Ministry of Environment, Forest and Climate Change

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TRAINING BIODIVERSITY MANAGEMENT COMMITTEES



A PACKAGE OF MODULES AND METHODS FOR TRAINERS



INTRODUCTION

The 'Training Biodiversity Management Committees - A Package of Modules and Methods for Trainers' provides comprehensive guidance for conducting training of trainers (ToT) on operationalising Biodiversity Management Committees. This package of modules and methods consists of three parts - 1. Curriculum - with six modules, namely, 'Biodiversity and Human Wellbeing', 'The Biological Diversity Act, 2002', 'Biodiversity Management Committees', 'Functions of Biodiversity Management Committees', 'People's Biodiversity Registers' and 'Access and Benefit Sharing. 2. Training Methods - describes participatory training methods and steps to conduct various training sessions, and 3. Implementation - guidance for implementing the ToT. We highly recommend that the readers be familiar with the Curriculum for BMCs to effectively conduct the training using the methods and implementation guide presented in this publication. We encourage trainers to use the 'Simply Explained' series of films on 'The Biodiversity Act', 'Biodiversity Management Committees' and 'People's Biodiversity Registers' available in 16 vernacular languages as communication tools to conduct the training for BMCs.

TARGET GROUP

This Handbook is meant for the State Biodiversity Boards (SBBs) and Biodiversity Councils, organisations engaged by them to conduct capacity development and training programmes for BMCs. This publication will serve as the resource book for the persons/organisations and trainers supporting the capacity development of BMCs, community resource persons, and others engaged in documenting the People's Biodiversity Registers.

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भारत सरकार
पर्यावरण, वन एवं जलवायु परिवर्तन मंत्रालय
GOVERNMENT OF INDIA
MINISTRY OF ENVIRONMENT, FOREST & CLIMATE CHANGE



MESSAGE

Commitments for safeguarding environment and protection of natural resources are amply reflected in the Constitution of India and through several policies and legal instruments enacted since independence. India also holds the unique distinction of being one of the leading countries to establish national legislation to implement obligations under the UN Convention on Biological Diversity adopted in 1992. The Biological Diversity Act 2002 enacted by the Parliament of India is a comprehensive legislation that covers all forms of biological diversity and associated knowledge.

The Biodiversity Act has established institutional structures aligning with the spirit of the federal framework and Panchayati Raj system to decentralise biodiversity governance in India. There is a Biodiversity Management Committee (BMC) for each village, taluk or urban body and municipality established by the local body.

The Ministry of Environment, Forest and Climate Change and the NBA have in recent years been focusing on institutional strengthening, capacity-building of State Biodiversity Boards and Union Teriitory Biodiversity Councils and BMCs to fulfil the objectives of the Act. Fully functional BMCs can bring in a transformative change in biodiversity management and also provide opportunities for livelihood enhancement.

I compliment officers of the National Biodiversity Authority and GIZ for their excellent guidance in preparing this publication titled “Training Biodiversity Management Committees – A package of Modules and Methods for trainers”. This publication comprises of specially customised curriculum with case studies and examples on ABS and functioning of BMCs, along with training methods and implementation guide. I would also like to thank the Federal Ministry for Economic Cooperation and Development (BMZ), Government of the Federal Republic of Germany and the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH for their support through the Access and Benefit Sharing Partnership Project.

I am confident that this publication will help the State Biodiversity Boards, Biodiversity Councils and training institutions in designing and implementing training for BMCs and contribute further to the effective management of our unique biodiversity.

B. V. Umadevi

16 May, 2021

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National Biodiversity Authority
भारत सरकार
Government of India

FOREWORD

India's biodiversity encompasses a myriad of habitats and ecosystems, with a wide range of plants, animals and microorganisms. This biodiversity also includes hundreds of indigenous breeds of livestock and native crop varieties bred and grown in equally diverse agro-climatic regions in the country that are sustainably managed by farmers, pastoralists and fishers.

Conservation of biodiversity is fundamentally essential for sustaining ecosystem services such as clean air, freshwater, temperature regulation, food security, fibre and medicine – all of which are critical for our survival on the planet. Now, more than ever, it has become crucial to conserve and sustainably use our biological resources, particularly in the context of both inter and intra-generational equity.

The Government of India has set up a robust legal framework through the Biological Diversity Act, 2002, which aims to ensure the conservation and sustainable use of all biodiversity and the access and benefit-sharing processes in the country. The Act has also established comprehensive institutional structures throughout India at various levels; the Biodiversity Management Committees (BMCs) are particularly important as they represent the local communities to manage biodiversity at the grassroots level. To this end, capacity development of BMCs is of paramount importance to effectively implement the Biological Diversity Act, 2002.

This training package includes meticulously designed modules on various aspects of biodiversity and the Biological Diversity Act and operationalisation of BMCs. It is well-complemented with a guide on implementing the training and methodological tools. The training package also has successful case studies on benefit-sharing and effective functioning of BMCs. I am confident that this will inspire and generate many more examples of effective functioning of all BMCs in India and will assist the State Biodiversity Boards, Biodiversity Councils and training institutions in strengthening capacities of the BMCs of India.

I commend the efforts of officers NBA, Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH, Kerala Institute of Local Administration, State Institute of Rural Development and Panchayati Raj in Tamil Nadu in preparing this training package. I gratefully acknowledge the support from the Federal Ministry for Economic Cooperation and Development (BMZ), Government of the Federal Republic of Germany and the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH through the Access and Benefit Sharing Partnership Project.

Chennai
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CURRICULUM

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On behalf of
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GIZ is responsible for the content of this publication.

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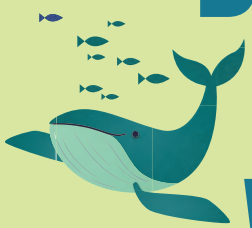
MODULE 1

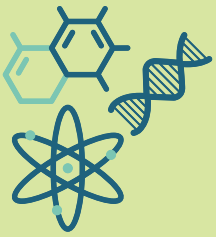






BIODIVERSITY & HUMAN WELL-BEING



INTRODUCTION

What is commonly referred to as ‘nature’ in everyday conversation has an inherent element of life within it. That life, in all its forms, from the mighty tiger to the humble honeybee, products of over three-billion years of evolution, is biodiversity. It is the variety of all life in any area, irrespective of how small or large that area might be, connected by ecosystem processes such as nutrient cycling. All of life in a particular area evolved together as part of an interconnected network, or web of life. To understand it further, imagine a pond which provides drinking water to elephants and other animals. The surrounding vegetation provides food, nesting and breeding ground for a myriad of organisms such as birds, butterflies, caterpillars, grasshoppers, and spiders. Within the pond are algae and aquatic plants, fed upon by fish, snails, and other fauna, which in turn form prey to frogs and reptiles. The detritus from plant and animal life contributes to building up the soil, with earthworms, insects, and micro-organisms breaking down plant matter into its organic components. This is just one example of a familiar environment and its biodiversity and ecosystem processes.



THE ECOSYSTEM CYCLE

Trees carry out photosynthesis, a process by which carbon dioxide in the atmosphere is converted to carbohydrates, and oxygen is released. This oxygen supports the basis of life on Earth. The carbohydrates produced by plants provide food to plant-eating animals, or the herbivores and micro-organisms collectively termed as primary consumers. In turn, these herbivores are consumed by carnivores, the predators. The detritus produced is broken down, and the carbon dioxide is released back into the atmosphere. These processes at the ecosystem level contribute to sustaining biodiversity.

Human activity can also release carbon dioxide by burning ancient biological material that has been converted to oil and gas. Therefore, it can increase the carbon dioxide in the atmosphere to unsustainable levels causing global warming.

Biodiversity is primarily affected by the local and global climate, which depends on latitude and elevation. There are different scales at which biodiversity is measured – local, within a given ecosystem, biome, or on the entire Earth. A biome is an assemblage of plants and animals within a region associated with specific ranges of temperature and rainfall.

Globally, the tropics (between Cancer and Capricorn) contain the highest number of species of plants and animals due to a more equable climate that sustains life throughout the year. In contrast, the ice-covered poles





Photo credits: Aravind Madhyastha

or hot deserts support few forms of life adapted to extreme climatic conditions[1]. Within the tropics, the rainforests that occur in regions with high rainfall which support the highest biodiversity. These tropical rainforests occupy almost 7% of the total land area on Earth. Yet, they shelter about 50% of all the species found on the planet.

BIODIVERSITY - DEFINITION

The term "biodiversity" is a broad concept that includes all organisms and the variations therein that have evolved together in a particular environment[2].

According to the internationally accepted definition, "Biological Diversity" means the variability among living organisms from all sources, including terrestrial, marine, and other aquatic ecosystems and ecological complexes of which they are part; this includes diversity within species, between species, and of ecosystems.

BIODIVERSITY IS NOT LIMITED TO WILDERNESS

Biodiversity is not limited to the 'wild' jungles and other landscapes of perceived wilderness, such as grasslands. It extends into the heavily 'engineered' landscapes as well. Agriculture has been the cornerstone of human civilisation with a rich history of people cultivating a wide variety of food and cash crops.



Photo credits:GIZ/Pradeep Mehta

Agricultural biodiversity, also known as "Agrobiodiversity," is the variety and variability of animals, plants, and micro-organisms that have been selected and domesticated by farmers over centuries to provide food, and other purposes. Humans have altered the genetic makeup of many species to such an extent that the domesticated variety no longer resembles their wild ancestors. These include species that are used for food, fodder, fibre, fuel, and medicines[3].

HUMANS ARE A PART OF 'NATURE.'

The relationship between humans and nature has varied over time and place. Some ancient cultures have identified nature as a higher power, ascribing the status of divinity to natural elements such as certain trees and animals. Others saw nature as a broad set of resources that needed to be conquered and used. Nevertheless, humans are an integral part of nature as we are a product of evolution, and our social systems have changed over time based on the location and resources. Human social systems range from forest dwellers that rely on hunting and gathering to highly advanced agricultural technologies where genes are artificially modified to increase yields or reduce pest attacks.







Photo credits: Aravind Madhyastha

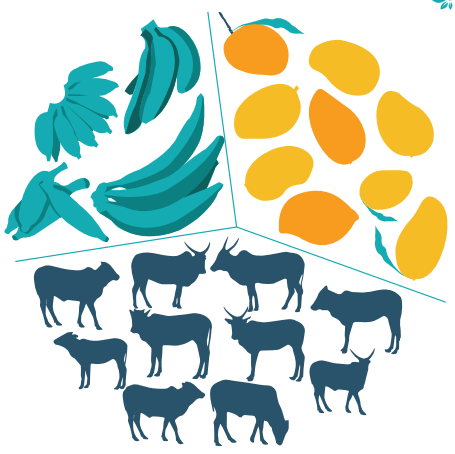
TYPES OF BIODIVERSITY

There are three levels of biodiversity - diversity between species - **species diversity;** diversity within species - **genetic diversity;** and between ecosystems - **ecosystem diversity.**

SPECIES DIVERSITY - Species diversity is the number and the abundance of species in a particular region. Scientists have estimated that around 5 to 30 million different species exist on the planet. Approximately 1 million species of animals and plants globally are now threatened with extinction. Further, the abundance of indigenous species in all the major terrestrial habitats has fallen by at least 20% in the past century[4]. In India, we have over 45,000 species of plants and 91,000 species of animals. More than 7,000 species of plants are used in traditional medicine systems such as Ayurveda, Siddha, Unani, and folk medicines of local communities.



SPECIES DIVERSITY



GENETIC DIVERSITY

GENETIC DIVERSITY - The variation in genetic composition among the different individuals of a species, community or population is genetic diversity. For example, we have different types of rice, mangoes, or bananas, different breeds of cattle such as Gir from Gujarat, Maharashtra, and some part of Rajasthan, Ongole from Andhra Pradesh, Amritmahal from Karnataka, and Kangayam from Tamil Nadu, each with a distinct appearance, and are bred for different purposes. The mango variety Banganapalli from southern Indian states tastes different from the Dasheri variety of the north. The genetic diversity in the species of cattle or mango makes one variety distinct from the other. As an example of genetic variation among humans, studies pointed out that Native American populations who migrated into the American continent from Northern Asia around 15,000 years ago differ genetically from their Asian ancestors[5].



ECOSYSTEM DIVERSITY

ECOSYSTEM DIVERSITY - The variety of different ecosystems within an area is ecosystem diversity. For example, in the Western Ghats, ecosystems range from rainforests, dry forests and grasslands to freshwater lakes and rivers. Other important ecosystems in India are deserts, mangrove forests, oceans, estuaries, etc.

Understanding the concept of the ecosystem is important within the context of biodiversity. Biodiversity is an essential element of ecosystem functioning. Loss of biodiversity has a cascading effect on ecosystems.

ECOSYSTEM

A set of interconnected or interdependent components, both living, including flora, fauna, microbes, and humans, and non-living, connected by the food chain is an ecosystem. In other words, an ecosystem is an assemblage of living beings in a defined habitat that interacts with the non-living elements of nature and vary greatly in extent. A small pond is a complete aquatic ecosystem. So are the enormous oceans, with a diversity of fish, mammals, plants, and microbes. The complete set of all the habitats on Earth is, a complex ecosystem called the **biosphere**. At a regional scale, the river Ganga, from the source to the delta, can be regarded as one living unit composed of different ecosystems. Therefore, all ecosystems are connected, and together make up the 'biosphere' which is all life on the planet (the biodiversity) interacting with the non-living elements.

Ecosystem – definition

"Ecosystem" means a dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit.





Photo credits: Gowrish Prabhu

WHY IS BIODIVERSITY IMPORTANT?

Earth is the only planet in our solar system, which supports life, enabled by a combination of factors. The Earth is located at the right distance from the sun, not too close nor too far. The metabolic processes by plants that have led to an increase in oxygen in the atmosphere, support all life forms. Any disruption of these processes, such as the increase in carbon dioxide in the atmosphere, will destabilise the ecosystem and eventually cause extinction of all life forms. Biodiversity contributes directly and indirectly to the survival and growth of humankind. The functions of ecosystems and their respective biodiversity, which sustain the welfare of humanity in one way or another, are referred to as ‘ecosystem services’.

> Ecosystem services are the benefits that people obtain from functional ecosystems. Different ecosystems provide a wide variety of services. An example of ecosystem services is the regulation of local and regional climates by forests which are also the source of drinkable water and clean air.



PROVISIONING COMMODITIES

Provisioning commodities are the goods or products produced by ecosystems. The biodiversity in the forest and marine or aquatic ecosystems also offers numerous commodities such as freshwater (for irrigation, drinking, household purposes), food (seeds, fruits, animals, fish), wood (for local constructions, fuel for cooking), medicinal herbs, fabric (wool, leather), etc. Aquatic, coastal, and marine ecosystems support the fishing industry and the livelihoods of thousands of fishing villages in coastal India.



