diversity as described by Vavilov. India has 15 different agro-climatic zones. India is considered as primary centre of origin of rice and along with it India also has 811 cultivated plants and 902 wild relatives of cultivated plants.

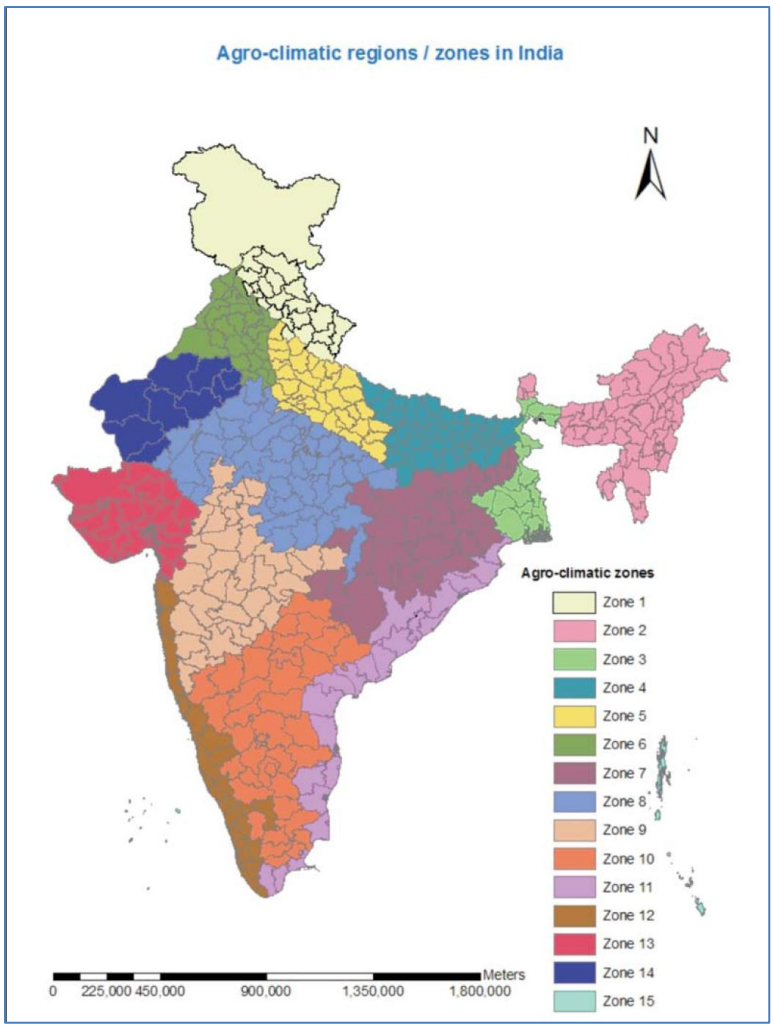

Figure 3 Agro-climatic regions in India

Source: Agricultural Research Data Book (2014)

2.4 Biodiversity and Green Growth

Biodiversity in India at ecosystem to genetic levels demonstrate its importance from local to global levels. At the genetic level one of the eight centres of domestication of food crops such as rice, higher levels of species endemism (one of the main criteria for Biodiversity Hotspot) and presence of important ecosystems like tropical evergreen forests are indicative of the uniqueness of the biodiversity in India. The rich heritage of traditional knowledge associated with the biodiversity provides an extremely important component from local to global levels. The country has a rich stock of genetic resources and associated traditional knowledge. The positive incentive in form of Payments for Environmental Services (PES) also forms an important phenomenon within the country. For shaping the future policy regime for low carbon growth the examples such as PES will be important to learn and replicate. The PES necessarily involves a relationship of service provider and beneficiary where the price is fixed and transacted for the service received from service provider. The typical example of PES application is the river catchment where upper catchment communities become service provider in terms of water to the communities in the lower catchment at a negotiated price.

