Protected Areas and Access and Benefit Sharing (ABS)

A Review



Centre for Biodiversity Policy and Law National Biodiversity Authority

2019

PROTECTED AREAS AND ACCESS AND BENEFIT SHARING (ABS): A REVIEW

Prakash Nelliyat & B. Meenakumari



Centre for Biodiversity Policy and Law National Biodiversity Authority

2019

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Citation

CEBPOL, NBA, 2018. Protected Areas and Access and Benefit Sharing (ABS): A Review, 2018. Published by the Centre for Biodiversity Policy and Law, National Biodiversity Authority, India, 91 pages.

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ISBN No.: 978-81-940589-2-2

Published by

Centre for Biodiversity Policy and Law [CEBPOL] National Biodiversity Authority, 5th Floor, TICEL Bio Park, CSIR Road, Taramani Chennai - 600 113 **Website:** www.nbaindia.org/cebpol

Layout and Design

N.Singaram Information Technology Executive, CEBPOL

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Acknowledgements

I wish to thank Shri. T Rabikumar IFS, Secretary NBA for his encouragements and guidance in preparing this paper and Dr. Rupam Mandal, Programme Manager, CEBPOL for his suggestions on the first draft of the report. I am extremely thankful to Dr. S. K. Khanduri IFS (Rtd.), Former Inspector General of Forests (WL), Ministry of Environment Forests and Climate Change for his intensive review of the draft report, valuable suggestions and insights on the linkages between protected areas and the ABS. The report is modified based on the comments of Dr. Khanduri and his suggestions are incorporated in the final report.

My thanks are to Mr. T. Narendran, Technical Officer - IPR for valuable discussions on major issues at different stages of the report preparation and his suggestions on the first draft, Ms. Sri Ramya, Young Professional – IPR for her legal inputs, and Dr. B. Andrews, Consultant GEF-ABS Project, Dr. Thompson C. Jacob, Consultant Biodiversity Policy CEBPOL and Dr. S. Sandilyan, Fellow Invasive Alien Species CEBPOL for their comments on certain aspects in the report. My gratitude also to Mr. N Singaram Information Technology Executive, CEBPOL for designing the report and Mr. G. Karthisrinivasan, Office Executive CEBPOL for his supports in various stages of preparation of this report.

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FOREWORD

Globally, protected areas are considered as one of the best options for managing the biodiversity crises and acting as an effective means to mitigate climate change impacts and stabilize the critical ecosystem services on which all societies depend. Protected areas are managed through stringent legal and institutional measures with limited public accessibility, especially for extracting/accessing the resources. However, with the advent of the Convention on Biological Diversity (CBD) and the Nagoya Protocol on Access and Benefit Sharing (ABS), the traditional approach on protected area management needs to be re-examined. Broadly, the genetic/biological resources are renewable in nature; hence their utilization within their regeneration capacity is an opportunity rather than a scare. In this context, protected areas are sources of genetic materials for bio-prospecting for users/industries and the money derived through ABS becomes an effective and sustained financial source for the protected area's management. Hence, a win-win situation for both the parties will emerge through the implementation of ABS in protected areas.

In India, one of the mega biodiverse countries in the world, protected areas play a significant role in the conservation of its rich biodiversity. As a member of the CBD and ratified Nagoya Protocol, India's initiatives on ABS are highly appreciable. India, is also actively involved in the CBD's 'Programme of Work on Protected Areas' (PoWPA) and has taken effective measures for achieving the Aichi Biodiversity Targets 11. In India, the statuses of protected / conservation areas are designated under different legal instruments. The Wildlife Protection Act, 1972 declared areas of "adequate ecological, faunal, floral, geo-morphological, natural or zoological significance" as wildlife sanctuaries, national parks, conservation reserves and community reserves for the purpose of protecting or developing wildlife or its environment (which includes the marine protected areas also). The National Forest Policy aims at the conservation of natural forests with vast varieties of flora and fauna, which represented remarkable biological diversity, through declaring areas as reserved forests and protected forests under the Indian Forest Act, 1972. The Wetlands of the country are also legally protected under the Wetlands Conservation and Management Rules, notified under the Environmental (Protection) Act 1986. These apply to the "wetlands of international importance under the Ramsar Conventions" and wetlands as notified by the Central, and State Governments and Union Territory Administration. Section 37 of the Biological Diversity Act 2002 empowers the state government to declare areas of significant biological diversity as Biodiversity Heritage Sites in consultation with the local bodies. From a broader perspective, the area under conservation/protection in India (under the above indicated laws) comes to 9,14,074 sq. km., which is 27% of India's geographical area.

The report; "Protected Areas and Access and Benefit Sharing: A Review" argues the formal requirement for accessing biological/genetic resources that exists in the biodiversity rich protected/conserved areas for commercial purpose (without compromising the original aim of each protected/conserved area) and the ABS associated with them for biodiversity conservation. In this regard an appropriate policy should be initiated.

I congratulate Dr. Prakash Nelliyat, Dr. B. Meenakumari and Shri. T. Rabikumar for their valuable contributions.

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Background

Protected areas are ecologically sensitive areas with rich biodiversity and high potential of genetic / biological resources. These geographical (inland and marine) locations are designated by the respective governments of the countries with the intention of conserving the natural habitats or restrict their depletion. Worldwide, nations have considered that the conservation of ecosystems through the declaration of ecologically sensitive zones as protected areas is an effective mechanism for their management. In this regard, governments have come up with stringent legal measures including specific rules and regulations for protected areas' management. However, the effective enforcement of existing legal measures in protected areas is the key challenge in many nations.

According to the Millennium Ecosystem Assessment (2005), over the past 50 years human activities have changed ecosystems more rapidly and extensively than at any comparable period in our history, with more than 60 per cent of the world's ecosystems already degraded. These changes have generated many economic gains but at growing environmental costs, including biodiversity loss and land degradation, which in turn, has resulted in many economic, social and cultural losses. Communities, particularly the poor, who rely on natural resources, become more vulnerable to biodiversity and ecosystem degradation.

Habitat loss, fragmentation, overexploitation of natural resources, pollution, and the spread of invasive alien species are the emerging threats to global biodiversity. These threats to biodiversity are increasing, largely driven by our failure to protect ecosystem integrity, the growing surge in human population, and unsustainable approaches to consumption and unlimited growth (CBD, 2010). Recently, climate change has emerged as the key environmental concern. Climate change aggravates environmental degradation and may generate new threats, with devastating consequences for both biodiversity and human welfare, especially for the poorest and most vulnerable communities and nations (Lopoukhine et. al, 2012). The impacts of climate change and biodiversity loss are major threats to achieving the Millennium Development Goals, especially those relating to environmental sustainability, poverty alleviation, and food and water security.

Globally, protected areas are considered as one of the best options for managing the biodiversity crises and act as an effective means to help society from the effects of climate change and stabilize the critical ecosystem services on which all societies depend. These ecosystem services include:

- a) **Provisioning Services** Ecosystems provide products such as food, water, fuel wood, fibre, medicinal products, and genetic resources. These services are important for securing livelihood, health and income.
- **b)** Regulating Services Ecosystems play an important role in regulating climate, floods and droughts, and diseases.
- c) Cultural Services Ecosystems such as rivers and hills are important for spiritual, religious, and cultural reasons, and therefore impact human wellbeing.
- **d)** Supporting Services These services include soil formation, nutrient cycling and primary production which are important for the functioning of the ecosystems themselves.

Hence, conserving the biodiversity and sustaining the ecosystem services is a critical requirement, where protected areas have a significant role. The Integration of protected areas into land use plans, as part of larger and connected conservation networks, offer practical, tangible solutions to the problems of both species loss and adaptation to climate change. Natural habitats make a significant contribution to mitigation by storing and sequestering carbon in vegetation and soils, and to adaptation by maintaining essential ecosystem services. Many protected areas could be justified on socio-economic grounds alone, yet their multiple goods and services are largely unrecognized in national accounting (Lopoukhine et al, 2012).

Protected areas are defined differently by various international agencies / organizations with an intent to suite their perspectives and objectives. On the other hand different countries, who are the parties of international organizations like CBD, also designated biologically important areas as 'protected areas' or 'other areas under legally assigned for conservation' for preserving their biodiversity and come up with specific definitions as per their legal documents. Hence the applicability of the newly emerged principles like ABS in the protected/ reserved areas required more consensus in legally and socially acceptable manner.

According to the International Union for Conservation of Nature (IUCN); protected area is a clearly defined geographical space, recognized, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values. Protected areas will usually encompass several zones, such as important and endemic bird areas, centres of plant diversity, indigenous and community conserved areas, alliance for zero extinction sites and key biodiversity areas.

The CBD stated that the protected areas make a vital contribution to the conservation of the world's natural and cultural resources. Their values range from the protection of natural habitats and associated biodiversity, to the provision of ecosystem services and contribution to poverty alleviation and sustainable development. Protected areas can provide opportunities for rural development and rational use of marginal lands, generating income and creating jobs, for research and monitoring, for conservation education, and for recreation and tourism. They are essential components in national and global conservation strategies.

The Programme of Work on Protected Areas (PoWPA), adopted during the CBD-COP VII (Decision VII/28) made lot of attention and support on protected areas and its management. The PoWPA deals with elements such as: (a) direct actions for planning, selecting, establishing, strengthening and managing protected areas; (b) ways and means to improve governance, participation and equity; (c) enabling activities relating to protected areas; and (d) standards, assessment and monitoring of protected areas. The PoWPA is expected to contribute to the 2010 target of achieving a significant reduction in the current rate of biodiversity loss.

There are several kinds of protected areas, which vary by the level of protection, depending on the enabling laws of each country or the regulations of the international organisations involved. Protected areas also include oceans (marine protected areas), the boundaries of which will include some area of the ocean, and trans-boundary protected areas that overlap multiple countries, which remove the borders inside the area for conservation and economic purposes. PoWPA focuses on "promotion of equity and benefits sharing" and suggested specific activities to their parties to be followed. It is very clear that the objectives of PoWPA and the Nagoya Protocol are similar, and both are attempting for the conservation of biodiversity. However, the approaches followed by these organizations are different. When the protected areas' management programs attempt the conservation of biodiversity through restrictive access, the Nagoya Protocol proposes the regulated (controlled) access of biological resources and their conservation through benefit sharing. Hence the access of biological / genetic resources and its regulations as well as the scope of ABS are important.

Realizing the importance of protected areas in managing globally and locally significant biodiversity, the CBD-COP: 10 designed a global target to deal with managing protected areas. Target 11 envisaged that: "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".

In India, the statuses of protected areas are designated under different legal instruments. The Wildlife Protection Act, 1972 provides for the declaration of areas of "adequate ecological, faunal, floral, geo-morphological, natural or zoological significance" as wildlife sanctuaries, national parks, conservation reserves and community reserves for the purpose of protecting or developing wildlife or its environment". These protected areas include the marine protected areas also. The National Forest Policy aims at the conservation of natural forests with vast varieties of flora and fauna which represented remarkable biological diversity. The objectives of the National Forest Policy are sought to be met by declaring areas as reserved forests and protected forests under the Indian Forest Act, 2017. The Act empowers the provisional state governments to notify any forest land or wasteland as reserved/protected forests, thus prohibiting the clearing of such areas, filling of trees, mining of similar activities that may damage the green cover. Wetlands of the country are also legally protected under the Wetlands Conservation and Management Rules 2017, notified under the Environmental (Protection) Act 1986. These apply to "wetlands of international importance under the Ramsar Conventions" and wetlands as notified by the Centre Government, State Government and Union Territory Administration. Section 37 of the Biological Diversity Act 2002 empowers providing state government to declare areas of significant biological diversity as Biodiversity Heritage Sites in consultation with the local bodies.

In the broader perspective, the area under conservation in India (under the above indicated laws) comes 9,14,074 sq. Km., which is 27 per cent of Indies geographical area. Access of different biological / genetic resources exist in these biodiversity enriched areas for commercial purpose and the ABS associated with them are the key and appropriate policy formulations / decisions is extremely important.

Compared to earlier periods, the present management approach to protected areas is quite different, and the sustainable use of its resource potential is getting more and more attention. Protected areas are internationally recognized as a major tool in conserving species and ecosystems. Besides, protected areas provide a range of goods and services including different biological / genetic resources, aesthetic and cultural value and a reservoir for carbon stocks. The goods, primarily the biological / genetic resources and their access permits and related benefit sharing should be positively viewed in all protected areas without sacrificing its assigned objectives.

Protected areas are under diversified categories with different legal and institutional structure envisaged for their management. Hence, the public accessibility in protected areas especially for extracting or accessing the resources is not uniform but varies substantially. When certain protected areas follow highly stringent rules and regulations, others follow lenient measures. This may vary from country to country as well as on the type of protected areas.

Generally, the goods available in the protected areas may be collected by the local communities for their subsistence / livelihood with the permission of the protected area managers. In some cases the community may collect the resources for the local market. The true/real value of these goods cannot be captured by the market, as market imperfections and information asymmetry exist in the product collection centres. Further, the multiple ecosystem services provided by the protected areas' in the form of non-marketed services are unable to be captured in the present national accounting. This can be estimated only through a valuation exercise.

Even if the protected areas' use values are enormous, at present it is absorbing in a limited manner, as debated in recent forums. The new agenda for protected areas requires greater inclusivity of a broader spectrum of actors and rights holders, with growing attention to landscapes and seascapes protected by indigenous peoples, local communities, private owners and other actors, which complement conservation areas managed by state agencies. Greater attention also needs to be focused on ways to integrate and mainstream protected areas into sustainable development, including promotion of "green" infrastructure as a strategic part of responses to climate change (Lopoukhine et al, 2012).

In this context, the mainstreaming of access and benefit sharing (ABS) in protected areas is significant. Protected areas are biodiversity hotspots with high volume of genetic / biological resources and excellent scope for bio-prospecting. ABS is the way in which genetic resources may be accessed, and how the benefits that result from their use are shared between the people or countries using the resources (users) and the people or countries that provide them (providers). Providers of genetic resources can be governments or civil society bodies, which can include private land owners and communities within a country, who are entitled to provide access to genetic resources and share the benefits resulting from their use. Using genetic resources refers to the process of researching their beneficial properties and using them to increase scientific knowledge and understanding and/or to develop commercial products.

ABS is based on prior informed consent (PIC) being granted by a provider to a user and negotiations between both parties that result in mutually agreed terms (MAT) including provision for fair and equitable benefit sharing. The benefits to be shared can be monetary (royalties, milestone payments, licensing fees) or nonmonetary (technology transfer, enhancement of research skills).

Hence, it is time for a change in the classical concept of protected area management, which followed high restrictions on absorbing the resource potential with stringent conservation measures. Currently, what is required is a paradigm shift on the management strategy for protected areas with its sustainable utilisation. From this perspective the optimum absorption of protected areas' bio-prospecting potential is important.

Through the successful ABS operation the protected area managers (providers of bio-resources) can obtain the monetary benefit from the bio-prospectors (users) who utilize the protected areas' genetic resource potential with commercial interests. This will lead to a win – win situation for both the parties.

For industries, protected areas act as a source for genetic materials for bio-prospecting. The money derived from ABS becomes an effective and sustained solution for finance for the protected area management. In this way, the ABS potential of the protected areas becomes an option for mitigating the current financial crisis in protected area management. Considering the merits of ABS in protected areas, the existing rules and regulations regarding different kinds of protected areas' management need to be re-examined and we have to come up with the required amendments and modifications for the smooth function of the ABS.

An understanding of the ABS potentiality of the biological resources existing in protected areas and an appropriated strategy towards the effective functioning of ABS, and considering the legal and the institutional arrangements prevailing on protected areas, is the main objective of this paper. Since the existing literature on ABS has not much debated on the 'ABS and Protected Areas' issues, we do not have sufficient references for making the conceptual framework of the study or having a strong debate on this issue. However, insights from the limited existing literature have been considered for further thought processes and arguments on 'Protected Areas and ABS' in a broader sense. Further, a series of discussions has been carried out with experts who are working on the ABS process / issues and protected areas management, and their views obtained. On Many occasions, experts revealed divergent views on the topic, which caused some confusion during the research.

The data on protected areas in India has been collected from the Wildlife Institute of India's database and a thorough analysis has done to understand the trend of protected areas' growth over a period. Further, the available legal documents on 'Protected Areas and ABS' were collected and reviewed, with the support of legal experts in the NBA, for delineating the legal insights.

This review paper examines: (a) the emerging scope of ABS in protected areas considering their bio-prospecting and commercial product development potential, (b) how ABS can act as an effective and sustainable financial source for protected area management and (c) the ABS' adaptable governance and management regimes for different types of protected areas. The paper has 2 parts. The first part is on the scope and argument of ABS on protected areas which considers various initiatives taken by the Convention on Biological Diversity (CBD). The second part details the protected areas in India in the light of ABS and their governance existing in the country.

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Part - I

Protected Areas And Access And **Benefit Sharing (ABS) Scope And Challenges**

Protected Areas: Definition and Significance 1.

Protected areas or conservation areas are locations which receive protection because of their recognized natural, ecological and/or cultural values. Generally, in protected areas human occupation or the exploitation of resources is limited and is regulated through National Legislation. The International Union for Conservation of Nature (IUCN) defined protected areas as: "a clearly defined geographical space, recognized, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values" (Dudley, 2008). Protected areas will usually encompass several zones, such as important and endemic bird areas, centres of plant diversity, indigenous and community conserved areas, alliance for zero extinction sitesand key biodiversity areas.

Protected areas are internationally recognized as a major tool in conserving species and ecosystems. They also provide a range of goods and services essential to the sustainable use of natural resources, including aesthetic and cultural value and a reservoir for Carbon Stocks (Nagulendran, 2013).

According to the CBD (2004), protected areas make a vital contribution to the conservation of the world's natural and cultural resources. Their values range from the protection of natural habitats and associated biodiversity, to the provision of ecosystem services and contribution to poverty alleviation and sustainable development. Protected areas can provide opportunities for rural development and rational use of marginal lands, generating income and creating jobs, for research and monitoring, for conservation education, and for recreation and tourism. They are essential components in national and global conservation strategies.

There are several kinds of protected areas, which vary by the level of protection, depending on the enabling laws of each country or the regulations of the international organisations involved. Protected areas also include oceans (marine protected areas), the boundaries of which will include some area of the ocean, and trans-boundary protected areas that overlap multiple countries, which remove the borders inside the area for conservation and economic purposes. In October 2010, there were over 161,000 protected areas in the world with 11.5% (17.1 million km²) of the world's land surface area. But only 1.17% of the world's oceans are included in the world's 6,800 marine protected areas (BIOPAMA, 2017). These numbers alone show that protected areas are the cornerstones of biodiversity conservation. They are critical to achieve the 2020 Aichi Targets and Millennium Development Goals (MDGs).



The following figure (figure 1) provides the growth – area coverage - in nationally designated protected areas from 1911 to 2011. It shows that the second half of the century witnessed a steady growth, particularly from the 1970s onwards.



Figure-1: Growth in Nationally Designated Protected Areas (1911 - 2011)

Source: IUCN and UNEP-WCMC (2012) Database on Protected Areas

The role of the protected areas in biodiversity conservation is significant. It often provides the habitat and protection from hunting for threatened and endangered species. Protection helps maintain ecological processes that cannot survive in most intensely managed landscapes and seascapes. Many protected areas will be allocated primarily for species conservation (flora or fauna or the relationship between them). But protected areas are similarly important for conserving the indigenous culture. They also play an important and considerable role in reserves of natural resources such as; Carbon stocks, rainforests and mountains.

People recognized the need to safeguard natural resources even many years before. More than 2,000 years ago, India designated protected localities through royal decree. The first formed protected area is the Tijuca National Park, founded 1861 in Brazil. As protected areas are designated with the objective of conservation of biodiversity and an area encompasses a broad range of governance types, the implementation of ABS is a tricky exercise and a challenge.

2. Protected Area Initiatives under the Convention on Biological Diversity

The Convention of Biological Diversity (CBD) was initiated on 5th June 1992 at the United Nations Conference on Environment and Development (the Rio "Earth Summit") and came into force on December 1993 as an international instrument for comprehensively addressing biological diversity. The Convention has three



objectives which include: (1) the conservation of biological diversity, (2) the sustainable use of its components and (3) the fair and equitable sharing of benefits arising from the utilisation of genetic resources. These objectives need to operate in a continuous and cyclical manner towards the successful running of the ecological/biodiversity functions for enhancing human welfare.

The Protected area provisions signified in the CBD are the most important international legal instruments for protecting biodiversity. Article 2 of the Convention defined the term protected area as "a geographically defined area, which is designated or regulated and managed to achieve specific conservation objectives". The Establishment and management of protected areas are central to Article 8 on "In-situ Conservation" of the CBD. The Article contains specific references to protected areas by encouraging Parties to:

- 1. Establish a system of protected areas or areas where special measures need to be taken to conserve biological diversity;
- 2. Develop, where necessary, guidelines for the selection, establishment and management of protected areas or areas where special measures need to be taken to conserve biological diversity;
- 3. Regulate or manage biological resources important for the conservation of biological diversity whether within or outside protected areas, with a view to ensuring their conservation and sustainable use;
- 4. Promote environmentally sound and sustainable development in areas adjacent to protected areas with a view to furthering protection of these areas;
- 5. Cooperate in providing financial and other support for in-situ conservation, particularly to developing countries. CBD (2008): https://www.cbd.int/protected/pacbd/default.shtml

The commitments contained in the CBD are intertwined and mutually supportive, as the principles of each provision are influenced by the CBD's other provisions.

Thus, one can understand the fact that the three objectives of the Convention as well as the commitments in its other Articles provide important dimensions to the scope of the protected areas commitments. For example, the commitments to promote the sustainable use of biological resources are also relevant to the Parties' management of the protected areas. Similarly, the obligation to support indigenous communities applies to the communities within the protected areas, which in turn is relevant to the Parties' development of protected area policies and management strategies (Laird et. al, 2003). However, the provision of the ABS on the genetic / biological resources available in the protected area network is a newly emerging one, which is to be explored further.

A range of legal and policy developments at the intergovernmental, national, institutional, and community levels exists, within which biodiversity research and bio-prospecting take place. At the intergovernmental level, the CBD and the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA) formalised the principles of prior informed consent, mutually agreed-terms and benefit-sharing associated with the use and exchange of genetic resources (Laird et. al, 2003).

The Programme of Work on Protected Areas (PoWPA), adopted during the CBD COP VII (Decision VII/28)



received a lot of attention and support. The PoWPA deals with elements such as:

- a) Direct actions for planning, selecting, establishing, strengthening and managing protected areas;
- b) Ways and means to improve governance, participation and equity;
- c) Enabling activities relating to protected areas; and
- d) Standards, assessment and monitoring of protected areas.

The PoWPA is expected to contribute to the 2010 target of achieving a significant reduction in the current rate of biodiversity loss. This involves a greater emphasis on practical results, such as the identification and pursuit of outcome-oriented targets for achieving by 2010 a significant reduction in the current rate of loss of biological diversity at the global, regional and national levels as a contribution to sustainable development, poverty eradication and the Millennium Development Goals (CBD, 2004).

Goal 2.1 of Element 2 of PoWPA focuses on "promotion of equity and benefits sharing" and stated the Target as: "Establish by 2008 mechanisms for the equitable sharing of both costs and benefits arising from the establishment and management of protected areas". Further, it has suggested two specific activities for the Parties to consider:

- 1. Assess the economic and socio-cultural costs, benefits and impacts arising from the establishment and maintenance of protected areas, particularly for indigenous and local communities, and adjust policies to avoid and mitigate negative impacts, wherever appropriate, compensate the costs, and equitably share benefits in accordance with the national legislation (2.1.1).
- 2. Establish or strengthen national policies to deal with access to genetic resources within protected areas and fair and equitable sharing of benefits arising from their utilization, drawing upon the Bonn Guidelines on Access to Genetic Resources and Fair and Equitable Sharing of the Benefits Arising out of their Utilization as appropriate (2.1.6.).

Collectively, the provisions of the Convention and decisions taken by the Conference of the Parties (CoP) promote a modern approach to protected area system management. They embody a concept that is not dependent upon setting aside or "locking up" resources found within the protected area network, but one which seeks to promote their integration into the national economy in a sustainable manner and to manage the threats to protected areas in a holistic and integrative manner. Countries have chosen a variety of mechanisms to introduce ABS measures into their national laws, including new stand–alone laws or additions to existing laws relating to biodiversity or specific sectors such as fisheries, forestry or protected areas (Laird et. al, 2003).

Realizing the importance of protected areas in managing globally and locally significant biodiversity, the CBD COP 10 designed a global target (Target 11) to deal with managing protected areas. Target 11 envisaged that:

"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 wellconnected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscapes and seascapes".

Latest statistics revealed that, 756102 sq.km of earth is under protected area with about 12.9% under terrestrial area coverage. In addition to serving as sites for the protection of significant biodiversity across the globe spread over diverse ecosystems, the protected areas also have proven to be important storehouses for valuable products based on bio-resources (Pisupati, 2014). This could facilitate an ample platform for the need of ABS on the genetic / biological resources entitled to the protected areas. In this regard, the ABS principles should be correctly accommodated and mainstreamed in the protected areas conservation policy.

3. The Nagoya Protocol on ABS

Genetic/bio-resources and associated traditional knowledge have great commercial potential, and their contribution to global economy and global intellectual property regimes is enormous. They are the key resources for sustainable bio-prospective and value addition processes. Further, biogenetic resources are the primary source of valuable genes, chemicals, drugs, pharmaceuticals, natural dyes, gums, resins, enzymes or proteins of great health, nutritional and economic importance (Pushpangadan and Nair, 2005). The combined world market for products manufactured through bio-resources is estimated to be over US \$ 500 billion (Laird and Kate, 2002).

With the advent of new tools and techniques, the power of bioprospectives has increased considerably in recent decades. According to Pushpangadan and Nair, (2005), modern bio-prospectives include the systematic search for genes, natural components, designs and whole organisms of either domesticated or wild sources with a potential for product development. Thus, the bio-prospective has three facets: chemical prospective, gene prospective and bionic prospective.

Even if biological diversity is a global asset, with tremendous value to the present and future generations, the species and ecosystem are under greater threat in recent years than ever before. Some estimates indicate the loss of 45-250 species per day and biodiversity losses have become a global concern. But biodiversity once lost is lost forever and likely to cause serious consequences to the ecosystem and human life. Considering this fact, arresting the decline of biodiversity (species and ecosystems) is a major objective of environmental policy at the global level, and needs to take initiatives at national and local levels. CBD emerged as an international treaty for comprehensively addressing the biological diversity crises. Objectives of the CBD include: (a) the conservation of biological diversity, (b) the sustainable use of its components and (c) the fair and equitable sharing of benefits arising from the utilisation of genetic resources.