Photo credits: Mira Amtmann

COMMODITIES FROM THE FORESTS

Many tribal communities collect leaves and fibres from their surrounding forests to make disposable utensils, ropes, bamboo baskets, and mats. Their livelihood revolves around the biodiversity of a healthy forest.

The Kurumba, Irula, Palayan, and Malai Malasar tribes of Tamil Nadu gather forest produce such as honey and wax. Similarly, the indigenous communities in Central India collect the leaves of tendu and sal, flowers of mahua, cocoons of tussar, etc.



TEMPERATURE REGULATION - As observed for urban areas, trees and plants directly decrease heat stress by providing shade and adding moisture in the air around them as they respire[6]. Scientific research demonstrates that forests have a significant cooling effect in summers and a warming effect in winters[7]. Thus forests play a direct role in balancing local temperatures.



AIR QUALITY CONTROL - Forests in rural and urban areas improve the quality of air by removing pollutants.



RAINFALL - Forests draw in moist air from the surrounding areas, the excess moisture results in the formation of clouds. When the forest cover is plentiful, enough moist air is absorbed to cause high rainfall[8].

FOOD FROM FORESTS

The uncultivated food from the forests is known to be one of the richest sources of unique nutrients which can help beat malnutrition in people. An NGO, Living Farms, working with the Kondh tribe of Odisha, identified 357 types of forest foods, including wild vegetables, animals, fruits, and tubers used by them. Out of these, 63 foods were high in micro-nutrients. Forests have been recognised as highly efficient food-producing systems that yield rich nourishing foods. If these forests are razed down, the tribal communities deriving their nutrition from these forests shall be forced to consume staple commodities such as wheat and rice. These dietary changes may have a crippling effect on their health and well-being.

PROTECTION AGAINST DISEASES

New research points out that environmental degradation makes pandemics more likely to occur, as pathogens and vectors of zoonotic diseases come into close contact with humans. Intact functional ecosystems buffer the transmission of zoonotic diseases. For example, the spread of Lyme disease to humans in the United States is enhanced due to lack of predators to control the population of its intermediate rodent host[9]. Modifying and transforming natural environments and the unregulated consumption of wild animals can promote the spread of infectious diseases such as Ebola and Covid-19. While our understanding of the role of ecosystems in defending us from the spread of diseases is limited, it is crucial to protect the environment to avoid any unknown risks to public health[10].

WHAT IS CAUSING THE LOSS OF BIODIVERSITY?

The Indian subcontinent supports ecosystems containing myriad species, many unique to this region. Human disturbances has irrevocably altered ecosystems, causing loss and fragmentation of habitats, endangering the survival of many species. Different ecosystems face different kinds of pressures and thus varying levels of threats. The most common threats are -



Eutrophication

Photo credits: Aravind Madhyastha

NON-SUSTAINABLE EXTRACTION OF FOREST RESOURCES

Studies have shown that forest resources such as fuelwood, fodder, and green leaves for manure are extensively harvested locally for sustenance and cash income in the Western Ghats[12]. In the southern Western Ghats, wealthier households collected forest products for household and farm use, whereas poorer landless families for cash income[13]. Extraction of these products reduced species abundance and diversity, and plant regeneration, thereby indicating that it was not sustainable[14].

EUTROPHICATION - It is the overgrowth of plants, such as algae, in a pond due to nutrient overload that reduces oxygen content and causes suffocation of aquatic animal life. Phosphate is an essential ingredient in the manufacture of agricultural fertilisers, detergents, and has many industrial applications. Phosphate from agricultural run-off and wastewater ends up in water bodies, causing accelerated growth of aquatic plants such as algae that reduce dissolved oxygen in the water and release toxins that kill fish and other aquatic organisms[11]. This process is known as eutrophication.

OVER-EXTRACTION OF BIO-RESOURCES - Nowadays human development comes at an immense cost to our environment. The felling of trees for the paper and timber industry, over-harvesting of medicinal plants, destruction of forest areas for infrastructure development, or conversion of agricultural fields all disturb the delicate balance of nature. Moreover, the degradation of forest land reduces the ability of forests to provide ecosystem services such as food, water, local climate regulation, preservation of soil nutrients, destruction of wildlife, and impact the livelihoods of forest-dependent communities.



Photo credits: GIZ/Mira Amtmann



DEFORESTATION - The destruction of forests causes irreparable damage to other ecosystems such as rivers. It has been estimated that rainforests, one of the most productive, species-rich, diverse ecosystems on the planet that has evolved over millions of years, shall be wiped off within 100 years. The Amazon rainforest contributes to 20% of the world's oxygen. Figures revealed in November 2019 showed that, 3769 square kilometres of the Amazon rainforest was destroyed for the 'economic growth' of Brazil within a year. Forest fires also pose a significant threat to forests; it is estimated that about 60% of forest cover in India is exposed to some degree of forest fires originating from anthropogenic activities.

HUNTING - Humans continue to hunt wildlife, resulting in the extremely vulnerable condition of already threatened species of birds, fish, reptiles, and especially large mammals. The hunting of animals for body parts such as the tiger for its skin or teeth or claws, rhinoceros for its horn, elephant for its ivory, peacock for its feathers, etc. threatens these charismatic species[15]. Loss of these species can destabilise ecosystems. For example, the loss of key predators can cause a cascading effect on biodiversity as shown by the example of the restoration of lost ecosystems in Yellowstone National Park of the USA after the re-introduction of the wolf[16].

CHANGING PATTERNS OF AGRICULTURE - Indian societies have developed a very sophisticated system of agriculture over millennia. The crop species consist of numerous varieties with remarkable genetic diversity. For instance, a single species of rice *(Oryza sativa)* has been diversified into at least 50,000 or quite possibly around 2,00,000 variants. The same is true of mangoes, where one species has been diversified into more than a thousand varieties. However, the changes in Indian agriculture over the last few decades, by the introduction of High Yield Varieties, and the indiscriminate use of chemical fertilisers, pesticides, and herbicides, has resulted in the loss of agrobiodiversity and traditional varieties. And thus, many of the genetically diverse crop varieties have been lost, eroding a considerable chunk of our heritage of cultivated biodiversity[17].

HARMFUL AGRICULTURAL PRACTICES - The use of an excessive amount of pesticides and herbicides has become integral in modern agricultural practices. However, this practice is a major environmental and public health issue worldwide. It affects human health and leads to the destruction of many non-target species such as pollinators (bees, butterflies), and predators (wasps, beetles) of agricultural pests that perform major ecological functions. Heavy use of pesticides also leads to chemical contamination of soil, water, and air, which leaves poisonous residues in both primary and derived agricultural products.



The introduction of a species from a different region or continent for agricultural production can destabilise ecosystems. For example, many tree species introduced for fodder have spread unmanageably, affecting ecosystems, and reducing biodiversity. The introduction of *Lucaena leucocephala* (Subabul), a native of Hawaii for fodder, has resulted in this species spreading rapidly and affecting native biodiversity in many regions of the world[18]. Another example is introducing exotic bee species for pollination services which has led to them competing with native pollinators such as bees and birds. In Arizona, USA, introduced honeybees competed directly with hummingbirds and functioned as a deterrent in their foraging. Southern Australia witnessed exotic honeybees removing close to 80% of the floral nectar resources produced by the bird pollinated plants[19].

CLIMATE CHANGE AND SHOLA FOREST-GRASSLAND MOSAIC IN HIGH ALTITUDE FORESTS OF THE NILGIRIS

The high altitudes of the Nilgiri and Palni hills in the southern part of the Western Ghats hosts a unique vegetation type, the shola forest which co-occurs with the montane grasslands. The sholas forests, consisting mostly of trees of tropical origin are confined to the valleys and hollows of the hillsides, and the ancient grasslands, resistant to frost and fire, occur in the intervening slopes. During global cooling, as during the ice-ages, the grasslands expanded due to low temperatures and rainfall, and during global warming, the sholas expanded. Now, as temperatures rise, the sholas are in the expanding phase. However, the dynamism of this unique ecosystem has been affected as most of it has been destroyed by pine and eucalyptus plantations along with faulty land uses[20].



Photo credits: Aravind Madhyastha

POLLINATION OF APPLE FLOWERS BY EXOTIC BEE SPECIES

Himachal Pradesh is a mountainous state in the north-western part of India, well-known for its apples. During the past few years, the state has reported reduced apple production due to climate change and the decline in pollinators. Indiscriminate use of pesticides has affected biodiversity, including the bee population. In the absence of adequate bee population, farmers resort to the hand-pollination method to ensure flowers are pollinated. However, hand-pollination is labour-intensive and increases the cost of production. In recent times, farmers have hired commercial bees, mostly an exotic species called ***Apis mellifera,*** for pollination. ***Apis mellifera*** colonies are easy to manage, but they are known to compete aggressively towards native bees, infecting them with pathogens such as mites that destroy colonies, causing population declines.



Photo credits:Pixabay/Emilia Baczynska

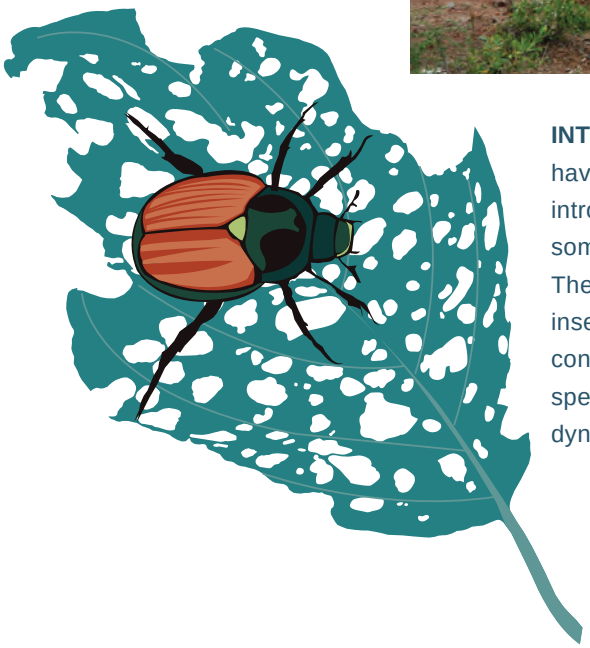
CROSSBREEDING IN ANIMAL HUSBANDRY - India hosts one of the largest varieties of livestock animals (cattle, goats, sheep, camels, etc.) in the world, but a considerable percentage of Indian livestock was crossbred with exotic breeds (e.g. Jersey) to increase milk production, thereby affecting the genetic diversity of indigenous species. The exotic breeds were not adapted to India's climatic conditions, while the indigenous cattle were finely interwoven into the cultural fabric of the country's rural societies.



SOIL EROSION AND ACIDIFICATION - Soil is another resource depleted rapidly due to forest degradation, harmful agricultural practices, overgrazing by livestock, and other factors. Soils are vital to the stability of an ecosystem and form the very basis of the food production. Soil harbours a vast part of all biodiversity that stays underground. The earthworm, numerous essential bacteria, and fungi, crucial to both natural forest growth and agriculture are destroyed upon the degradation of soil[21].



Photo credits: Aravind Madhyastha



INTRODUCTION OF INVASIVE SPECIES - Species that have not evolved in a particular region but have been introduced by humans are termed 'aliens.' They can sometimes spread rapidly and destroy native biodiversity. The threat from invasive species of plants, mammals, and insects causes immense biodiversity loss and can be considered second only to habitat destruction. Invasive species cause species extinctions and affect ecosystem dynamics by altering the food chain[22].

INVASIVE SPECIES ENDANGER FORESTS

In the Shivalik Hills of Himachal Pradesh, three invasive plant species have reduced the habitat available for many native plant species. The diversity of native species in the invaded area has declined by 47%, and ecosystem productivity has declined.

In Bandipur Tiger Reserve in Karnataka, which has been infested by the invasive alien shrub Lantana camara, ground fires have replaced canopy fires, thereby killing many native trees.



Photo credits: Aravind Madhyastha

SAND MINING - In India, the impacts of sand mining include the collapse of riverbanks, habitat loss, depletion of groundwater, and destruction of coastal mangroves which leads to flooding and erosion. Urbanisation drives the demand for sand, particularly the construction of housing complexes. The increased demand for sand, thus acts as a driver for the illegal trade of sand, which is valued at 2.3 billion USD[23].



Photo credits: Pixabay/RitaE

COMMUNICATING THE IMPORTANCE OF BIODIVERSITY TO PEOPLE

We need to understand the dynamics of life forms, from a bacterium to the largest mammal, as included in the definition of the term biodiversity, and value the function and contribution of every single living organism for human well-being. The extinction of plants, animals, insects or micro-organisms is not an isolated event. Ecosystem functioning is affected by species extinction. Functionality reduces as each species is removed, finally resulting in ecosystem collapse. For instance, a particular plant species might rely on a bee species for pollination and if the bee becomes extinct, eventually, the plant population will also be affected[24]. Because of these deep linkages among all species within the web of life, one species' loss will affect the others.

Conservation of biodiversity will protect against climate change. For example, intact forests keep carbon fixed in their plants and soil. When these forests are destroyed the carbon escapes into the atmosphere as carbon dioxide destabilising the processes that regulate the global climate.

However, in practice, biodiversity is not an easy concept to convey to the relevant stakeholders. The term 'biodiversity' is usually equated to a forest that is easy to relate to. Agricultural biodiversity is hugely significant to human welfare. Preserving the genetic diversity or purity of native or wild crops is also an effort to conserve biodiversity. In the same vein, smaller animals such as earthworms and even microbes play a critical role in agriculture and should be protected. Similarly, safeguarding the fish stocks from lakes, rivers, ponds, and seas is vital for human welfare.

HOW TO COMMUNICATE THE IMPORTANCE OF BIODIVERSITY?



A few ways in which the importance of biodiversity can be communicated to people are presented here -

THEATRE - Local NGOs, colleges, and schools could be involved in acting out plays focused on the interlinkage of biodiversity with human well-being.



DOCUMENTARIES/ SHORT FILMS - A vast collection of information on biodiversity is available in television media. Documentaries could be shown, followed by a discussion on the locally relevant issues and actions needed.

STORY/POEM RECITATIONS – Many literary works on nature and wildlife exist in English and regional languages. Short stories or parts of stories or poems about the functioning of nature and the delicate balance of ecosystems could be read out in training, followed by discussions. Apart from this, storyboards could be created for specific issues, such as demonstrating the effect of loss of bees on a forest and dependent tribal community where the issue communicated by visual images knit together in the form of story-like narration.