To recognize and emphasize the local and global values of biodiversity in India, the country has signed and ratified several international Conventions and Protocols. India is party to a number of Multi-lateral Environment Agreements (MEAs), and is obliged to fulfill the provisions of the MEAs. India is a party to five major international conventions related to Wildlife conservation, i.e., Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), International Union for Conservation of Nature and Natural Resources (IUCN), International Whaling Commission (IWC), United Nations Educational, Scientific and Cultural Organization-World Heritage Committee (UNESCO-WHC) and the Convention on Migratory Species (CMS). Apart from this, India is also a member of the World Heritage Convention, Convention on Conservation of Migratory Species (CMS) or Bonn Convention, Ramsar Convention, and Convention on Biological Diversity (CBD).

3 Convention on Biological Diversity and India's contribution

India signed the Convention on Biological Diversity (CBD) on 5th June 1992 and ratified it on 18th February 1994. The Preamble of CBD mentions that while conservation of biological diversity is a common concern of humankind, States have sovereign rights over their own biological resources. CBD emphasizes on sharing benefits equitably arising from the commercial use of biological diversity and its associated traditional knowledge and ensure the sustainable use of the biodiversity.

Since its ratification of CBD India has been working steadily on developing a national regime on biodiversity conservation, sustainable use and benefit sharing. India enacted the Biological Diversity Act, 2002 (Biodiversity Act) which was followed by the Biological Diversity Rules, 2004. The Biodiversity Act was enacted to provide for conservation of biological diversity, sustainable use of its components and fair and equitable sharing of the benefits arising out of the use of biological resources, and traditional knowledge. This Act is subsidiary to the existing legislations on biological resources and is an immediate consequence of ratification of the Convention on Biological Diversity. According to the Act, "biological diversity" means the variability among living organisms from all sources and the ecological complexes of which they are part, and includes diversity within species or between species and of eco-systems.

Amongst other commitments to CBD, India is committed to two important internationally agreed processes namely the Aichi Biodiversity Targets and The Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization (ABS). Both these processes aim to achieve the three goals of CBD at international level. The national biodiversity targets define the period of 2020 to achieve the targets. The Nagoya Protocol is aimed at evolving the international and national regime on ABS. By helping to ensure benefit-sharing, the Nagoya Protocol creates incentives to conserve and sustainably use genetic resources, and therefore enhances the contribution of biodiversity to development and human well-being.

4 Ways Forward

It is important to dovetail the national efforts for biodiversity conservation with the international goals and processes such as Aichi Biodiversity Target and Nagoya Protocol. Table 1 presents a mapping of India's national targets in accordance with the Aichi Biodiversity Targets.

Table 1 : Mapping of Aichi Biodiversity Targets and National Targets

Sr No	Aichi Target	National Target
1	**Target 1 By 2020, at the latest, people are aware of the values of biodiversity and the steps they can take to conserve and use it sustainably.**	**Target 1:** By 2020, a significant proportion of the country's population, especially the youth, is aware of the values of biodiversity and the steps they can take to conserve and use it sustainably.
2	**Target 2 - By 2020, at the latest, biodiversity values have been integrated into national and local development and poverty reduction strategies and planning processes and are being incorporated into national accounting, as appropriate, and reporting systems.**	**Target 2:** By 2020, values of biodiversity are integrated in National and State planning processes, development programmes and poverty alleviation strategies.
3	**Target 5 - By 2020, the rate of loss of all natural habitats, including forests, is at least halved and where feasible brought close to zero, and degradation and fragmentation is significantly reduced.**	**Target 3:** Strategies for reducing rate of degradation, fragmentation and loss of all natural habitats are finalized and actions put in place by 2020 for environmental amelioration and human well-being.
	Target 15 - By 2020, ecosystem resilience and the contribution of biodiversity to carbon stocks has been enhanced, through conservation and restoration, including restoration of at least 15 per cent of degraded ecosystems, thereby contributing to climate change mitigation and adaptation and to combating desertification.	
4	**Target 9 - By 2020, invasive alien species and pathways are identified and prioritized, priority species are controlled or eradicated, and measures are in place to manage pathways to prevent their introduction and establishment.**	**Target 4:** By 2020, invasive alien species and pathways are identified and strategies to manage them developed so that populations of prioritized invasive alien species are managed.
5	**Target 6 - By 2020 all fish and invertebrate stocks and aquatic plants are managed and harvested sustainably, legally and applying ecosystem based approaches, so that overfishing is avoided, recovery plans and measures are in place for all depleted species, fisheries have no significant adverse impacts on threatened species and vulnerable ecosystems and the impacts of fisheries on stocks, species and ecosystems are within safe ecological limits.**	**Target 5:** By 2020, measures are adopted for sustainable management of agriculture, forestry and fisheries.