In a realistic sense, the third objective of the CBD (the fair and equitable sharing of benefits arising from the utilisation of genetic resources) is more instrumental for achieving the first (conservation of biological diversity) and second (the sustainable use of its components)objectives of the CBD. Therefore, further advance of the implementation of the third objective was essential. The World Summit on Sustainable Development at Johannesburg, (September 2002) called for the negotiation of an international regime, within the framework of the Convention, to promote and safeguard the fair and equitable sharing of benefits arising from the utilisation of genetic resources. The Convention's Conference of the Parties (CoP) responded at its seventh meeting, in 2004, by mandating its Ad Hoc Open-ended Working Group. After six years of negotiation, the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization, to the CBD was adopted at the tenth meeting of the CoP on 29th October 2010, in Nagoya, Japan (CBD, 2011).

The Protocol significantly advances the Convention's third objective by providing a strong basis for greater legal certainty and transparency for both providers and users of genetic resources. Specific obligations to support compliance with domestic legislation or regulatory requirements of the Party providing genetic resources and contractual obligations reflected in mutually agreed terms are a significant innovation of the Protocol. In other words, the protocol made a platform for compliance provisions as well as the more predictable conditions for access to genetic resources and sharing their benefits. In addition, the Protocol emphasises on the provisions of access to traditional knowledge (associated with genetic resources) owned by indigenous and local communities as well as benefit sharing to the community, when a company makes use of their knowledge, innovations and practices.

The protocol has 36 Articles containing divergent aspects including: objectives, use and scope, access of biological resources and traditional knowledge, fair and equitable benefit sharing, contribution to conservation and sustainable use, global multilateral benefit sharing mechanism, compliance with domestic legislation, monitoring the utilization of genetic resources, capacity and awareness raising, technology transfer, monitoring and reporting by parties etc.

By promoting the use of genetic resources and associated traditional knowledge, and by strengthening the opportunities for fair and equitable sharing of benefits from their use, the Protocol will create incentives to conserve biological diversity, sustainably use its components, and further enhance the contribution of biological diversity to sustainable development and human well-being (CBD, 2011). The protocol clearly demarcated various monetary and non-monetary benefit sharing strategies (Appendix -1).

It is very clear from the above discussion that CBD is taking ample initiatives for the conservation of biodiversity through the PoWPA and Nagoya Protocol's ABS mechanism. Even if these two principles of CBD have huge inter-linkages, they are observed separately in different activities and objectives. Hence, there is an urgent need for the synergies between the PoWPA and ABS (Nagoya Protocol) programs under the CBD.



4. Bio-prospecting and ABS in Protected Areas

The role of protected areas in biodiversity conservation is significant and has universal acceptance. Prospecting for useful products using biological and genetic resources (bioprospecting) is undertaken by companies in a wide range of sectors. The Demand for genetic resources, and the ways they are valued and incorporated into research and development (R&D) varies considerably within and between sectors.

Terrestrial and marine protected areas are treasure boxes of biodiversity - highly attractive for bio-prospectors looking for active substances in plant and animal genetic resources. Integrating ABS into protected areas policy and management is therefore essential. Besides, not only do protected areas provide a home to extreme ecosystems and genetic variety; the local populations have developed a significant amount of traditional knowledge about these habitats over the past centuries and millennia (BIOPAMA, 2017).

The relevance of bioprospecting in this regard lies in the fact that, in recent years, bioprospecting in protected areas has yielded valuable commercial products. This has led, and continues to lead, to the perception that genetic resources found in protected areas are reservoirs of genetic material that could, in future, serve important functions in agriculture or medicine (Laird et. al, 2003). Despite this perception, little attention has been paid to how the newly emerging thoughts (like scope of ABS for protected areas) could be addressed by protected area managers, who act as 'gatekeepers' in the absence of well–developed national ABS measures and implementing procedures.

Generally, genetic resources and bio-prospecting are considered 'option values' held in protected areas. Option values (considered one of the use values of the ecosystem) are the premium placed on maintaining an environmental good or service for possible future use. In this context, protected areas are reservoirs of genetic materials that might serve important functions in agriculture or medicine in the future. However, in the last fifteen years, the legal and policy framework for biodiversity research and bioprospecting, and the perception, exchange and use of genetic resources has been transformed. These steps are going to bring new obligations to those serving as 'gatekeepers' of national biological and genetic resources.

Bioprospecting in protected areas has yielded valuable commercial products leading to the perception that genetic resources found in protected areas are reservoirs of genetic material with commercial benefits. Such resources range from non-timber forest produce to medicinal plants to high value enzymes and genes with potential for future biotechnological applications. However, there have been only limited attempts to link activities to sustainably manage protected areas with issues of access and benefit sharing. Little attention has been paid to the tapping the potential of genetic resources present in the protected areas for prospecting, (except in a few countries), using the ABS frameworks (Pisupati, 2014).

However, one cannot generalize the protected areas of a country under a single category and restrict or encourage access the biological resources and bio-prospecting. Various models of protected areas followed different conservation and management strategies: some of which envisage access and use, while some do not contemplate access for use, but exclusively for conservation of specific species. Hence, the protection or conservation strategy for each protected areas depends upon the purpose and focus of management. In this

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context experts opined that all categories of protected areas cannot be considered together for the purpose of deliberations on ABS, but should be in differentiated manner.

With the adoption of the Nagoya Protocol on ABS, the need to implement ABS related actions in protected areas gains more significance, particularly for a country like India. But, the fact is that protected area managers in many parts of the world still consider protected areas as in-violate areas preventing access to any material in these areas. However, recent developments in innovative management practices of protected areas, including designating community conserved areas (CCAs) are beginning to change the mind-set of long term and collaborative management of protected areas for securing not just conservation benefits from these areas but also economic benefits (Pisupati, 2014). These changes observed in protected areas like CCAs, need to be explored further scientifically and to come-up with appropriate ABS mechanisms.

It is also assumed that the more the benefits generated from protected areas, the more opportunities for conservation at the local level. In addition, experience shows that there are greater chances that local communities will support the management of these areas if they provide continual benefits from managing such areas (Laird S et.al, 2003). Sharing of benefits arising from the protected areas equitably is understood from different perspectives, such as: contribute to ensuring local livelihoods, slowing biodiversity loss due to enhanced management of resources, ensure a right-based approach to managing protected areas, and generate income for governance issues.

In recent decades, bioprospecting in protected areas has yielded valuable commercial products, and some of the cases are indicated below.

- 1. The pharmaceutical Sandimmun Neoral (cyclosporine), marketed by Novartis. Sandimmun Neoral was the thirty-third top-selling drug worldwide in 2000, with total sales of US\$1.2 billion. In 1969, a researcher at Sandoz (which became Novartis after a 1996 merger with Ciba Geigy) collected a soil sample in Hardangervidda National Park in Norway. By 1972 the immunosuppressant property of cyclosporine found in the soil sample was identified, and in 1983 Sandoz introduced Sandimmun into the market.
- 2. In 1966, the thermophile Thermus aquaticus was collected in the geothermal features of Yellowstone National Park in the United States by academic researchers. In 1984, a DNA polymerase enzyme, Taq polymerase, was isolated from T. aquaticus and has subsequently been used in a range of biotechnological applications, with annual sales exceeding US\$200 million.

In the light of the bioprospecting significance of protected areas, the national ABS framework should include the protected area ABS policies as well. Further, national and international laws, have also to provide the legal and regulatory mechanisms necessary to realize the 'option values' of genetic resources existing in protected areas. Further, protected area managers should be aware about the current perceptions is practices associated with genetic resources, particularly biodiversity research and bioprospecting. Accordingly, they should come forward for rapid and dynamic change in the status of protected areas management.

5. Is ABS an Innovative Financial Mechanism for **Conservation of Protected Areas?**

It is very clear from the above discussion that protected areas play a significant role in bioprospecting. However, the significance of bioprospecting in the protected areas needs to be realized by the protected area managers. The economic value of the products derived from the biological resources found in protected areas and the further potential of bioprospecting should be enormous and should be estimated and exposed to the policy makers including the protected area managers. The application of the ABS mechanism in protected areas through appropriate measures (suitable for the legal and institutional structure of protected areas) is the need of the hour. The benefit sharing amount derived through the ABS may act as an additional source of funding the protected area management. But, in the absence of policy and legal frame works, which facilitate the channelizing of the ABS amount to the sites of collection, the broader conservation objectives may be under threat.

Generally, the stringent regulatory and bureaucratic frameworks in protected areas make restrictions to researchers on caring out their research. However, the protected areas scope to the researchers through inventing new chemical compounds and other genetic materials which has potential for product development is huge. Compare to earlier periods, the present management approach to protected areas is quite different, and the sustainable use of its resource potential is getting more and more attention.

Countries pay both direct management and opportunity costs to maintain their biodiversity in protected areas and make them available to researchers and companies. A survey in 1999 found that only 1 per cent of protected areas worldwide was considered 'secure' and that a large proportion of protected areas amount to little more than 'paper parks' (Laird S et.al, 2003). While the external threats to protected areas are complex, chronic funding shortages and limitations in human skills and institutional capacity are some of the most consistently cited obstacles to effective protected area management. Expenditure by developing countries on protected areas is significantly less than that of developed countries, with an average of US\$157 per km² compared with US\$2,058 per km² in developed countries (Laird et.al, 2003).

Addressing these chronic funding problems in all countries will ultimately require the protected area network to be managed in a way that contributes to the intellectual and financial capital of the country, as if it were used in other ways. Conserved areas are often seen as another kind of land use, one with costs and benefits like any other sector. Even in countries with a high tax base, like Norway and the US, governments rarely allocate sufficient funds to manage their parks. While recreation and tourism can help significantly towards this end, protected areas must diversify their income resource base, develop sustainable financing mechanisms, and better harness private financial flows in the service of conservation (Laird S et.al, 2003).

Biodiversity research and bioprospecting can serve as one element in such a strategy. In Costa Rica, for example, the National Institute of Biodiversity (InBio) includes 'conservation overhead' in the budgets of its commercial research partnerships. 10 per cent of all bioprospecting budgets, and 50 per cent of all royalties, are donated to the Ministry of Environment and Energy (MINAE). As of early 2000, INBio's contributions to conservation



areas had reached US\$790,000, with another US\$400,000 for conservation activities directed through MINAE. An additional US\$713,000 went to public universities and US\$750,000 to support INBio's activities, particularly the National Inventory Program (Laird S et.al, 2003).

In brief, parties who come up with ABS legislations and institutional mechanism, ABS can be an innovative financial mechanism for conservation has been duly recognized. In the case of protected areas, with consider its innumerable non-marketed services; government is incurring huge expenditure for its conservation. Broadly the overall benefits from ecosystems (including the protected areas) are huge. However, a well designed and successful ABS from the protected areas can be considered as an additional financial source for successful management of ecosystems thereof, provide the ecosystem services as indicated in the following figure (Figure - 2).



Figure - 2: Rational Between Protected Areas and ABS

Bio-prospecting in all repositories of biodiversity is a good idea, the management of certain category of areas designated as protected areas, is based on specific objectives of management which is often species focus and may have the need of keeping the area inviolate. In such cases, bio-prospecting as a routine activity may not be desirable. However, research as such is not prohibited in protected areas of certain countries, but the human presence which is usually regulated, depending upon the exigency of management and conservation strategy of the area. Fact remains that protected areas particularly those with the objective of preserving the sources of genetic material for dispersal in other surrounding areas, must remain in prime state of preservation and any access to the genetic resources can be managed outside, unless it is endemic to a specific protected areas.



Cost-Benefit analysis and Economic Valuation of Protected Areas 6.

Benefits and costs associated with the conservation of protected areas is significant. Generally, the benefits from protected areas are invisible but the costs are visible. There are assessments which captured the kinds of costs and benefits of managing protected areas (Gonzalez and Martin (2007)). However, such assessments were largely undertaken in the past in the absence of a legally binding regime on ABS (the Nagoya Protocol). But recognizing the contributions from ABS could lead to better monetary benefits and management of protected areas. The Millennium Ecosystem Assessment categorizes the services and benefits provided by ecosystems and protected areas to local and international communities as provisional, regulatory and cultural services. These benefits are multiple, direct and indirect, tangible, intangible and complex.

According to Pisupati (2014), the relation between conservation costs derived from establishing a protected area and the derivation of benefits thereof, should not be assumed using simple cost-benefit analyses. In practice, such analyses are not possible since a significant amount of opportunity costs are also involved in establishing a protected area. That is, if an area is declared as protected, one can lose the other alternative optionsor usages for that area, such as for cultivation, housing, or any other development purpose.

In this regard, the proper valuation of the benefits of protected areas and the assessment of cost (both the management cost as well as the opportunity cost) is extremely important. Protected areas having great biological richness are a major source of material and non-material wealth. They represent important stocks of natural, cultural and social capital, supporting the livelihood and wellbeing of many. Worldwide, protected areas are helping local communities, tourism, agro-biodiversity, spirituality, capacity building, poverty reduction, and sustainable development.

- 1. A study conducted in 2003 found that 33 of the world's 105 largest cities obtain a significant proportion of their drinking water from protected areas.
- 2. In addition to the biodiversity benefits and ecosystem services that protected areas provide, they can also create investment opportunities and employment. In Guatemala, the Maya Biosphere Reserve generates an annual income of approximately US \$47 million while creating employment for 7,000 people.
- 3. Protected areas can help guard against environmental disturbances and the impacts of climate change by helping society to both mitigate and adapt to stressors.
- 4. Protected coral reef ecosystems provide coastal protection services worth \$9 billion per year (CBD, 2008).

However, the biosphere reserves are generally viewed differently from the protected areas and have been done in context of business and employment opportunities as created in Maya Biosphere Reserve. In case of protected areas (such as National Parks and Wildlife Sanctuaries in India), such opportunities in the neighbouring areas outside are immensely possible, often as a function of the opportunities arising from the state of management of the protected area itself. In case of biosphere reserves, such opportunities can very well be within, and many even independent of the protected areas.





For understanding a comprehensive picture of the benefit, the Total Economic Value (TEV) of the protected areas should be considered. TEV is one of the most widely used conceptual frameworks for understanding any ecosystem's overall significance. TEV broadly consists of Use Values and Non - Use Values (Fig. 3).





Use-values of ecosystems or protected areas include: (a) Direct Values, (b) Indirect Values and (c) Option Values.

- a) Direct Values: Direct values are the benefits derived from the use of protected area goods either for direct consumption or production of other commodities. For example, medicinal plants, forest products, fish and other marine resources, genetic materials available in the ecosystems are used by humans either for direct consumption or for manufacturing different consumer products or both. Besides, people are directly enjoying (using) the scenic beauty and recreational potential of the ecosystem.
- **b) Indirect Values:** Indirect values include various benefits provided by protected areas for ecosystem functions and services. Ecosystems are providing services, such as carbon absorption, hydrological cycle, nutrient cycling, climate control, flood control, etc. which are sometimes more valuable than the goods they provide.
- c) Option Values: Option values are the premium placed on maintaining an ecosystem good or service for possible future use.



Non-useValues of protected areas include: Existence Value, Bequest Value and Intrinsic Value.

- a) Existence values: Existence values are satisfaction from just knowing that a unique species or ecosystem is present. For example, the mere existence of a unique flora and fauna in protected areas gives some value to the people who belong there.
- b) Bequest value: Bequest value is the willingness to pay to ensure that future generations inherit a particular environmental asset.
- c) Intrinsic Value: Intrinsic value is the value of a species or ecosystem in its own right, independent of any value placed on it by humans.

The protected area provides ample scope to derive different benefits as indicated above. Use of biological resources for bio-prospecting from the protected areas is one of the direct use values of the protected area. Generally, the genetic / bio-resources obtained from the ecosystem / protected area are the base for many value added products to come into the market. Hence, innovative options including provisions, need to be in place for deriving the benefits from the provision of access to the bio-resources by protected area managers in a manner that contributes to securing the finances for enhanced management of the protected areas as well as to ensure that the local communities derive the benefits of participation in management (Pisupati, 2014).

ABS Experience from Protected Areas: Lessons and Challenges 7.

Available reports revealed that, the commercial prospecting of genetic resources from national parks and protected areas is going on in different ways (formal and informal) for the past several years. However, there has been lack of clarity on how, at a national level, the park managers can mainstream and/or internalize the ABS principles into providing permits for prospecting. Broadly, the protected area mangers have adopted different strategies to deal with ABS issues. The bioprospecting arrangements in Yellowstone National Park in the United States reveal how the park management sought to maximize revenues for the Park from bioprospecting partnerships.

However, in South Africa, several of the provincial protected areas' park managers have chosen to await developments on national ABS measures, refusing commercial collections until national legislation is in place. This is the case in several other countries as well. However, the park managements in African National Parks and EzemveloKwaZuluNatal Wildlife Park, the Bwindi National Park in Uganda, Waza National Park in Cameroon, and Tai National Park in Cote d'Ivoire have taken pro-active, interim measures to deal with ABS issues without awaiting either the finalization of the Nagoya Protocol on ABS or the national frameworks on ABS (Laird S et.al, 2003).

With the adoption of the Nagoya Protocol on ABS in 2010, it is important now to ensure that specific guidance be provided to protected area managers and communities conserving specific areas on ABS issues that are in line with the provisions of the Protocol and national priorities to secure equitable and fair benefit sharing agreements for prospecting (Pisupati, 2014). Any delay in securing this process and implementation will adversely affect the entire potential of bio-prospectingand become neither useful for the users of genetic resources nor beneficial for the protected areas.



There are opportunities and challenges for protected areas which include:

- Identifying the commonalities and differences within the prospecting components of genetic resources in protected areas and ABS.
- The linking of ABS national frameworks with protected area management plans.
- Enhancing awareness of the issues of ethics, equity and governance within the protected area stakeholder community.
- Developing endogenous capacities and know-how for protected area managers.
- Indigenous peoples and local communities and ABS as management principles of protected areas and
- The identification and assessment of best practices, case studies, and model contractual clauses.

The Decisions X/1 and X/31 relating to ABS and protected areas, adopted by the 10th Meeting of the CoP to the CBD offer a unique opportunity to consider the potential linkages between protected area management systems and the ABS implementation at the national level. With a number of parties to the CBD hastening to ratify the Nagoya Protocol and implement domestic ABS laws, it is critical to ensure that the ABS frameworks not only avoid conflicts with existing protected area frameworks, but are also harmonized with the aims of Element 2 of the PoWPA that focus on governance, participation, equity and benefitsharing (Pisupati, 2014).

ABS should not be seen exclusively as bioprospecting. Although reference is made to bioprospecting in most readings of the Nagoya Protocol, the requirements of ABS are broader than that, especially in the case of protected areas. There are, for example, bio-cultural ecosystem services provided by protected areas, especially those that allow indigenous people to modify the environment in certain ways to provide services, like ecosystem services and cultural habitats that require benefit-sharing (Pisupati, 2014). Further, from a broader perspective, the entire concept can be viewedas 'Payment for Ecosystem services'.

ABS policy for Protected Areas Management 8.

According to Borrini et, al. (2013), over the past decades there has not only been a significant increase in the number of protected areas around the world, but also a dramatic change in understanding how protected areas can and should be governed and managed. At present, along with the state-run protected areas managed by government employees, we now have protected areas established and managed by indigenous peoples, local communities, ecotourism organisations, non-profit trusts, private individuals, commercial companies and religious institutions. Many government-run protected areas are also increasingly bringing other stakeholders into the processes of decision-making. These changes have been strongly supported by the international community. Countries becoming part of the Convention on Biological Diversity's Programme of Work on Protected Areas (POWPA) is one of the examples.

Protected areas are repositories of biodiversity that provide sustainable sources of biodiversity for conservation and use which could facilitate recurrent bioprospecting. Modern technologies provide unprecedented opportunities for discovering novel compounds from genetic resources occurring in situ. The demand for genetic resources, and the research and development in the pharmaceutical and other sectors persist. The successes with bioprospecting within protected areas, and their effective management and governance systems are important areas of learning for ABS practitioners, and facilitate the development and implementation of the ABS frameworks (Pisupati, 2014).

To date, the response from protected area managers and policy makers to ABS issues has largely been ad hoc, but this is likely to change in the coming years, since protected areas remain a favoured site for biodiversity research and bioprospecting, while the policy context is in a state of flux. Protected area policy makers thus need to provide guidance and assistance to protected area managers to deal with these issues in a more standardised and comprehensive manner (Laird S et.al, 2003).

In this context the following questionsare important and need to be addressed.

- 1. How to frame an effective ABS policy with consideration for the specific and governance structure of different kinds of protected areas, as existing in India.
- 2. Examine the existing legal and international regime (for operationalising the ABS) in the country and assess its practicability in the case of protected areas.
- 3. Ensure better clarity and consider arguments on ABS in protected areas.

For contemplating an ABS policy for protected areas the following issues need to be considered:

- 1. Policy and regulatory linkages between prospective management options of PAs that are in line with the obligations of the Nagoya Protocol and national priorities on ABS. These can range from issuing prospecting permits to negotiating PIC, MAT and benefit sharing arrangements.
- 2. Coordination between PoWPA and ABS focal points at the national level for effective coordination between PoWPA focal points and ABS focal points and competent authorities in drafting protected area-ABS policies at protected area system-level, involving all stakeholders, need to be addressed, including the development of appropriate ABS frameworks at the national level.
- 3. Options for the development of implementation frameworks for ABS, specific for PAs should be explored, for example involving indigenous and local communities, based on protected area system-level policy.
- 4. Frameworks of governance under various categories of PA management should also consider issues of ABS and related equity and fairness principles in addition to focusing on securing the tenure and rights for indigenous and local communities (Pisupati, 2014).

9. Conclusions

Protected area agencies are struggling to find new ways of running their protected areas while many other actors are learning about how to maintain their traditional "conserved territories" through times of rapid change or in the face of mounting pressures from unsustainable forms of development. It is generally acknowledged





that the components of the POWPA that have lagged in implementation have been those dealing with issues relating to governance, human rights, equity and benefit sharing (Borrini et, al., 2013).

Protecting the biodiversity and maintaining the ecosystem services through declaring ecologically sensitive zones as protected areas is one of the environmental conservation strategies that have obtained universal recognition. Generally, the available resource stock in the protected areas is conserved through stringent policy restrictions. In this way the direct use values (including the bioprospecting value) of the protected areas are being sacrificed by the present generation. However, the ecosystem services (indirect use value) of the protected areas are widely discussed and recognized.

As the parties of the CBD are attempting to achieve the Aichi Biodiversity 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 areabased conservation measures, and integrated into the wider landscapes and seascapes") more and more ecologically sensitive areas in the country have become protected areas. Further, the CBD, which has universal membership, has been insisting on all the parties to implement the objectives of the CBD, including the ABS. Now, countries are ratifying the Nagoya Protocol and establishing the legal and institutional measures on the implementation of the ABS.

In this context the traditional approaches followed by the protected area management need to be reexamined from their sustainable utilization perspective. The genetic and biological resources available in protected areas are renewable natural resources. Hence, its utilization within its regeneration capacity is an opportunity rather than a scare. However, this attempt should not hamper the overall objective of protected area, that is, conservation of ecosystems. Future, the management of protected areas clearly needs differential management options as well as efforts to finance such management. Experience from different parts of the world revealed that, setting aside significant financial resources for managing protected areas as nogo zones will not be attractive for many governments, and may become a fiscal burden.

Estimating the benefits, both tangible (goods) and non-tangible (services), from protected areas will emerge as a key challenge to protected area managers in the years to come. Introduction of ABS mechanisms may be an important option for long-term conservation and sustainable management of protected areas. The Implementation of such national and local actions also directly contributes to realizing the objectives of the Nagoya Protocol besides effective implementation of its Article 9 on contribution to conservation and sustainable use. This was amply recognized previously, prior to the adoption of the Nagoya Protocol on ABS but was never translated into actionable practice (Pisupati, 2014).

According to Pisupati (2014), "it will be a lost opportunity if countries do not see synergistic implementation of provisions of the Nagoya Protocol and PoWPA at this point. With about six years left to achieving the Aichi Biodiversity Targets 11 and part of Target 16, the time has come for us to design and develop implementable ABS projects in protected areas and ensure that the provisions of Goal 2.1 of PoWPA receive needed attention".



The recommendation from the Fifth Meeting of the Working Group on Review and Implementation of the CBD (WGRI 5) calls for mainstreaming ABS issues across all relevant work programmes of the CBD. For implementing / mainstreaming the ABS principles in protected area management, the following approaches were suggested.

- 1. The protected area management plans should include the focus on issues of ABS and related processes and encourage sustainable and equitable prospecting actions.
- 2. Development of regulatory/legal/management frameworks to implement the provisions of the Nagoya Protocol should consider the current and emerging management practices of protected areas in the country and provide flexible options to deal with ABS issues within the protected areas.
- 3. Countries need to adopt a cohesive framework for managing protected areas that attract investments in such management options encouraging research and development in such areas rather than using the traditional approach of keeping researchers away from such areas.
- 4. A specific biodiversity prospecting fund could be established that attracts all ABS related revenues from protected areas at local and national levels.

In brief, the objectives of PoWPA and the Nagoya Protocol are similar, and both are attempting the conservation of biodiversity. But the approaches are different. When the protected areas' management programs attempt the conservation of biodiversity through restrictive access, the Nagoya Protocol proposes the access of biological resources and their conservation through benefit sharing.

A successful implementation of the Aichi Biodiversity Target 11 implies that some more biodiversity hot spots, which may currently experience bioprospecting, will be converted as protected areas. In this context the existing policies of the protected areas, which restrict access of genetic / biological resources become a threat to their utilization for developmental purpose or human well being. Application of the ABS policies in protected areas help protected area managers to maximise the potential gains from bioprospecting and minimise the financial crises currently facing the government towards protected area management.

Borrini et, al., (2013) stated that as biodiversity becomes rarer and increasingly precious, protected areas the jewel ecosystems, species, genetic diversity and associated values that societies agree to conserve - are becoming an ever more important focus of interest and concern, delight and conflict. This might be true in the case of the application of ABS in the protected areas in the interest of bioprospectors. But ABS concerns in protected areas should not lead to conflicts, but take into consideration broader perspectives (their conservation and sustainable use) in a delightful manner more amicably.



References

BIOPHAMA (2017). "Protected Areas", Available at: http://www.biopama.org/

Borrini Feyerabend, G., N. Dudley, T. Jaeger, B. Lassen, N. Pathak Broome, A. Phillips and T. Sandwith (2013). "Governance of Protected Areas: From understanding to action. Best Practice", Protected Area Guidelines Series No. 20, Gland, Switzerland: IUCN. xvi + 124pp.

Convention on Biological Diversity (2004). "Programme of Work on Protected Areas, CBD Programmes of Work, Montreal: Secretariat of the Convention on Biological Diversity 31 p.

Convention on Biological Diversity (2008). "Protected Areas in Today's World: Their Values and Benefits for the Welfare of the Planet", Montreal, Technical Series no. 36, i-vii + 96 pages.

Convention on Biological Diversity (2010). "Global Biodiversity Outlook 3", Montreal: Secretariat of the Convention on Biological Diversity.

Convention on Biological Diversity (2011). "Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization to the Convention on Biological Diversity" Convention on Biological Diversity, United Nations.

Dudley, N. (Editor) (2008). "Guidelines for Applying Protected Area Management Categories". Gland, Switzerland:

Gonzalez, A.M., Y Martin, A.S. (2007). "Equitable Sharing of Benefits and Costs Generated by Protected Areas". Innovations for Conservation Series - Parks in Peril Program, Arlington, VA, USA: The Nature Conservancy.