GAMES – A digital game could be created that starts with a healthy and stable ecosystem of a forest or river. Then, as one component of biodiversity changes (increases or decreases), it could reflect on the other interlinked components. For example, if a particular bird becomes extinct, the seeds of native trees of the forest would not get dispersed, and other birds and animals who depend on that tree would have lower survival. A similar game could also be played by role-playing involving people in the village.



Photo credit: Aravind Madhyastha



Photo credit: Aravind Madhyastha



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Photo credit: GIZ/Mira Ammann

TRADITIONAL KNOWLEDGE RELATED TO BIODIVERSITY

Before defining traditional Knowledge, let us understand the contextual meaning of 'tradition.' A set of inherited customs and beliefs is called tradition. It helps establish certain key elements of cultures and represents distinct societies while forming an essential part of the social identity[25].

Traditional Knowledge (TK), also referred to as Indigenous Traditional Knowledge (ITK), Traditional Ecological Knowledge (TEK), and Indigenous Knowledge (IK) is any information, set of practices, or innovation of a local indigenous community that could be considered relevant to the conservation and sustainable use of biological resources.

Traditional Knowledge is usually passed down from one generation to the next through cultural practices, oral traditions in the form of folklore, songs and stories, laws and norms, rituals, and medicinal practices. This Knowledge is believed to have been formulated by the ancestors and handed down for the collective welfare of future generations.

A survey of the tribal area in Malkangiri district, Odisha, reported that tribal people used 34 varieties of plant species to treat common ailments in their everyday lives[26].



TRADITIONAL KNOWLEDGE AS COMMON KNOWLEDGE

Traditional Knowledge is not limited to indigenous communities. It could be the common Knowledge of a large society or a set of societies. For instance, Turmeric is the go-to remedy for the common cold and is well-known for its wound healing properties, use in skincare and cosmetic products in India. Knowledge of the wide range of benefits of Turmeric is thus universal for numerous societies in different states in India and not limited to a local community.

Traditional Knowledge is vital in the everyday functioning of many communities, and at times this Knowledge becomes associated with cultural identities. Due to their reliance on biodiversity for subsistence, Indigenous communities gain a profound understanding of their local environment, ecosystems, and biodiversity.

Consequently, traditional Knowledge transforms itself into a valuable tool for protecting biodiversity, as generation after generation of communities, safeguards trees, plants, and wildlife, which are an essential component of their lives.

Traditional Knowledge has been preserved for ages in both codified (such as Ayurveda, Siddha, Unani systems of medicine) and non-codified forms as in orally transmitted Knowledge of folk medicine. TK-based medicine, agricultural practices, cosmetology, art, etc. have inspired many modern-day research and development of drugs and products.



Traditional Knowledge depends upon its practice. Therefore, this Knowledge is extremely sensitive to the changing relationships of people with their environment. When people use synthetic chemical drugs as medicines for common ailments, their dependence on the traditionally used herbs and spices decreases. The need to safeguard their survival also reduces.

TODA AND THE ENDEMIC GRASS ERIOCHRYSIS RANGACHARII IN TAMIL NADU

Eriochrysis rangacharii C. E. C. Fisch., a swamp grass, was considered by the Red Data Book of Indian Plants as extinct. However, this ancient grass was re-discovered as it was very much utilised by the Todas, an indigenous community of the high plateau of the Nilgiris. They use it as thatching material for their temples and their traditional houses. It also provides fodder to their buffaloes. This plant, which constitutes a major resource for perpetuating their traditions, was managed carefully over centuries. Today, the swamps where it grows are threatened with destruction by inappropriate management such as livestock grazing and agriculture. This rediscovery - which is not a rediscovery for the Todas - shows that traditional Knowledge should be taken into consideration for better management of biodiversity[27].

STRATEGIES FOR CONSERVATION

- Reintroducing traditional Knowledge into decision-making regarding the extraction of all kinds of resources from an ecosystem. A community-based approach could be used where the members adhere to the norms and practices to reduce unsustainable use of resources. For example, Tribal people from the Central Indian forests harvest the leaves of the tendu tree only after Akshaya Tritiya (a festival in April-May), based on their Knowledge of this plant's growth process since the leaves become ripe only around April-May. Thus, the tree to mature before it is harvested.
- Most villages in India depend on agriculture as their primary source of income. Famers and communities in agricultural villages can form cooperatives to set up seed banks, market native, genetically diverse crop varieties in rural areas and urban centres. These cooperatives could be linked to larger markets through platforms provided by the government agencies, which would help market their products. 'Restore,' an organic store in Chennai, has helped create awareness and revive minor millets in the region. The Bharat Beej Swaraj Manch has been promoting traditional rice varieties, tubers, pulses and carving out a new market for these products[31].



Photo credits:GIZ/Geetha Nayak



Photo credits: GIZ/Suddhabrata Chakraborty

- All grassroots efforts towards conservation of resources need to be community-based. The development of strong community-level institutions is essential for the implementation of any strategy. India's Biodiversity Act has established institutional structures at every panchayat level called "Biodiversity Management Committees" or BMCs, specifically for the conservation of biological diversity, its sustainable use and promoting fair and equitable sharing of benefits arising from the use of biological resources. A detailed account of BMCs and their functions are discussed in modules 3 and 4.

- Religious and cultural identities associated with biodiversity go a long way in their conservation and instil a sense of respect towards the local environment. Villages could maintain or revive their sacred groves. Panchayats and other community councils in villages could restore their sacred groves with the support of NGOs and other agencies working towards the conservation of biodiversity. The local BMC could facilitate these collaborations and facilitate in identifying Biodiversity Heritage Sites (BHS).

REFLECTIVE QUESTIONS

Now that you have learnt about the concept of biodiversity, ecosystems and its importance, it is time to reflect on the following questions. Use these questions when you conduct training.

1. What species of plant, animal, bird, insect, or reptile have you seen in the area you live in, and which of these have disappeared?
2. How has the land around you changed over time?
3. How has the weather changed (temperature, rainfall, humidity, etc.)?
4. What are the changes in agriculture and its practices in your village?
5. What practices contribute to biodiversity loss?
6. How can you help protect biodiversity?
7. How can you create awareness of biodiversity and the ecosystem in your village?
8. Identify traditional practices that contribute to the preservation of seed banks in your village.

NOTES



MODULE 2
THE BIOLOGICAL DIVERSITY ACT, 2002





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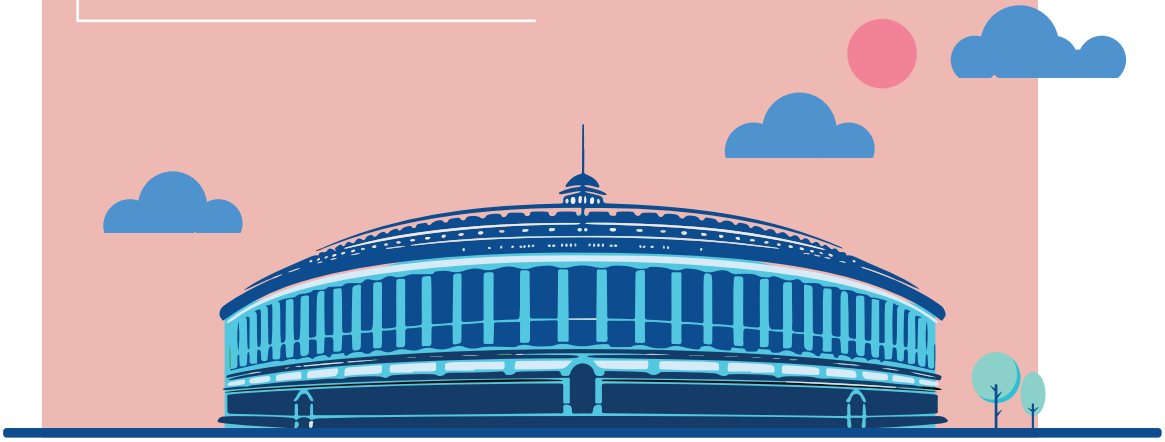
INTRODUCTION

The Constitution of India is noteworthy for its clear-cut position on environmental protection, which is now considered as a fundamental law of the land. Environmental protection, along with the right to a pollution-free environment is a prerequisite to ensuring basic human dignity[1].

The Supreme Court of India has been a champion in safeguarding the principles of environmental protection. In the 1996 case of the Vellore Citizens Welfare Forum vs Union of India, a petition was filed against tannaries and other industries for causing severe pollution to the river Palar in Tamil Nadu from the discharge of untreated effluents. The polluted water of the river had contaminated about 35,000 hectares of agricultural land, thereby making it unfit for agriculture. The Supreme Court observed that while the tanneries contributed towards employment generation and economy, the pollution had affected human health and livelihoods. The landmark verdict directed the tanneries to pay a fine, highlighting the “polluter pays principle” and mandated the constitution of Green Benches to deal with matters related to the environment.

INDIAN CONSTITUTION ON ENVIRONMENTAL PROTECTION

Supreme Court's stance on environmental protection is the result of the evolution of the Constitution, in particular, the broad scope of interpretations of the fundamental rights enshrined therein. Article 21, a Fundamental Right, provides that no person shall be deprived of his life or personal liberty except according to the procedure established by law. The Supreme Court has applied this principle to consider the environment as a fundamental human right, which means access to a pollution-free environment. Article 51A, which enshrines the Fundamental Duties of the Citizens of India, explicitly states their duty towards safeguarding the environment by protecting the country's forests, lakes, rivers, and wildlife and also having compassion for living creatures.



A crucial factor that has shaped constitutional and judicial discussions in India favouring environmental protection is the progressive stand of the Indian Government in international conventions. However, to understand the origins of international level discussions on biodiversity conservation and environmental protection, it is essential to know the context in which those discussions began.

EMERGENCE OF INTERNATIONAL LAWS FOR PROTECTION OF ENVIRONMENT AND BIODIVERSITY

The Anthropocene is defined as 'the current geological age, viewed as the period during which human activity has been the dominant influence on climate and the environment.' Although the beginning of the Anthropocene is still under discussion, the radical change of the environment by humans has impacted life on earth to the extent that the number of species going extinct will increase with time. The combustion of fossil fuels, such as oil and gas, has affected the atmosphere and the biogeochemical cycles that maintain the Biosphere to be suitable for life.

Planetary boundaries are defined as the 'safe operating space for humanity' and crossing them would heighten the risk of abrupt and irreversible fluctuations in the environment, making the earth uninhabitable for living organisms[2]. Therefore, life on earth is in danger of extinction if the current trends continue.



Photo credits: Aravind Madhyastha

Life on earth has evolved over 3.5 billion years ago. The complexity of diversity and the metabolic processes that drive organisms have evolved over geological time, and the disruption of these processes will affect all of life. The loss of global biodiversity due to deforestation, unsustainable harvest, and pollution have led to the loss of many species, including agro-biodiversity and wild fishes that humans depend upon[3]. This loss has severe consequences for the global economy as natural ecosystems provide services vital to human welfare.

In the 1960s, there was a surge in public concern about the environment, with pollution and biodiversity conservation issues taking centre stage. This momentum continued in the 1970s in various countries, and it eventually led to a focused demand to bring environmental protection into all levels of decision making[4]. A 1972 book titled 'Limits to Growth[5]' expressed grave concern that the lack of initiatives in developing a sustainable economy would cause environmental and economic collapse.

Fossil fuels powered the Industrial Revolution, creating new processes for manufacturing goods on a large scale, advances in medicine, and an increase in food production. This revolution led to urbanisation and an unprecedented rise in the global population. While agricultural production tripled between 1960 and 2015 due to the Green Revolution, this also led to the destruction of natural ecosystems[6]. The resulting industrialised agricultural practices used fast-growing monoculture crops. Now more than 75% of global crop diversity has vanished from fields under cultivation, and over half the breeds of domesticated livestock have been lost.

AGRO-BIODIVERSITY

The first settled human communities practised agriculture and domesticated many plants and animals for their use. These domesticated species evolved over thousands of years due to selective breeding, careful human-mediated selection, and have now diverged from their wild ancestors. In 1940, Nikolai Vavilov, a Russian agronomist, found that till about 11000 to 5000 years ago, different wild plants and animals were domesticated by various human societies, which led to the emergence of the first recorded food production economies. He identified seven centres of plant domestication in the world[7].

European colonisation of tropical regions led to intensive exploitation of biological and genetic resources. Thus, the commencement of unrestricted, constant and unregulated flow of genetic resources worldwide, accelerated the growth of the pharmaceutical and agricultural economies of the industrialised world.

INTERNATIONAL AGREEMENTS FOR THE PROTECTION OF ENVIRONMENT AND BIODIVERSITY

In response to the demand for the abatement of pollution and the conservation of natural resources, there were numerous multilateral environmental agreements adopted internationally. The foundation of international environmental law commenced with the United Nations Stockholm Conference on the Human Environment in 1972, wherein the United Nations Environment Programme (UNEP) was established[8].

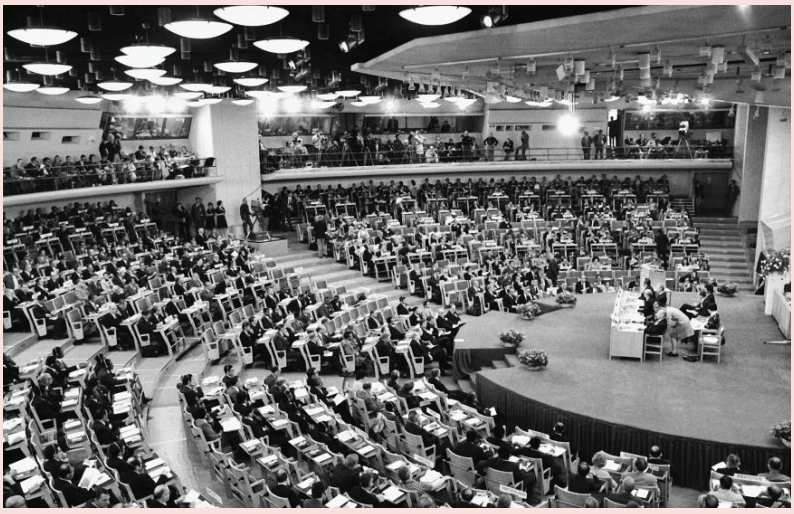


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Mrs. Indira Gandhi, Prime Minister of India, addressing the conference. 05 June 1972 Stockholm, Sweden

As a legal concept, the preservation of natural resources was relatively slow to emerge in international environmental law[9]. This lag was because the governments of both developed and developing countries needed to exploit their natural resources to attain economic growth and development. However, gradually progress was made leading up to the Rio declaration of 1992. For instance, the World Charter for Nature adopted in 1982 by the United Nations with an overwhelming majority (111 votes for, USA the only country voting against), established 24 principles for protecting and conserving nature[10].