Sr No	Aichi Target	National Target
	Target 7 - By 2020 areas under agriculture, aquaculture and forestry are managed sustainably, ensuring conservation of biodiversity.	
	Target 8 - By 2020, pollution, including from excess nutrients, has been brought to levels that are not detrimental to ecosystem function and biodiversity.	
6	**Target 10 - By 2015, the multiple anthropogenic pressures on coral reefs, and other vulnerable ecosystems impacted by climate change or ocean acidification are minimized, so as to maintain their integrity and functioning.**	**Target 6:** Ecologically representative areas on land and in inland waters, as well as coastal and marine zones, especially those of particular importance for species, biodiversity and ecosystem services, are conserved effectively and equitably, on the basis of PA designation and management and other area-based conservation measures and are integrated into the wider landscapes and seascapes covering over 20% of the geographic area of the country, by 2020
	Target 11 - By 2020, at least 17 per cent of terrestrial and inland water, and 10 per cent of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscapes and seascapes.	
	Target 12 - By 2020 the extinction of known threatened species has been prevented and their conservation status, particularly of those most in decline, has been improved and sustained.	
7	**Target 13 - By 2020, the genetic diversity of cultivated plants and farmed and domesticated animals and of wild relatives, including other socio-economically as well as culturally valuable species, is maintained, and strategies have been developed and implemented for minimizing genetic erosion and safeguarding their genetic diversity.**	**Target 7:** By 2020, genetic diversity of cultivated plants, farm livestock and their wild relatives, including other socioeconomically as well as culturally valuable species, is maintained, and strategies have been developed and implemented for minimizing genetic erosion and safeguarding their genetic diversity.
8	**Target 14 - By 2020, ecosystems that provide essential services, including services related to water, and contribute to health, livelihoods and well-being, are restored and safeguarded, taking into account the needs of women, indigenous and local communities, and the poor and vulnerable.**	**Target 8:** By 2020, ecosystem services, especially those relating to water, human health, livelihoods and wellbeing, are enumerated and measures to safeguard them are identified, taking into account the needs of women and local communities, particularly the poor and vulnerable sections.