Laird Sa and Kate K Ten (2002). "Biodiversity prospecting: the commercial use of genetic resources and best practices in benefit sharing", in Laird SA (ed.) Biodiversity and traditional knowledge equitable partnerships in practice, Earth Scan publication limited, London 2002, 241-286.

Laird Sarah, Sam Johnston, Rachel Wynberg, Estherine Lisinge and Dagmar Lohan (2003). "Biodiversity access and benefit sharing policies for protected areas; An Introduction". UNU-IAS, Yokohama.

Lopoukhine N, N. Crawhall, N. Dudley, P. Figgis, C. Karibuhoye, D. Laffoley, J. Miranda Londoño, K. MacKinnon et T. Sandwith (2012). "Protected areas: providing natural solutions to 21st Century challenges", S.A.P.I.EN.S (Surveys and Perspectives Integrating Environment and Society) Paper. Vol.5 – Issue 2, IUCN Commissions.

Millennium Ecosystem Assessment (MEA) (2005). "Ecosystems and Human Well-being: Biodiversity Synthesis". Washington, D.C.: World Resources Institute.

Nagulendran K. (2013). "ABS Interventions to Strengthen Protected Area Management", Paper presented in 1st Asia Parks Congress 13-17 November, Sendai, Japan.

Pisupati Balakrishna (2014). "Protected Areas and ABS: Getting Most of the Two", Fridtjof Nansen Institute (FNI-rapport 4/2014).

Pushpangadan P and K. Narayanan Nair, (2005). "Value addition and commercialization of biodiversity and associated traditional knowledge in the context of the intellectual property regime", Journal of intellectual property rights, Vol. 10 Sept, 2005, PP 441 -453

Annexure - 1

Monetary and Non-Monetary Benefits

Monetary benefits may include, but not be limited to:

- a) Access fees/fee per sample collected or otherwise acquired;
- b) Up-front payments;
- c) Milestone payments;
- d) Payment of royalties;
- e) Licence fees in case of commercialization;
- f) Special fees to be paid to trust funds supporting conservation and sustainable use of biodiversity;
- g) Salaries and preferential terms where mutually agreed;
- h) Research funding;
- i) Joint ventures;
- j) Joint ownership of relevant intellectual property rights.

Non-monetary benefits may include, but not be limited to:

- a) Sharing of research and development results;
- b) Collaboration, cooperation and contribution in scientific research and development programmes, particularly biotechnological research activities, where possible in the Party providing genetic resources;
- c) Participation in product development;
- d) Collaboration, cooperation and contribution in education and training;
- e) Admittance to *ex situ* facilities of genetic resources and to databases;
- f) Transfer to the provider of the genetic resources of knowledge and technology under fair and most favourable terms, including on concessional and preferential terms where agreed, in particular, knowledge and technology that make use of genetic resources, including biotechnology, or that are relevant to the conservation and sustainable utilization of biological diversity;
- g) Strengthening capacities for technology transfer;
- h) Institutional capacity-building;


- i) Human and material resources to strengthen the capacities for the administration and enforcement of access regulations;
- j) Training related to genetic resources with the full participation of countries providing genetic resources, and where possible, in such countries;
- k) Access to scientific information relevant to conservation and sustainable use of biological diversity, including biological inventories and taxonomic studies;
- Contributions to the local economy;
- m) Research directed towards priority needs, such as health and food security, taking into account domestic uses of genetic resources in the Party providing genetic resources;
- n) Institutional and professional relationships that can arise from an access and benefit-sharing agreement and subsequent collaborative activities;
- o) Food and livelihood security benefits;
- p) Social recognition;
- q) Joint ownership of relevant intellectual property rights.



Part - II

Protected Areas And Access And Benefit Sharing: Indian Scenario

Introduction 1.

In India, one of the mega biodiverse countries in the world, areas under conservation as per different laws, which currently cover 27% of the country's landscape, play a significant role in the conservation of its rich biodiversity. As a member of the Convention on Biological Diversity (CBD) and the ratified Nagoya Protocol, India's initiatives on Access and Benefit Sharing (ABS) are highly appreciable. India, also actively involved in the CBD's 'Programme of Work on Protected Areas (PoWPA)' has taken effective measures for the conservation of its divergent ecosystems. In India, so far, though there is no success case of ABS in protected areas, its scope is enormous. At Present, biological resources available in protected areas are (legally or illegally) collected by the tribal/local communities and a major share, after their self use/consumption, may go for commercial use through local traders where ABS plays a significant role.

India's protected areas are managed through various legal measures including the Indian Forest Act - 1927, Wild Life Protection Act - 1970, Wild Life Protection (Amendment) Act – 2002, and Scheduled Tribes and other Traditional Forest Dwellers (Recognition of Forest Rights) Act - 2006. Besides, designated wetlands declared under the Environmental (Protection) Act 1986 and Biodiversity Heritage Sites declared under the Biological Diversity Act, 2002 are come under the area based conservation spots in India. These legal processes envisaged restrictions as well as conditions in accessing the biological resources from the protected areas. The tribal and / or local communities have customary rights on forest resources collection and utilization, which is prevailing in many parts of the country. The transformation from the subsistence level of forest resources utilization to their commercial utilization is the key to ABS.

India's legal measures for initiating the ABS include the Biological Diversity Act (2002), Biological Diversity Rules (2004), the Guidelines on Access to Biological Resources and Associated Knowledge and Benefit Sharing Regulation (2014), and various notifications issued by the Central Government under the Biological Diversity Act. Further, at the state level, different states notified state specific Biological Diversity Rules for the smooth implementation of ABS. The legal measures on ABS have not specifically indicated the case on the biological resources existing in protected areas. The Biological Diversity Act emphasised the ABS applicability on "any biological resources occurring in India or knowledge associated thereto for research or for commercial utilization or for bio-survey and bio-utilization". Accordingly, the applications of ABS on the biological resources from the protected areas are evident.



As a mega bio-diverse country, much of India's biological resources exist in the protected areas. These resources need to be conserved and utilized in a sustainable manner for the benefit of the present and future generation, where the scope of ABS plays a critical role. This part of the paper (Part II) examines the protected areas and the ABS related issues in India.

2. India's Biodiversity: An Overview

India is one of the 17 mega-diverse countries of the world. India has only 2.4% of the world's land area. But the country possesses 16.7% of the world's human population and 18% of livestock. It contributes about 8% of the known global biodiversity. The country has 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 (the Himalaya, the Western Ghats, the North-east, and the Nicobar Islands) are present in India. Considering the outstanding universal values and exceptionally high levels of endemism in the Western Ghats, 39 sites in the states of Kerala, Karnataka, Tamil Nadu and Maharashtra have been considered on the United Nations Education Scientific and Cultural Organization (UNESCO) World Heritage List in 2012 (Ministry of Environment and Forests, 2014).

India is home to the world's largest wild tiger population and has got a unique assemblage of globally important endangered species like the Asiatic lion, Asian Elephant, One-horned Rhinoceros, Gangetic River Dolphin, Snow Leopard, Kashmir Stag, Dugong, Gharial, Great Indian Bustard, Lion Tailed Macaque etc. India has identified 12 Transboundary Protected Areas through bilateral and/or multilateral cooperation that has been initiated with the support of the neighbouring nations (Convention on Biological Diversity, 2017).

India has taken significant steps in inventorying its vast and diverse biological heritage. Studies on freshwater and marine ecosystems, mycological work related to taxonomy and floristic studies have been carried out. India has a large number of lichen species, which are nature's most remarkable alliances. Around 2300 species belong to 305 genera and 74 families, have been reported from India. With over 200 diatom species, 90 dinoflagellates, 844 marine algae and 39 mangrove species, the marine floral biodiversity of India is remarkable. Endemism is significant across different plant groups in India. About 4,045 species of flowering plants (angiosperms) endemic to India are distributed amongst 141 genera belonging to 47 families (Ministry of Environment and Forests, 2014).

In terms of endemism of vertebrate groups, India's global rank is 10th in birds with 69 species, fifth in reptiles with 156 species, and seventh in amphibians with 110 species. As a centre of origin of cultivated plants, India has 15 agro-climatic zones. It is considered to be the primary centre of the origin of rice. A total number of 811 cultivated plants and 902 of their wild relatives have been documented so far. India also has a vast and rich repository of farm animals, represented by a broad spectrum of native breeds of cattle (34), buffaloes (12), goat (21), sheep (39) and chicken (15) (Ministry of Environment and Forests, 2014). The great diversity of traditional farming systems and practices in different parts of India contribute to the food security of millions of people across the country. The livestock sector too plays an important role in the Indian economy and is an important subsector of Indian agriculture.



India's biodiversity faces a number of threats, ranging from land use changes in natural habitats to overexploitation of natural resources, proliferation of invasive species and climate change. To overcome this a range of measures including an enabling policy and legal framework, especially the National Environment Policy (NEP), 2006 has been put in place to mainstream the environment, including biodiversity, in development planning processes.

India has taken considerable measures for conserving its forests and wildlife. An estimate in 2015 revealed that the forests in India spread over an area of 7,01,673 km², covering 21.34% of the total geographical area of the country, which is 32,87,263km² (Wildlife Institute of India, 2018). While the forest cover has either remained static or has reduced in many developing countries, India has added around 3 million hectares of forest and tree cover over the last decade. The government's initiatives on targeted afforestation programmes such as the Green India Mission (GIM) played a critical role in this regard.

The Wildlife Institute of India (WII) has prepared a biogeographic classification of the country, which has been designed to facilitate conservation planning, and to review the adequacy of existing protected areas to conserve the range of biological diversity in the country. Further, in India, wildlife conservation faces several challenges as a large number of wild animal species occur outside the protected area system. Thus, the recovery of critically endangered species and their habitats requires priority. With this in view, the scheme of 'Assistance for the Development of National Parks and Sanctuaries' was reformulated and renamed as 'Integrated Development of Wildlife Habitats (IDWH) during the 11th Plan period (2007-2012).

There are 16 terrestrial and seven marine species, with the objective of saving critically endangered species/ ecosystems that cannot be covered under the conservation of protected areas and that need protection outside protected areas, across the wider landscape/seascape. The Lion (Pantheraleopersica) and Rhinoceros (Rhinoceros unicornis) populations are showing an increasing trend, and the Sangai (Rucervuseldiieldii) and Hangul (Cervuselaphushanglu) populations are stable; but the populations of the Great Indian bustard (Ardeotisnigriceps) and the Nicobar megapode (Megapodiusnicobariensis) have recorded declines. Vulture populations, in particular Gyps bengalensis, that had declined substantially in recent times have registered a small upward trend, indicating that conservation measures taken for the species are showing a positive outcome. Efforts are underway for developing protocols for monitoring the status and trends of the remaining IDWH species(Ministry of Environment and Forests, 2014).

Recovery programs have been initiated for critically endangered species, and reintroduction of threatened species into their natural habitats has been carried out for crucial species, such as pitcher plants, rhinoceros and mangroves.

In terms of *ex situ* conservation, several national gene banks were created for plants, animals, insects, fish and agriculturally-important micro-organisms. India has established several National Bureaus dealing with genetic resources of plants, animals, insects, microorganisms, fish and soil sciences. These include:

a) The National Bureau of Plant Genetic Resources (NBPGR), with a total of 4,08,186 plant genetic resource accessions;



- b) The National Bureau of Animal Genetic Resources (NBAGR), which has a total holding of 1,23,483 frozen semen doses from 276 breeding males representing 38 breeds of cattle, buffalo, sheep, goats, camels, yaks and horses for ex situ conservation;
- c) The National Bureau of Agriculturally Important Microorganisms (NBAIM), with a repository of 4668 cultures, including 4644 indigenous and 24 exotic accessions;
- d) The National Bureau of Agriculturally Important Insects (NBAII), with 593 insect germplasm holdings, and
- e) The National Bureau of Fish Genetic Resources (NBFGR), with a repository of 2,553 native fin fishes and Fish Barcode Information System, were updated with 2,570 micro satellite sequences. In terms of fish diversity, the Zoological Survey of India (ZSI) has also recorded 3,022 species in India, constituting about 9.4% of the known fish species of the world (Ministry of Environment and Forests, 2014).

India's contribution to crop biodiversity has been impressive with repositories of over 50,000 varieties of rice, 5,000 of sorghum, 1,000 varieties of mango, etc. The National Gene bank, primarily responsible for ex situ conservation of unique germplasm on a long-term basis, holds nearly 4,00,000 unique accessions of plant genetic resources (Ministry of Environment and Forests, 2014). India's National Gene Bank is considered among the most dynamic and prominent systems in the world. Moreover, India, being a CITES Party, actively prohibits the international trade of endangered wild species and several measures are in place to control threats from invasive alien species.

The fundamental source for genetic material for our ex-situ conservation is the wild sources including the geographical areas designated as protected areas. In brief, for our in-situ and ex-situ biodiversity conservation (as indicated above) and its further enrichments, the ecologically sensitive areas, including the protected areas, play a significant role.

3. Protected Area Network: An Option for Conservation of Biodiversity

The country made a detailed protected area Network for the conservation of its rich biodiversity. A National Board for Wildlife (NBWL) chaired by the Prime Minister of India provides for policy framework for wildlife conservation in the country. The National Wildlife Action Plan (2002-2016) was adopted in 2002, emphasizing the people's participation and their support for wildlife conservation. India's conservation planning is based on the philosophy of identifying and protecting representative wild habitats across all the ecosystems. The Indian constitution entails the subject of forests and wildlife in the Concurrent list. The Federal Ministry acts as a guiding torch dealing with the policies and planning on wildlife conservation, while the provincial Forest Departments are vested with the responsibility of implementation of national policies and plans(Ministry of Environment and Forests, 2014).

The protected area network in India has been used as a tool to manage natural resources for biodiversity conservation and for the wellbeing of resource dependent populations. Under the Wildlife Protection Act (1972), 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 km² or 3.34% of the country's geographical area in 1988, the network has grown steadily; as of 2018 January, there are 769protected areas (including 103 national parks, 544 wildlife sanctuaries, 76 conservation reserves and 46 community reserves) covering a total area of 1,62,072.49 km² or 4.93% of the country's geographical area. The country has 25 marine Protected Areas in peninsular India and 106 in the islands particularly in the Andaman and Nicobar Islands (Wildlife Institute of India, 2018). The wildlife protected areas also include 39 tiger reserves and 28 elephant reserves, along with 6 world heritage sites within UNESCO's framework. So far, 115 wetlands have been identified under the 'National Wetland Conservation Program' and 25 wetlands are already classified as 'Ramsar Sites' (Ministry of Environment and Forests, 2014).Based on the provisions of the Biological Diversity Act, State Biodiversity Boards declared 12 sites as Biodiversity Heritage Sites in India.

Particular attention is also drawn to forest protection. The National Forest Policy aims to maintain a minimum of 33% of the country's geographical area under forest and tree cover. Numbers of programs, projects and vast regulations are aimed at reforestation conservation and sustainable development, eco-development of degraded forests, development of community conservation reserves outside protected areas, economic valuation of ecosystem services, and inculcating awareness and training to a range of stakeholders.

Towards achieving Aichi Biodiversity Targets 11 and 14, 106 coastal and marine sites have been identified and prioritized as Important Coastal and Marine Areas (ICMBA). 62 ICMBAs have been identified on India's west coast and 44 ICMBAs identified along the east coast. These sites have also been proposed as conservation or community reserves with the participation of local communities. Efforts are currently underway to secure and strengthen community participation in the management of the marine protected area network in India.

4. Evolution and Concerns of Protected Area Net work in India

The diversity of its physiography and climatic conditions in India has made it one of the mega biodiverse countries of the world. The protection of wildlife has a long tradition in Indian history, and the country has adopted *in-situ* and *ex-situ* conservation strategies for conservation of its rich wildlife as discussed above. Protected area network (national parks, wildlife sanctuaries, conservation reserves, and community reserves) is the most important *in-situ* conservation method.

Wise use of wildlife and other natural resources was a prerequisite for many hunter-gatherer societies of India, which date back to at least 6000 BC. Extensive clearance of forests accompanied the advance of agricultural and pastoral societies in subsequent millennia, but an awareness of the need for ecological prudence emerged and many so-called pagan nature conservation practices were retained. As more land became settled or cultivated, so these hunting reserves increasingly became refuges for wildlife. Many of these reserves were subsequently declared as national parks or sanctuaries, mostly after Independence in 1947. Wildlife, together with forestry, has traditionally been managed under a single administrative organization within the forest departments of each state or union territory, with the role of the central government being mainly advisory (Maitreyi, 2003).

In 1970, the Indian Board for Wildlife drafted a 'National Wildlife Policy'. This policy identified the cause for



wildlife depletion and made specific recommendations for wildlife conservation in the country. The major threats to wildlife species and habitats identified were: habitat changes, use of pesticides, lack of legislative support, commercial exploitation, introduction of exotics, poaching, biotic interference, use of crop protection guns and lack of organization and guidelines for management (Maitreyi, 2003). The policy recommended the establishment of a central organization to maintain the territorial integrity of wildlife areas and suggested that 4% of the total land area be managed as national parks by a central organization.

Following the 1970 policy on wildlife conservation, several major initiatives were taken during the decades of the 70s and 80s. These included:

- a) The enactment of the Wild Life (protection) Act in 1972
- b) Establishment of the Central and State Directorates of Wildlife Preservation
- c) Launching of new centrally sponsored schemes for development of National Parks and Sanctuaries
- d) Establishment of the Wildlife Institute of India (WII) in 1982
- e) Adoption of the National Wildlife Action Plan in 1983 and
- f) Setting up of a Central Zoo Authority in 1992

The enactment of the Wild Life (protection) Act in 1972provides for three categories of protected areas: national parks, sanctuaries and closed areas. However, the levels of protection afforded in each category differ, as do the degrees of restriction on human activities. National parks are given the highest level of protection, with no grazing and no private land holding or rights permitted within them. Sanctuaries are given a lesser level of protection, and certain activities may be permitted within them for better protection of wildlife or for any other good and sufficient reason. The state government may declare an area closed to the hunting of wild animals for a specified period; other activities are permitted to continue.

The adoption of a National Policy for Wildlife Conservation in 1970 and the enactment of the Wild Life (Protection) Act in 1972 led to a significant growth in the protected areas network in the country from 5 national parks and 60 sanctuaries to 103 and 544 respectively in 2018. Through the establishment of the Central and State Directorates of Wildlife Preservation, major species' conservation projects were initiated. Project Tiger, Elephant, Rhino, Asiatic Lion, Himalayan musk deer, turtles and crocodiles are the outcome of the initiative. Further efforts such as regulating the export and import of wildlife and their parts and derivatives acceding to major international conventions dealing with wildlife, inclusion of forests and wildlife under the concurrent list of the Constitution of India, enactment of the Forest (Conservation) Act in 1980 to regulate diversion of forestland for non-forestry purposes, also exist.

The protected areas network of India faces many problems. Studies and assessments made it clear that one of the most difficult challenges facing protected areas' managers was the reconciliation of the local community's demands for biomass and incomes from the protected areas with the requirement of biodiversity conservation. According to the First Indian Survey of the Protected Area Network of India, it was found out that a huge number of national parks and sanctuaries of India have human population within their boundaries. This survey



also found out the huge population pressure in the areas adjacent to parks and sanctuaries. The major external pressures faced by the protected areas include:

- Animals moving from the buffer zone to the core for grazing
- Animals moving from the core to the buffer zone for hunting and grazing
- External pressures created by human movement from the buffer zone to the core
- Grazing by livestock (though some national parks and sanctuaries allow limited grazing within their boundaries but unauthorized grazing was reported from many protected areas).
- Extraction of timber and non-timber forest products (NTFP) (the law prohibits the extraction of timber and other forest produce from national parks. But from sanctuaries, timber and other biomass can only be extracted if their extraction is "for better management of wildlife". Subsequently, extraction can also be allowed from a sanctuary if it is a right that has been allowed by the Chief Wildlife Warden. Still, illegal extraction of timber and NTFP from protected areas is one major problem (Maitreyi, 2003).

5. Legal Interpretation on Protected Areas and Application of ABS

The legal rights of a community on forest areas are established rights provided under different forest laws. However, these legislations are enacted and introduced at different times with the prevailing socio-economic situations of the country. Further, the application and effectiveness of these legislations varies from state to state as a result of diverse socio-political interests. Even though most of the forest legislations are relatively older than the ABS legislations (the Biological Diversity Act and Rules) there exist some ambiguities which raise the following questions:

- Does the right of tribes in a forest area extend to wildlife sanctuaries and national parks?
- If so, what are the activities permitted either absolutely or in a conditional manner?
- Does the Scheduled Tribes and Forest Dwellers Act 2006 prevail over the Wild Life Protection Act 1972?
- Is there any restriction on accessing / collecting of certain minor forest products (MFPs) and their trade, that is, the amount to be collected or the persons to whom they are traded?

These issues need to be addressed and connected with the ABS regime prevailing in the country, particularly with respect to ABS in the protected areas. Since tribal communities have exclusive rights to forest resources, the possibilities for mobilizing the resources for commercial interests may exist in India. Before discussing the legal issues, it is important to understand the key terminologies as defined in the Act and Rules.

According to Section2(25B) of the Wild Life Protection Act 1972 "reserve forest" means the forest declared to be reserved by the state government under section 20 of the Indian Forest Act, 1927 (16 of 1927), or declared as such under any other state Act. Chapter II of the Forest Act 1927 addresses reserve forests. With respect to the power to reserve forests; Section 3 says, the state government may constitute any forest-land or waste-land which is the property of the government, or over which the government has proprietary rights,



or the whole or any part of the forest produce to which the Government is entitled, as a reserved forest in the manner hereinafter provided.

Section2(24A) of the Wild Life Protection Act 1972 mentioned that "protected area" means a national park, a sanctuary, a conservation reserve or a community reserve notified under sections 18, 35, 36A and 36C of the Act. Section18 of the Wild Life Protection Act made provisions for the declaration of a sanctuary. Accordingly, the state Government may, by notification, declare its intention to constitute any area other than an area comprised within any reserve forest or the territorial waters as a sanctuary if it considers that such an area is of adequate ecological, faunal, floral, geomorphological, natural or zoological significance, for the purpose of protecting, propagating or developing wild life or its environment.

Section 35 of the Wild Life Protection Act indicated that, whenever it appears to the State Government that an area, whether within a sanctuary or not, is, by reason of its ecological, faunal, floral, geomorphological or zoological association or importance, needed to be constituted as a national park for the purpose of protecting, propagating or developing wild life therein or its environment, it may, by notification, declare its intention to constitute such an area as a national park. The section further addresses territorial waters declared as national parks. Section 38 of the Wild Life Protection Act also contains provisions for the central government to declare sanctuaries or national parks.

Conservation efforts can reach their zenith only with the participation and cooperation of the communities closely associated with biodiversity. In such a scenario, community reserves and sacred groves play a major role. The Wild Life Protection Act provides for conservation reserves and community reserves under sections 36A and 36C respectively. Section 36A of the Act indicated the provisions on the declaration and management of conservation reserves. The state government may, after having consultations with the local communities, declare any area owned by the government, particularly the areas adjacent to national parks and sanctuaries and those areas which link one protected area with another, as a conservation reserve for protecting landscapes, seascapes, flora and fauna and their habitat: Provided that where the conservation reserve includes any land owned by the central government, its prior concurrence shall be obtained before making such a declaration.

The Declaration and management of a community reserve is dealt with under Section 36C as the state government may, where the community or an individual has volunteered to conserve wild life and its habitat, declare any private or community land not comprised within a national park, sanctuary or a conservation reserve, as a community reserve, for protecting its fauna, flora and traditional or cultural conservation values and practices.

The general rule of law is that, a special act prevails over the general act. Accordingly the Scheduled Tribes and Forest Dwellers Act, 2006 accords a special status. It is further contemplated in the Act itself under section 4 of Chapter III which says; "notwithstanding anything contained in any other law for the time being in force, and subject to the provisions of this Act, the central government hereby recognizes and vests forest rights in: (a) the forest dwelling Scheduled Tribes in States or areas in states where they are declared as scheduled tribes in respect of all forest rights mentioned in section 3".



So, the clause says that this act (Scheduled Tribes and Forest Dwellers Act, 2006) prevails over all other Acts pertaining to forests to the extent of the recognition of the forest rights of these tribes. Section 4(2) states that the forest rights recognised under this Act in critical wildlife habitats of national parks and sanctuaries may subsequently be modified or resettled, under the following conditions: (a) the activities or impact of the presence of holders of rights upon wild animals is sufficient to cause irreversible damage and threaten the existence of the said species and their habitat; (b) the state government has concluded that other reasonable options, such as, co-existence are not available. It can be inferred from the clause that rights to access have been guaranteed in critical wildlife habitats including national parks and sanctuaries.

For the application of ABS for the commercial utilization of the biological resources from protected areas, it is very much necessary to understand the rights exclusively guaranteed to the forest dwelling tribes, as they become the focal point in transferring the biological resources from the protected areas to the commercial hubs. Though in practice, there is most often exploitation of middlemen, it is undeniable through the provisions of law that access to the biological resources in protected area is given exclusively to the schedule tribes and other traditional forest dwellers.

In order to provide justice and livelihood to the scheduled tribes and other traditional forest dwellers (who were denied their rights during the British period through restrictions imposed on them in entering the forest and accessing the resources) the Parliament enacted the Schedule Tribes and other Traditional Forest Dwellers (Recognition of Forest Rights) Act, in 2006.

The Act confers the rightson forest dwelling scheduled tribes and other traditional forest dwellers to all forest land, which includes, land of any description falling within any forest area, unclassified forests, un-demarcated forests, existing or deemed forests, protected forests, reserved forests, sanctuaries, and national parks as per Section 2(d) of the Act. The rights conferred include, the right to hold and live in forest land, right to ownership, access to collect, use and dispose of minor forest products which have been traditionally collected within and outside their villages.

The changes in the socio-economic conditions of the tribes, have made them to venture into the market supply chain beyond their subsistence needs. This has been addressed in the Scheduled Tribes and other Traditional Dwellers (Recognition of Forest Rights) Rules 2008, which states "bona fide livelihood needs" as fulfilment of livelihood needs of self and family through the exercise of any of the rights specified in sub-section (1) of Section 3of the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act and includes the sale of surplus produce arising out of the exercise of such rights.

The rule also further elaborates on the disposal of minor forest produce. Rule 2(1) (d) indicated that the "disposal of minor forest produce" under clause (c) of sub-section (1) of Section 3 shall include the right to the selling as well as individual or collective processing, storage, value addition, transportation within and outside forest area through appropriate means of transport for the use of such produce or selling by the gatherers or their cooperatives or associations or federations for livelihood. It has been further elaborated in the explanation.

The rules also facilitate the easy disposal of minor forest products by emphasising that transit permit procedures should be cleared and the MFPs shall be free of all royalties / fee / any charges. Since the tribes are new participants in the market regime, it is the duty of the representative state government to conserve that the absolute rights are recognised and also ensured that they get remunerative prices for their MFPs.