In 1962, an American marine biologist Rachel Carson, published 'Silent Spring', a book that proved to be a turning point in shaping people's understanding of their changing environments. 'Silent Spring' revealed how nature was in peril using synthetic pesticides, especially DDT. She pointed out that once chemical pesticides and insecticides entered the environment, these toxins would make its way into the food chain and accumulate at different levels, ultimately reaching humans. These toxic substances would result in the death of organisms, thus affecting ecosystem processes.

The impact of 'Silent Spring' was such that it led to policy decisions to restrict pollutants in the soil, water, and atmosphere.

Scientists, indigenous groups, citizens, and certain institutions came out in support for the need to safeguard entire ecosystems and habitats to save the 'richness of life on the planet' and not just the few endangered species. The new approach emphasised the need for an international convention on biological diversity. The Earth Summit, held in Rio de Janeiro from 3 to 14 June 1992, was also known as the United Nations Conference on Environment and Development (UNCED). This summit resulted in the Convention on Biological Diversity or, in short, CBD, an international legally binding treaty, which entered into force on 29 December 1993. The CBD obliges countries to protect biodiversity in all levels, i.e. species diversity, genetic diversity and ecosystems. By 2015, 196 countries had joined the CBD as parties, making it one of the most widely accepted agreements[11].

THE CONVENTION OF BIOLOGICAL DIVERSITY HAS THREE OBJECTIVES

- Conservation of biodiversity,'
- Sustainable use of biological resources,' and
- Fair and equitable sharing of benefits arising out of the utilisation of genetic resources including by appropriate access to genetic resources' or Access and Benefit Sharing (ABS).



A very significant element of the CBD was that it recognised the sovereign rights of countries over their natural resources and that access to genetic resources is subject to prior informed consent(PIC). It means that a nation is an ultimate authority in the decision-making process concerning the natural resources within its boundary. The CBD also acknowledged the conservation of biological diversity as a common concern of humankind.

SUSTAINABLE USE

Sustainable use means the use of components of biological diversity in a way and at a rate that does not lead to the long-term decline of biological diversity, thereby maintaining its potential to meet the needs and aspirations of present and future generations.



The CBD, the most widely recognised international agreement between countries of the world, stated the absolute right of all nations to their genetic resources, both wild and domesticated. It also emphasised the need for protection of knowledge and innovations of indigenous and local communities.

Further, countries were required to frame their domestic legislation to determine how to provide access to genetic resources and knowledge and innovations associated with it, found within their boundary. User countries can access these provider countries, only after obtaining Prior Informed Consent (PIC) for the use of genetic resources and signing Mutually Agreed Terms (MAT) or ABS agreement. Benefits, if any, arising out of the commercialisation or other forms of the utilisation are to be shared in a fair and equitable manner. Therefore, the regime under CBD aim to establish a balanced partnership between biodiversity-rich countries and technology-advanced countries.

India ratified the CBD in February 1994 and established national legislation called "the Biological Diversity Act" in 2002 and has since then been a pioneer in implementing its provisions.

India is also a member of many other global conventions to aimed at protection of biological diversity and natural resources. A list of international Conventions that India is party to, is provided at the end of this chapter.

THE BIOLOGICAL DIVERSITY ACT, 2002

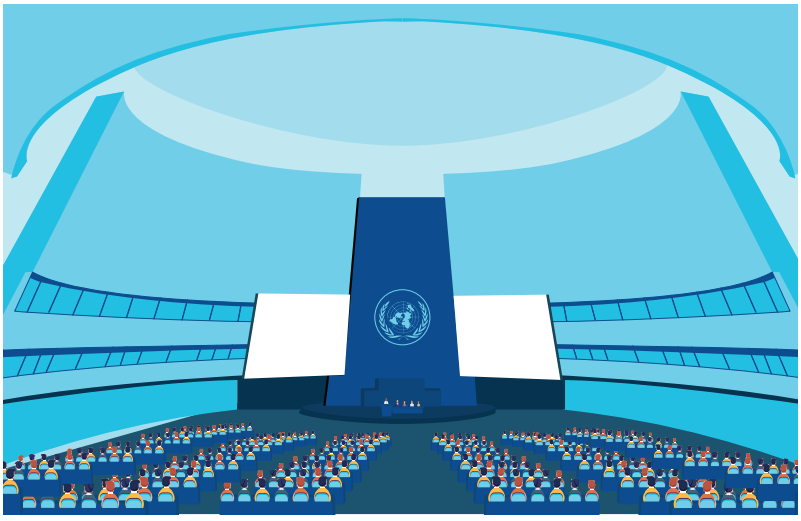
India enacted its national legislation “the Biological Diversity Act” in 2002 to fulfil its commitment agreed under the CBD. The Biological Diversity Act, 2002, aims to conserve biodiversity in the country, sustainably utilise the components of biodiversity, and share benefits arising out of the use of biological resources and the associated traditional knowledge in a fair and equitable manner.

The Biodiversity Act in India is a complementary Act applied in addition to other legislation relating to the forest, wildlife, protection of plant varieties and plant breeder’s rights, etc. The Biodiversity Act regulates access to biological resources (BRs) and traditional knowledge. The Biodiversity Act does not intend to stop or restrict researchers or companies, whether Indian or foreign, from using biological resources. The Act facilitates access through a legal process involving the signing of an ABS agreement with the competent authorities to use biological resources in research, commercial utilisation, etc.

In India, laws and policies to protect, conserve and sustainably use the natural or biological resources are not new. The Biological Diversity Act, 2002 in addition to supporting the objective of conservation and sustainable use of biological resources introduces a new set of legal principles known as ‘fair and equitable sharing of benefits arising from the use of biological resources’ or in short called as ‘Access and Benefit-Sharing’ or ABS.

Module 6 explains the concept of ABS and related case studies.

The Biological Diversity Act, 2002 regulates access to India’s biological resources and traditional knowledge. It seeks to prevent misappropriation of these resources and bio-piracy.



OBJECTIVES OF THE BIOLOGICAL DIVERSITY ACT, 2002

The Parliament of India promulgated the Biological Diversity Act in 2002 to fulfil its obligation of signing CBD. In line with the goals of CBD, India's Biodiversity Act has three objectives:



Conservation of biological diversity



Sustainable use of its components



Fair and equitable sharing of benefits arising from the use of biological resources

The biological diversity of a country is like its wealth. The protection of this biodiversity and the knowledge associated with it is of paramount importance. There are several examples of unregulated use of biological resources. Some researchers and companies in the United States patented traditional knowledge of India such as the healing properties of turmeric described in the ancient system of medicine 'Ayurveda'; and appropriation of rice varieties such as 'basmati' rice, an aromatic variety developed by farmers in the Indian Subcontinent.

THE PRIMARY INTENT OF THIS LEGISLATION IS TO PROTECT INDIA'S INHERENTLY RICH BIOLOGICAL RESOURCES AND THE ASSOCIATED TRADITIONAL KNOWLEDGE.

BIODIVERSITY AND TRADITIONAL KNOWLEDGE

Biological diversity and diversity in traditional knowledge systems have existed as a part of cultural practices in many societies, including those in India. Natural resources and traditional knowledge have immense cultural value to these societies and preserved like heritage. However, the countries, entities, researchers or individuals seeking access to these resources or this traditional knowledge may perceive them merely as raw materials to be researched, commercialised and used for profits. The value of this biodiversity and the associated traditional knowledge is, therefore, widely different for the two parties. The ABS regime ensures benefit-sharing through mutually agreed terms (MAT) when biological resources are accessed and used for research and commercialisation of products.

CASES OF MISAPPROPRIATION OF TRADITIONAL VARIETIES AND KNOWLEDGE THROUGH IPR

Intellectual property rights (IPR) could refer to the ownership of an idea or design by the person who then files a patent, copyright, or trademark which results in that person exclusively owning all decisions regarding the use of the item determined to be her/his property.

BASMATI RICE

A famous example is that of the Basmati rice, grown widely in the North-Western parts of India and Pakistan for thousands of years. Yet, a patent was granted by the US Patent Office (USPTO) to an American company Rice Tech Inc. for the development of lines and grains of Basmati rice derived from the Indian variety and crossed with other rice varieties. A PIL was filed in the Supreme Court of India in March 1998, that directed the Government of India to challenge this patent at the USPTO. Ultimately the USPTO narrowed the scope of the patents rejecting 15 out of the 20 claims filed by the company.



Photo credits: Freepik (valeria_aksakova)

TURMERIC

A patent was granted to the University of Mississippi Medical Centre, USA (Patent No. 5, 401,504 28 March 1995), to two US-based Indian nationals over the use of turmeric for healing wounds. The Government of India challenged this patent with references to traditional knowledge enlisting the usage of turmeric for healing wounds submitted before the US Patent Office. The USPTO finally revoked the patent in April 1998.



Photo credits: Freepik (jigsawstocker)

NEEM

W.R. Grace of New York and the US Department of Agriculture were granted a patent (Patent No. 436257 14 September 1994), by the European Patent Office for a method which restricted growth of fungi on plants, with the help of a substance extracted from Neem oil. Neem seed extract as a potent fungicide has been used in India for centuries in the Ayurvedic system of medicine. There are several products derived from Neem seeds to cure skin diseases and stop fungal growth and infections in crop plants. India filed a legal opposition against the grant of the patent as this use of Neem was part of Indian traditional knowledge and had no novelty or invention on the part of the parties who had filed the patent.

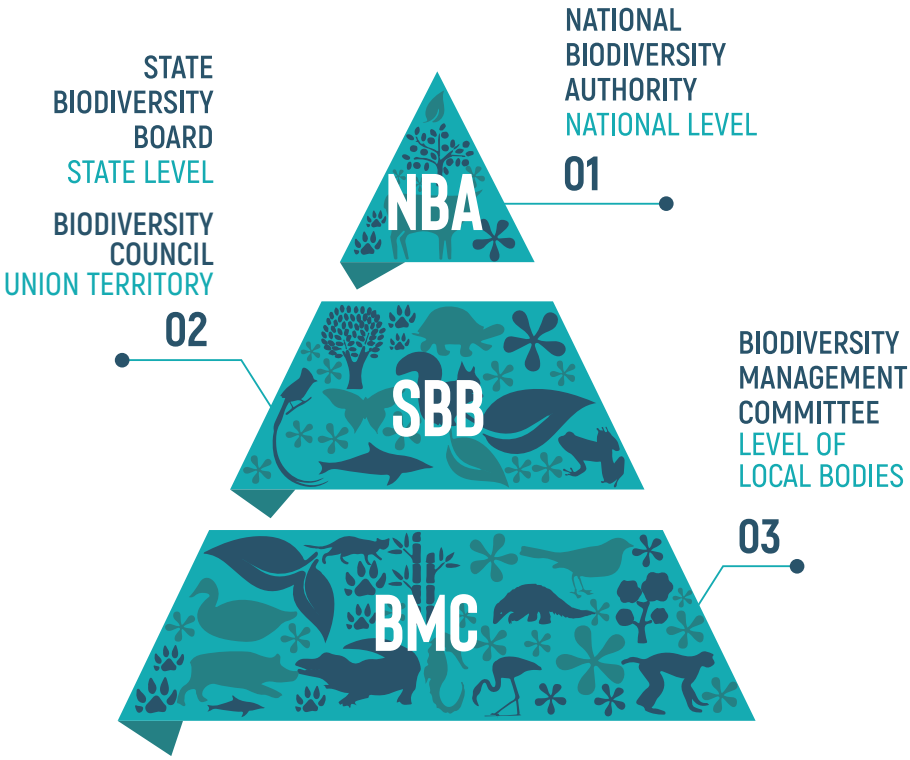


Photo credits: Shutterstock

Keeping in mind the challenges of unauthorised access, the Biological Diversity Act, 2002, specifically focused on regulating access to biological resources, protection of traditional knowledge and innovation and safeguarding the interests of local communities. It has already accomplished a great deal in establishing a robust system to protect India's rich biological resources.

INSTITUTIONAL SETUP FOR THE IMPLEMENTATION OF THE BIOLOGICAL DIVERSITY ACT, 2002

The Biodiversity Act has established a three-tier structure for implementation. For matters at the national level, the National Biodiversity Authority (NBA) is the competent authority. The State Biodiversity Boards (SBBs) and Biodiversity Councils are responsible for matters at the levels of the state and Union Territories, respectively. The Biodiversity Management Committees (BMCs) are the structures established at the level of every local body in the country to implement the provisions of the Act.



NATIONAL BIODIVERSITY AUTHORITY

The National Biodiversity Authority (NBA) constituted in 2003, with its headquarters at Chennai is the apex body for implementing the Biological Diversity Act, 2002. Its functions include drafting procedures and guidelines to govern the activities of access and benefit-sharing as well as intellectual property rights. The NBA provides technical assistance and guidance to the SBBs and BMCs.

The NBA is the advisory body to the Government on matters relating to the conservation and protection of biodiversity, the sustainable use of its components, fair and equitable sharing of benefits arising out of their utilisation, and the notification of areas as biodiversity heritage sites (BHS) under the Act.

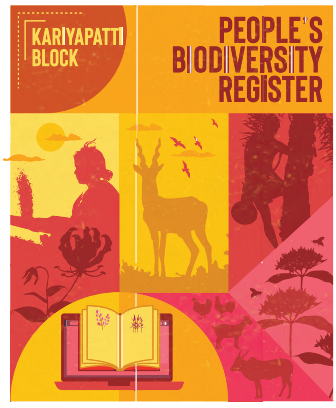
STATE BIODIVERSITY BOARDS

All states of India are mandated to constitute State Biodiversity Boards (SBBs). These Boards function as advisory bodies to state governments on all matters relating to the state's biodiversity and the regulation of biological resources for commercial utilisation.

BIODIVERSITY MANAGEMENT COMMITTEES

The Biological Diversity Act, 2002 states that every local body should constitute a Biodiversity Management Committee (BMC) within its area of territorial jurisdiction. The functions of a BMC are to promote the conservation, sustainable use as well as the documentation of all local biological diversity.

BMCs are responsible for the conservation and sustainable utilisation of biological or genetic resources in their local area. The BMCs can verify if granting access to a particular biological resource would result in the depletion of said resource or in any way affect the ecosystem or livelihood of people.



Each BMC maintains a People's Biodiversity Register (PBR) for documenting local biodiversity. The PBR maintained by the BMC should have a record of availability of bio-resources, and species that are in danger so that in case that particular biological resource is requested for access by an applicant, they can share appropriate feedback with the NBA or the SBB.