Sr No	Aichi Target	National Target
9	**Target 16 - By 2015, the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization is in force and operational, consistent with national legislation.**	**Target 9:** By 2015, Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization as per the Nagoya Protocol are operational, consistent with national legislation.
10	**Target 3 - By 2020, at the latest, incentives, including subsidies, harmful to biodiversity are eliminated, phased out or reformed in order to minimize or avoid negative impacts, and positive incentives for the conservation and sustainable use of biodiversity are developed and applied, consistent and in harmony with the Convention and other relevant international obligations, taking into account national socio economic conditions.**	**Target 10:** By 2020, an effective, participatory and updated national biodiversity action plan is made operational at different levels of governance.
	Target 4 - By 2020, at the latest, Governments, business and stakeholders at all levels have taken steps to achieve or have implemented plans for sustainable production and consumption and have kept the impacts of use of natural resources well within safe ecological limits.	
	Target 17 - By 2015 each Party has developed, adopted as a policy instrument, and has commenced implementing an effective, participatory and updated national biodiversity strategy and action plan.	
11	**Target 18 - By 2020, the traditional knowledge, innovations and practices of indigenous and local communities relevant for the conservation and sustainable use of biodiversity, and their customary use of biological resources, are respected, subject to national legislation and relevant international obligations, and fully integrated and reflected in the implementation of the Convention with the full and effective participation of indigenous and local communities, at all relevant levels.**	**Target 11:** By 2020, national initiatives using communities' traditional knowledge relating to biodiversity are strengthened, with a view to protecting this knowledge in accordance with national legislations and international obligations.
12	Target 19 - By 2020, knowledge, the science base and technologies relating to biodiversity, its values, functioning, status and trends, and the consequences of its loss, are improved, widely shared and transferred, and applied.	**Target 12:** By 2020, opportunities to increase the availability of financial, human and technical resources to facilitate effective implementation of the Strategic Plan for Biodiversity 2011–2020 and the national targets are identified and

Sr No	Aichi Target	National Target
	Target 20 - By 2020, at the latest, the mobilization of financial resources for effectively implementing the Strategic Plan for Biodiversity 2011-2020 from all sources, and in accordance with the consolidated and agreed process in the Strategy for Resource Mobilization, should increase substantially from the current levels. This target will be subject to changes contingent to resource needs assessments to be developed and reported by Parties.	the Strategy for Resource Mobilization is adopted.

Source: India's Fifth National Report to CBD (2014)

The national targets are cross-cutting in terms of issues as well as respective jurisdictions of ministries of central government and state governments. However, there is a limitation in terms of funds available for achieving the national targets for biodiversity conservation. There is thus a need to identify new financial mechanisms to support biodiversity conservation in India. The newly formed national Access and Benefit-sharing (ABS) regime is one of the powerful mechanisms to generate funding for biodiversity conservation and equitable benefit sharing. The important provisions of the National ABS Guidelines, 2014 are given in the Table 2.

Table 2: Benefit sharing arrangement for access of biodiversity in India

Sr. No.	Purpose of Access	Procedure	Agreement	Benefit sharing arrangements
1	Research / bio-survey and bio-utilisation for research (NRIs, Foreign entities)	Application to NBA using Form I	With NBA	As per agreement and may include upfront payment for high economic value resources
2	Commercial utilization or for bio-survey for commercial utilization (Indian)	Application to NBA, SBB using Form I	With NBA or SBB as applicable	1) If agreement is not done before purchase then 1% to 3% of purchase price for trader and for manufacturer 3% to 5% of purchase price. 2) If agreement is made then not less than 3% of purchase price for trader and not less than 5% for manufacturer 3) For high value resources upfront payment of 5% on auction price / sale price
3	Commercial utilization			0.1% to 0.5% of annual gross ex-factory sale ranging from Rs 1 Cr to more than Rs 3 Cr

Source: National ABS Guidelines 2014

Similarly for various other purposes the benefit sharing is described in the following table-

Table 3: Benefit sharing arrangement for use of biodiversity in India

S. No.	Purpose	Procedure	Benefit sharing arrangements	Obligations
1	Transfer of research result (NRIs, Foreign entities)	1) Application to NBA through Form II 2) Provide evidence of approval from NBA	1) As per agreement 2)Payment to NBA 3% to 5% of the monetary benefits received	Complete disclosure of information on potential commercial value
2	Obtaining IPR for resource obtained from India	1) Application to NBA through Form III 2) NRIs, Foreign entities need to provide evidence of access	1) As per agreement 2) Payment to NBA 0.2% to 1% of the monetary benefits received, if applicant is commercialising 3) In case of third party, 3% to 5% of fee received and 2% to 5% of royalty amount	1) Prior intimation by Indian person to SBB as per the form and comply with any terms and conditions 2) If Foreign entity/ies, then need to apply to NBA with Form I
3	Third party transfer for research or commercial utilization	Application to NBA under Form IV	1) As per agreement 2) Payment to NBA 2% to 5% of the monetary benefits / royalty received 3) Upfront payment in case of high economic value resource	
4	Non-commercial research / emergency research outside India by Indian entity	Application to NBA using Form B of Guidelines	Not Applicable	Deposit copy of voucher specimens in the designated national repositories. And provide proof of such deposits to NBA

Source: National ABS Guidelines 2014.