The guidelines further end the monopoly of Forest Corporation in the trade of MFPs in many states, especially in the case of high value MFPs, such as tendupatta etc. It also guarantees that the forest right holders or their cooperatives/federations should be allowed full freedom to sell such MFPs to anyone or to undertake individual or collective processing, value addition, and marketing, for livelihood within and outside the forest area by using locally appropriate means of transport. Thus the MFPs have been transferred from the product to the merchants or commercial centres. ABS stands away only from the tribes having access to the MFPs; once the MFPs have entered the normal supply chain, ABS comes into the picture.

Generally, there is a misconception about the applicability of ABS to protected areas. However, the Biological Diversity Act (2002) covers the entire geographical area of the country. According to section 59 of the "Act to have effect in addition to other Acts" stated that: 'the provisions of this Act shall be in addition to, and not in derogation of, the provisions in any other law, for the time being in force, relating to forests or wildlife'. It implies that the Biological Diversity Act complements the other existing Acts related to forests and wildlife. However, the objectives of the Biological Diversity Act could be attained to their fullest by the harmonious interpretation of the provisions of the Biological Diversity Act with other Acts related to forests and wildlife.

According to the Guidelines on 'Access to Biological Resources and Associated Knowledge and Benefit Sharing Regulation, 2014' any person who intends to have access to biological resources including access to biological resources harvested by the Joint Forest Management Committee (JFMC)/ Forest dweller/ Tribal cultivator/ Gram Sabha, shall apply to the NBA in Form-I of the Biological Diversity Rules, 2004 or to the State Biodiversity Board (SBB), in such form as may be prescribed by the SBB, as the case may be, along with Form 'A' annexed to these regulations. Subsequently, the NBA or the SBB, as the case may be, shall, on being satisfied with the application under sub-regulation (1), enter into a benefit sharing agreement with the applicant which shall be deemed as grant of approval for access to biological resources, for commercial utilization or for bio-survey and bio-utilization for commercial utilization referred to in that sub-regulation.

Classifications of Protected Areas India: An Overview 6.

Generally, there are several kinds of protected areas in the world. The level of protection varies substantially among the protected areas depending on the enabling laws of each country or the regulations of the international organizations involved. The term 'protected area' also includes 'marine protected areas', the boundaries of which will include some area of the ocean, and 'transboundary protected areas' that overlap multiple countries which remove the borders inside the area for conservation and economic purposes.

In India, the statuses of protected areas are designated under different legal instruments. The Wildlife Protection Act, 1972 provides for the declaration of areas of "adequate ecological, faunal, floral, geo-morphological,



natural or zoological significance" as wildlife sanctuaries, national parks, conservation reserves and community reserves for the purpose of protecting or developing wildlife or its environment". These protected areas include the marine protected areas also (subsequent section is discussing more on this).

The National Forest Policy aims at the conservation of natural forests with vast varieties of flora and fauna which represented remarkable biological diversity. The objectives of the National Forest Policy are sought to be met by declaring areas as reserved forests and protected forests under the Indian Forest Act, 2017. The Act empowers the provisional state governments to notify any forest land or wasteland as reserved/protected forests, thus prohibiting the clearing of such areas, filling of trees, mining of similar activities that may damage the green cover (UNDP & MoEFCC, 2018). Table 1 provides the recorded forest areas up to 2017 under the Indian Forest Act, 1927.

S. No	Category	Area (Sq.Km)
1	Reserve Forests	4,34,705
2	Protected Forests	2,19,432
3	Unclassified Forests	1,31,881
	Total	7,67,419

Table 1: Category wise Recorded Forests Area	(under the Indian Forest Act, 1927)
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Source: UNDP & MoEFCC (2018)

In India wetlands are legally protected under the Wetlands Conservation and Management Rules 2017, notified under the Environmental (Protection) Act 1986. These apply to "wetlands of international importance under the Ramsar Conventions" and wetlands as notified by the Centre Government, State Government and Union Territory Administration. The National Wetland Inventory and Assessment, 2011 indicates 2.02 lakh wetlands in India, covering an area of 1.52 crore hectares. This amounts to 4.63 percent of geographical area. Nearly 60% of these wetlands fall in the highly protected areas discussed earlier. The remaining 40% are natural and manmade wetlands. India has declared 26 wetlands as wetlands of international importance or Ramsar sites (UNDP & MoEFCC, 2018). Details of Ramsar wetland sites in India are given in Annexure – 7.

Section 37 of the Biological Diversity Act 2002 empowers providing state government to declare areas of significant biological diversity as Biodiversity Heritage Sites in consultation with the local bodies. Eleven sites covering an area of 942.21 sq.km were notified by the end of 2017 (UNDP & MoEFCC, 2018). A list of Biodiversity Heritage Sites is in Annexure – 8.

In brief; The total areas covered or protected under the 4 Acts together (after avoiding the overlaps and double counting) is 9,14,074 sq. Km., which is 27% of Indies geographical area (Table 2). Access of different biological resources exist in these biodiversity enriched areas and the ABS associated with them are extremely important.



S. No	Category of Area	Area (Sq. Km)	%
1	Protected Areas Under the Wildlife Protection Act (1972)	1,62,072	17.73
2	Forests under Indian Forest Act 1927 (after deducting the area of protected areas under the Wildlife Protection Act)	6,05,347	66.22
3	Designated wetlands under the Environmental (Protection) Act 1986 (after deducting the area of protected areas under the Wild- life Protection Act)	1,45,714	15.95
4	Biodiversity Heritage Site under the Biological Diversity Act, 2002	941	0.10
	TOTAL	9,14,074	100

Table 2: Total Areas under Conservation in India – As per Different Laws

Source: UNDP & MoEFCC (2018)

For detail discussion on protected areas and ABS, the protected areas come under the Wildlife Protection Act (1972) has considered.

Protected Areas Under the Wildlife Protection Act (1972) 7.

The protected areas, under the Wildlife Protection Act (1972), in India include: national parks, wildlife sanctuaries, conservation reserves and community reserves. Apart from this, India is giving special attention to the conservation of the aquatic ecosystem / biodiversity and has declared some of the ecologically sensitive sites as marine protected areas. The following table (Table 3) provides the present status and coverage of different protected areas (number and the area) in India.

Table 3: Status of Protected Areas of India (as on January, 2018)

Protected Areas	Area	155475.63	158470.27	158879.19	162651.45	162651.45	164062.99	164512.37	165641.62	166347.6	158645.05	160499.31	160901.74	162024.69	162072.49	
Total F	No.	578	606	619	661	661	699	675	686	689	692	726	733	764	769	
erves	Area	ı	42.87	94.82	1259.84	1259.84	1382.28	1801.29	1998.15	2017.94	2037.11	2344.53	2349.38	2547.19	2567.95	
Conse Res	No.	ı	4	7	45	45	47	52	56	57	60	66	67	73	76	
y Reserves	Area	1	1	20.69	20.69	20.69	20.69	20.69	20.69	20.69	20.69	46.93	46.93	59.66	72.61	
Communit	No.	ı	ı	4	4	4	4	4	4	4	4	26	26	45	46	
e Sanctuaries	Area	117881.68	120244.39	120543.95	122138.33	122138.33	122585.56	122615.94	123548.33	124234.52	116254.36	117607.72	118005.30	118917.71	118931.80	
Wild Life	No.	489	506	510	513	513	516	517	524	526	525	531	537	543	544	
nal Parks	Area	37593.94	38183.01	38219.72	39232.58	39232.58	40074.46	40074.46	40074.46	40074.46	40332.89	40500.13	40500.13	40500.13	40500.13	
Natio	No.	89	96	98	66	66	102	102	102	102	103	103	103	103	103	
Year		2000	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	

Source: National Wildlife Database Cell, Wildlife Institute of India (2018) (Note: All areas are in km²⁻Community Reserves have been established in India from 2007 onwards and Conservation Reserves from 2005 onwards).



wildlife sanctuaries) ecologically sensitive sites declared as protected areas. This number has increased to 647 (103 national parks and 544 wildlife sanctuaries) in 2018. Out of the 69 newly introduced sites (between 2000 and 2018) 14 are national parks and 55 are wildlife sanctuaries.

Another notable change in the protected area regime in India is the introduction of conservation reserves and community reserves. Till 2000, these two types of protected areas did not exist. . However, its number made a considerable increase in subsequent years. In 2018, there are 46 community reserves and 76 conservation reserves in India. This indicated a paradigm shift in protected area management. Through the establishment of community reserves and conservation reserves, the government is attempting to protect the ecologically sensitive areas of the country with community participation, which was not followed in the earlier years, when the national parks and wildlife sanctuaries existed.

Table 4 provides the current status of different protected areas in India. As of January 2018 there were 769 protected areas in the country with an area coverage of 1,62,072.49 km2, which is 4.93% of India's total land area. The table also reveals the dominance of wildlife sanctuaries in India's protected area policy. At present 544 wildlife sanctuaries covered 118931.80 km2of area, which is 73.30% of the protected areas in the country followed by 103 national parkscovering 40500.13 km², which is 25.15% of the protected areas in India. At present the conservation reserves' and community reserves' share in the protected areas is very minimal.

Type of Protected Areas	No.	Total Area (km²)	% of Total Protected Areas	% Coverage of County's total area
National Parks (NPs)	103	40500.13	25.15	1.23
Wildlife Sanctuaries (WLSs)	544	118931.80	73.30	3.62
Conservation Reserves (CRs)	76	2567.95	1.50	0.08
Community Reserves	46	72.61	0.05	0.002
Total Protected Areas	769	162072.49	100.00	4.93

Table 4: Current Status of Different Protected A	Areas of India (2018)
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Source; Wildlife Institute of India (2018) Note: Geographical Area of India = 32,87,263 km²



National Parks

A National park is an area, whether within a sanctuary or not, which can be notified by the state government to be constituted as a national park, by reason of its ecological, faunal, floral, geomorphological, or zoological association or importance, needed for the purpose of protecting & propagating or developing the wildlife therein or its environment. No human activity is permitted inside the national park except for those permitted by the Chief Wildlife Warden of the state under the conditions given in Chapter IV, Wild Life Protection Act 1972. section 35 (6) of the chapter 4 stated that: "No person shall, destroy, exploit, or remove any wildlife from a National Park or destroy or damage the habitat or any wild animal or deprive any wild animal or its habitat within such a National Park except under and in accordance with a permit granted by the Chief Wildlife Warden and no such permit shall be granted unless the State Government, being satisfied that such destruction, exploitation, or removal of wildlife from the National Park is necessary for the improvement and better management of the wildlife therein, authorises the issue of such a permit".

According to the National Wildlife Database, 2018, there are 103 existing national parks in India covering an area of 40,500.13 km², which is 1.23% of the geographical area of the country (Wildlife Institute of India, 2018). Table 5 provides the decadal growth of the national parks in India. Before 1950, only one national park was designated and its growth was slow during the 1950s and 1960s. But the 1970s, 1980s, and 1990s witnessed a significant growth with 19, 47, and 18 national parks respectively. Proportionately, the area covered also increased. During the period 2001 to 2010 the national parks' additions in the country were 13 and from 2011 to 2018, one.

Years	Number	Area (km²)
Before 1950	1	520.82
1951-1960	3	1431.77
1961-1970	1	448.85
1971-1980	19	6908.39
1981-1990	47	22962.1
1991-2000	18	5531.17
2001-2010	13	2480.52
2011- 2018	1	216.51
Total	103	40500.13

Table 5: Growth of National Parks in India

Source: Estimated based on the Wildlife Institute Database (2018)

The following figures (figures 1 and 2) provide the cumulative growth (number and area coverage) of national parks in India.



Figure 1: Growth of National Park



Source: Estimated based on the Wildlife Institute Database (2018)



Figure 2: Area under National Park (Sq.km)

Table 6 provides the state and union-territory wise break up of national parks (July, 2017) and their percentage in the total areas of the state. State-wise breakup of the national parks is in Annexure 1.

Source: Estimated based on the Wildlife Institute Database (2018)



Name of State & Union Territory	State Area km ²	No. of NPs	NP Area (km ²)	% of State Area
STATES		•		
1. Andhra Pradesh	1,60,205	2	356.02	0.22
2. Arunachal Pradesh	83,743	2	2,290.82	2.74
3. Assam	78,438	5	1,977.79	2.52
4. Bihar	94,163	1	335.65	0.36
5. Chhattisgarh	1,35,191	3	2,899.08	2.14
6. Goa	3,702	1	107.00	2.89
7. Gujarat	1,96,022	4	480.12	0.24
8. Haryana	44,212	2	48.25	0.11
9. Himachal Pradesh	55,673	5	2,271.38	4.08
10. Jammu & Kashmir	2,22,236	4	3,925.00	1.77
11. Jharkhand	79,714	1	226.33	0.28
12. Karnataka	1,91,791	5	2,795.76	1.46
13. Kerala	38,863	6	558.16	1.44
14. Madhya Pradesh	3,08,245	9	3,656.36	1.19
15. Maharashtra	3,07,713	6	1,273.60	0.41
16. Manipur	22,327	1	40.00	0.18
17. Meghalaya	22,429	2	267.48	1.19
18. Mizoram	21,081	2	150.00	0.71
19. Nagaland	16,579	1	202.02	1.22
20. Orissa	1,55,707	2	990.70	0.64
21. Punjab	50,362	0	0.00	0.00
22. Rajasthan	3,42,239	5	3,947.07	1.15
23. Sikkim	7,096	1	1,784.00	25.14
24. Tamil Nadu	1,30,058	5	307.85	0.24
25. Telangana	1,14,840	5	1,032.47	0.90
26. Tripura	10,486	2	36.71	0.35
27. Uttar Pradesh	2,40,928	1	490.00	0.20
28. Uttarakhand	53,483	6	4,915.02	9.19
29. West Bengal	88,752	6	1,981.65	2.23
UNION TERRITORY		•		
1. Andaman & Nicobar	8,249	9	1,153.94	13.99
2. Chandigarh	114	0	0.00	0.00
3. Dadra & Nagar Haveli	491	0	0.00	0.00
4. Daman & Diu	112	0	0.00	0.00
5. Delhi	1,483	0	0.00	0.00
6. Lakshadweep	32	0	0.00	0.00
7. Pondicherry	480	0	0.00	0.00
Total	32,87,263	103	40,500.13	1.23

Table 6: State-wise break up of National Parks (July, 2017)

Source; Wildlife Institute of India (2018)

Wildlife Sanctuary

Any area other than areas comprising reserve forest or territorial waters can be notified by the state government as a sanctuary, if such an area is of adequate ecological, faunal, floral, geomorphological, natural or zoological significance, for the purpose of protecting, propagating or developing the wildlife or its environment. Some restricted human activities are allowed inside the sanctuary area, details of which are given in Chapter IV, Wild Life Protection Act 1972. Section 28 of chapter 4 covers the Grant of permit, and states that: "The Chief Wildlife Warden may, on application, grant to any person a permit to enter or reside in a sanctuary for all or any of the following purposes, namely :(a) Investigation or study of wildlife and purposes ancillary or incidental thereto;(b) Photography;(c) Scientific research;(d) Tourism;(e) Transaction of lawful business with any person residing in the sanctuary. A permit to enter or reside in a sanctuary shall be issued subject to such conditions and on payment of such fee as may be prescribed".

There are 544 existing wildlife sanctuaries in India covering an area of 118,931 km², which is 3.62 % of the geographical area of the country (National Wildlife Database, 2018). Table 7 provides a comprehensive picture of the establishment of wildlife sanctuaries in India. Before 1950 the country had only 3 wildlife sanctuaries and made a moderate progress during the 1950's and 1060's. However, the growth was substantial during the period 1970 to 2000, when 425 wildlife sanctuaries were established in the country. However, in the subsequent years the growth rate was moderate.

Years	Number	Area (km²)
Before 1950	3	218.73
1951-1960	28	4692.01
1961-1970	24	4887.63
1971-1980	102	31690.82
1981-1990	158	49665.01
1991-2000	65	14092.51
2001-2010	31	3338.86
2011- 2018	33	6778.11
Total	544	118931.80

Table 7: Wildlife Sanctuaries in India

Source: Estimated based on the Wildlife Institute Database (2018)

The following figures (Figures 3 and 4) provide the number as well as area increased in the protected areas of the country.



Figure 3: Growth of Wildlife Sanctuary



Source: Estimated based on the Wildlife Institute Database (2018)



Figure 4: Area under Wildlife Sanctuary (Sq.km)

Source: Estimated based on the Wildlife Institute Database (2018)



Table 8 provides the state and union territory wise break up of wildlife sanctuaries (July, 2017) and their percentage in the total areas of the state (also see annexure 2).

Name of State & Union Territory	State Area km ²	No. of WLS	Area km²	% of State Area
	STAT	E		
Andhra Pradesh	1,60,205	13	5,942.23	3.71
Arunachal Pradesh	83,743	11	7,487.75	8.94
Assam	78,438	18	1,840.14	2.35
Bihar	94,163	12	2,901.67	3.08
Chhattisgarh	1,35,191	11	3,760.29	2.78
Goa	3,702	6	6,47.91	17.50
Gujarat	1,96,022	23	16,618.42	8.48
Haryana	44,212	8	2,33.21	0.53
Himachal Pradesh	55,673	28	6,116.10	10.99
Jammu & Kashmir	2,22,236	15	10,243.11	4.61
Jharkhand	79,714	11	1,955.82	2.45
Karnataka	1,91,791	30	6,774.81	3.53
Kerala	3,88,63	17	1,928.24	4.96
Madhya Pradesh	3,08,245	25	7,158.42	2.32
Maharashtra	3,07,713	42	7,604.44	2.47
Manipur	22,327	2	184.81	0.83
Meghalaya	22,429	4	94.10	0.42
Mizoram	21,081	8	1,090.75	5.17
Nagaland	16,579	3	20.34	0.12
Odisha	1,55,707	19	7,094.65	4.56
Punjab	50,362	13	3,26.60	0.65
Rajasthan	3,42,239	25	5,592.38	1.63
Sikkim	7,096	7	3,99.10	5.62
Tamil Nadu	1,30,058	29	6,157.12	4.73
Telangana	1,14,840	9	5,675.91	4.94
Tripura	10,486	4	5,66.93	5.41
Uttar Pradesh	2,40,928	25	5,828.36	2.42
Uttarakhand	53,483	7	2,690.12	5.03
West Bengal	88,752	15	1,442.12	1.62
Union Territory				
Andaman & Nicobar	8,249	96	389.39	4.72
Chandigarh	114	2	26.01	22.82
Dadra & Nagar Haveli	491	1	92.16	18.77

Table 8: State-wise break up of Wildlife Sanctuaries (As on July, 2017)





Name of State & Union Territory	State Area km ²	No. of WLS	Area km²	% of State Area
Daman & Diu	112	1	2.19	1.96
Delhi	1,483	1	27.82	1.88
Lakshadweep	32	1	0.01	0.03
Pondicherry	480	1	3.90	0.81
Total	3287263	543	1,18,918	3.62

Source; Wildlife Institute of India (2018)

Conservation Reserves

Conservation Reserves and Community Reserves in India are terms denoting protected areas of India which typically act as buffer zones to or connectors and migration corridors between established national parks, wildlife sanctuaries and reserved and protected forests of India. Such areas are designated as conservation areas if they are uninhabited and completely owned by the Government of India but used for subsistence by communities, and community areas if parts of the lands are privately owned. These protected area categories were first introduced in the Wild Life (Protection) Amendment Act of 2002 – the amendment to the Wildlife Protection Act of 1972. These categories were added because of reduced protection in and around the existing or proposed protected areas due to private ownership of land, and land use.

Section 36A (1) of the Wild Life (Protection) Amendment Act (2002) is on the Declaration and Management of a Conservation Reserve and states that "the State Government may, after having consultations with the local communities, declare any area owned by the Government, particularly the areas adjacent to National Parks and sanctuaries and those areas which link one protected area with another, as a conservation reserve for protecting landscapes, seascapes, flora and fauna and their habitats, provided that where the conservation reserve includes any land owned by the Central Government its prior concurrence shall be obtained before making such a declaration".

The following table (Table 9) provides the growth of conservation reserves with area from 2006 to 2018.

Table 9: Growth of Conservation Reserve in India

Year	No.	Area (km²)
2006	4	42.87
2007	7	94.82
2008	45	1259.84
2009	45	1259.84
2010	47	1382.28
2011	52	1801.29
2012	56	1998.15
2013	57	2017.94
2014	60	2037.11
2015	66	2344.53
2016	67	2349.38
2017	73	2547.19
2018	76	2567.95

Source: Estimated based on the Wildlife Institute Database (2018)



Till 2005, there were no conservation reserves in India and their number increased to 4 in 2006 and 7 in 2007. But, 2007 to 2008 witnessed a substantial growth in the conservation reserves in the country and the number increased to 45. From 2009, a gradual increase has been witnessed and their number reached 76 in 2018. Proportionate to the growth in number, the area covered also increased. Figures 5 and 6 provide the conservation reserves' growth (number and area) in India.



Figure 5: Growth of Conservation Reserves

Source: Estimated based on the Wildlife Institute Database (2018)



Figure 6: Area under Conservation Reserves (Sq.km)

Table 10 provides the state wise break up of conservation reserves (till January, 2018) in India.

Source: Estimated based on the Wildlife Institute Database (2018)



State	No.	Area (km ²)	
Gujarat	1	227	
Haryana	2	48.72	
Himachal Pradesh	3	19.17	
Jammu & Kashmir	34	1452.91	
Karnataka	14	623.15	
Maharashtra	2	184.21 25.71	
Punjab	4		
Rajasthan	10	392.88	
Tamil Nadu	2	4.88	
Uttarakhand	4	212.43	
Total	76	2567.9	

Table 10: State-wise break up of Conservation Reserves (As on January, 2018)

Source: Wildlife Institute of India (2018)

It is very clear from the table that the number and area of conservation reserves is more in Jammu & Kashmir. State wise breakup of conservation reserve is in Annexure 3.

Community Reserves

Community reserves in India are terms denoting protected areas of India which typically act as buffer zones to or connectors and migration corridors between established National Parks, wildlife sanctuaries, and reserved and protected forests of India. Such areas are designated as conservation areas if they are uninhabited and completely owned by the Government of India but used for subsistence by communities and community areas if parts of the lands are privately owned. These protected area categories were first introduced in the Wild Life (Protection) Amendment Act of 2002 - the amendment to the Wildlife Protection Act of 1972. These categories were added because of reduced protection in and around the existing or proposed protected areas due to private ownership of land, and land use.

On the declaration and management of community reserve, section 36C (1) of the Wild Life Protection (Amendment) Act (2002) stated that: the State Government may, where the community or an individual has volunteered to conserve wild life and its habitat, declare any private or community land not comprised within a national park, sanctuary or a conservation reserve, as a community reserve, for protecting the fauna, flora and traditional or cultural conservation values and practices.

Table 11 provides details on the growth (number and area) of the community reserves in India.



Year	No.	Area
2007	4	20.69
2008	4	20.69
2009	4	20.69
2010	4	20.69
2011	4	20.69
2012	4	20.69
2013	4	20.69
2014	4	20.69
2015	26	46.93
2016	26	46.93
2017	45	59.66
2018	46	72.61

Table 11: Growth of Community Reserves in India

Source: Estimated based on the Wildlife Institute Database (2018)

In India, community reserves as a protected area option, emerged in 2007 with the establishment of 4 sites with a total area of 20.69 km². However, their number did not increase till 2014. But in 2015, 22 community reserves were established with an area of 26.24 km². At present (2018), there are 46 community reserves in India with a total area of 72.61 km². Table 12 provides the State wise break up of community reserves (till January, 2018) in India. Out of 45 community reserves in India, 41 are located in Meghalaya. Lists of community reserves in India is in Annexure 4.

State	No.	Area	
Karnataka	1	3.12	
Kerala	1	1.50	
Meghalaya	41	38.96	
Punjab	2	16.08	
Total	45	59.66	

Table 12: State-wise break up of Community Reserve (As on July, 2017)

Source: Wildlife Institute of India (2018)

Marine Protected Areas 8.

A marine protected area is essentially a space in the ocean where human activities are more strictly regulated than the surrounding waters - similar to the parks we have on land. These places are given special protection for their natural or historic marine resources by local, state, territorial, native, regional, or national authorities.



In peninsular India, there are 25 marine protected areas established with an area of 8231.47 km² (Table – 13). Out of it, 20 are sanctuaries with an area of 6585.77 km², four are national parks with an area of 1644.22 km² and one is a community reserve with an area of 1.50 km².

Years	Number Area (km²)			
Before 1970	1	172.60		
1971-1980	9	3997.70		
1981-1990	7	1649.11		
1991-2000	5	1837.23		
2001-2010	1	1.50		
2011- 2016	6 2 573.31			
Total	25	8231.45		

Table 13: Marine Protected Areas in Peninsular India

Source: Estimated based on the Wildlife Institute Database

Figures 7 and 8 provide details of the growth of marine protected areas (number and area) in peninsular India. Further, 106 sites (97 sanctuaries with an area of 409.99 km² and 9 national parks with an area of 1153.94 km²) covering an area of 1563.93 km² are designated as marine protected areas in the Andaman and Nicobar islands. List of as marine protected areas in peninsular India and Island are given in Annexure 5 and 6 respectively.



Figure 7: Number of Marine Protected Area in Peninsular India

Source: Estimated based on the Wildlife Institute Database (2018)





Figure 8: Marine Protected Area in Peninsular India (Sg.km)

Source: Estimated based on the Wildlife Institute Database (2018)

It is clear from the above discussion that India's protected area's network in terms of number and areas has increased over a period of time. This is a positive sign for the ecosystem and biodiversity conservation. However, mainstreaming ABS on the biological resources available from protected areas is of concern and requires more attention.

9 India's Initiatives in Implementing the Programme of Work on Protected Areas

The Aichi Biodiversity Targets 11 indicates that by 2020, at least 17% of terrestrial and inland water areas and 10% of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services are conserved through protected areas and other effective area-based conservation measures; are effectively and equitably managed; are ecologically representative; and are well connected systems of protected areas integrated into the wider landscapes and seascapes. In concurrence with Aichi Targets, India comes up with 12 National Biodiversity Targets (NBTs) and Target 6 deals with the protected area, which is the objective of Aichi Targets 11.

According to the Ministry of Environment and Forests, 2013 in India, all government owned forests and other important ecosystems (which are outside the legally designated protected area network) occupy around 20% of the geographical area of the country and are under some kind of conservation planning and managed for biodiversity conservation. There are several examples of community driven conservation initiatives in the country. The government is also taking steps to notify'Eco-sensitive Zones' around protected areas to regulate developmental activities. The National Environmental Policy 2006 envisages that human activities





around protected areas should be harmonized so that such activities have minimal adverse impact. Besides, a task force has also been set up to identify Transboundary Protected Areas (TBPA). An important scheme for 'Integrated Development of Wildlife Habitats (IDWH)' has been formulated and is being implemented to strengthen wildlife conservation outside the legally designated protected areas Network.