The Biodiversity Act mandates the NBA and SBBs to consult BMCs when approving access to biological resources or associated knowledge sought by the researchers or companies. BMC's feedback on the ABS application or any conditions laid down by them becomes part of Prior Informed Consent or PIC[12].*

SCOPE OF THE BIODIVERSITY ACT

The Biodiversity Act applies to a variety of activities that uses biological resources and knowledge associated with it. The complex techno-legal nature of topics covered in the Act makes it difficult to explain in simple terms and is, therefore, often prone to misinterpretation. The following sections detail the applicability of the Act to different categories of persons, activities, and biological resources. We encourage readers to check with authorities, State Biodiversity Boards or National Biodiversity Authority, and legal professionals in determining the scope and interpreting the provisions of the Act.

TO WHOM DOES THE BIODIVERSITY ACT APPLY?

The Biodiversity Act makes a distinction between two types of users of biological resources. Broadly they are classified as category I in section 3 of the Act and category II in section 7, this legal classification roughly translates to non-Indians and Indians respectively. However, the Non-Resident Indians or NRIs are under category I. Category I applications are dealt with by the National Biodiversity Authority and the State Biodiversity Boards deal with category II applications.

NATIONAL BIODIVERSITY AUTHORITY	STATE BIODIVERSITY BOARDS
CATEGORY I	CATEGORY II
• A person who is not a citizen of India; • A non-resident Indian (NRI) • A company or institution not registered in India • A company or institution registered in India but has non-Indians in its share capital or management	• Citizen of India • A company or institution registered in India

* A Guide to conducting BMC consultations on ABS applications.

WHICH BIOLOGICAL RESOURCES ARE COVERED?

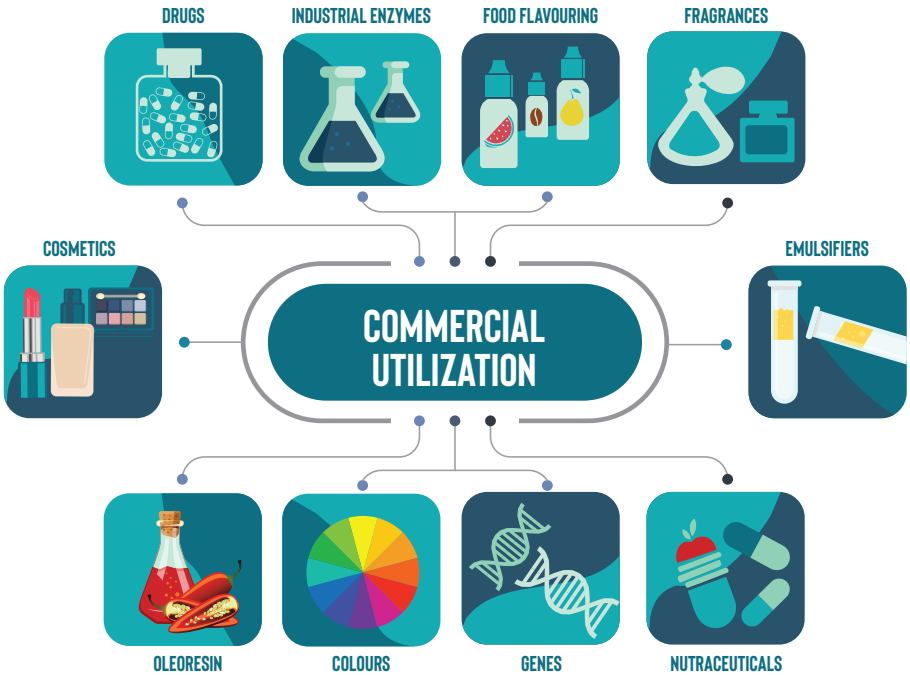
The Biodiversity Act applies to biological resource and its associated knowledge.

BIOLOGICAL RESOURCES - plants, animals and microorganisms or parts thereof, their genetic material and by-products with actual or potential use or value, but does not include human genetic material

ASSOCIATED KNOWLEDGE - this is traditional knowledge and knowledge, or invention generated from research on Indian biological resources.

WHAT ACTIVITIES ARE REGULATED?

The Biodiversity Act is applicable to a range of activities using Indian biological resources or its associated knowledge which include commercial utilisation, IPR claims, transfer of results of research on Indian biological resources or traditional knowledge.



"COMMERCIAL UTILIZATION" defined in the Act is not the same as trade and commerce in common parlance. The term "commercial utilisation" refers to end uses of biological resources for commercial utilisation. Commercial use includes drugs, industrial enzymes, food flavours, fragrance, cosmetics, emulsifiers, oleoresins, colours and extracts. It also covers genes used for improving crops and livestock through genetic intervention, but not conventional breeding or traditional practices used in any agriculture, horticulture, poultry, dairy farming, animal husbandry or beekeeping.



A SUMMARY OF ACTIVITIES AND REGULATING AUTHORITIES UNDER THE BIODIVERSITY ACT

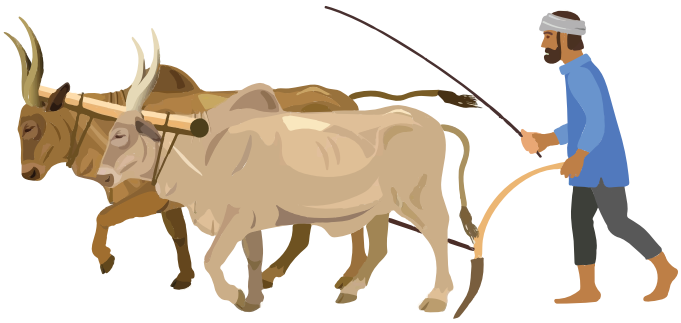
ACTIVITIES	WHO SHOULD APPLY?	COMPETENT AUTHORITY
Accessing Indian biological resources for research, commercial utilisation, bio-survey and bio-utilisation	Non-Indian citizens and entities or entities, having foreign participation.	National Biodiversity Authority
Transferring the results of any research relating to any biological resources in India or obtained from India to any non-Indians or non-Indian entities	Indians, Indian entities and non-Indians and non-Indian entities	National Biodiversity Authority
Any inventions based on research or information relating to biological resources obtained from India to secure IPR within or outside India	Indians and non-Indians	National Biodiversity Authority
Obtaining biological resources for commercial utilisation or bio-survey and bio-utilisation for commercial utilisation	ndians and Indian entities	State Biodiversity Board

EXEMPTIONS UNDER THE BIODIVERSITY ACT

Although the definition of “biological resources” given in the Biodiversity Act covers plants, animals, microorganisms and their parts along with genetic material, the use of some biological resources are exempt from the Act. For example, a category of biological resources called “normally traded as commodities” provides an exemption to certain items such as spice, agricultural commodities, fodder crops and even some commonly available medicinal plants. Therefore, it is necessary to check the latest notification given by the National Biodiversity Authority from time to time. Similarly, not all activities are regulated by the Act. For example, buying medicinal plants from the market for household use does not require permission from the authorities. **It is important to keep in mind that trade and commerce is different from the “commercial utilisation” definition given in the Act.**

SOME OF THE EXEMPTIONS GIVEN IN THE ACT ARE AS FOLLOWS:

- Local people and communities can freely use bio-resources within India.
- Growers and cultivators, vaids and hakims (practitioners of traditional medicinal systems) can use bio-resources for their medical practice.
- Biological resources that are “normally traded as commodities” notified by the Central Government under section 40 of the Act.
- Indians can use biological resources for research without the permission of the NBA or SBBs.



VIOLATIONS AND PENAL PROVISIONS UNDER THE BIODIVERSITY ACT

The Biodiversity Act has strict penal provisions for dealing with violations, wherein arrests can be without warrant and non-bailable. The penalties are also huge.

VIOLATIONS	SANCTIONS
Category I or non-Indians	Imprisonment up to 5 years or with a fine up to 10 lakh rupees or both
Category II or Indians	Imprisonment up to 3 years or fine up to 5 lakh rupees or both

OFFICERS AUTHORISED TO FILE COMPLAINTS UNDER THE BIODIVERSITY ACT

The court can take cognisance over complaints through the officers who are authorised to file them under the Biodiversity Act. The BMC members and the public should approach the officers listed below, to report any violation or offence of the provisions of the Act.

OFFICERS	AREA OF JURISDICTION
Officers of the National Biodiversity Authority, not below the rank of Scientist 'C'	Whole of India
Officers of the State Biodiversity Boards, not below the rank of Scientist 'C'	Whole of India
Officers of the Regional Offices of the Ministry of Environment and Forests, Government of India, not below the rank of Scientist 'C'	Whole of India
Advisor (Law). National Biodiversity Authority, Chennai	Whole of India
Forest Officers not below the rank of Range Officers	In their respective jurisdictions



In instances of failure or non-action by the concerned officer to stop the violation as per the law, the BMC member or benefit claimer or public have the option to approach the local court after giving 30 days' notice using form VII (see annexure I, on page 138). Illustrated below are the steps for filing complaints under the Biodiversity Act:

STEPS FOR FILING COMPLAINTS UNDER THE ACT

01 WHAT IS THE ACTIVITY?

Activities without approval of NBA/SBBs| Activities detrimental to conservation, sustainable use or fair & equitable sharing of benefits | Non-payment of collection fees levied by the BMC | Violation of T&C of approval given by NBA/SBBs.

02 NATURE OF VIOLATION

Whether it fits into listed offence or a violation | Who are involved?!!

03 COLLECT PHOTOGRAPHS & OTHER EVIDENCE

Documentary evidence | Name of the persons and organisations | Impact of said activity on the environment.

04 INFORM FOREST RANGE OFFICER OR OFFICIALS OF NBA/SBB USING FORM VII

When notified, based on merits of the complaints, the concerned officers may proceed to stop the violation as per the law.

05 COMPLAINT IN THE LOCAL COURT AFTER 30 DAYS

If said officer has not taken any steps to stop the violation, the Benefit Claimer or BMCs can go to the local court.

GLOBAL CONVENTIONS ON BIODIVERSITY AND ITS PROTECTION

The unprecedented loss of biodiversity, including plants, animals, wild and domesticated crop species in the world has prompted the establishment of many global treaties. These international legally binding treaties address conservation of specific species or habitats and their use in a sustainable manner. The Convention on Biological Diversity (CBD) is the first comprehensive legal instrument covering species, their ecosystems, and genetic diversity in its entirety. Currently, there are eight global treaties and three protocols. India has committed to all these conventions and protocols.

CONVENTION	OBJECTIVE & YEAR OF ITS ESTABLISHMENT
Convention on Biological Diversity	The Convention on Biological Diversity (CBD) has three objectives: 1. The conservation of biological diversity 2. The sustainable use of the components of biological diversity 3. The fair and equitable sharing of the benefits arising out of the utilisation of genetic resources Established in 1992, it has 196 member countries. India became a member in 1994 and has enacted national legislation to fulfil obligations made under CBD - "the Biological Diversity Act 2002."
CITES	The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) is an international agreement between governments. It aims to ensure that international trade of wild animals and plants does not threaten their survival. Established in 1973, it has 183 member countries, India became a member in 1977.
CMS	The Convention on the Conservation of Migratory Species of Wild Animals (CMS) is an environmental treaty of the United Nations provides a global platform for the conservation and sustainable use of migratory animals and their habitats. CMS brings together the States through which migratory animals pass, the Range States, and lays the legal foundation for internationally coordinated conservation measures throughout a migratory range. Established in 1992, it has 131 countries which have signed the Convention, India became a member in 1984.

	International Plant Protection Convention (IPPC) The International Plant Protection Convention (IPPC) is an intergovernmental treaty that aims to protect the world's plant resources from the spread and introduction of pests and to promote safe trade. Established in 1951, it has 184 member countries, India became a member in 1956.
	The objectives of the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGFRA) are the conservation and sustainable use of all plant genetic resources for food and agriculture and the fair and equitable sharing of the benefits arising out of their use, in harmony with the Convention on Biological Diversity, for sustainable agriculture and food security. Established in 2001, it has 148 countries, India became a member in 2003
	The Ramsar Convention is an intergovernmental treaty that provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources. The Convention's mission is "the conservation and wise use of all wetlands through local and national actions and international cooperation, as a contribution towards achieving sustainable development throughout the world". Established in 1971, it has a membership of 170 countries, India became a member of the Convention in 1982.
	The United Nations Convention to Combat Desertification (UNCCD) is the sole legally binding international agreement linking environment and development to sustainable land management. The Convention addresses specifically the arid, semi-arid and dry sub-humid areas, known as the drylands, where some of the most vulnerable ecosystems and peoples can be found. Established in 1994, India became a member in 1996.

The most significant feature of the World Heritage Convention is that it links together in a single document the concepts of nature conservation and the preservation of cultural properties. The Convention recognises the way in which people interact with nature, and the fundamental need to preserve the balance between the two.

Established in 1972; India has 38 World Heritage Sites, which includes 7 natural sites namely, Manas Wildlife Sanctuary in Assam, Keoladeo National Park in Rajasthan, Sundarbans National Park in West Bengal, Nanda Devi and Valley of Flowers National Parks in Uttarakhand, the Western Ghats or Sahyadri Mountains in Kerala, Karnataka, Maharashtra and Tamil Nadu, Great Himalayan National Park in Himachal Pradesh and Khangchendzonga National Park in Sikkim.



NATIONAL BIODIVERSITY AUTHORITY

STATE BIODIVERSITY BOARDS

ANDHRA PRADESH

MANIPUR

HARYANA

WEST BENGAL

GUJARAT

TRIPURA

TAMIL NADU

MEGHALAYA

MADHYA PRADESH

UTTAR PRADESH

ARUNACHAL PRADESH

KERALA

ASSAM

UTTARKHAND

GOA

TELANGANA

CHHATTISGARH

NAGALAND

PUNJAB

ODISHA

MAHARASHTRA

REFLECTIVE QUESTIONS

1. Can you think of a medicinal herb or some form of traditional knowledge associated with a community in your area?
2. Can you list out 5 biological resources that come under the scope of the Biodiversity Act? Examine if any traditional knowledge associated with those 5 resources.
3. What are the objectives of the Biodiversity Act? How would you explain this to people in your village?
4. Can you identify 5 practices that contribute to sustainable use of biodiversity in your region?
5. A vaid (traditional medicine practitioner) has collected some medicinal plants found in your village. Do you think this activity is covered under the Biodiversity Act? Substantiate your answer.

NOTES



MODULE 3

BIODIVERSITY MANAGEMENT COMMITTEES



Photo credits:Aravind Madhyastha

INTRODUCTION

India's Biological Diversity Act, 2002 including its related notifications, is one of the most comprehensive pieces of legislation to implement the obligations under the Convention on Biodiversity and its supplementary agreement, the Nagoya Protocol. The Biodiversity Act has established institutional structures aligning with the federal framework and Panchayat Raj administration system in India. A three-tier institutional structure was formulated under the Act for the governance of biodiversity at different levels. A National Biodiversity Authority (NBA), State Biodiversity Boards (SBBs) and Biodiversity Management Committees (BMCs) perform the functions allocated to them at the national, state and local levels respectively.