The implementation of ABS guidelines is expected to bring about INR 20,000 crores annually as visualized by some of the State Biodiversity Boards in India like Madhya Pradesh State Biodiversity Board.

5 Conclusion

India is bestowed with unique biodiversity and associated traditional knowledge. At the national level India also has a robust policy framework to safeguard biodiversity. This has helped India to commit to strong measures at international level under Aichi Biodiversity Targets 2020. Against every national target indicators and responsible organizations have been identified. However, for a large number of indicators there are issues of defining baselines and availability of state or national level data leading to inadequate basis for understanding the impacts of conservation efforts.

6 References

Agricultural Research Data Book 2014, Published by : Director, Indian Agricultural Statistics Research Institute, Pusa, New Delhi -110012

Baillie, J.E.M., Hilton-Taylor, C. and Stuart, S.N. (eds). 2013. *2013 IUCN Red List of Threatened Species: A Global Species Assessment*. IUCN, Gland, Switzerland and Cambridge, UK.

Gokhale Y and Gazdar S (2012). Biodiversity Chapter, Green India 2047, TERI.

Government of India 2014 National Access and Benefit Sharing Guidelines 2014. Available from http://www.tkdl.res.in/tkdl/langdefault/common/Home.asp?GL=Eng

Malhotra, K.C., Y. Gokhale, S. Chatterjee, and S. Srivastava. 2007. *Sacred groves in India*. New Delhi: Aryan Books International.

MoEF (2014) India's Fifth National Report to the Convention on Biological Diversity. Ministry of Environment, Forests & Climate Change, Government of India.

Myers N. 2000 Biodiversity Hotspots for conservation priorities *NATURE* Vol. 403 24 FEBRUARY 2000

National Access and Benefit Sharing Guidelines 2014. Available from http://nbaindia.org/uploaded/pdf/Gazette_Notification_of_ABS_Guidelines.pdf

Web-resources

www.biodiversityhotspots.org. Accessed on 12.2.2015

About TERI

A unique developing country institution, TERI is deeply committed to every aspect of sustainable development. From providing environment-friendly solutions to rural energy problems to helping shape the development of the Indian oil and gas sector; from tackling global climate change issues across many continents to enhancing forest conservation efforts among local communities; from advancing solutions to growing urban transport and air pollution problems to promoting energy efficiency in the Indian industry, the emphasis has always been on finding innovative solutions to make the world a better place to live in. However, while TERI's vision is global, its roots are firmly entrenched in Indian soil. All activities in TERI move from formulating local- and national-level strategies to suggesting global solutions to critical energy and environment-related issues. TERI has grown to establish a presence in not only different corners and regions of India, but is perhaps the only developing country institution to have established a presence in North America and Europe and on the Asian continent in Japan, Malaysia, and the Gulf.

TERI possesses rich and varied experience in the electricity/energy sector in India and abroad, and has been providing assistance on a range of activities to public, private, and international clients. It offers invaluable expertise in the fields of power, coal and hydrocarbons and has extensive experience on regulatory and tariff issues, policy and institutional issues. TERI has been at the forefront in providing expertise and professional services to national and international clients. TERI has been closely working with utilities, regulatory commissions, government, bilateral and multilateral organizations (The World Bank, ADB, JBIC, DFID, and USAID, among many others) in the past. This has been possible since TERI has multidisciplinary expertise comprising of economist, technical, social, environmental, and management.

The Energy and Resources Institute
www. teriin.org