It is evident that if all the above initiatives are taken into account then around one-fifth of the geographical area of the country is currently under a broad based conservation planning for biodiversity conservation (Ministry of Environment and Forests, 2012). The biogeographical classification of India has used four levels of planning unit for establishing are presentative network of protected areas. These are:

- 1. The Biogeographic Zone: Large distinctive units of similar ecology, biome representation, community and species e.g. The Himalayas, and The Western Ghats.
- 2. The Biotic Province: Secondary units within a zone, giving weight to particular communities separated by dispersal barriers or gradual change in environmental factors e.g. North West and West Himalayas on either side of the Sutlej River.
- 3. The Land Region: A tertiary set of units within a province, indicating different land forms, e.g. Aravalli Mountains and Malwa Plateau in Gujarat-Rajwara Province.
- 4. The Biome: This is an ecological unit, not a biogeographic unit. A biome such as a swamp/wetland or temperate broad leaved forest could be found in several biogeographic zones or provinces (Ministry of Environment and Forests, 2012).

The objectives of the protected area planning using the biogeographic framework has been to ensure that at least one major protected area of national park status covers a representative range of available biomes in each biogeographic division. This requirement is for each State. Additional protected areas are required to cover the remaining biomes, paying particular attention to communities and species of conservation significance (rare, endemic & threatened.) Wildlife conservation and management in India is currently facing a myriad of complex challenges that are both ecological and social in nature, such as: habitat loss/fragmentation, overuse of biomass resources, human-wildlife conflicts, livelihood dependence on forests and wetlands, poaching and illegal trade in wildlife parts and products. Hence, a broad base of public support for wildlife conservation is needed with multi stakeholders' participation.

In the early 1980s, the Government of India initiated the process of an ecological gap assessment and commissioned the Wildlife Institute of India to develop a 'Biogeographic Classification of India' to facilitate the rational conservation planning of protected areas in India. India has made significant progress in expanding the protected area network including the marine protected areas. India has carried out Management Effectiveness Evaluation (MEE) of its protected areas comprising national parks, wildlife sanctuaries and tiger reserves. Till 2010, 58 national parks and wildlife sanctuaries have been evaluated under the MEE process and 30 national parks and wildlife sanctuaries are being evaluated in 2011-2012. The tiger reserves have been subjected to the MEE process twice – first in 2005-2006 and then in 2010-2011 and the outcomes are given in Table 14.



Toal No. of National Parks and Wildlife	Evaluation Category				
Sanctuaries Evaluated (2007-2010)	Very Good	Good	Satisfactory	Poor	
58	9 (16%)	22 (38%)	19 (33%)	8 (14%)	
Total No. of Tiger Reserves Evaluated	Evaluation Category				
(2005-2006)	Very Good	Good	Satisfactory	Poor	
28	9 (32%)	10 (36%)	07 (25%)	02 (7%)	
Total No. of Tiger Reserves Evaluated	Evaluation Category				
(2010 - 2011)	Very Good	Good	Satisfactory	Poor	
39	15 (38%)	12 (31%)	08 (21%)	04 (10%)	

Table 14: Outcome of the Management Effectiveness Evaluation: Results

Source: Ministry of Environment and Forests, (2012)

It is clear from the above evaluation that the protected area network in India performs well and in a successful manner. In other words, the rich biodiversity of the country is conserved in a successful manner.

10. India's ABS Initiatives

Though the biodiversity richness of India is commendable, it faces threats due to overexploitation and / or the destruction of the ecosystems. The protected area policy is broadly considered the answer to the biodiversity challenge. However, its reconciliation with the ABS policies is needed. As a party to the CBD and as one of the mega-diverse countries, India enacted the Biological Diversity Act in 2002, and notified the Biological Diversity Rules there -under in 2004. The objectives of the Biological Diversity Act are similar to those of the CBD and a "fair and equitable sharing of the benefits arising out of the use of biological resources and knowledge associated thereto" is the key. The National Biodiversity Authority (NBA), the State Biodiversity Boards (SBBs) and the Biodiversity Management Committees (BMCs) oversee the implementation of the Act and Rules at the national, state and local levels respectively.

India also came up with the "Guidelines on Access to Biological Resources and Associated Knowledge and Benefits Sharing Regulations, 2014" on November, 2014. The Regulation facilitates: legal certainty, clarity and transparency, simplified procedure to the Indian researchers / government institutes to carry out basic research outside India, options of benefit sharing for different users, graded benefit sharing, establishing a supply chain from source to manufacturer, upfront payment on high economic valued bio-resources (Red sanders, Sandal etc.) and apportioning the accrued benefits to the community or BMC."

Under Section 3 of the Act, all foreigners, non-resident Indians, and any corporate body, association or organization, that is either not incorporated in India or incorporated in India with non-Indian participation in its share capital or management, have to obtain the approval of the NBA, before they access / use biological resources and associated knowledge occurring in India or obtained from the country, for commercial or research purposes or for the purposes of bio-survey or bio-utilization.



ABS agreements under the Biological Diversity Act are divided into four categories, and necessitate the signing of legally binding arguments through various forms.

- Form I deals with the access of biological resources occurring in or obtained from India and/or associated traditional knowledge for research, commercial utilization, bio-survey or bio-utilization. It is applicable to: Non-Indian, NRI, Foreign entity or Indian entity having non-Indian participation in share capital or management.
- Form II deals with the transfer of the research results relating to biological resources from India. This is applicable to any Indian / non-Indian or entity to any non-Indian, NRI, foreign entity or Indian entity having non-Indian participation in share capital or management.
- Form III is for applying for Intellectual Property Rights (IPR) for inventions based on any research or information on a biological resource obtained from India, which is applicable to any Indian/non-Indian or entity.
- Form IV deals with the transfer of biological resources and/or associated traditional knowledge to third parties by individuals/entities (Indian or Non-Indian), who have accessed these resources and knowledge through Form I.

Further, after the introduction of the 'Guidelines on Access to Biological Resources and Associated Knowledge and Benefits Sharing Regulations, 2014' NBA introduced forms such as Form A and Form B. Form A can be used in case the applicant is a trader/ manufacturer / company, and he shall submit it along with Form I. Regulation 2 of the ABS Guidelines, 2014 indicated that "Any person who intends to have access to biological resources including access to biological resources harvested by Joint Forest Management Committee (JFMC)/ Forest dweller/ Tribal cultivator/ Gram Sabha, shall apply to the NBA in Form-I of the Biological Diversity Rules, 2004 or to the State Biodiversity Board (SBB), in such form as may be prescribed by the SBB, as the case may be, along with Form A".

Form B is applicable for the conducting of non-commercial research or research for emergency purpose outside India by Indian Researchers/Government Institutions. Regulation 13 of the ABS Guidelines, 2014, indicated that: "Conducting of non-commercial research or research for emergency purposes outside India by Indian researchers/ Government institutions.

- 1. Any Indian researcher / Government institution who intends to carry / send the biological resources outside India to undertake basic research other than collaborative research referred to in section 5 of the Act shall apply to the NBA in Form 'B' annexed to these regulations.
- 2. Any Government Institution which intends to send biological resources to carry out certain urgent studies to avert emergencies like epidemics, etc., shall apply in Form 'B' annexed to these regulations.
- 3. The NBA shall, on being satisfied with the application under sub-regulation (1) or sub-regulation (2), accord its approval within a period of 45 days from the date of receipt of the application.
- 4. On receipt of approval of the NBA under sub-regulation (3), the applicant shall deposit voucher specimens in the designated national repositories before carrying / sending the biological resources outside India and a copy of proof of such deposits shall be endorsed to the NBA".



The benefit sharing components on different purposes are also explained in detail in the guideline. The summary of the benefit sharing components is given in Table - 15.

S. No	Purpose	Benefit Sharing Criteria	Range	Benefit Sharing Components / Obligations
1	1CommercialAnnual Gross ex-factory sale of product		Up to Rs. 1,00,00,000	0.1 %
			Rs. 1,00,00,001 to 3,00,00,000	0.2 %
			Above Rs. 3,00,00,000	0.5 %
2	Transfer of results of research			3.0 to 5.0% of the monetary consideration
3	Intellectual Property Rights	If applicant himself commercialize the process/ product/innovation		0.2 – 1.0% of Annual Ex-factory gross sale (minus govt. taxes)
		If applicant assigns / licenses the process / product / innovation to a third party for commercialization		3.0 - 5.0 % of the fee received in any form and $2.0 - 5.0$ % of Royalty
4	Transfer of accessed bio-resources and TK			2.0 to 5.0% of any amount and / or royalty received from the transferee.

Table 15: Benefit Sharing Components as per the ABS Guideline

Source: Ministry of Environment, Forests and Climate Change, 2012

So far, around 700 approvals have been granted to the applicants (Table 16).

Table 16: Approval Granted to the Applicant

Year wise status of applications	Form I Access to bioresources for Research/ Commercial Purpose	Form II Transfer to Research Results	Form III Approval for obtaining IPR	Form IV Third Party Transfer	Form B	Total
2006 - 2007	4	1	9	2	0	7
2007 - 2008	5	3	12	6	0	26
2008 - 2009	4	4	21	6	0	35
2009 - 2010	2	1	9	1	0	13
2010 - 2011	3	1	4	1	0	9
2011 - 2012	1	2	6	0	0	9
2012 - 2013	1	0	8	7	0	16
2013 - 2014	1	0	14	2	0	17
2014 - 2015	19	0	22	1	0	42
2015 - 2016	31	1	51	2	7	92
2016 - 2017	36	4	127	0	15	182
2017 - 2018	36	2	246	1	31	316
Total	143	19	520	29	53	764

Source: NBA, 2018



Out of 764 approvals granted by the NBA to the applicants, 711 are ABS agreements which include 143 in Form 1, 19 in Form 2, 520 in Form 3 and 29 in Form 4. It is very clear from the above table that a substantial share (73%) of the ABS agreements is in Form 3, where the patent office is insisting to the applicant to obtain NBA's approval.

Section 6 of the Biological Diversity Act stated that the application for intellectual property rights is not to be made without approval of National Biodiversity Authority. It indicated that "no person shall apply for any intellectual property right, by whatever name called, in or outside India for any invention based on any research or information on a biological resource obtained from India without obtaining the previous approval of the National Biodiversity Authority before making such application". As per the statistics (Table 13) there is no substantial progress on approvals for obtaining IPR till 2012. However, the approvals for obtaining IPR increased from 2012 primarily due to the introduction of the 'Guidelines for Processing of Patent Applications Relating to Traditional Knowledge and Biological Material (2012)' by the Patent Office, which clearly mentioned the procedures to be followed by the patent applicants who use biological materials and traditional knowledge for doing the invitation as well as the penal provision for whoever contravenes the provisions (Controller General of Patents, Designing and Trademark, 2012).

11. Protected Area Network and ABS Synergy: A Retrospective

In the broader sense, the protected area network in India come under the domain of four important Acts, include: the Protected Areas under the Wildlife Protection Act (1972), forests under Indian Forest Act 1927, designated wetlands under the Environmental (Protection) Act 1986, and the Biodiversity Heritage Site under the Biological Diversity Act, 2002. The area together (after avoiding the overlaps and double counting) come 9,14,074 sq. Km., which is 27% of Indies geographical area. Hence, the access permits and the ABS scope of the biological resources in this vast area is huge and become a major policy concern.

As per the Wildlife Protection Act (1972), as of January 2018, 769 protected areas have been established in India, extending over 1,62,073 sq. kms, that is, 4.93% of the country's total geographic area. These protected areas comprise 103 national parks, 544 wildlife sanctuaries, 76 conservation reserves and 64 community reserves. 39 tiger reserves and 28 elephant reserves have also been designated for species specific management of tiger and elephant habitats. From the 769 protected areas in the country, UNESCO has designated 5 protected areas as world heritage sites. As the ecosystems and species do not recognise political borders, the concept of transboundary protected areas has been initiated for the coordinated conservation of ecological units and corridors with bilateral and / or multilateral cooperation of the neighbouring nations.

In order to strengthen and synergise global wildlife conservation efforts, India is a party to major international conventions, viz., the Convention on International Trade in Endangered Species (CITES) of wild fauna and flora, International Union for the Conservation of Nature (IUCN), International Convention for the Regulation of Whaling, UNESCO-World Heritage Committee and Convention on Migratory Species (CMS).

The protected areas are constituted and governed under the provisions of the Wild Life (Protection) Act, 1972,

which has been amended from time to time, with the changing ground realities concerning wildlife crime control and protected areas management. The Implementation of this Act is further complemented by other Acts, viz., the Indian Forest Act - 1927, Forest (Conservation) Act - 1980, Environment (Protection) Act - 1986 and Biological Diversity Act - 2002 and the Scheduled Tribes and other Traditional Forest Dwellers (Recognition of Forest Rights) Act - 2006. Further, the Wildlife Crime Control Bureau of the Central Government supplements the efforts of provincial governments in wildlife crime control through the enforcement of CITES and control of wildlife crimes having cross-border, interstate and international ramifications (Ministry of Environment and Forests, 2012).

Pursuant to the Convention on Biological Diversity (CBD), India enacted the Biological Diversity Act in 2002 and notified the Rules (Biological Diversity Rules) in 2004 to give effect to the provisions of the Convention including those relating to Access and Benefit Sharing (ABS). The Nagoya Protocol on ABS is also being implemented through the Biological Diversity Act, 2002 at the national level. The Biological Diversity Act, 2002 is implemented through a three-tier institutional mechanism: The National Biodiversity Authority (NBA) at the national level; State Biodiversity Boards (SBBs) at the provincial (State Government) level; and the Biodiversity Management Committees (BMCs) to be set up by the elected bodies at the local level. While all the provincial Governments (29 in all) have set up SBBs, the setting up of BMCs is an ongoing process. So far, over 62,000 BMCs have been constituted by the local bodies in 26 states (Convention on Biological Diversity – CBD, 2018).

For the implementation of various provisions of the Biological Diversity Act, 2002 several notifications have been issued so far. The Guidelines on Access to Biological Resources and Associated Knowledge and Benefit Sharing Regulations, 2014, prescribe the scheme of processing the applications, along with templates and terms for benefit sharing. India is initiating the ABS agreements.

The ABS application required details and specific information about the nature of access sought, and the biological material and associated knowledge to be accessed. In this regard details like scientific and common names of the biological resources, geographical location of resources collection (indicate the name of village, panchayat, block, taluk, district and state), source of collection (wild/cultivated), and quantity of the biological resources to be collected need to be submitted by the applicant. Further, if the biological resources is to be collected or procured from the Institute/ Organization/ Company/local trader/individual, their exact contact details (address and contact number) should also to be mentioned in the application. From this database it is difficult to identify the exact origin of the biological resources- whether they are from the protected areas or not.

However, the discussion with 'protected area and ABS' experts on the 'applicability of the ABS in protected areas' revealed that: 'a huge volume of biological resources having commercial demand is collected by the tribal / local communities from the protected areas and transferred to the local traders. From the local traders it is moving to big traders / wholesalers and to the industries that use resources as raw materials / inputs for manufacturing different commercial products'. It revealed that without a complete understanding of the value chain of the biological resources one cannot predict the origin of the resources with respect to the ABS. A Majority of the botanical industries prefer the biological resources, particularly medicinal plants obtained from the wild, as their quality is superior to that of the cultivated ones.



The National Biodiversity Authority (NBA) is the designated competent National Authority on ABS in India. The NBA is initiating the ABS process through legislative, institutional and policy measures and mobilizing the amount. Out of the ABS amount accrued so far in NBA, a major share of the amount (95%) is obtained from a biological resource named red sanders (*Pterocarpus santalinus*). Red sanders are an endemic species existing in the Seshachalamforests, a Biosphere Reserve, in Andhra Pradesh.

Box 1: The Seshachalam Biosphere Reserve

Through the UNESCO's Man and Biosphere program, the government of India established the Seshachalam Biosphere Reserve on 20th September, 2010. The reserve is the first biosphere reserve in Andhra Pradesh and the 17th in India. In size, it is the 9th largest in India. The reserve aims to support the conservation of species in situ by supporting economic and social development. It is home to a number of endemic species including the famous Red Sanders and Slender Loris. The hilly terrain offers some spectacular trekking opportunities too. Many scientific studies have been and are being conducted in the reserve. The native population of the reserve includes the tribes of Yanadis. By reducing the competition between man and animals for forest resources and by decreasing the number of man-animal conflicts, we aim to re-establish a balance in the ecosystem. The majority of the people dependent on the forest fall outside the reserve. A small number of people live in the outermost zone - the transition zone.

Source: Government of Andhra Pradesh, 2018.

Out of the benefit sharing amount obtained from the red sanders (*Pterocarpus santalinus*) access, NBA has distributed a portion of the amount (through Andhra Pradesh Biodiversity Board) to the Andhra Pradesh Forest Department. The Forest Department is using the amount for conservation and sustainable use of red sanders, an endemic species in the Seshachalam Biosphere Reserve (Convention on Biological Diversity – CBD, 2018).

Forest management model of India and the modalities of ABS do not work in conflict but complement each other in the sense that though the harvesting and utilization of biological resources is not contemplated within National Parks and Wildlife Sanctuaries, intensity of biodiversity characterization in terms of ecosystem, species and genetic levels is more pronounced here, which provides fair idea of the profile of habitats in the neighbouring areas where harvesting with assessment of sustainable withdrawal as well as prospecting is part of the management. Occurrence of any specific resource, limited to a National Parks or Wildlife Sanctuaries has not been reported so far and in case of research on any such resource or its element, government has the authority to take decision on prospecting / withdrawal, as such a utility can lead to the betterment of management of the protected area by addition of a special conservation value to it.



Yellowstone National Park of USA was one of the pioneer National Parks in the world established in 1862 to conserve exclusively forest biodiversity. This model was replicated later in many countries including India, to establish an exclusive network of protected areas to conserve genetic diversity. The areas protected in India is under the domain of 4 important Acts: (1) Protected Areas Under the Wildlife Protection Act (1972), (2) Forests under Indian Forest Act 1927, (3) Designated wetlands under the Environmental (Protection) Act 1986, and (4) Biodiversity Heritage Site under the Biological Diversity Act, 2002. The area together (after avoiding the overlaps and double counting) come 9,14,074 sq. Km., which is 27% of Indies geographical area. The biological resources in this vast area and its ABS potential are real concerns.

The protected areas network declared under the Wild Life (Protection) Act, 1972 include: national parks, wildlife sanctuaries, conservation reserves and community reserves. The geographical location and boundaries of all the 4 kinds of protected areas are notified by legislation. Broadly, human activities are limited inside in the protected areas. The total number of protected areas (includes the national parks, wildlife sanctuaries, conservation reserves) increased over a period, as indicated in the following figure (figure 9).



Figure 9: Total Number Protected Areas (under the Wildlife Protection Act - 1972) in India

Source: National Wildlife Database Cell, Wildlife Institute of India (2018)

In India forests, the hot spot of biodiversity, which are managed through different legal measures. Experts opened that, the primary objective of forest management is conservation and sustainable use of the resources therein. Classical forest management also aims at this objective though focus on products / services, which may differ from place to place. For example, forests include; bamboo forests, timber production areas, watershed / protection forests etc. Protected areas under the Wildlife Protection Act context - National Parks and Wildlife Sanctuaries - became part of the forest management system, when a few selected areas were



notified specifically as habitats for the focus species. While National Parks were created to maintain exclusivity of the identified habitats (wildlife sanctuaries were the areas with some scope of access to a limited extent) to favor the identified conservation focus. The National Parks in India constitute only 1.23% of the total forest cover, the specific strategy is of management of these areas exclusively for protection and therefore, as a conservation strategy, harvesting is not contemplated. Rests of the forests are meant to be managed with sustainable use inherent in the conservation strategy.

In the ABS perspective, even if the biologically rich forests in India are categorized under different heads, based on the Wildlife Protection Act as well as the Indian Forest Acts, with differentiated public accessibility, one should view the case in a broader perspective with larger strategy, which includes conservation with sustainable use of the resource potential of the forests. While the domesticated biodiversity elements are prospected and utilized in non-natural modified environments (e.g. agriculture), natural elements are utilized from managed forests and to ensure sustainability of such resources, PAs have the role of harboring, protecting, proliferation and dispersal of the bio-resources of the region represented by those, thus ensuring genetic outflow in the surrounding managed forests to augment the resource under stress if any, because of the use there.

The uniqueness of accessing the biological resources and bio-prospecting in the protected areas itself may debatable in certain situations and vary substantially based on the biological resources. In certain case, specific biological / genetic resources available in the protected area may be available in its finge lands too or under cultivation and in that case, for accessing the resources, one should not depend on the protected areas. However, there are cases, where the existence of specific biological resources exclusively within the protected areas and the access permission denied; those resources bio-prospecting scope is a challenge or forgone.

However, Wildlife conservation in India is currently facing complex challenges, both ecological and social in nature. These challenges include: habitat loss/fragmentation, overuse of biomass resources in the context of biotic pressures, increasing human-wildlife conflicts, livelihood dependence on forests and wildlife resources, poaching and illegal trade in wildlife parts and products. Setting up of protected areas has been marked by conflicts with indigenous communities living inside the forests for generations. It had been debated widely nationwide as to who should be the authority of such protected areas; the forest official or the community or a joint authority (Maitreyi, 2003).

The first survey of the protected areas network of India conducted by the Indian Institute of Public Administration and other studies and assessments, made it clear that one of the most difficult challenges facing protected areas' managers was the reconciliation of the local community's demands for biomass and incomes from the protected areas with the requirement of biodiversity conservation. This is the fundamental base for the arguments of ABS in protected areas. The law, on the one hand, prohibited public access to almost all the resources within protected areas. But forest resources are the primary livelihood source and survival options for communities and tribes. Besides, many of the local people living in and around protected areas had been using these resources for years, sometimes for generations and from well before the protected areas were constituted. According to Maitreyi (2003), the sudden restrictions on their access not only resulted in severe hardships but also made them hostile to the protected areas' managers.


The government and the civil society are taking several measures to address these issues. Improved synergies and better coordination amongst the wide array of stakeholders are needed to meet the challenges of conserving India's diverse wild resources. As Schaller (1993) suggested 'conservation cannot be imposed from above. Any conservation effort must involve the local people, based on their interests, skills, self-reliance and traditions and it must initiate programs that offer them spiritual and economic benefits'.

In this context, ABS is a workable solution which facilitates livelihood options for the community and revenue to the protected area managers for managing the protected area on the one hand and raw material options for the industry, which uses forest resources as raw-materials for manufacturing consumer products on the other. As the tribal / local communities have customary rights to collect and sell MFPs in different types of protected areas, a substantial share of biological resources are going out from the protected areas to the commercial hubs. Generally, commercial users of biological resources, like industries are not permitted to enter the protected areas to directly procure their required biological resources.

The introduction of the ABS in protected areas should be in a manner which facilitates to utilize the resources of protected areas in a productive and sustainable manner. This could achieve a win-win situation for the protected area management / forest product depended communities and the industries which use the biological resources for commercial purposes and manufacturing different consumer products.

Generally, the biological resources, including those in protected areas, are renewable natural resources. Hence, their extraction within the regeneration capacity does not harm biodiversity or hamper the conservation of species / wildlife and deviate from the primary objectives of protected areas. The Wild Life Act, 1972 and the subsequent legal measures made a platform for the protected area network in India. However, in reality, through the protected areas network we cannot restrict or ban on the tribal / local community's traditional rights to the forest resources. In a country like India, large number of tribes depends on forest products for their livelihood.

The Biological Diversity Act, 2002 encompasses the objectives of the Convention on Biological Diversity (CBD): the conservation of biological diversity, the sustainable use of its components, and the fair and equitable sharing of benefits arising from the utilisation of genetic / biological resources. The ABS philosophy argues for benefit sharing (whenever biological resources are accessed with commercial interests) towards the conservation of biodiversity and its further utilization in a sustainable manner for the benefit of humanity. The conservation of biodiversity, which includes species and wildlife, is the ultimate aim of the concept of ABS and protected areas. The scope of ABS in the protected areas (covering the forestry land with various rights and privileges recognized as per law and the legal process of notification of forests) to be explored. In this regard the policy suggestions for ABS in the forestry sector can help in improving the benefit sharing mechanisms of forest utilization and thus various stakes related to conservation of biological resources.

Based on the above discussion, one can argue that ABS needs to be viewed and developed as an inevitable part of protected area management in a country like India, where a large number of the poor (tribes and local communities) depends on forest resources. In this regard the following prerequisites are proposed:



During the 1970s and 1980s, the global environmental agenda, emphasised on the conservation of ecosystems and species through the declaration of environmentally sensitive and fragile geographical zones as protected areas. Accordingly, the Wild Life Protection Act (1972) in India emphasised the protected areas network for the conservation of wildlife and its biodiversity. Even if the Act imposes restrictions on accessing the forest products / biological resources by the general public, the tribal communities' rights on forests and their resources are safeguarded in a conditional manner.

Subsequently, the emergence of CBD in 1993 and its universal acceptability made a paradigm shift in the global environmental management agenda. CBD insisted on its parties to follow 'conservation and sustainable use of biodiversity' rather than mere protection. As a follow-up of this, India enacted the Biological Diversity Act in 2002. India was also actively involved in the CBD's initiative on the Programme of Work on Protected Area (PoWPA) and framing strategies for achieving the Aichi Target 11. In this context, a synergy between the Wild Life Protection Act / Indian Forest Act, / Environmental (Protection) Act, 1986 and the Biological Diversity Act and appropriate policy decisions on the smooth implementation of the ABS in protected areas are the need of the hour.

It is also to be appreciated that the management of National Parks and Wildlife sanctuaries does not prohibit researches, including biopiracy specifically, but regulates human presence in order to fulfill the management objectives of the area. In such circumstances, consent to access depends upon the provisions of the management plan.

2 Documentation and Assessment of the ABS Potential Biological Resources in Protected Areas

Protected areas are the buffer zones of rich biodiversity and biological resources. These resources are transferred to commercial hubs by tribes / traders with or without the knowledge of the protected area managers. The resources are exchanged at the forest gate in traditional practices like auction. As information asymmetry and imperfect markets exist in biological resources exchange, the providers of resources (tribes) are not receiving a fair price and are often exploited by the traders.

It is important to do a scientific assessment of the ABS potential biological resources in each protected area considering their availability, existing stocks, renewable limit etc. This could facilitate implementing the effective ABS mechanism for protected areas without compromising the objective of the protected area network in the country. In this regard, the initiatives done by the GCC in procuring and exchange of MFPs in Andhra Pradesh is a learning case for framing strategies with respect to ABS (Box 2).



Box 2: Girijan Co-operative Corporation (GCC)

GCC is one of the largest tribal development co-operative agencies in India for procuring Minor Forest Produce (MFPs) in the forest areas of Andhra Pradesh. This state undertaking Corporation (functions through a wider network in the state even in remote and inaccessible tribal habitats with a large transport fleet) serves nearly a 4 million tribal population spread over 32,000 km² of forests. For thePast 60 years, the GCC safequards the tribes from exploitative middlemen, petty traders and establishes a mutually beneficial relationship with the rest of the world. GCC's functions include: purchasing MFPs from tribes at reasonable and fair prices from the very doorstep of the tribes, imparting training to the tribes in the collection of theMPPs- so that forest yields can be increased without endangering the trees and environment, with a proactive search for adding new MFPs to the existing list. In brief, GCC aims for 'protecting the environment through the regeneration of species of MFPs and ensuring pure and natural products to the consumer at reasonable prices (Girijan Co-operative Corporation, 2018). In brief, GCC's efforts may considered as a first step towards the ABS.