The philosophy behind the implementation of the Biodiversity Act is that of the public trust doctrine, in which the sovereign, i.e. Government is the trustee of all natural resources, and has an obligation to protect these resources. The Government and its agencies hold numerous common properties such as rivers, lakes, forests, grasslands etc. in the role of a trustee to facilitate its access and use by the public, and the conservation of such resources. The people, therefore, act as custodians of these resources. Such a relationship between public agencies and the people can be observed in the implementation of the Biological Diversity Act, wherein the NBA and SBBs act as trustees and the local communities and people associated with BMCs in their areas as custodians of biological resources.

WHAT IS BIODIVERSITY MANAGEMENT COMMITTEE?

Biodiversity Management Committee or BMC is a seven-member committee at every local body consisting of people enlisted in the local electoral rolls. The BMC formed under the Biological Diversity Act, 2002, is for the management, conservation and sustainable utilisation of bio-resources.

SOME OF THE MAIN FUNCTIONS OF THE BMCs ARE:

- Promoting the sustainable use of bioresources
- Preparation of People's Biodiversity Register (PBR)
- Conservation of local varieties, breeds and protection of traditional knowledge
- Providing feedback on ABS applications to NBA and SBBs
- Raising awareness about biodiversity and the need for its sustainable use

PANCHAYAT RAJ SYSTEM AND BMCs IN INDIA

The Indian subcontinent or South Asia has enormous plant, animal, microbial, human and cultural diversity blended over its natural history. The complexity of cultures, languages and societies mediated by history, geographical processes and climate, has resulted in regional differences in traditional knowledge that are of immense value.

The structure of governance over the subcontinent known for its heterogeneity, nevertheless, has some common elements such as the Gram Sabhas and Panchayats that have been an integral part of villages for many years. These institutions carry forward the age-old tradition of ensuring local participation in the administration and decision-making process. Since its independence in 1947 from British rule, India acquired a new, unitary system of Government which was centralised. Over time, with the realisation of the importance of devolution of power and resources, the country introduced local self-government in villages and cities through constitutional amendments in 1992.

With the enactment of the Biological Diversity Act, 2002, the Government of India reinforced its trust in the effectiveness of decentralisation as a tool for efficient local administration and management of biodiversity. Chapter X of the Biodiversity Diversity Act, under Section 41, specifies that Biodiversity Management Committees shall be constituted by every local body in the country, to promote the conservation, sustainable use as well as the documentation of biodiversity within its area. Maintaining a record of the local traditional knowledge related to biodiversity is also one of the primary responsibilities of the BMC.



CONSTITUTION OF BMCs

The process of the constitution of a BMC is consultative, which encourages the inclusion of local stakeholders and actors whose participation is essential in the effective management of local biodiversity. Tribal communities and marginalised groups must participate in the process. The local Civil Society Organisations (CSOs) and Technical Support Groups (TSGs) mediate these consultations. Further, the SBBs or rural development department need to allocate funds to enable the involvement of CSOs, TSGs or resource persons so that they can help to identify priority areas to operationalise BMCs, and document People's Biodiversity Registers. The local body may also integrate BMCs with other village level committees related to natural resource management. The local body may support in establishing the office of BMC in its premises.



Photo credits:GIZ/Suddhabrata Chakraborty

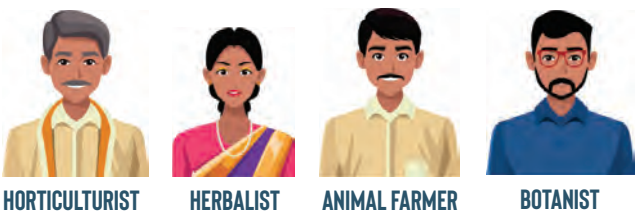
The tenure of the BMC will be five years or co-terminus with the local body. Readers should check the available state-specific information in this regard.



COMPOSITION OF THE BMC

The composition of a BMC as described under Rule 22 of the Biological Diversity Rules, 2004 states that a BMC is to consist of seven persons who shall be nominated by the local body. Of these, at least one third should be women, and not less than 18% of the total members should be from the Scheduled Castes or Scheduled Tribes. The nominated individuals should include traditional knowledge holders and indigenous medicine practitioners, as well as people from the fishing and farming communities, tribal heads, herbalists, collectors of Non-Timber Forest Produce (NTFP) and academicians. The BMC can also include members of other local committees dealing with natural resources or rural development or any others who represent the interests of the local community. The nominated persons should be residents within the territorial jurisdiction of the concerned local body and registered on the electoral voter's list. SBBs may also issue a suggestive list of persons to include in the BMC based on local conditions. The representation may also be flexible to meet the local requirements .





SELECTION OF THE CHAIRPERSON OF BMC

To elect the Chairperson of the BMC, the head of the local body will call a meeting of the nominated members. In case of a tie, the head of the local body has the right to vote. The tenure of the Chairperson of the BMC is three years.



Photo credits:GIZ/Suddhabrata Chakraborty

ROLE OF BMCs IN ACCESS AND BENEFIT SHARING

The Biodiversity Act and rules have laid out the procedure for obtaining permits for accessing and using the biological resources or knowledge of local communities. As explained in module 2, foreign companies or researchers are required to apply for access to the NBA and Indian users or companies can approach the SBBs to obtain approval for accessing biological resources. The NBA or SBBs scrutinise all such access requests in consultation with the concerned BMC. The BMCs act as a representative forum for the thousands of panchayats and urban local bodies across India. Thus, consulting the BMCs signifies deliberation with those bodies. In fulfilment of its task of the documentation of biodiversity and traditional knowledge, every BMC must prepare the People's Biodiversity Register (PBR) in consultation with the local people.



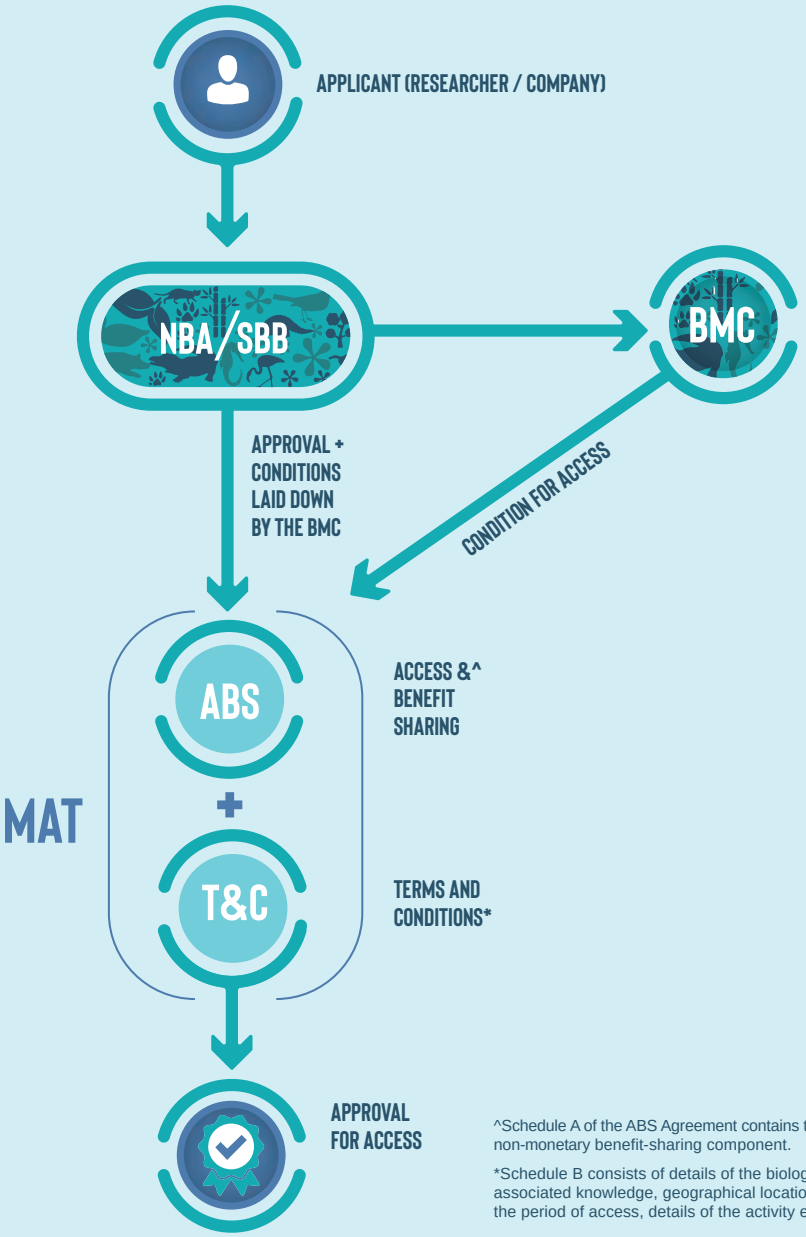
FEEDBACK ON ABS APPLICATION

FEEDBACK ON ABS APPLICATIONS

When the NBA or SBBs receive a request for access to a biological resource or knowledge related to biodiversity, they consult the BMCs in the source location of the bio-resources for information on the availability and knowledge of that resource and its uses, medicinal value, etc. If the resource requested is available in plenty, the BMC can recommend granting access. However, in case the bio-resource in question is threatened according to BMC's records or People's Biodiversity Registers, the BMC can deny access to ensure its conservation. BMCs can also lay down certain conditions for sustainable harvesting of resources.

For detailed information on how to conduct a consultation with the BMC to obtain feedback on ABS applications, readers may refer to publication titled “A guide to conducting BMC consultations on ABS applications.”

The strategic role of BMCs in the ABS process shown in the flowchart will also explain the steps involved in obtaining permits to access biological resources and knowledge associated with it.



^Schedule A of the ABS Agreement contains the details of the monetary or non-monetary benefit-sharing component.

*Schedule B consists of details of the biological resources used, quantity, associated knowledge, geographical locations, reporting requirements, the period of access, details of the activity etc.



Photo credits: GIZ/Kunal Sharma

ROLE OF BMCs IN ACCESS AND BENEFIT SHARING PEOPLE'S BIODIVERSITY REGISTERS

People's Biodiversity Register (PBR) is a record that contains information on the availability of biological resources (wild and domestic species of plants and animals) in the local area along with its traditional knowledge, medicinal value and other uses. The PBR, documented in consultation with local people, farmers, fisherfolk, traditional knowledge holders, etc., facilitates sustainable harvests and knowledge-based management of biological resources.



DOCUMENTATION OF PBR

The registers are to contain extensive information on both the availability and knowledge of local biological resources and their associated traditional knowledge if any. NBA and SBBs provide technical support and guidance to BMCs in the preparation of PBRs. PBRs are legal documents which safeguard the traditional knowledge of people or village community. Where access to a biological resource or traditional knowledge has been provided, the register maintained by the BMC will document the specifics of the accessed bio-resource such as, information of the person accessing the resource, collection fee charged by the BMCs, its intended use etc.

COLLECTION OF FEES BY THE BMCs

The BMC is further empowered to collect a fee from anyone who collects biological resources for commercial purposes from areas falling within its territorial jurisdiction. However, it is advisable to consult the State Biodiversity Boards to learn more about the procedure and modalities established in the state for the collection of fees by the BMCs.



CONSERVATION OF BIODIVERSITY

The functions of BMCs may vary according to the context of the regions of their operation. However, in general, the following activities can be undertaken by BMCs to promote the conservation and sustainable management of local biodiversity, including preservation of habitats, conservation of landraces, folk varieties and cultivars and domestic of animals.



CULTIVAR is a variety of plant that has originated and persisted under cultivation or specifically bred for cultivation. For example.

FOLK VARIETY is a cultivated variety of plant developed, grown and exchanged informally among farmers. For example.

LANDRACE is a primitive cultivar that was grown by ancient farmers and their successors. For example.

In rural areas, where agriculture is predominant, establishing community seed banks can promote the preservation of local varieties of crops, vegetables and medicinal plants.

In cases where villages or a group of villages produce specific local crops or horticultural products, the concerned BMC could facilitate in the marketing of that produce to nearby markets. BMCs could also promote in marketing organically grown and sustainably harvested produce and products from local artisans.

Mapping the geographical distribution of biological resources in consultation with the local people can help to maintain and regularly update the People's Biodiversity Register.

"KNOW YOUR BMC" CAMPAIGN IN TAMIL NADU

The 'Know Your BMC' poster campaign aimed at raising awareness of the BMCs, their functions, and the local biodiversity in their region. The posters showcase information on the local varieties of crops and fruits, the local breeds of livestock, wildlife of the area and highlight the importance of traditional knowledge associated with biodiversity, particularly medicinal plants, their use etc.

The Block Development Office, Forest Office, as well as the offices of other Govt. line departments and local bodies have displayed these posters. BMC members also took the initiative to develop People's Biodiversity Registers for documenting the biodiversity of their region.



Photo credits: Subanathan S

English and Tamil versions of the 'Know Your BMC' posters of Sedapatti Block displayed at the Sedapatti Panchayat Union Office

BMCs IN URBAN AREAS

BMCs in urban areas could engage in awareness generation about the local biodiversity, the ecosystem services it provides and the role that people could play in its conservation. Enacting skits and short plays in schools and colleges, and inviting the public and other civil society organisations to consultations and meetings of the BMC can enhance their knowledge of the surrounding ecosystems.

Further, the BMCs in urban areas could organise awareness drives about the importance of biodiversity and sensitise urban dwellers about activities that harm biodiversity and ecosystems. BMCs situated in rural areas could connect with the BMCs located in urban areas to establish a market in cities for any unique produce or products from the villages.

The responsibility of BMCs is to ensure that the access provided to biological resources or traditional knowledge does not result in the depletion of the local biodiversity or exploitation of traditional knowledge holders. BMCs also need to ensure that they use the benefits accrued from the ABS agreements for the conservation and promotion of sustainable use of biological resources. A fully functional BMC is a pre-requisite for the establishment of an effective ABS mechanism in India.

BENEFIT-SHARING WITH BIODIVERSITY MANAGEMENT COMMITTEES

Based on the ABS provisions of the Biodiversity Act, the BMC or benefit claimers will receive 95% of the amount collected by the NBA or SBBs for providing access to the biological resource. This amount will aid the BMC or benefit claimers in their conservation efforts and support economic development in the region.