Strict Monitoring and follow-up on the Research Permitted 3. in Protected Areas

According to section 28 of the Wild Life Protection Act (1972) the Chief Wildlife Warden can grant permission to enter a sanctuary for different purposes including 'scientific research'. Naturally, the scientific research in a sanctuary focuses on biological resources (plants or animals) with different motives, varying from pure academic research to research with a commercial intent. Research with commercial intent requires approval (ABS agreement) from the NBA. Sometimes academic research may have a commercial angle. Hence, strict monitoring and conditional follow-up on the research permitted in protected areas is required. The officials of the NBA / SBBs need to take initiatives on this with the collaboration of the Chief Wildlife Warden.

4. Ownership of Biological Resources and the **Conservation Measures**

The entitlement on the biological resources existing in protected areas is with the Forest Department or the Chief Wildlife Warden. In other words, the state is the custodian of the biological resources. But the tribal communities are enjoying the user rights, when collecting the resources. Hence, the authority concerned can fix a support price, with the consultation of the experts, for the biological resources prevailing in the protected areas, which facilitates obtaining a fair price.

The concerned agencies need to understand the biological resources' movement with the support of traders or follow the supply chain for understanding the biological resources' ABS linkages. The authority concerned



with the protected areas, should design an effective conservation strategy for the ABS money. India's National Wildlife Action Plan emphasised on peoples' participation and their support in wildlife conservation. Ideally, a BMC cannot function within a protected area. Hence, the Chief Wildlife Warden needs to avail the local / tribal communities' support in conservation activities.

Further appropriate policies on the availability of the commercially significant and unique biological/genetic resources exist in the protected areas to be introduced. In this context, the protected area managers should plan the cultivation of those resources with the support of local communities or BMCs, in the periphery lands of the protected areas. In this way the conservation objective as well as the access permits of the resources may fulfil simultaneously.

Capacity Building for Protected Area Managers about the Significance 5. of ABS and Protected Areas

As ABS is an emerging aspect in protected areas, the capacity building for the protected area managers on ABS issues is required. NBA and the SBBs need to look at initiatives in this regard with the collaboration of different ABS stakeholders including the industry.

ABS should be considered as an Innovative Financial Mechanism 6. for Protected Areas' Management.

For protected areas management huge finance is required and its mobilization, in a situation when government budget allocation becomes minimal, is a huge challenge. As the scope for ABS on protected areas is high, the protected area managers need to view ABS as an innovative financial mechanism for protected areas' biodiversity conservation. Through a successful ABS, the state can mobilize the required money for the protected areas' management in a continuous manner.

In conclusion, In India, protected areas - which are the buffer zone of biodiversity - are designated under different legal structures. The Wildlife Protection Act, 1972 declared wildlife sanctuaries, national parks, conservation reserves and community reserves as protected areas, which includes the marine protected areas also, for the purpose of protecting or developing wildlife and its environment. The National Forest Policy aims at the conservation of natural forests with vast varieties of flora and fauna which represented rich biological diversity by declaring areas as reserved forests and protected forests under the Indian Forest (Amendment) Act, 2017. The Act empowers the provisional state governments to notify any forest land or wasteland as reserved/ protected forests. Wetlands of the country are also legally protected under the Wetlands Conservation and Management Rules 2017, notified under the Environmental (Protection) Act 1986. Section 37 of the Biological Diversity Act 2002 empowers providing state government to declare areas of significant biological diversity as Biodiversity Heritage Sites in consultation with the local bodies.

Hence, the area under conservation in India (under the 4 laws) comes 9,14,074 sq. Km., which is 27% of Indies geographical area. Hence, the significance of bio-prospecting in this biodiversity / biological resources rich



In the case of forest resources, organized harvests and sale thereof by the government, commercial scale collection of other forest produce - NTFPs in context of forest rights as per laws, according to the provisions of forest working plans, commercial collection by Forest Development Corporations, and collection by other commercial entities and researchers are options that could be explored through further scientific investigation. Further, ABS stakeholders in such scenarios modalities would also include local self governments (particularly for 'MFP' as in constitution), forest rights holders, Joint Forest Management Committees or Eco-Development Committees, holders and users of traditional knowledge etc. It needs to be appreciated that several models of benefit sharing in forest harvesting activities with local communities through Joint Forest Management, allotment to tribal cooperative societies etc. are needed to be taken into account as models of ABS. A workable model may be devised and proposed in such scenarios, which could be tested and adopted in regular forest management.

What is needed: rather than a generic approach on ABS in all protected areas (irrespective of the category) a differential and target oriented approach in specific protected areas, without sacrificing the fundamental objective of them, is required with the support of concerned stakeholders.



References

Controller General of Patents, Designing and Trademark 2012, "Guidelines for Processing of Patent Applications Relating to Traditional Knowledge and Biological Material", Office of the Controller General of Patents, Designing and Trademark, (Mumbai)

Convention on Biological Diversity - CBD (2018), "Interim National Report on the Implementation of the Nagoya Protocol". Available at: https://absch.cbd.int/search/nationalRecords?schema=absNationalReport

Convention on Biological Diversity – CBD (2017), "India - Country Profile Biodiversity Facts", available at: https://www. cbd.int/countries/profile/default.shtml?country=in#measures

Girijan Co-operative Corporation (2018), "Girijan Co-operative Corporation – GCC: Profile and Mission. Available at http://www.apgirijan.com/

Government of Andhra Pradesh (2018), "The Seshachalam Biosphere Reserve". Available at: http://www. seshachalambiospherereserve.in/

Maitreyi Mandal (2003), "Protected Area Management in India: A Perspective", Paper submitted for the XII World Forestry Congress at Quebec, Canada, September 21-28, 2003. Available at http://www.fao.org/docrep/ARTICLE/WFC/ XII/0449-B3.HTM

Ministry of Environment and Forests (2012), "Protected Area Network in India". Available at: http://www.envfor.nic.in/ sites/default/files/protected-area-network.pdf

Ministry of Environment and Forests (2014), "India's Fifth National Report to the Convention on Biological Diversity", Ministry of Environment and Forests, Government of India

Ministry of Environment, Forests and Climate Change (2014), "Guidelines on Access to Biological Resources and Associated Knowledge and Benefits Sharing Regulations, 2014", Notification (21st November, 2014).

National Biodiversity Authority (2013), "Biological Diversity Act, 2002", NBA, Chennai.

National Biodiversity Authority (2018), "Approvals Granted to the Applications". Available at: http://nbaindia.org/ content/683/61/1/approvals.html

Schaller, G. B (1993), "The Last Panda", University of Chicago Press, Chicago and London. Pp 35.

UNDP & MoEFCC (2018), "Achievement of Aichi Biodiversity targets 11 and 16: Success Stories from India".

Wildlife Institute of India (2012), "India's Action Plan for Implementing the Convention on Biological Diversity's Programme of Work on Protected Areas", Wildlife Institute of India, Dehradun (Uttarakhand). (Ministry of Environment and Forests, 2013)

Wildlife Institute of India (2018), "Protected Areas of India: Database", National Wildlife Database Cell, Wildlife Institute of India. Available at: http://www.wiienvis.nic.in/Database/Protected_Area_854.aspx



S. No.	Name of State/ Protected Area	Year of Establishment	Area (km²)	District(s)
	AND	AMAN & NICOBA	AR ISLANDS	
1	Campbell Bay NP	1992	426.23	Nicobar
2	Galathea Bay NP	1992	110.00	Nicobar
3	Mahatama Gandhi Marine (Wandoor) NP	1983	281.50	Andaman
4	Middle Button Island NP	1987	0.44	Andaman
5	Mount Harriett NP	1987	46.62	Andaman
6	North Button Island NP	1987	0.44	Andaman
7	Rani Jhansi Marine NP	1996	256.14	Andaman
8	Saddle Peak NP	1987	32.54	Andaman
9	South Button Island NP	1987	0.03	Andaman
		ANDHRA PRAI	DESH	
1	Papikonda NP	2008	1012.86	East & West Godavari
2	Rajiv Gandhi (Rameswaram) NP	2005	2.40	Kadapa
3	Sri Venkateswara NP	1989	353.62	Chittoor & Cuddapah
		ARUNACHAL PR	ADESH	
1	Mouling NP	1986	483.00	Upper Siang
2	Namdapha NP	1983	1807.82	Changlang
		ASSAM		
1	Dibru-Saikhowa NP	1999	340.00	Tinsukia & Dibrugarh
2	Kaziranga NP	1974	858.98	Golaghat, Nagaon & Sonitpur
3	Manas NP	1990	500.00	Barpeta & Bongaigaon
4	Nameri NP	1998	200.00	Sonitpur
5	Rajiv Gandhi Orang NP	1999	78.81	Darrang & Sonitpur
		BIHAR		
1	Valmiki NP	1989	335.65	West Champaran
		CHHATTISGA	RH	
1	Guru Ghasidas (Sanjay) NP	1981	1440.71	Surguja & Koria
2	Indravati (Kutru) NP	1982	1258.37	Dantewada
3	Kanger Valley NP	1982	200.00	Bastar
		GOA		
1	Mollem NP	1992	107.00	North Goa
		GUJARAT		
1	Vansda NP	1979	23.99	Navasari
2	Blackbuck (Velavadar) NP	1976	34.53	Bhavnagar
3	Gir NP	1975	258.71	Junagadh

Annexure 1: State-wise break up of National Parks (July, 2015)



S. No.	Name of State/ Protected Area	Year of Establishment	Area (km²)	District(s)
4	Marine (Gulf of Kachchh) NP	1982	162,89	lamnagar
-		HARYANA	102.05	Jannaga
1	Kalesar NP	2003	46.82	Yamuna Nagar
2	Sultanpur NP	1989	1.43	Gurgaon
		HIMACHAL PRA	ADESH	
1	Great Himalayan NP	1984	754.40	Kullu
2	Inderkilla NP	2010	104.00	Kullu
3	Khirganga NP	2010	710.00	Kullu
4	Pin Valley NP	1987	675.00	Lahul & Spiti
5	Simbalbara NP	2010	27.88	Sirmaur
		JAMMU & KAS	HMIR	
1	City Forest (Salim Ali) NP	1992	9.00	Srinagar
2	Dachigam NP	1981	141.00	Srinagar & Pulwama
3	Hemis NP	1981	3350.00	Leh
4	Kishtwar NP	1981	425.00	Kishtwar & Doda
		JHARKHAN	D	
1	Betla NP	1986	226.33	Latehar
		KARNATAK	A	
1	Anshi NP	1987	417.34	Uttara Kannada
2	Bandipur NP	1974	874.20	Mysore & Chamarajanagar
3	Bannerghatta NP	1974	260.51	Bangalore
4	Kudremukh NP	1987	600.32	Dakshin Kannada, Udipi & Chikmagalur
5	Nagarahole (Rajiv Gandhi) NP	1988	643.39	Kodagu & Mysore
		KERALA		
1	Anamudi Shola NP	2003	7.50	Idukki
2	Eravikulam NP	1978	97.00	Idukki
3	Mathikettan Shola NP	2003	12.82	Idukki
4	Pambadum Shola NP	2003	1.32	Idukki
5	Periyar NP	1982	350.00	Idukki & Quilon
6	Silent Valley NP	1984	89.52	Palakkad
	1	MADHYA PRAI	DESH	1
1	Bandhavgarh NP	1968	448.85	Umaria & Katni
2	Fossil NP	1983	0.27	Mandla
6	Indira Priyadarshini Pench NP	1975	292.85	Seoni & Chhindwara
3	Kanha NP	1955	940.00	Mandla, Balaghat & Dindori
4	Madhav NP	1959	375.22	Shivpuri



S. No.	Name of State/ Protected Area	Year of Establishment	Area (km²)	District(s)			
5	Panna NP	1981	542.67	Panna & Chhatarpur			
7	Sanjay NP	1981	466.88	Sidhi			
8	Satpura NP	1981	585.17	Hoshangabad			
9	Van Vihar NP	1979	4.45	Bhopal			
	MAHARASHTRA						
1	Chandoli NP	2004	317.67	Sangli, Satara, Kolhapur, Ratnagiri			
2	Gugamal NP	1975	361.28	Amravati			
3	Nawegaon NP	1975	133.88	Bhandara (Gondia)			
4	Pench (Jawaharlal Nehru) NP	1975	257.26	Nagpur			
5	Sanjay Gandhi (Borivilli) NP	1983	86.96	Thane & Mumbai			
6	Tadoba NP	1955	116.55	Chandrapur			
		MANIPUR	ł				
1	Keibul-Lamjao NP	1977	40.00	Bishnupur			
		MEGHALAY	Ά				
1	Balphakram NP	1985	220.00	South Garo Hills			
2	Nokrek Ridge NP	1986	47.48	East Garo Hills			
		MIZORAN	1				
1	Murlen NP	1991	100.00	Champhai			
2	Phawngpui Blue Mountain NP	1992	50.00	Lawngtlai			
		NAGALAN	D				
1	Intanki NP	1993	202.02	Dimapur			
		ODISHA					
1	Bhitarkanika NP	1988	145.00	Kendrapara			
2	Simlipal NP	1980	845.70	Mayurbhanj			
		RAJASTHA	N				
1	Mukundra Hills NP	2006	200.54	Kota & Chittourgarh			
2	Desert NP	1992	3162.00	Barmer & Jaisalmer			
3	Keoladeo Ghana NP	1981	28.73	Bharatpur			
4	Ranthambhore NP	1980	282.00	Sawai Madhopur			
5	Sariska NP	1992	273.80	Alwar			
		SIKKIM					
1	Khangchendzonga NP	1977	1784.00	North Sikkim			
		TAMIL NAD	U				
1	Guindy NP	1976	2.82	Chennai			
2	Gulf of Mannar Marine NP	1980	6.23	Ramanathpuram & Tuticorin			
3	Indira Gandhi (Annamalai) NP	1989	117.10	Coimbatore			



S. No.	Name of State/ Protected Area	Year of Establishment	Area (km²)	District(s)			
4	Mudumalai NP	1990	103.23	Nilgiris			
5	Mukurthi NP	1990	78.46	Nilgiris			
	TELANGANA						
1	Kasu Brahmananda Reddy NP	1994	1.43	Hyderabad			
2	Mahaveer Harina Vanasthali NP	1994	14.59	Ranga Reddy			
3	Mrugavani NP	1994	3.60	Ranga Reddy			
		TRIPURA					
1	Clouded Leopard NP	2007	5.08	West Tripura			
2	Bison (Rajbari) NP	2007	31.63	South Tripura			
	UTTAR PRADESH						
1	Dudhwa NP	1977	490.00	Lakhimpur-Kheri			
		UTTARAKHA	ND				
1	Corbett NP	1936	520.82	Nainital & Pauri Garhwal			
2	Gangotri NP	1989	2390.02	Uttarkashi			
3	Govind NP	1990	472.08	Uttarkashi			
4	Nanda Devi NP	1982	624.60	Chamoli			
5	Rajaji NP	1983	820.00	Dehradun, Pauri Garhwal & Haridwar			
6	Valley of Flowers NP	1982	87.50	Chamoli			
		WEST BENG	AL				
1	Buxa NP	1992	117.10	Jalpaiguri			
2	Gorumara NP	1992	79.45	Jalpaiguri			
3	Jaldapara NP	2014	216.51	Jalpaiguri			
4	Neora Valley NP	1986	159.89	Darjeeling			
5	Singalila NP	1986	78.60	Darjeeling			
6	Sunderban NP	1984	1330.10	North & South 24-Paraganas			

(Source: Wildlife Institute of India)



Annexure 2: State-wise break up of Wildlife Sanctuaries (As on February, 2016)

S. No.	Name of State/ Protected Area	Year of Establishment	Area (km²)	District(s)
	ANDAMAN	& NICOBAR ISLAN	IDS	
1	Arial Island WLS	1987	0.05	Andaman
2	Bamboo Island WLS	1987	0.05	Andaman
3	Barren Island WLS	1987	8.10	Andaman
4	Battimalv Island WLS	1987	2.23	Nicobar
5	Belle Island WLS	1987	0.08	Andaman
6	Benett Island WLS	1987	3.46	Andaman
7	Bingham Island WLS	1987	0.08	Andaman
8	Blister Island WLS	1987	0.26	Andaman
9	Bluff Island WLS	1987	1.14	Andaman
10	Bondoville Island WLS	1987	2.55	Andaman
11	Brush Island WLS	1987	0.23	Andaman
12	Buchanan Island WLS	1987	9.33	Andaman
13	Chanel Island WLS	1987	0.13	Andaman
14	Cinque Islands WLS	1987	9.51	Andaman
15	Clyde Island WLS	1987	0.54	Andaman
16	Cone Island WLS	1987	0.65	Andaman
17	Curlew (B.P.) Island WLS	1987	0.16	Andaman
18	Curlew Island WLS	1987	0.03	Andaman
19	Cuthbert Bay WLS	1997	5.82	Andaman
20	Defence Island WLS	1987	10.49	Andaman
21	Dot Island WLS	1987	0.13	Andaman
22	Dottrell Island WLS	1987	0.13	Andaman
23	Duncan Island WLS	1987	0.73	Andaman
24	East Island WLS	1987	6.11	Andaman
25	East of Inglis Island WLS	1987	3.55	Andaman
26	Egg Island WLS	1987	0.05	Andaman
27	Elat Island WLS	1987	9.36	Andaman
28	Entrance Island WLS	1987	0.96	Andaman
29	Gander Island WLS	1987	0.05	Andaman
30	Galathea Bay WLS	1997	11.44	Nicobar
31	Girjan Island WLS	1987	0.16	Andaman
32	Goose Island WLS	1987	0.01	Andaman
33	Hump Island WLS	1987	0.47	Andaman
34	Interview Island WLS	1987	133.87	Andaman
35	James Island WLS	1987	2.10	Andaman
36	Jungle Island WLS	1987	0.52	Andaman
37	Kwangtung Island WLS	1987	0.57	Andaman
38	Kyd Island WLS	1987	8.00	Andaman





S. No.	Name of State/ Protected Area	Year of Establishment	Area (km²)	District(s)
39	Landfall Island WLS	1987	29.48	Andaman
40	Latouche Island WLS	1987	0.96	Andaman
41	Lohabarrack (Saltwater Crocodile) WLS	1987	22.21	Andaman
42	Mangrove Island WLS	1987	0.39	Andaman
43	Mask Island WLS	1987	0.78	Andaman
44	Mayo Island WLS	1987	0.10	Andaman
45	Megapode Island WLS	1987	0.12	Nicobar
46	Montogemery Island WLS	1987	0.21	Andaman
47	Narcondam Island WLS	1987	6.81	Andaman
48	North Brother Island WLS	1987	0.75	Andaman
49	North Island WLS	1987	0.49	Andaman
50	North Reef Island WLS	1987	3.48	Andaman
51	Oliver Island WLS	1987	0.16	Andaman
52	Orchid Island WLS	1987	0.10	Andaman
53	Ox Island WLS	1987	0.13	Andaman
54	Oyster Island-I WLS	1987	0.08	Andaman
55	Oyster Island-II WLS	1987	0.21	Andaman
56	Paget Island WLS	1987	7.36	Andaman
57	Parkinson Island WLS	1987	0.34	Andaman
58	Passage Island WLS	1987	0.62	Andaman
59	Patric Island WLS	1987	0.13	Andaman
60	Peacock Island WLS	1987	0.62	Andaman
61	Pitman Island WLS	1987	1.37	Andaman
62	Point Island WLS	1987	3.07	Andaman
63	Potanma Islands WLS	1987	0.16	Andaman
64	Ranger Island WLS	1987	4.26	Andaman
65	Reef Island WLS	1987	1.74	Andaman
66	Roper Island WLS	1987	1.46	Andaman
67	Ross Island WLS	1987	1.01	Andaman
68	Rowe Island WLS	1987	0.01	Andaman
69	Sandy Island WLS	1987	1.58	Andaman
70	Sea Serpent Island WLS	1987	0.78	Andaman
71	Shark Island WLS	1987	0.60	Andaman
72	Shearme Island WLS	1987	7.85	Andaman
73	Sir Hugh Rose Island WLS	1987	1.06	Andaman
74	Sisters Island WLS	1987	0.36	Andaman
75	Snake Island-I WLS	1987	0.73	Andaman
76	Snake Island-II WLS	1987	0.03	Andaman
77	South Brother Island WLS	1987	1.24	Andaman
78	South Reef Island WLS	1987	1.17	Andaman



S. No.	Name of State/ Protected Area	Year of Establishment	Area (km²)	District(s)
79	South Sentinel Island WLS	1987	1.61	Andaman
80	Spike Island-I WLS	1987	0.42	Andaman
81	Spike Island-II WLS	1987	11.70	Andaman
82	Stoat Island WLS	1987	0.44	Andaman
83	Surat Island WLS	1987	0.31	Andaman
84	Swamp Island WLS	1987	4.09	Andaman
85	Table (Delgarno) Island WLS	1987	2.29	Andaman
86	Table (Excelsior) Island WLS	1987	1.69	Andaman
87	Talabaicha Island WLS	1987	3.21	Andaman
88	Temple Island WLS	1987	1.04	Andaman
89	Tillongchang Island WLS	1985	16.83	Nicobar
90	Tree Island WLS	1987	0.03	Andaman
91	Trilby Island WLS	1987	0.96	Andaman
92	Tuft Island WLS	1987	0.29	Andaman
93	Turtle Islands WLS	1987	0.39	Andaman
94	West Island WLS	1987	6.40	Andaman
95	Wharf Island WLS	1987	0.11	Andaman
96	White Cliff Island WLS	1987	0.47	Andaman

ANDHRA PRADESH

1	Coringa WLS	1978	235.70	East Godavari	
2	Gundla Brahmeswaram WLS	1990	1194.00	Kurnool & Prakasam	
3	Kambalakonda WLS	2002	71.39	Visakhapatnam	
4	Koundinya WLS	1990	357.60	Chittoor	
5	Kolleru WLS	1953	308.55	West Godavari & Krishna	
6	Krishna WLS	1989	194.81	Krishna & Guntur	
7	Nagarjuna Sagar-Srisailam WLS	1978	3568.09*	Guntur, Prakasam & Kurnool	
8	Nellapattu WLS	1976	4.59	Nellore	
9	Pulicat Lake WLS	1976	500.00	Nellore	
10	Rollapadu WLS	1988	6.14	Kurnool	
11	Sri Lankamalleswara WLS	1988	464.42	Cuddapah	
12	Sri Penusila Narasimha WLS	1997	1030.85	Cuddapah & Nellore	
13	Sri Venkateswara WLS	1985	172.35	Cuddapah & Chittoor	
	*combined area with Telangana				
ARUNACHAL PRADESH					
1	D'Ering Memorial (Lali) WLS	1978	190.00	Upper Siang	
2	Dibang WLS	1991	4149.00	Dibang Valley	
3	Eagle Nest WLS	1989	217.00	West Kameng	

1978

1989

140.30

783.00

Papum Pare

Lohit

Itanagar WLS

Kamlang WLS

4 5



S. No.	Name of State/ Protected Area	Year of Establishment	Area (km²)	District(s)
6	Kane WLS	1991	31.00	West Siang
7	Mahao WLS	1980	281.50	Dibang Valley
8	Pakke (Pakhui) WLS	1977	861.95	East Kameng
9	Sessa Orchid WLS	1989	100.00	West Kameng
10	Tale WLS	1995	337.00	Lower Subansiri
11	Yordi Rabe Supse WLS	1996	397.00	West Siang
		ASSAM		
1	Amchang WLS	2004	78.64	Kamrup
2	Barail WLS	2004	326.24	Cachar Karimgang
3	Barnadi WLS	1980	26.22	Udalguri (Darrang)
4	Bherjan-Borajan-Padumoni WLS	1999	7.22	Tinsukia
5	Burachapari WLS	1995	44.06	Sonitpur
6	Chakrasila WLS	1994	45.57	Dhubri
7	Deepor Beel WLS		4.14	Guwahati
8	Dihing Patkai WLS	2004	111.19	Dibrugarh & Tinsukia
9	East Karbi Anglong WLS	2000	221.81	Karbi-Anglong
10	Garampani WLS	1952	6.05	Karbi-Anglong
11	Hollongapar Gibbon WLS	1997	20.98	Jorhat
12	Lawkhowa WLS	1972	70.13	Nagaon
13	Marat Longri WLS	2003	451.00	Karbi-Anglong
14	Nambor WLS	2000	37.00	Karbi-Anglong
15	Nambor-Doigrung WLS	2003	97.15	Karbi-Anglong
16	Pabitora WLS	1987	38.81	Marigaon
17	Pani-Dihing Bird WLS	1995	33.93	Sibsagar
18	Sonai Rupai WLS	1998	220.00	Sonitpur
		BIHAR		
1	Barela Jheel Salim Ali Bird WLS	1997	1.96	Vaishali
2	Bhimbandh WLS	1976	681.99	Munger
3	Gautam Budha WLS	1976	138.34	Gaya
4	Kaimur WLS	1982	1342.00	Rohtas
5	Kanwarjheel WLS	1989	63.11	Begusarai
6	Kusheshwar Asthan Bird WLS	1994	29.17	Darbhnaga
7	Nagi Dam WLS	1987	1.92	Jamui
8	Nakti Dam WLS	1987	3.33	Jamui
9	Pant (Rajgir) WLS	1978	35.84	Nalanda
10	Udaipur WLS	1978	8.87	Pashchim Champaran
11	Valmiki WLS	1978	545.15	Pashchim Champaran
12	Vikramshila Gangetic Dolphin WLS	1990	50.00	Bhagalpur