Photo credits: GIZ/Suddhabrata Chakraborty

AMARCHINTA BMC IN ANDHRA PRADESH

In the Amarchinta village BMC in Andhra Pradesh, more than 2000 kg of neem leaves were collected by the villagers and sold to a company in Hyderabad called Bio-India Biologicals (BIB) Corporation. The BIB Corporation then exported the product to Japan for the production of neem leaf extract to use in dietary supplements. Upon signing of the ABS agreement between the NBA and BIB, a sum of ₹ 55,035 was accrued for benefit-sharing, and the BMC in Amarchinta village received 95% of the money. The BMC utilised that money to plant new saplings of neem and create further awareness among the villagers.

KODAIKANAL BMC IN TAMIL NADU

Firmenich Grasse, a fragrance and flavour company, based in France applied to the NBA for collection of 1 kg of Kurinji honey from *Strobilanthes kunthiana* (Neelakurinji plants) to carry out research. Kurinji is a shrub found in forests of high altitudes known as the “shola forests” of the Western Ghats in southern India. The Kurinji plants flowers once in 12 years. The Adivasi communities, Paliyan and Toda tribal communities in Tamil Nadu harvest honey from the forests for their consumption as well as for sale in markets. Firmenich Grasse intended to buy Kurinj honey marketed by an enterprise based in Kodaikanal called “Hoopoe on a Hill”, run by a group of women working together to market wild honey.

NBA consulted the Kodaikanal BMC in Dindigul district before approving the collection of Kurinji honey. Upon receiving feedback from the BMC members, the NBA signed an ABS agreement with Firmenich Grasse and charged an upfront payment of ₹ 7000. This amount has been transferred to the BMC for activities as it may deem fit to support objectives of the Biodiversity Act.





Photo credits: GIZ/Geetha Nayak



Photo credits: GIZ/Geetha Nayak

THIRUPORUR BMC IN TAMIL NADU

The Irula tribal community of northern Tamil Nadu is well-known for their skills as snake-catchers, both locally and internationally. The Irula Snake Catcher's Industrial Cooperative Society, established over forty years ago, are currently the leading organised suppliers of snake venom in India. Snake venom is a derivative of biological resources as defined by the Biological Diversity Act, 2002. Venom is extracted from four species of venomous snakes, i.e. *Naja naja* (spectacled cobra), *Bungarus caeruleus* (common krait), *Daboia russelii* (Russell's viper) and *Echis carinatus* (saw-scaled viper), collected from the districts of Chennai, Kancheepuram and Thiruvallur in Tamil Nadu. The venom is partially processed and then sold for research and commercial purposes. iSERA Biological Pvt Ltd, an Indian company, applied to the Tamil Nadu Biodiversity Board for access to snake venom to develop anti-snake venom serum. Upon obtaining approval for their application, iSERA Biological Pvt Ltd signed the ABS agreement with the Tamil Nadu Biodiversity Board in January 2020, agreeing to a benefit-sharing obligation of 5% of the purchase price of the snake venom for three years. The company made an upfront payment of Rs. 17,700 as benefit-sharing. Through the Thiruporur BMC in Kancheepuram district, the Irula Society, as benefit claimers, received the benefit-sharing amount in November 2020.



Photo credits:Tamil Nadu Biodiversity Board

In module 4, we will learn more about the functions of BMCs.

REFLECTIVE QUESTIONS

1. You have been designated as a member of Technical Support Group (TSG) to support constitution of BMC in your village. Make a suggestive list of people to be included as its members along with justification.
2. Make a list of activities that can be taken up by the BMC in your village.
3. A company signed an ABS agreement for collection of medicinal plants found in your village. The State Biodiversity Board shared INR. 30000 accrued from the ABS agreement with your BMC. How would you use that money?
4. A company has approached a traditional knowledge holder in your village to conduct research on medicinal use of a herb. How would you as a group provide feedback on ABS application? (refer to publication “A Guide to conducting BMC consultations on ABS applications”).
5. Using the template provided in Annexure II on page 138, prepare a poster to create awareness on BMC in your village.

NOTES



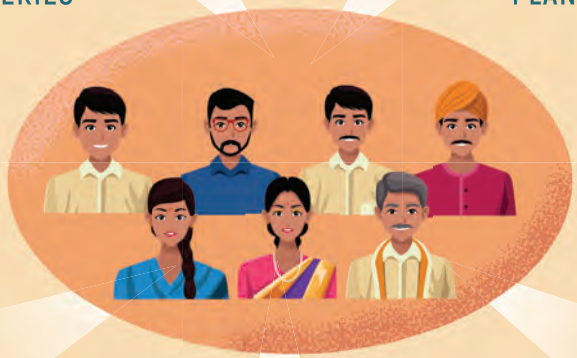
Photo credits: Gowrish Prabhu



NURSERIES



PLANTATIONS



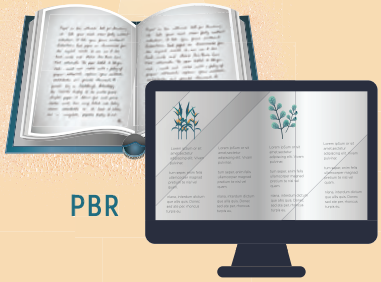
BMC



CONSERVATION OF IMPORTANT SPECIES



VALUE ADDITION



PBR

MODULE 4

FUNCTIONS OF BIODIVERSITY MANAGEMENT COMMITTEE

INTRODUCTION

Conservation of ecosystems and sustainable development has emerged as a focus area for all governments and institutions, notably since biodiversity is being destroyed at an alarming rate affecting ecosystem functioning and local livelihoods. In the realm of public policy and governance, natural resource management (NRM) and biodiversity have now assumed critical significance as indicated by increased budgetary allocation to programmes focused around this and its allied components. The outlay for schemes of the Ministry of Environment, Forests and Climate Change, for example, has increased over the past years and currently stands at ₹1017.23 crores for the year 2020-21[1].

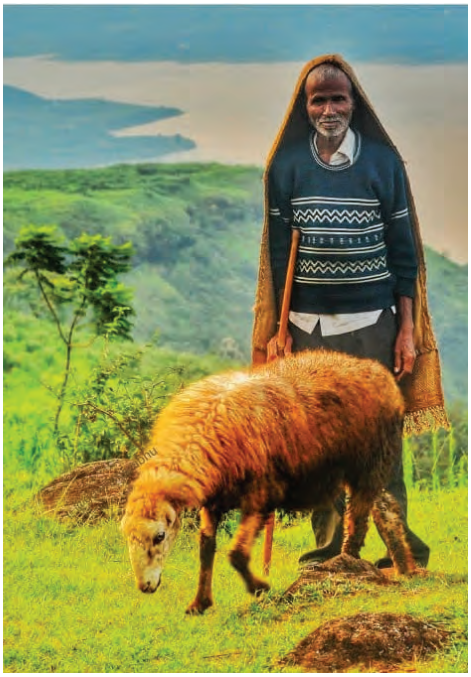


Photo Credits: Gowrish Prabhu

In the same vein, the institutional structure for biodiversity governance, as defined in the Biological Diversity Act, 2002 (Biodiversity Act), has become more established and comprehensive. The National Biodiversity Authority (NBA) is the apex organisation for implementation of the Biodiversity Act. State Biodiversity Boards support states (SBBs) support states and Biodiversity Councils support the Union Territories of India. SBBs have been constituted in all states. The third tier of institutions is the Biodiversity Management Committees (BMCs), established at every Local Body. As of March 2020, there are 244727 BMCs constituted in 28 states, and 4371 in the UTs of J&K and Lakshadweep.

The BMCs are particularly important as they involve the local communities in the management of biodiversity. Local communities are the custodians of biodiversity and the traditional knowledge associated with it, as its deeply intertwined with their cultural practices. Therefore, ensuring the active participation of local people in the process of biodiversity management is fundamental to the successful implementation of the Biological Diversity Act.

ROLE OF BMCs IN LOCAL AREA CONSERVATION

The BMCs perform numerous functions in their operational area, be it a village, town or city. For functions, such as the conservation and sustainable use of biological resources or creating awareness on biodiversity or any other activities to support the goals of the Biodiversity Act, the BMCs can decide how to implement them to suit the local needs or context.

Some other functions explicitly mentioned in the Biodiversity Act, include the preparation of People's Biodiversity Register (PBR) and management of biodiversity heritage sites (BHS) like sacred groves or sacred water bodies. They also include providing feedback on ABS applications forwarded by the State Biodiversity Boards or the National Biodiversity Authority[2].



Seed bank in Sanarpatti, Dindigul, Tamil Nadu

Photo credits: GIZ/Suddhabrata Chakraborty

FUNCTIONS OF BMC

- Conservation and sustainable use of biological resources
- Restoration of local biodiversity
- Documenting the People's Biodiversity Register (PBR)
- Providing feedback to the concerned State Biodiversity Board, and the National Biodiversity Authority, in matters related to ABS applications, traditional knowledge and issues of local biodiversity
- Management of Biodiversity Heritage Sites
- Monitoring the collection of biological resources or protection of traditional knowledge in the area
- Identifying benefit claimers and sharing of benefits accrued from the signing of ABS agreements
- Educating local people about issues of biodiversity



Photo credits: Aravind Madhyastha

BIODIVERSITY HERITAGE SITES



Biodiversity Heritage Sites (BHS) are well-defined areas that are unique, ecologically fragile ecosystems - terrestrial, coastal & inland waters and marine having rich biodiversity comprising of any one or more of the following components:

- The richness of wild as well as domesticated species or intra-specific categories;
- High endemism, presence of rare and threatened species, keystone species, species of evolutionary significance;
- Wild ancestors of domestic/cultivated species or their varieties;
- Past pre-eminence of biological components represented by fossil beds;
- Having significant cultural, ethical or aesthetic values and are important for the maintenance of cultural diversity, with or without a long history of human association with them.

The Section 37 of the Biodiversity Act empowers the State Government to notify areas of biodiversity importance as “Biodiversity Heritage Sites” in consultation with local bodies.

PROCESS OF THE ESTABLISHMENT OF BIODIVERSITY HERITAGE SITES

- BMCs play a vital role in the identification of Biodiversity Heritage Sites (BHSs). The State Biodiversity Boards invite suggestions for the declaration of biodiversity heritage sites through BMCs, institutions like Panchayats or Gram Sabhas. A list of areas, which comprise natural or human-made habitats containing a significant diversity of life forms, is consolidated. Following this, public discussions in local forums highlight the far-reaching benefits of conservation of the sites. Further, the restrictions that can be placed on developmental activities, if the area in question is eventually declared a biological heritage site, are also considered.

- Once the local forum approves, the SBB issues a notification specifying the boundary of the BHS. The public is made aware of this notification through media and public offices, and their suggestions are invited based on which the BMC constitutes a team to study the site. Local participation is encouraged in this process, and a final report is prepared to be deliberated in a joint meeting of SBB with all the stakeholders.

- A notification is issued throughout the state in the vernacular language to announce the declaration of BHS. Local communities and people have another opportunity to raise any objections regarding their traditional rights and privileges in and around the site. The BMC conducts a public hearing to address concerns of the local people. Upon the completion of this procedure, the SBB officially notifies all relavant government departments about the successful establishment of a BHS.



Photo credits: Aravind Madhyastha

MANAGEMENT OF BIODIVERSITY HERITAGE SITES

- The local BMC, prepares a management plan for the BHS.
- The management plan can include all practices of conservation and sustainable utilisation of resources in the BHS. It can also impose certain restrictions on developmental activities or suggest ways in which the site can be developed without causing any damage to the ecosystem for promotion of activities such as eco-tourism .
- Once the BMC finalises the management plan, the respective SBB constitutes an expert committee to evaluate the same.
- Upon its approved, the SBB should set up a state-level monitoring committee to oversee the effective implementation of the management plan.
- Formation of the BHS is notified by the state government, after which the NBA appropriates the required funds for its initial establishment. Further, a separate budget for the BHS is allocated in the annual budget of the local body[3].

The role played by BMCs in the identification and management of Biodiversity Heritage Sites, highlightsand significance of this institution in the preservation of local flora, fauna and their habitats. As the challenges faced by cities, towns and villages are very different from one another, the functions of a BMC should be firmly rooted in its local context. In identifying and conserving crucial biodiversity hotspots as BHSs, the BMCs can integrate their collective knowledge of local threats to conservation with the most context-specific solutions. Therefore, creating BHSs can be understood as one of the most effective tools to save biodiversity on relatively smaller scales.



Photo credits: GIZ/Mira Amtmann

The Biodiversity Management Committee of Mallappuzhassery Panchayat, in the state of Kerala, proposed Pannivelichira to be declared a Biodiversity Heritage Site. Pannivelichira, a water dyke, is a source of drinking water and a biodiversity hotspot. Many species of migratory and native birds, fish, butterflies, dragonflies and snakes inhabit this zone. While initially with an area of 170 acres, it has now reduced to almost 62 acres due to rampant encroachment to the extent of constructing houses on its bed. This encroachment will now change, with the decision to establish a BHS acknowledging the ecological sensitivity and importance of the site. The management of the BHS shall lie with the BMC, which can introduce preservation and restoration efforts to conserve the ecological integrity of Pannivelichira.



Image Source: Google Earth

BIODIVERSITY HERITAGE SITES

MAJULI RIVER ISLAND IN ASSAM

Majuli is the largest river island, located in the river Brahmaputra in North East of India harbouring unique ecological and cultural heritage. It is also one of the largest inhabited mid-river deltaic islands of Brahmaputra River covering an area of 875 sq. km. It has innumerable small islets, called Chaporis. Majuli island was formed as a result of periodical changes in the course of the river Brahmaputra caused by frequent earthquakes and high floods.

Majuli is home to unique riverine biodiversity and fertile soils. The island is also one of the identified 'Important Bird Areas' of Assam having more than 225 species of birds including rare, and endangered migratory species.

Apart from its rich biodiversity, Majuli is also the centre of 'Vaishnavite culture'. The influence of the Neo-Vaishnavite culture on the island, which restricts killing animals, has resulted in great reverence for wildlife and the environment. The Majuli island also represents an example of a symbiotic relationship between nature and culture, traditionally providing a pleasant environment for the protection of all life forms.

To safeguard its unique ecological and cultural heritage, the Indian Government upon recommendation of the State Government and Assam State Biodiversity Board notified Majuli as the first Biodiversity Heritage Site of Assam on 29th March 2017, under Section 37 of Biological Diversity Act, 2002 and Rule 24(1) of the Assam Biodiversity Rules 2010. Majuli BMC and Ujani-Majuli BMC manage and oversee sustainable utilisation of resources from Majuli Biodiversity Heritage Site.