S. No.	Name of State/ Protected Area	Year of Establishment	Area (km²)	District(s)		
	СН	ANDIGARH		·		
1	City Bird WLS	1998	0.03	Chandigarh		
2	Sukhna Lake WLS	1986	25.98	Chandigarh		
	CHł	HATTISGARH				
1	Achanakmar WLS	1975	551.55	Bilaspur		
2	Badalkhol WLS	1975	104.45	Jashpur		
3	Barnawapara WLS	1976	244.66	Raipur		
4	Bhairamgarh WLS	1983	138.95	Dantewada		
5	Bhoramdev WLS	2001	351.24	Kawardha		
6	Sarangarh-Gomardha WLS	1975	277.82	Raigarh		
7	Pamed Wild Buffalo WLS	1985	262.12	Dantewada		
8	Semarsot WLS	1978	430.35	Surguja		
9	Sitanadi WLS	1974	553.36	Dhamtari		
10	Tamor Pingla WLS	1978	608.51	Surguja		
11	Udanti Wild Buffalo WLS	1985	237.27	Raipur		
	DADRA & NAGAR HAVELI					
1	Dadra & Nagar Haveli WLS	2000	92.16	Dadra & Nagar Haveli		
	DA	MAN & DIU				
1	Fudam WLS	1991	2.18	Diu		
		DELHI				
1	Asola Bhati (Indira Priyadarshini) WLS	1992	27.82	South Delhi		
		GOA				
1	Bondla WLS	1969	7.95	North Goa		
2	Dr. Salim Ali Bird (Chorao) WLS	1988	1.78	North Goa		
3	Cotigaon WLS	1968	85.65	South Goa		
4	Madei WLS	1999	208.48	North Goa		
5	Bhagwan Mahavir WLS	1967	133.00	North Goa		
6	Netravali WLS	1999	211.05	South Goa		
		GUJARAT				
1	Balaram Ambaji WLS	1989	542.08	Banas Kantha		
2	Barda WLS	1979	192.31	Jamnagar & Porbandar		
3	Gaga (Great Indian Bustard) WLS	1988	3.33	Jamnagar		
4	Gir WLS	1965	1153.42	Junagadh & Amreli		
5	Girnar WLS	2008	178.80	Junagadh		
6	Hingolgadh WLS	1980	6.54	Rajkot		
7	Jambughoda WLS	1990	130.38	Panchmahal		
8	Jessore Sloth Bear WLS	1978	180.66	Banas Kantha		
9	Kachchh (Lala) Great Indian Bustard WLS	1995	2.03	Kachchh		
10	Kachchh Desert WLS	1986	7506.22	Kachchh		
11	Khijadiya Bird WLS	1981	6.05	Jamnagar		



S. No.	Name of State/ Protected Area	Year of Establishment	Area (km²)	District(s)		
12	Marine (Gulf of Kachchh) WLS	1980	295.03	Jamnagar		
13	Mitiyala WLS	2004	18.22	Amreli		
14	Nal Sarovar Bird WLS	1969	120.82	Ahmadabad & Surendrnagar		
15	Narayan Sarovar Chinkara WLS	1995	442.91	Kachchh		
16	Paniya WLS	1989	39.63	Amreli		
17	Porbandar Bird WLS	1988	0.09	Porbander		
18	Purna WLS	1990	160.84	Dangs		
19	Rampara Vidi WLS	1988	15.01	Rajkot		
20	Ratanmahal Sloth Bear WLS	1982	55.65	Dahod		
21	Shoolpaneswar (Dhumkhal) WLS	1982	607.70	Bharuch		
22	Thol Lake WLS	1988	6.99	Mahesana		
23	Wild Ass WLS	1973	4953.71	Kachchh, Rajkot, Mahesana & Banas Kantha		
HARYANA						
1	Abubshehar WLS	1987	115.30	Sirsa		
2	Bhindawas Lake WLS	1986	4.12	Rohtak		
3	Bir Shikargarh WLS	1987	7.67	Panchkula		
4	Chhilchhila Lake WLS	1986	0.29	Kaithal		
5	Kalesar WLS	1996	54.06	Yamuna Nagar		
6	Khaparwas WLS	1991	0.83	Jhajjar		
7	Morni Hills (Khol-Hi-Raitan) WLS	2004	48.83	Panchkula		
8	Nahar WLS	1987	2.11	Rewari		
	HIMA	CHAL PRADESH				
1	Bandli WLS	1962	32.11	Mandi		
2	Chail WLS	1976	16.00	Solan & Shimla		
3	Chandratal WLS	2007	38.56	Lahul & Spiti		
4	Churdhar WLS	1985	55.52	Sirmaur & Shimla		
5	Daranghati WLS	1962	171.50	Shimla		
6	Dhauladhar WLS	1994	982.86	Kangra		
7	Gamgul Siyabehi WLS	1962	108.40	Chamba		
8	Kais WLS	1954	12.61	Kullu		
9	Kalatop-Khajjiar WLS	1958	17.17	Chamba		
10	Kanawar WLS	1954	107.29	Kullu		
11	Khokhan WLS	1954	14.94	Kullu		
12	Kibber WLS	1992	2220.12	Lahaul & Spiti		
13	Kugti WLS	1962	405.49	Chamba		
14	Lippa Asrang WLS	1962	31.00	Kinnaur		
15	Majathal WLS	1954	30.86	Solan		
16	Manali WLS	1954	29.00	Kullu		
17	Nargu WLS	1962	132.37	Kullu		
18	Pong Dam Lake WLS	1982	207.59	Kangra		



S. No.	Name of State/ Protected Area	Year of Establishment	Area (km²)	District(s)
19	Renuka WLS	2013	4.00	Sirmaur
20	Rupi Bhaba WLS	1982	503.00	Kinnaur
21	Sainj WLS	1994	90.00	Kullu
22	Rakchham Chitkul (Sangla Valley) WLS	1989	304.00	Kinnaur
23	Sech Tuan Nala WLS	1962	390.29	Chamba
24	Shikari Devi WLS	1962	29.94	Mandi
25	Shimla Water Catchment WLS	1958	10.00	Shimla
26	Talra WLS	1962	46.48	Shimla
27	Tirthan WLS	1992	61.00	Kullu
28	Tundah WLS	1962	64.00	Chamba
	JAMA	NU & KASHMIR		
1	Baltal-Thajwas WLS	1987	210.50	Ganderbal
2	Changthang WLS	1987	4000.00	Leh
3	Gulmarg WLS	1987	180.00	Baramulla
4	Hirapora WLS	1987	110.00	Shopian
5	Hokersar WLS	1992	13.75	Srinagar
6	Jasrota WLS	1987	25.75	Kathua
7	Karakoram (Nubra Shyok) WLS	1987	5000.00	Leh
8	Lachipora WLS	1987	80.00	Baramulla
9	Limber WLS	1987	26.00	Baramulla
10	Nandni WLS	1981	33.34	Jammu
11	Overa-Aru WLS	1987	425.00	Anantnag
12	Rajparian (Daksum) WLS	2002	20.00	Anantnag
13	Ramnagar Rakha WLS	1981	31.50	Jammu
14	Surinsar Mansar WLS	1981	55.50	Udhampur, Samba & Jammu
15	Trikuta WLS	1981	31.77	Udhampur
	Jł	IARKHAND		
1	Dalma WLS	1976	193.22	East Singhbhum & Saraikela
2	Gautam Budha	1976	121.14	Koderma & Hazaribagh
3	Hazaribagh WLS	1976	186.25	Hazaribagh
4	Kodarma WLS	1985	177.35	Koderma
5	Lawalong WLS	1978	211.03	Chatra
6	Mahuadanr Wolf WLS	1976	63.26	Latehar
7	Palamau WLS	1976	752.94	Latehar
8	Palkot WLS	1990	182.83	Gumla & Simdega
9	Parasnath WLS	1984	49.33	Giridih
10	Topchanchi WLS	1978	12.82	Dhanbad
11	Udhwa Lake Bird WLS	1991	5.65	Sahebganj



S. No.	Name of State/ Protected Area	Year of Establishment	Area (km²)	District(s)		
	К	ARNATAKA		1		
1	Adichunchunagiri Peacock WLS	1981	0.84	Mandya		
2	Arabithittu WLS	1985	13.50	Mysore		
3	Attiveri Bird WLS	1994	2.22	Uttara Kannada		
4	Bhadra WLS	1974	492.46	Chikmagalur & Shimoga		
5	Bhimgad WLS	2010	190.42	Belgaum		
6	Biligiri Rangaswamy Temple (B.R.T.) WLS	1987	539.52	Chamarajanagar		
7	Brahmagiri WLS	1974	181.29	Kodagu		
8	Cauvery WLS	1987	1027.53	Mysore, Bangalore & Mandya		
9	Chincholi WLS	2012	134.88	Gulbarga & Yadgir		
10	Dandeli WLS	1987	886.41	Uttara Kannada		
11	Daroji Bear WLS	1992	82.72	Bellary		
12	Ghataprabha Bird WLS	1974	29.79	Belgaum		
13	Gudavi Bird WLS	1989	0.73	Shimoga		
14	Gudekote Sloth Bear WLS	2013	38.48	Bellary		
15	Malai Mahadeshwara WLS	2013	906.19	Chamarajanagar		
16	Melkote Temple WLS	1974	49.82	Mandya		
17	Mookambika WLS	1974	370.37	Udipi		
18	Nugu WLS	1974	30.32	Mysore		
19	Pushpagiri WLS	1987	102.96	Kodagu & Dakshina Kannada		
20	Ranebennur Black Buck WLS	1974	119.00	Dharwad		
21	Ranganathittu Bird WLS	1940	0.67	Mysore		
22	Ramadevara Betta Vulture WLS	2012	3.46	Ramanagara		
23	Rangayyanadurga Four-horned antelope	2011	77.24	Davangere		
24	Sharavathi Valley WLS	1974	431.23	Shimoga		
25	Shettihalli WLS	1974	395.60	Shimoga		
26	Someshwara WLS	1974	314.25	Udipi		
27	Talakaveri WLS	1987	105.01	Kodagu		
28	Jogimatti WLS	2015	100.48	Chitradurga		
29	Thimlapura WLS	2016	50.86	Davangere		
30	Yadahalli Chinkara WLS	2015	96.36	Bagalkote		
		KERALA				
1	Aralam WLS	1984	55.00	Kannur		
2	Chimmony WLS	1984	85.00	Thrissur		
3	Chinnar WLS	1984	90.44	Idukki		
4	Chulannur Peafowl WLS	2007	3.42	Thrissur & Palakkad		
5	ldukki WLS	1976	70.00	ldukki		
6	Kottiyoor WLS	2011	30.38	Kannur		
7	Kurinjimala WLS	2006	32.00	Idukki		
8	Malabar WLS	2010	74.22	Kozhikode		



S. No.	Name of State/ Protected Area	Year of Establishment	Area (km²)	District(s)	
9	Mangalavanam Bird WLS	2004	0.03	Ernakulam	
10	Neyyar WLS	1958	128.00	Thiruvananthapuram	
11	Parambikulam WLS	1973	285.00	Palakkad	
12	Peechi-Vazhani WLS	1958	125.00	Thrissur	
13	Peppara WLS	1983	53.00	Thiruvananthapuram	
14	Periyar WLS	1950	427.00	Idukki	
15	Shendurney WLS	1984	100.32	Ouilon	
16	Thattekad Bird WLS	1983	25.00	ldukki	
17	Wayanad WLS	1973	344.44	Wayanad	
	LAI	KSHADWEEP	1	r	
1	Pitti (Bird Island) WLS	1995	0.01	Lakshadweep	
	MAD	HYA PRADESH			
1	Bagdara WLS	1978	478.00	Sidhi	
2	Bori WLS	1977	485.72	Hoshangabad	
3	Gandhi Sagar WLS	1981	368.62	Mandsaur & Neemuch	
4	Ghatigaon WLS	1981	511.00	Gwalior	
5	Karera WLS	1981	202.21	Shivpuri	
6	Ken Gharial WLS	1981	45.20	Panna & Chhatarpur	
7	Kheoni WLS	1982	122.70	Dewas & Sehore	
8	Narsighgarh WLS	1978	59.19	Raigarh	
9	National Chambal WLS	1978	435.00	Morena & Bhind	
10	Noradehi WLS	1984	1194.67	Damoh, Sagar & Narsimhapur	
11	Orcha WLS	1994	44.91	Tikamgarh	
12	Pachmarhi WLS	1977	417.78	Hoshngabad	
13	Kuno WLS	1981	344.68	Morena	
14	Panna (Gangau) WLS	1979	68.14	Panna	
15	Panpatha WLS	1983	245.84	Umaria	
16	Pench WLS	1975	118.47	Seoni & Chhindwara	
17	Phen WLS	1983	110.74	Mandla	
18	Ralamandal WLS	1989	2.35	Indore	
19	Ratapani WLS	1978	823.84	Raisen	
20	Sailana WLS	1983	12.96	Ratlam	
21	Sanjay Dubari WLS	1975	364.59	Sidhi	
22	Sardarpur WLS	1983	348.12	Dhar	
23	Singhori WLS	1976	287.91	Raisen	
24	Son Gharial WLS	1981	41.80	Sidhi, Shahdol & Satna	
25	Veerangna Durgavati WLS	1997	23.97	Damoh	



S. No.	Name of State/ Protected Area	Year of Establishment	Area (km²)	District(s)			
MAHARASHTRA							
1	Amba Barwa WLS	1997	127.11	Buldhana			
2	Andhari WLS	1986	509.27	Chandrapur			
3	Aner Dam WLS	1986	82.94	Dhule			
4	Bhamragarh WLS	1997	104.38	Gadchiroli			
5	Bhimashankar WLS	1985	130.78	Pune & Thane			
6	Bor WLS	1970	61.10	Wardha & Nagpur			
7	Chaprala WLS	1986	134.78	Gadchiroli			
8	Deulgaon-Rehekuri WLS	1980	2.17	Ahmednagar			
9	Dhyanganga WLS	1997	205.23	Buldhana			
10	Gautala-Autramghat WLS	1986	260.61	Aurangabad & Jalgaon			
11	Great Indian Bustard WLS	1979	1222.61	Solapur & Ahmednagar			
12	Jaikwadi WLS	1986	341.05	Aurangabad & Ahmednagar			
13	Kalsubai Harishchandragad WLS	1986	361.71	Ahmednagar			
14	Karnala Fort WLS	1968	4.48	Raigad			
15	Karanja Sohal Blackbuck WLS	2000	18.32	Akola			
16	Katepurna WLS	1988	73.63	Akola & Washim			
17	Koyana WLS	1985	423.55	Satara			
18	Lonar WLS	2000	1.17	Buldhana			
19	Malvan Marine WLS	1987	29.12	Sindhudurg			
20	Mansingdeo WLS	2010	182.59	Nagpur			
21	Mayureswar Supe WLS	1997	5.15	Pune			
22	Melghat WLS	1985	778.75	Amravati			
23	Nagzira WLS	1970	152.81	Gondia, Bhandara			
24	Naigaon Peacock WLS	1994	29.89	Beed			
25	Nandur Madhameshwar WLS	1986	100.12	Nashik			
26	Narnala Bird WLS	1997	12.35	Akola			
27	Nawegaon WLS	2012	122.76	Gondia			
28	New Bor WLS	2012	60.70	Nagpur-Wardha			
29	New Nagzira WLS	2012	151.33	Gondia			
30	Painganga WLS	1986	324.62	Yeotmal & Nanded			
31	Phansad WLS	1986	69.79	Raigad			
32	Radhanagari WLS	1958	351.16	Kolhapur			
33	Sagareshwar WLS	1985	10.87	Sangali			
34	Tansa WLS	1970	304.81	Thane			
35	Thane Creek Flamingo WLS	2015	16.905	Mumbai Suburban			
36	Tipeshwar WLS	1997	148.63	Yeotmal			
37	Tungareshwar WLS	2003	85.00	Thane			
38	Yawal WLS	1969	177.52	Jalgaon			
39	Yedsi Ramlin Ghat WLS	1997	22.38	Aurangabad (Osmanabad)			
40	Umred-Kharngla WLS	2012	189.30	Nagpur & Bhandara			



S. No.	Name of State/ Protected Area	Year of Establishment	Area (km²)	District(s)				
41	Wan WLS	1997	211.00	Amravati				
42	Gangewadi New Great Indian Bustard WLS	2015	1.98	Solapur, Osmanabad				
MANIPUR								
1	Yangoupokpi Lokchao WLS	1989	184.40	Chandel				
2	Khongjaingamba Ching	2016	0.412					
	<u> </u>	EGHALAYA						
1	Baghmara Pitcher Plant WLS	1984	0.02	South Garo Hills				
2	Nongkhyllem WLS	1981	29.00	Ri-Bhoi (North Khasi Hills)				
3	Siju WLS	1979	5.18	South Garo Hills				
4	Narpuh WLS	2015	59.90	East Jaintia Hills				
	Mizoram							
1	Dampa WLS	1985	500.00	Mamit				
2	Khawnglung WLS	1992	35.00	Serchhip				
3	Lengteng WLS	1999	60.00	Champhai				
4	Ngengpui WLS	1991	110.00	Lawngtlai				
5	Pualreng WLS	2004	50.00	Kolasib				
6	Tawi WLS	1978	35.75	Aizawl				
7	Thorangtlang WLS	2002	50.00	Serchhip				
8	Tokalo WLS	2007	250.00	Saiha				
	Ν	IAGALAND						
1	Fakim WLS	1980	6.41	Tuensang				
2	Puliebadze WLS	1980	9.23	Kohima				
3	Rangapahar WLS	1986	4.70	Dimapur				
		ODISHA						
1	Badrama WLS	1962	304.03	Sambalpur				
2	Baisipalli WLS	1981	168.35	Nayagarh				
3	Balukhand Konark WLS	1984	71.72	Puri				
4	Bhitarkanika WLS	1975	525.00	Kendrapara				
5	Chandaka Dampara WLS	1982	175.79	Khurda & Cuttack				
6	Chilika (Nalaban) WLS	1987	15.53	Khurda, Puri & Ganjam				
7	Debrigarh WLS	1985	346.91	Sambalpur				
8	Gahirmatha (Marine) WLS	1997	1435.00	Kendrapara				
9	Hadgarh WLS	1978	191.06	Keonjhar & Mayurbhanj				
10	Kapilash WLS		125.50	Dhenkanal				
11	Karlapat WLS	1992	147.66	Kalahandi				
12	Khalasuni WLS	1982	116.00	Sambalpur				
13	Kothagarh WLS	1981	399.50	Phulbani				
14	Kuldiha WLS	1984	272.75	Balesore				
15	Lakhari Valley WLS	1985	185.87	Gajapati				
16	Nandankanan WLS	1979	14.16	Khurda				





S. No.	Name of State/ Protected Area	Year of Establishment	Area (km²)	District(s)
17	Satkosia Gorge WLS	1976	745.52	Angul, Boudh & Cuttack
18	Simlipal WLS	1979	1354.30	Mayurbhanj
19	Sunabeda WLS	1988	500.00	Nuapada
	PU	IDUCHERRY		
1	Oussudu WLS	2008	3.90	Pondicherry
		PUNJAB		
1	Abohar WLS	1988	186.50	Firozpur
2	Bir Aishvan WLS	1952	2.64	Sangrur
3	Bir Bhadson WLS	1952	10.23	Patiala
4	Bir Bunerheri WLS	1952	6.62	Patiala
5	Bir Dosanjh WLS	1952	5.18	Patiala
6	Bir Gurdialpura WLS	1977	6.20	Patiala
7	Bir Mehaswala WLS	1952	1.23	Patiala
8	Bir Motibagh WLS	1952	6.54	Patiala
9	Harike Lake WLS	1982	86.00	Firozpur
10	Jhajjar Bacholi WLS	1998	1.16	Ropar
11	Kathlaur Kushlian WLS	2007	7.58	Gurdaspur
12	Takhni-Rehampur WLS	1992	3.82	Hoshiarpur
13	Nangal WLS	2009	2.90	Rupnagar
	R	AJASTHAN		
1	Bandh Baratha WLS	1985	199.50	Bharatpur
2	Bassi WLS	1988	138.69	Chittaurgarh
3	Bhensrodgarh WLS	1983	229.14	Chittaurgarh
4	Darrah WLS	1955	80.75	Kota & Jhalawar
5	Jaisamand WLS	1955	52.00	Udaipur (Rajsamand)
6	Jamwa Ramgarh WLS	1982	300.00	Jaipur
7	Jawahar Sagar WLS	1975	153.41	Kota, Bundi & Chittaurgarh
8	Kailadevi WLS	1983	676.38	Karouli (Sawai Madhopur)
9	Kesarbagh WLS	1955	14.76	Dholpur
10	Kumbhalgarh WLS	1971	608.58	Pali, Rajsamand, Udaipur
11	Mount Abu WLS	1960	326.10	Sirohi
12	Nahargarh WLS	1980	50.00	Jaipur
13	National Chambal WLS	1979	274.75	Kota, Bundi, Sawai Madhopur, Dholpur & Karouli
14	Phulwari Ki Nal WLS	1983	692.68	Udaipur & Pali
15	Ramgarh Vishdhari WLS	1982	252.79	Bundi
16	Ramsagar WLS	1955	34.40	Dholpur
17	Sajjangarh WLS	1987	5.19	Udaipur
18	Sariska WLS	1955	219.00	Alwar
19	Sawaimadhopur WLS	1955	131.30	Sawai Madhopur
20	Sawai Man Singh WLS	1984	103.25	Sawai Madhopur



S. No.	Name of State/ Protected Area	Year of Establishment	Area (km²)	District(s)		
21	Shergarh WLS	1983	98.71	Kota (Baran)		
22	Sitamata WLS	1979	422.94	Chittaurgarh & Udaipur		
23	Tal Chhapar WLS	1971	7.19	Churu		
24	Todgarh Raoli WLS	1983	495.27	Ajmer, Pali & Rajsamand		
25	Van Vihar WLS	1955	25.60	Dholpur		
		SIKKIM				
1	Barsey Rhododendron WLS	1998	104.00	West Sikkim		
2	Fambong Lho WLS	1984	51.76	East Sikkim		
3	Kitam Bird WLS	2005	6.00	South Sikkim		
4	Kyongnosla Alpine WLS	1977	31.00	East Sikkim		
5	Maenam WLS	1987	35.34	South Sikkim		
6	Pangolakha WLS	2002	128.00	East Sikkim		
7	Shingba Rhododendron WLS	1984	43.00	North Sikkim		
	TA	AMIL NADU				
1	Cauvery North WLS	2014	504.33	Kishnagiri & Dharmapuri		
2	Chitrangudi Bird WLS	1989	0.48	Ramanathpuram		
3	Gangaikondam Spotted Dear WLS	2013	2.88	Tirunelveli		
4	Indira Gandhi (Annamalai) WLS	1976	841.49	Coimbatore		
5	Kalakad WLS	1976	223.58	Tirunelveli		
6	Kanjirankulam Bird WLS	1989	1.04	Ramanathpuram		
7	Kanyakumari WLS	2002	457.78	Kanyakumari		
8	Karaivetti Bird WLS	1999	4.54	Perambalur		
9	Karikilli Birds WLS	1989	0.61	Kanchipuram		
10	Kodaikanal WLS	2013	608.95	Dindigul & Theni		
11	Koonthankulam-Kadankulam WLS	1994	1.29	Tirunelveli		
12	Megamalai	2016	269.11	Theni		
13	Melaselvanoor-Keelaselvanoor WLS	1998	5.93	Ramanathpuram		
14	Mudumalai WLS	1942	217.76	Nilgiris		
15	Mundanthurai WLS	1977	567.38	Tirunelveli		
16	Nellai WLS	2015	356.73	Tirunelveli		
17	Oussudu Lake Bird Sanctuary	2015	3.32	Villupuram		
18	Point Calimere WLS	1967	17.26	Nagapattinam		
19	Pulicat Lake Bird WLS	1980	153.67	Tiruvellore		
20	Sathyamangalam WS	2008, 2011	1411.61	Erode		
21	Srivilliputhur Grizzled Squirrel WLS	1988	485.20	Virudhunagar		
22	Theerthangal	2016	0.29	Ramanathpuram		
23	Sakkarakottai	2016	2.30	Ramanathpuram		
24	Udayamarthandapuram Lake WLS	1991	0.45	Thiruvarur		



S. No.	Name of State/ Protected Area	Year of Establishment	Area (km²)	District(s)				
25	Vaduvoor Birds WLS	1991	1.28	Thiruvarur				
26	Vedanthangal Lake Birds WLS	1936	0.30	Chengalpet				
27	Vellanadu Blackbuck WLS	1987	16.41	Tuticorin				
28	Vellode Birds WLS	1997	0.77	Erode				
29	Vettangudi Birds WLS	1977	0.38	Sivagangai				
	TE	LANGANA						
1	Nagarjuna Sagar-Srisailam WLS	1978	3568.09*	Nalgonda & Mahaboobnagar				
2	Eturnagaram WLS	1953	806.15	Warangal				
3	Kawal WLS	1965	892.23	Adilabad				
4	Kinnersani WLS	1977	635.41	Khammam				
5	Lanja Madugu Siwaram WLS	1978	29.81	Adilabad & Karimnagar				
6	Manjeera Crocodile WLS	1978	20.00	Medak				
7	Pakhal WLS	1952	860.00	Warangal				
8	Pocharam WLS	1952	130.00	Medak				
9	Pranahita WLS	1980	136.03	Adilabad				
*combined area with Andhra Pradesh								
	TRIPURA							
1	Gumti WLS	1988	389.54	South Tripura				
2	Rowa WLS	1988	0.86	North Tripura				
3	Sepahijala WLS	1987	13.45	West Tripura				
4	Trishna WLS	1988	163.08	South Tripura				
	Uti	tar Pradesh						
1	Bakhira WLS	1990	28.94	Sant Kabir Nagar				
2	Chandraprabha WLS	1957	78.00	Chandauli				
3	Dr. Bhimrao Ambedkar Bird WLS	2003	4.27	Pratapgarh				
4	Hastinapur WLS	1986	2073.00	Muzzafar Nagar, Meerut, Mu- radabad, Ghaziabad, Bijnore & Jyotibhaphuley Nagar				
5	Kaimur WLS	1982	500.73	Mirzapur & Sonbhadra				
6	Katerniaghat WLS	1976	400.09	Bahraich				
7	Kishanpur WLS	1972	227.00	Lakhimpur-Kheri & Shahjahanpur				
8	Lakh Bahosi Bird WLS	1988	80.24	Farrukhabad				
9	Mahavir Swami WLS	1977	5.41	Lalitpur				
10	National Chambal WLS	1979	635.00	Agra & Etawah				
11	Nawabganj Bird WLS	1984	2.25	Unnao				
12	Okhala Bird WLS	1990	4.00	Gautam Budha Nagar (Ghaziabad)				
13	Parvati Aranga WLS	1990	10.84	Gonda				
14	Patna WLS	1990	1.09	Etah				
15	Ranipur WLS	1977	230.31	Banda & Chitrakoot				
16	Saman Bird WLS	1990	5.26	Mainpuri				
17	Samaspur Bird WLS	1987	7.99	Rae Bareli				



S. No.	Name of State/ Protected Area	Year of Establishment	Area (km²)	District(s)		
18	Sandi Birds WLS	1990	3.09	Hardoi		
19	Sohagibarwa WLS	1987	428.20	Maharajganj		
20	Sohelwa WLS	1988	452.47	Gonda, Shravasti & Balrampur		
21	Sur Sarovar Bird WLS	1991	4.03	Agra		
22	Jai Prakash Narayan (Surhatal) Bird WLS	1991	34.32	Ballia		
23	Turtle WLS	1989	7.00	Varanasi		
24	Vijai Sagar WLS	1990	2.62	Mahoba		
25	Pilibhit WLS	2014	602.79	Pilibhit		
	UT	TARAKHAND				
1	Askot WLS	1986	600.00	Pithoragarh		
2	Binsar WLS	1988	47.07	Almora		
3	Govind Pashu Vihar WLS	1955	485.89	Uttarkashi		
4	Kedarnath WLS	1972	975.20	Chamoli & Rudraprayag		
5	Mussoorie WLS	1993	10.82	Dehradun		
6	Nandhaur WLS	2012	269.96	Nainital & Champawat		
7	Sonanadi WLS	1987	301.18	Pauri Garhwal		
	W	EST BENGAL				
1	Ballavpur WLS	1977	2.02	Birbhum		
2	Bethuadahari WLS	1980	0.67	Nadia		
3	Bibhuti Bhusan WLS	1980	0.64	North 24-Paraganas		
4	Buxa WLS	1986	267.92	Jalpaiguri		
5	Chapramari WLS	1976	9.60	Jalpaiguri		
6	Chintamani Kar Bird WLS	1982	0.07	South 24-Paraganas		
7	Haliday Island WLS	1976	5.95	South 24-Paraganas		
8	Jorepokhri Salamander WLS	1985	0.04	Darjeeling		
9	Lothian Island WLS	1976	38.00	South 24-Paraganas		
10	Mahananda WLS	1976	158.04	Darjeeling & Jalpaiguri		
11	Raiganj WLS	1985	1.30	North Dinajpur		
12	Ramnabagan WLS	1981	0.14	Burdwan		
13	Sajnakhali WLS	1976	362.40	South 24-Paraganas		
14	Senchal WLS	1976	38.88	Darjeeling		
15	West Sunderban WLS	2013	556.45	South 24-Paraganas		

Source: (Wildlife Institute of India)



Annexure 3: State-wise break up of Conservation Reserves (As on January, 2018)

State	Sr .No.	Name	Area (km²)	District
Gujarat	1.	Chharidhandh Wetland	227	Kachchh
Haryana	2.	Bir Bara Ban	4.19	Jind
	3.	Saraswati	44.53	Kurukshetra & Kaithal
Himachal Pradesh	4.	Darlaghat	0.67	Solan
	5.	Shilli	1.49	Solan
	6.	Shri Naina Devi	17.01	Bilaspur
Jammu & Kashmir	7.	Ajas (WL)	1	Bandipora
	8.	Ajas	48	Bandipora
	9.	Bahu	19.75	Jammu
	10.	Boodh Karbu	12	Kargil
	11.	Brain-Nishat	15.75	Srinagar
	12.	Chatlam, Pampore (WL)	0.25	Pulwama
	13.	Gharana (WL)	0.75	Jammu
	14.	Hokera (Ramsar Site) (WL)	13.75	Srinagar
	15.	Hygam (WL)	7.25	Baramula
	16.	Jawahar Tunnel	18	Doda
	17.	Khanagund	15	Pulwama
	18.	Khimber/Dara/Sharazbal	34	Srinagar
	19.	Khiram	15.75	Anantnag
	20.	Khonmoh	67	Pulwama
	21.	Khrew	50.25	Pulwama
	22.	Kukarian (WL)	24.25	Jammu
	23.	Malgam (WL)	4.5	Baramula
	24.	Manibugh (WL)	4.5	Pulwama
	25.	Mirgund (WL)	4	Budgam
	26.	Naganari	22.25	Baramula
	27.	Nanga (WL)	15.25	Jammu
	28.	Narkara (WL)	3.25	Budgam
	29.	Norrichain (WL)	2	Leh
	30.	Panyar	10	Pulwama
	31.	Pargwal (WL)	49.25	Jammu
	32.	Sabu	15	Leh
	33.	Sangral-Asa Chak (WL)	7	Jammu
	34.	Shallabugh (WL)	16	Srinagar
	35.	Shikargah	15.5	Pulwama
	36.	Sudhmahadev	142.25	Udhampur
	37.	Thein	19	Kathua
	38.	Tsomoiri (Ramsar Site) (WL)	120	Leh
	39.	Wangat/Chatergul	12	Srinagar



	40.	Zaloora, Harwan	25.25	Srinagar
Karnataka	41.	Afghanashini	299.52	Uttara Kannanda
	42.	Ankasamudra Birds	0.9826	Ballari
	43.	Bedthi	57.3	Uttara Kannanda
	44.	Bankapur Peacock	0.56	Haveri
	45.	Basur Amruth Mahal Kaval	7.36	Chikmagalur
	46.	Hornbill Con Res	52.5	Uttara Kannanda
	47.	Jayamangali Blackbuck	3.23	Tumkur
	48.	Kappathagudda	178.72	Gadag
	49.	Magadi Kere	0.54	Gadag
	50.	Melapura Bee Eater Bird	0.0318	Mandya
	51	Puttenahalli Lake Birds	0.15	
	52.	Shalmale Ripariam Bio-System	4.89	N.A
	53.	Thungabhadra Otter	34 km (length)	Bellary & Koppal
	54.	Thimlapura	17.38	Tumkur
Maharashtra	55.	Bhorkada (Bhorgad)	3.49	Nashik
	56.	Kolamarka	180.72	Gadchiroli
Punjab	57.	Rakh Sarai Amanat Khan	4.95	Taran Taran
	58.	Ropar Wetland	2.11	Ropar
	59.	Ranjit Sagar	18.65	Gurdaspur
	60.	Beas River	0.00	Hosiarpur, Gurdaspur, Kapurthala, Ferozpur
Rajasthan	61.	Bisalpur	48.31	Tonk
	62.	Jor Beed Gadwala Bikaner	56.47	Bikaner
	63.	Sundha Mata	117.49	Jalore, Sirohi
	64.	Gudha Vishnoi	2.32	Jodhpur
	65.	Shakambhari	131.00	Sikar & Jhunjhunu
	66.	Umedganj Bird	2.72	Kota
	67.	Jawai Band Leopard	19.79	Pali
	68.	Gogelao	3.58	Nagaur
	69.	Rotu	0.73	Nagaur
	70.	Bir Jhunjhunu	10.47	Jhunjhunu
Tamil Nadu	71.	Tiruppadaimarathur	0.03	Tirunelveli
	72.	Suchindrum-Theroor-Managudi	4.85	Kanyakumari
Uttarakhand	73.	Asan Wetland	4.444	Dehradun
	74.	Jhilmi Jheel	37.84	Haridwar
	75.	Pawalgarh	58.25	Nainital
	76.	Naina Devi Himalayan Bird	111.90	Nainital

Source: Wildlife Institute of India



Annexure 4: EXISTING COMMUNITY RESERVES IN INDIA (As on July, 2017)

State	S. No.	Name of Community Reserve	Year	Area
Karnataka	1	Kokkare Bellur Com R	2007	3.12
Kerala	2	Kadalundi Vallikkunnu Com R	2007	1.50
Meghalaya	3	Kpoh Eijah Com R	2014	0.17
Meghalaya	4	Miewsyiar Com R	2014	0.87
Meghalaya	5	Umsum Pitcher Plant Com R	2014	0.40
Meghalaya	6	Lumkohkriah Com R	2014	6.11
Meghalaya	7	Ryngud Com R	2014	5.22
Meghalaya	8	Thangkharang Com R	2014	1.11
Meghalaya	9	Nongsangu Com R	2014	1.00
Meghalaya	10	Raid Nongbri Com R	2014	0.70
Meghalaya	11	Lum Jusong Com R	2014	0.70
Meghalaya	12	Jirang Com R	2014	2.00
Meghalaya	13	Raid Nonglyngdoh/ Pdah Kyndeng Com R	2014	0.75
Meghalaya	14	Phudja-ud Com R	2014	1.20
Meghalaya	15	Lawbah Com R	2014	2.10
Meghalaya	16	Ryngibah Com R	2014	0.80
Meghalaya	17	Mongalgre Com R	2014	0.20
Meghalaya	18	Dangkipara Com R	2014	0.025
Meghalaya	19	Aruakgre Com R	2014	1.00
Meghalaya	20	Resu Haluapra Com R	2014	0.50
Meghalaya	21	Kitmadamgre Com R	2014	0.70
Meghalaya	22	Ka Khloo Thangbru Umsymphu Com R	2014	0.196
Meghalaya	23	Ka Khloo Pohblai Mooshutia Com R	2014	0.335
Meghalaya	24	Ka Khloo Langdoh Kur Pyrtuh Com R	2014	0.154
Meghalaya	25	Baladingre Com R	2013	0.5
Meghalaya	26	Bandarigre Com R	2013	0.67
Meghalaya	27	Chandigre Com R	2013	0.37
Meghalaya	28	Daribokgre Com R	2013	1.73
Meghalaya	29	Dumitdikgre Com R	2013	0.7
Meghalaya	30	Dura Kalkgre Com R	2013	0.6
Meghalaya	31	Eman Asakgre Com R	2013	0.3
Meghalaya	32	Khloo Amrawan Com R	2015	1.29
Meghalaya	33	Khloo Blai Ka Raij U Landoh longlang Com R	2016	0.15
Meghalaya	34	Khloo Blai Kongwasan Khloo Blai Chyrmang Com R	2014	0.07
Meghalaya	35	Khloo Blai Sein Raij Tuber Com R	2014	0.965
Meghalaya	36	Mandalgre Com R	2013	0.5
Meghalaya	37	Mikadogre Com R	2013	0.01
Meghalaya	38	Nongumiang Com R	2003	0.31
Meghalaya	39	Rongma Paromgre Com R	2013	0.62
Meghalaya	40	Rongma Rekmangre Com R	2013	1.92



State	S. No.	Name of Community Reserve	Year	Area
Meghalaya	41	Sakalgre Com R	2013	1.22
Meghalaya	42	Sasatgre Com R	2013	0.6
Meghalaya	43	Selbalgre Com R	2013	0.2
Punjab	44	Keshopur Chhamb Com R	2007	3.40
Punjab	45	Lalwan Com R	2007	12.67

Source: Wildlife Institute of India

Annexure 5: List of Marine Protected Areas in peninsular India

S. No.	Name of MPA	State	Category	Area	Year of establishment
1	Coringa	Andhra Pradesh	Sanctuary	235.7	1978
2	Krishna	Andhra Pradesh	Sanctuary	194.81	1989
3	Pulicat Lake	Andhra Pradesh	Sanctuary	500	1980
4	Dadra & Nagar Haveli	Dadra & Nagar Haveli	Sanctuary	92.16	2000
5	Fudam	Daman & Diu	Sanctuary	2.18	1991
6	Chorao Island	Goa	Sanctuary	1.78	1988
7	Marine (Gulf of Kachchh)	Gujarat	National Park	162.89	1995
8	Khijadia	Gujarat	Sanctuary	6.05	1981
9	Marine (Gulf of Kachchh)	Gujarat	Sanctuary	295.03	1980
10	Kadalundi Vallikkunnu Com R	Kerala	Community Reserve	1.50	2007
11	Malvan Marine	Maharashtra	Sanctuary	29.12	1987
12	Thane Creek Flamingo	Maharashtra	Sanctuary	16.905	2015
13	Bhitarkanika	Odisha	National Park	145	1998
14	Bhitarkanika	Odisha	Sanctuary	672	1975
15	Chilka (Nalaban)	Odisha	Sanctuary	15.53	1987
16	Gahirmatha	Odisha	Sanctuary	1435	1997
17	Balukhand Konark	Odisha	Sanctuary	71.72	1984
18	Gulf of Mannar Marine	Tamil Nadu	National Park	6.23	1980
19	Point Calimere	Tamil Nadu	Sanctuary	172.6	1967
20	Pulicat Lake	Tamil Nadu	Sanctuary	153.67	1980
21	Sundarbans	West Bengal	National Park	1330.1	1984
22	West Sundarbans	West Bengal	Sanctuary	556.45	2013
23	Haliday Island	West Bengal	Sanctuary	5.95	1976
24	Sajnakhali	West Bengal	Sanctuary	2091.12	1976
25	Lothian Island	West Bengal	Sanctuary	38	1976

*excluding small island MPAs of Andaman and Nicobar Islands

Source: K Sivakumar, Coastal and Marine Biodiversity Protected Areas in India: Challenges and Way Forward, K. Venkataraman et al. (eds.), Ecology and Conservation of Tropical Marine Faunal Communities, Springer-Verlag Berlin Heidelberg 2013.



Annexure 6: List of Marine Protected Areas in Islands of India

S. N.	PA Name	State	NP/ WLS Area		Status year
1	Arial Island	Andaman & Nicobar	Sanctuary 0.05		1977
2	Bamboo Island	Andaman & Nicobar	Sanctuary 0.05		1977
3	Barren Island	Andaman & Nicobar	Sanctuary	11.99	1977
4	Battimalv Island	Andaman & Nicobar	Sanctuary 5.03		1977
5	Belle Island	Andaman & Nicobar	Sanctuary 0.08		1977
6	Bennett Island	Andaman & Nicobar	Sanctuary	3.46	1977
7	Bingham Island	Andaman & Nicobar	Sanctuary	0.08	1977
8	Blister Island	Andaman & Nicobar	Sanctuary	0.26	1977
9	Bluff Island	Andaman & Nicobar	Sanctuary	1.14	1977
10	Bondoville Island	Andaman & Nicobar	Sanctuary	2.55	1977
11	Brush Island	Andaman & Nicobar	Sanctuary	0.23	1977
12	Buchanan Island	Andaman & Nicobar	Sanctuary	9.33	1977
13	Campbell	Andaman & Nicobar	National Park	426.23	1992
14	Chanel Island	Andaman & Nicobar	Sanctuary	0.13	1977
15	Cinque Islands	Andaman & Nicobar	Sanctuary	9.51	1977
16	Clyde Island	Andaman & Nicobar	Sanctuary	0.54	1977
17	Cone Island	Andaman & Nicobar	Sanctuary	0.65	1977
18	Curlew (B.P.) Island	Andaman & Nicobar	Sanctuary	0.16	1977
19	Curlew Island	Andaman & Nicobar	Sanctuary	0.03	1977
20	Defence Island	Andaman & Nicobar	Sanctuary 10.49		1977
21	Dot Island	Andaman & Nicobar	Sanctuary 0.13		1977
22	Dottrell Island	Andaman & Nicobar	Sanctuary	0.13	1977
23	Duncan Island	Andaman & Nicobar	Sanctuary	0.73	1977
24	East Island	Andaman & Nicobar	Sanctuary	6.11	1977
25	East Of Inglis Island	Andaman & Nicobar	Sanctuary	3.55	1977
26	Egg Island	Andaman & Nicobar	Sanctuary	0.05	1977
27	Elat Island	Andaman & Nicobar	Sanctuary	9.36	1977
28	Entrance Island	Andaman & Nicobar	Sanctuary	0.96	1977
29	Galathea	Andaman & Nicobar	National Park	110	1992
30	Gander Island	Andaman & Nicobar	Sanctuary	0.05	1977
31	Girjan Island	Andaman & Nicobar	Sanctuary	0.16	1977
32	Goose Island	Andaman & Nicobar	Sanctuary	0.01	1977
33	Hump Island	Andaman & Nicobar	Sanctuary	0.47	1977
34	Interview Island	Andaman & Nicobar	Sanctuary	133.87	1977
35	James Island	Andaman & Nicobar	Sanctuary	2.1	1977
36	Jungle Island	Andaman & Nicobar	Sanctuary	0.52	1977
37	Kyd Island	Andaman & Nicobar	Sanctuary	8	1977
38	Landfall Island	Andaman & Nicobar	Sanctuary	29.48	1977
39	Latouche Island	Andaman & Nicobar	Sanctuary	0.96	19//
40	Lohabarrack	Andaman & Nicobar	Sanctuary	22.21	1977
41	Mahatma Gandhi Marine	Andaman & Nicobar	National Park	281.5	1983
42	Mangrove Island	Andaman & Nicobar	Sanctuary	0.39	1977
43	Mask Island	Andaman & Nicobar	Sanctuary	0.78	1977
44	Mayo Island	Andaman & Nicobar	Sanctuary	0.1	1977
45	Megapode Island	Andaman & Nicobar	Sanctuary	0.12	1977
46	Middle Button Island	Andaman & Nicobar	National Park	0.44	1987
47	Montogemery Island	Andaman & Nicobar	Sanctuary	0.21	1977

S. N.	PA Name	State	NP/ WLS	Area	Status year		
48	Mount Harriett	Andaman & Nicobar	National Park	46.62	1987		
49	Narcondam Island	Andaman & Nicobar	Sanctuary	6.81	1977		
50	North Brother Island	Andaman & Nicobar	Sanctuary	0.75	1977		
51	North Button Island	Andaman & Nicobar	National Park	0.44	1987		
52	North Island	Andaman & Nicobar	Sanctuary	0.49	1977		
53	North Reef Island	Andaman & Nicobar	Sanctuary	3.48	1977		
54	Oliver Island	Andaman & Nicobar	Sanctuary	0.16	1977		
55	Orchid Island	Andaman & Nicobar	Sanctuary	0.1	1977		
56	Ox Island	Andaman & Nicobar	Sanctuary	0.13	1977		
57	Oyster Island-I	Andaman & Nicobar	Sanctuary	0.08	1977		
58	Oyster Island-II	Andaman & Nicobar	Sanctuary	0.21	1977		
59	Paget Island	Andaman & Nicobar	Sanctuary	7.36	1977		
60	Parkinson Island	Andaman & Nicobar	Sanctuary	0.34	1977		
61	Passage Island	Andaman & Nicobar	Sanctuary	0.62	1977		
62	Patric Island	Andaman & Nicobar	Sanctuary	0.13	1977		
63	Peacock Island	Andaman & Nicobar	Andaman & Nicobar Sanctuary		1977		
64	Pitman Island	Andaman & Nicobar	Sanctuary	1.37	1977		
65	Point Island	Andaman & Nicobar	Sanctuary	3.07	1977		
66	Potanma Islands	Andaman & Nicobar	Sanctuary	0.16	1977		
67	Ranger Island	Andaman & Nicobar	Sanctuary	4.26	1977		
68	Rani Jhansi	Andaman & Nicobar	National Park	256.14	1996		
69	Reef Island	Andaman & Nicobar	Sanctuary	1.74	1977		
70	Roper Island	Andaman & Nicobar	Sanctuary	1.46	1977		
71	Ross Island	Andaman & Nicobar	Sanctuary	1.01	1977		
72	Rowe Island	Andaman & Nicobar	Sanctuary	0.01	1977		
73	Saddle Peak	Andaman & Nicobar	National Park	32.54	1987		
74	Sandy Island	Andaman & Nicobar	Sanctuary	1.58	1977		
75	Sea Serpent Island	Andaman & Nicobar	Sanctuary	0.78	1977		
76	Shark Island	Andaman & Nicobar	Sanctuary	0.6	1977		
77	Shearme Island	Andaman & Nicobar	Sanctuary	7.85	1977		
78	Sir Hugh Rose Island	Andaman & Nicobar	Sanctuary	1.06	1977		
79	Sisters Island	Andaman & Nicobar	Sanctuary	0.36	1977		
80	Snake Island-I	Andaman & Nicobar	Sanctuary	0.73	1977		
81	Snake Island-II	Andaman & Nicobar	Sanctuary	0.03	1977		
82	South Brother Island	Andaman & Nicobar	Sanctuary	1.24	1977		
83	South Button Island	Andaman & Nicobar	, National Park	0.03	1987		
84	South Reef Island	Andaman & Nicobar	Sanctuary	1.17	1977		
85	South Sentinel Island	Andaman & Nicobar	Sanctuary	1.61	1977		
86	Spike Island-I	Andaman & Nicobar	Sanctuary	0.42	1977		

Andaman & Nicobar

Andaman & Nicobar

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Andaman & Nicobar

Sanctuary

Sanctuary

Sanctuary

Sanctuary

11.7

0.44

0.31

4.09

87

88

89

90

Spike Island-II

Stoat Island

Surat Island

Swamp Island

1977

1977

1977

1977



S. N.	PA Name	State	NP/ WLS	Area	Status year
91	Table (Delgarno) Island	Andaman & Nicobar	Sanctuary	2.29	1977
92	Table (Excelsior) Island	Andaman & Nicobar	Sanctuary	1.69	1977
93	Talabaicha Island	Andaman & Nicobar	Sanctuary	3.21	1977
94	Temple Island	Andaman & Nicobar	Sanctuary	1.04	1977
95	Tillongchang Island	Andaman & Nicobar	Sanctuary	36.43	1977
96	Tree Island	Andaman & Nicobar	Sanctuary	0.03	1977
97	Trilby Island	Andaman & Nicobar	Sanctuary	0.96	1977
98	Tuft Island	Andaman & Nicobar	Sanctuary	0.29	1977
99	Turtle Islands	Andaman & Nicobar	Sanctuary	0.39	1977
100	Kwangtung Island	Andaman & Nicobar	Sanctuary	0.57	1987
101	West Island	Andaman & Nicobar	Sanctuary	6.4	1977
102	Wharf Island	Andaman & Nicobar	Sanctuary	0.11	1977
103	White Cliff Island	Andaman & Nicobar	Sanctuary	0.47	1977
104	Galathea Bay	Andaman & Nicobar	Sanctuary	11.44	1997
105	Cuthbert Bay	Andaman & Nicobar	Sanctuary	5.82	1997
106	Pitti	Lakshadweep	Sanctuary 0.01		2002

Source: Wildlife Institute of India

Annexure 7: Ramsar Wetlands Sites

S. N.	Name of Site	State Location	Date of Declaration	Area (in sq.km.)
1	Asthamudi Wetland	Kerala	19.8.2002	1860
2	Bhitarkanika Mangroves	Orissa	19.8.2002	525
3	Bhoj Wetlands	Madhya Pradesh	19.8.2002	31
4	Chandertal Wetland	Himachal Pradesh	8.11.2005	38.56
5	Chilka Lake	Orissa	1.10.1981	1140
6	Deepor Beel	Assam	19.8.2002	4.14
7	East Calcutta Wetlands	West Bengal	19.8.2002	378
8	Harike Lake	Punjab	23.3.1990	86
9	Hokera Wetland	Jammu and Kashmir	8.11.2005	13.75
10	Kanjli Lake	Punjab	22.1.2002	14.84
11	Keoladeo Ghana NP	Rajasthan	1.10.1981	28.73
12	Kolleru Lake	Andhra Pradesh	19.8.2002	673
13	Loktak Lake	Manipur	23.3.1990	945
14	Nalsarovar Bird Sanctuary	Gujarat	24/09/12	120
15	Point Calimere	Tamil Nadu	19.8.2002	17.26
16	Pong Dam Lake	Himachal Pradesh	19.8.2002	307.29
17	Renuka Wetland	Himachal Pradesh	8.11.2005	Not Available
18	Ropar Lake	Punjab	22.1.2002	41.36
19	Rudrasagar Lake	Tripura	8.11.2005	2.40
20	Sambhar Lake	Rajasthan	23.3.1990	736
21	Sasthamkotta Lake	Kerala	19.8.2002	11.3
22	Surinsar-Mansar Lakes	Jammu and Kashmir	8.11.2005	3.50
23	Tsomoriri Lake	Jammu and Kashmir	19.8.2002	120
24	Vembanad Kol Wetland	Kerala	19.8.2002	4583
25	Upper Ganga River (Brijghat to Narora Stretch)	Uttar Pradesh	8.11.2005	265.90
26	Wular Lake	Jammu & Kashmir	23.3.1990	173

Source: Wildlife Institute of India / Ministry of Environment & Forests, Government of India



Annexure 8: List of Biodiversity Heritage Sites (As on September, 2018)

S. No.	Name of the Site	Name of the District	Taluk	Area	Importance of the area
1	Nallur Tamarind Grove	Bengaluru	Devanahalli	54 acres	It is popularly believed to be a relic of the Chola Dynasty that ruled nearly 800 years ago, is spectacle of awesome wonder and a freakish site. This BHS spread over 54 acres comprising a population of nearly 300 trees, is a picture of dynamic pattern of plant diversity. The significant component of this popular structure is a group of old plants standing like ageless sentinels, firmly rooted to the ground with their gigantic trunks, along with large picturesque crowns spread very high and aloft like open wings.
2	Hogrekan	Chikmagalur	Kadur	2508.15 acres	The area has unique Shola vegetation and grass land with number of floral species which are unique and having lot of medicinal value. Hogrekan is moderately wooded land and its vegetation is of dry deciduous type and has a link with Bababudanagiri and Kemmangundi, adjoining Bhadra Wildlife Sanctuary and Yemmedode Tiger Reserve and serving as "Wildlife Corridor" between Kudremukha and Bhadra Wildlife Sanctuary.
3	University of Agricultural Sciences, GKVK Campus, Bengaluru	Bengaluru		167 hectares	The GKVK campus is considered one of the greenest areas in Bengaluru. Biological diversity of this campus constitutes a critical repository of various forms of flora and fauna (including 13 sp of mammals, 10 sp of reptiles, 165 sp of birds and 530 sp of plants) which needs to be protected nurtured to posterity.
4	Ambaraguda	Shimoga		3857.12 hectares	It is a revenue land located between Sharavathi Wild Life Sanctuary and Someshwara Wildlife Sanctuary. It has Shola vegetation which is primitive vegetation in the Western Ghat and also has grasslands.
5	Glory of Allapalli	Gadchiroli		6 hectares	It is a reserved forest being preserved as natural forest having biological, ethinical and historical values.
6	Tonglu BHS under the Darjeeling Forest Division	Darjeeling		230 hectares	It is a Medicinal Plant Conservation Areas



S. No.	Name of the Site	Name of the District	Taluk	Area	Importance of the area
7	Dhotrey BHS under the Darjeeling Forest Division	Darjeeling		180 hectares	It is a Medicinal Plant Conservation Areas
8	Dialong Village	Tamenglong		11.35 Sq.km	
9	Ameenpur lake	Sangareddy	Ameenpur		
10	Majuli	Majuli		875 Sq.km	It is an island situated in the Brahmaputra River which is harboring unique Ecological and Cultural Heritage.
11	Ghariyal Rehabilitation Centre	Lucknow	Kukrail Reserve Forest	10 Hectares	It is a centre established for conservation and rehabilitation of critically endangered species of Gharial.
12	Chilkigarh Kanak Durga	Jhargram	Chilkigarh	55.9 Acres (Perimeter Of 1,969 Meters)	Chilkigarh Kanak Durga Sacred Grove is a remnant forest with traditional beliefs and taboos of local inhabitants and rich in biodiversity covering an area of 55.9 acres in Jhargram District of West Bengal.

Source: Wildlife Institute of India / National Biodiversity Authority

About CEBPOL

Government of India in collaboration with the Norwegian Government has established "Centre for Biodiversity Policy and Law (CEBPOL)" at the National Biodiversity Authority (NBA), an autonomous and statutory body of the Ministry of Environment Forest and Climate Change towards strengthening of expertise in Biodiversity Policy and Law in India. This programme is executed by the NBA in collaboration with Norwegian Environment Agency through the Royal Norwegian Embassy, New Delhi, India.

The Centre aims to provide advice and support to the Government of India and Norway on Biodiversity Policy and Law related issues including complex negotiations on Access and Benefit Sharing and Traditional knowledge as well as governance issues relating to biodiversity at the National and International level. The Centre proposes to help NBA in the effective implementation of International agreements on conservation, sustainable use and the associated access and benefit sharing components of it.

CEBPOL is set up as a specialized Centre of Excellence in Biodiversity Policy and Law to network, organize and consolidate expertise on issues of Biodiversity Policy and Law in India and Norway. The Centre, located at NBA, would function as an independent think tank on Biodiversity Policy and Law. In addition, CEBPOL aims to contribute to the effective implementation of the Biological Diversity Act 2002 and Rules 2004.

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