Text - Sunanda Devi, Assam Biodiversity Board



Photo credits: Oinam Sunanda Devi

NALLUR TAMARIND GROVE IN KARNATAKA

The Nalluru village of Bengaluru Rural district in the state of Karnataka proposed the declaration of the Nallur Tamarind Grove as a Biodiversity Heritage Site. The grove, a 53.2-acre land, is believed to have its origins in the Chola dynasty. The site comprises of 300 gigantic trees, the carbon dating of which have proven them to be around 200 years old, some even over 400 years old. The grove is a refuge for many important faunas. Declared a Biodiversity Heritage Site in 2007, the Nallur Tamarind Grove is managed by the BMC at Nalluru village.



Photo Credits: Pritham Srini

AMBARGUDDA IN KARNATAKA

Ambargudda is a 3857.17-acre land located in the hilly regions of the Western Ghats belt, between the Sharavathi Wildlife Sanctuary, Someshwara Wildlife Sanctuary and the Kudremukh National Park, in the Shivamogga district of Karnataka. With evergreen, semi-evergreen and shola forests, t he site also has a rich diversity of insects, birds and amphibians. The BHS falls within the territorial jurisdictions of several villages in Shivamogga district and is managed by the Shakanna Shanuboga BMC.



Photo Credits: Pritham Srini

Text - Pritham Srini, Karnataka Biodiversity Board

SUSTAINABLE HARVESTING PRACTICES

The biodiversity richness in any region is closely associated with the sustainable management of its natural resources. Therefore, promoting sustainable harvesting practices is one of the responsibilities of the BMC.

In many biodiversity-rich regions, the lack of awareness on sustainable collection coupled with an increasing industrial demand for wild resources has led to the decline of biodiversity. Competition among various local collectors and inadequate incentives for primary gatherers have also contributed to these damaging practices. Therefore, the role played by BMCs to promote sustainable use of biological resources assumes even greater importance.





Photo credits: GIZ/Geetha Nayak



Photo credit: GIZ/Suddhabrata Chakraborty

The Aichi biodiversity targets established under the United Nations Convention on Biological Diversity in 2010 act as a roadmap for biodiversity conservation in all countries. Under the targets, Strategic Goal B focuses on reducing direct pressures on biodiversity and promotion of sustainable use. Further, target 7 aspires to manage areas under agriculture, aquaculture and forestry to ensure the conservation of biodiversity.

Destructive collection practices include cutting of tree branches, plucking immature fruits and leaves, ultimately lead to an increase in the mortality rate of trees, and diminished regeneration. The output of the resource thereby decreases year after year. When there is deterioration in the expected quality of the harvested resources, it fetches a lower price in the marketplace.

BMCs can initiate specific measures to ensure the promotion and endorsement of sustainable harvest practices.

- Mapping natural resources can estimate the possible quantity of resources that can be gathered. A value analysis of the products by assessment of the value chain and the benefits acquired by different stakeholders can further help in making informed choices.

- Using the participatory approach can help integrate a community and assign roles and responsibilities to various stakeholders in the selection of species and sites for sustainably harvesting biological resources. Traditional knowledge of the local people would act as a valuable tool in this process.

- Using local traditional knowledge can help devise context-specific protocols for the harvest of biological resources. Status of vulnerability threats to different species, their medicinal or other uses, the frequency of their trade and techniques of propagation can serve as useful parameters while outlining sustainable harvesting protocols[4].

- Another crucial element in the advancement of sustainable collection practices is the identification of all stakeholders linked to that process. The details of local collectors and traders must be collated and updated regularly. Undertaking capacity-building measures for all stakeholders

and issuing permits for collectors is necessary. All the local government departments, such as the state's Forest Department, must be encouraged to include local indigenous communities and people whenever resources which have traditionally been governed by them, are utilised in any way. Women, who tend to play a significant role in the collection of local forest produce, should be urged to participate in all discussions.

- Efforts should be made to raise the quality of the product that is supplied by the adoption of post-harvesting techniques such as sorting, drying, storage labelling and branding. This could help generate additional revenue by fetching higher prices for the finished product.

- It has been observed in a lot of biodiverse regions that the rights of the collection are auctioned or sold off to external agents and contractors. The indigenous people and individuals from tribal communities work as daily labourers for the contractors. They are paid based on the weight of the collection amassed by them, which may encourage destructive forms of harvesting. It is imperative to increase the stake of local communities in resource harvesting. The integration of knowledge held by tribal and indigenous communities into the harvesting protocol of the concerned forest departments is beneficial.

- Primary gatherers and collectors may form community enterprise or cooperatives under their respective BMC, to negotiate for an increase in returns for the produce harvested by them, particularly for medicinal plants, and other biological resources.



EXAMPLES OF SUSTAINABLE HARVESTING PRACTICES

Sustainable harvesting has been an intrinsic element in most traditional collection practices. Tribes in the Pachmarhi Biosphere Reserve of Central India use *Madhuca Indica* (Mahua) in different ways. Raw flowers are consumed and also used to make liquor. The tree branches, used during wedding ceremonies, are harvested only after the celebration of the 'Chait' festival in March. Cultural norms while collecting required plant and tree species are followed in most areas[5].





Photo Credits: Wikimedia Commons

Madhuca Indica

Texts of Ayurveda elaborate that the branches and leaves of plants of medicinal value are to be collected in spring and rainy seasons, their roots in summer or late winters after the leaves have fallen or fully matured. Autumn season is recommended for the collection of barks, tubers and latex. Heartwood can be collected in early winters, and fruits and flowers gathered according to their seasons.

- When the roots of *Chlorophytum borivilianum* (Safed Musli/ Tiravanticham/ Veluttanilappana/ Dravanti) are harvested, one or two roots along with the disc are left intact in the soil. These roots lie dormant and sprout into a new plant in the rainy season.

- In Karnataka, the resin of the White Palle tree (*Ailanthus triphysa*) is collected for its use in local traditional medicine and as an incense. The rough cuts made on the tree eventually lead to rot and the trees to fall during the heavy rains of Agumbe. To minimalise the wound, alternate methods such as the fishbone incision provide higher yield, thus making the harvest more sustainable[6].

COMMON PROPERTY RESOURCES

Resources, which are accessible to and are collectively owned or managed by a community and to which no person has exclusive property rights, are called common property resources (CPRs). Members of a community all share co-equal rights to the usage and have obligations to protect the common property; for example, pasture lands in and around villages. All members of the village have access to it and can take their cattle to graze there. At the same time, when the grass starts to diminish, it is customary to leave that tract of land, to let it regenerate on its own.



Photo credits: GIZ/Mira Amtmann

CPRs form an intrinsic part of life in rural and tribal areas. BMCs constituted at the panchayat level, may be put in change of the management of resources in CPRs. Oftentimes, CPRs do not find enough importance on development policies, as indicated by a continuous decrease in their areas in India. This decrease is alarming given many people are directly dependent for their livelihood and daily needs of food, medicines, fodder for cattle, drinking water etc. on them.

Being responsible for local biodiversity governance, BMCs can make radical changes to past approaches of neglect and over-exploitation of CPRs. The rights of communities over certain CPRs are historically well established and recognised, and thus BMCs can facilitate the involvement and participation of communities in their management.



Photo credits: Creative Commons - Edweed

The Bugun Liocichla bird, named in honour of the Bugun tribe of Arunachal Pradesh, survives in a 17 km2 community reserve forest over which the Bugun tribe has ownership. It is found nowhere else in the world. The acknowledgement that their forests were home to many rare and threatened endemic species led the indigenous people to push for declaring the area as a community reserve and protecting biodiversity. Their efforts realised in 2017 with the declaration of the Singchung Bugun Village Community Reserve. The management committee of the community reserve draws its members from the indigenous people who use their traditional knowledge to protect the bird and its habitat. The youth have become actively involved in saving other endangered species within the forest. The community has worked closely with the forest department to ensure that the reserve is safeguarded which has led to the conservation of forest catchment areas and endemic medicinal plants[7].

GRAM SABHAS AS A FORUM FOR OPERATIONALISING BMCs

The enactment of the 73rd Constitutional Amendment Act provided constitutional status to Panchayati Raj institutions in India. Of these, Gram Sabhas trace their roots to ancient times. These are local gatherings organised by the panchayats and given the number of panchayats in the country, would easily qualify as an enormous exercise in deliberative democracy in the world. The Constitution (73rd Amendment) Act in 1992 meant to devolve powers and authority to Panchayati Raj institutions to empower and strengthen them. It observed that the distortions prevalent in the higher orders of Government have, in many ways trickled down to panchayats as well. However, the revival of Gram Sabhas brought about a new meaning to the idea of self-governance and direct democracy. The panchayats are responsible to the Gram Sabha and can be held accountable by it[8].



Photo credits: M Prabhagaran

The Sabha plays a crucial role in enabling democratic processes at the grass-root level in the management of resources, increasing awareness and promoting assertiveness among weaker sections in expressing their viewpoints.

The Constitution of India (Article 243 A), defines Gram Sabha to be a body of persons registered in the electoral roll of a village or the area coming under a Panchayat. The emphasis, therefore, is to ensure greater participation of people, and examine every point of view as policies and programs are implemented at local levels. Gram Sabhas are conducted on prescribed dates by each state and are ideally attended by almost all adult individuals of the village. Hence, they can serve as excellent forums to discuss environment and conservation-related issues.

The Gram Sabhas function as monitoring bodies and keep a close eye on the operations of the Panchayats. The Panchayats themselves can be held accountable by the Sabha if the work done by them is considered unsatisfactory. Therefore, Gram Sabha may become a forum for deliberating on conservation issues and supporting works of BMCs.

The functioning of Gram Sabha is democratic, and thus it can be assumed, that the decisions are taken on issues of the environment, and its conservation is an ideal representation of all opinions, including those of the poor and marginalised section of people. Thus, integrating the gram sabha in biodiversity governance can ensure the consideration of the interests of all groups. For the same reason, gram sabhas are the most appropriate forums to discuss the functioning of BMCs, protection of common property resources and their utilisation, and in the identification of stakeholders in the governance of biodiversity from within a village.



Photo Credit: Mira Amtmann

REFLECTIVE QUESTIONS

1. How can your BMC contribute in sustainable management of biodiversity in your area?
2. Make a list of Common Property Resources in your village and identify threats to them.
3. Are you aware of sustainable harvesting practices in your village? List out 5 such practices along with details on bio-resources
4. How would you explain functions of BMCs in your grama sabha?
5. Identify two potential Biodiversity Heritage Sites in your district.

NOTES



Photo Credits: Aravind Madhyashta



Photo Credits: Aravind Madhyashta



FAUNA



FLORA



CROPS



MODULE 5
PEOPLE'S BIODIVERSITY REGISTER



TRADITIONAL KNOWLEDGE



DEMOGRAPHY



SOIL BIODIVERSITY

INTRODUCTION

Biodiversity provides numerous benefits to people. Many rural households are directly dependent on biodiversity for their livelihoods, the provision of food, shelter, health and well-being etc. Through market mechanisms, particular species in an area become fundamental parts of local as well as global supply chains. For example, many plants and herbs used in traditional medicine in India, have found immense popularity in both western countries as well as urban Indian cities. A considerable proportion of people all over the world now accept the motto of 'Return to Nature'. These lifestyle changes lead to much greater consumption of natural products and wild foods. The Ayurveda sector earned around $4.4 billion or ₹30000 crores in trade by the end of 2018[1]. Biodiversity loss, at any level, can therefore directly threaten the livelihoods and employment of people in any component of the global supply chains. The loss of even one species of plant, animal, or microorganism has a cascading effect which can bring down the entire ecosystem, resulting in local, regional as well as global impacts on trade.



Photo credits: Aravind Madhyastha

WHY IS THE MONITORING OF BIODIVERSITY NECESSARY?

Documentation of biodiversity can serve as a useful tool in monitoring changes in the population of a target species over time, and identify whether it is increasing, decreasing or stable. By its very nature, biodiversity in any ecosystem is dynamic, continually changing its composition and structure. Anthropogenic pressure has further exacerbated the decline of biodiversity globally. Numerous threats including over-harvesting, deforestation, livestock grazing, invasive species invasions that reduce the populations of native species, pest attack, unpredictable climatic events, have severely affected species population while some of these threats can be mitigated, others such as climatic changes are difficult to predict and offset.

The Government of India, by way of the Biological Diversity Act, 2002 paved the way for maintaining a record of local biodiversity throughout the country. Section 41(1) of the Biological Diversity Act directs every local body to constitute a Biodiversity Management Committee (BMC) within its area of operation. One of the primary responsibilities of a BMC is the documentation of People's Biodiversity Registers (PBR) in consultation with local people[2].



ROLE OF BMCs IN THE DOCUMENTATION OF PBR

BMCs advise on any matter referred to it by the SBBs and NBA before approving the access to biological resources or traditional knowledge. BMCs also keeps the record of local vaids and traditional mrdicine practitioners who use biological resources. Documentation of the PBR is one of the main functions of BMCs, and they facilitate the entire process as detailed:

- The BMC can conduct an inception meeting with the technical support group consisting of experts from agriculture, horticulture, forestry, conservation, knowledgeable members of the community, representatives from universities and NGOs, to begin the preparation of the PBR.



Photo Credits: GIZ/Suddhabrata Chakraborty



Photo Credits: GIZ/Pradeep Mehta

- The preparation of the PBR is done in collaboration with local people and experts in the area. A few members from the BMC can coordinate and arrange meetings with knowledgeable individuals from the village or town, members of Panchayat or local bodies, experts from the technical support group and other members of the BMC. BMC may also organise activities to spread awareness about the PBR among the local people.
- Land-use maps are essential components of a PBR. Resource mapping is a collaborative activity which requires the participation of knowledgeable local individuals, and the BMC can help validate information provided by them.
- The BMCs are authorised to levy charges in the form of collection fees from individuals who are provided access to biological resources for any commercial purpose. The PBR documents the quantity of resource accessed, the fees collected, and any benefits obtained as and when such transactions take place.
- The BMC verifies all the data recorded in the PBR and updates it from time to time. The PBR is a dynamic, living document which changes to reflect the variations in the area.



Photo Credits: GIZ/Pradeep Mehta

PEOPLE'S BIODIVERSITY REGISTER (PBR)

People's Biodiversity Register (PBR) is a record that contains information on the availability of biological resources (wild and domestic species of plants and animals) in the local area along with its traditional knowledge, medicinal value and other uses. The PBR, documented in consultation with local people, farmers, fisherfolk, traditional knowledge holders, and others, facilitates sustainable harvest and knowledge-based management of biological resources.

The concept of the PBR was to achieve an integration of modern conservation science and policy with indigenous knowledge. It is a concrete step towards the regular monitoring of the local biodiversity in any region in India. Indigenous knowledge of the local people applied in the direction of achieving greater resilience of ecosystems can lead to a more stable ecological community. A healthy ecosystem can combat the risks of climate change and diseases.

NGT ORDER ON ESTABLISHMENT OF BMCs IN INDIA

An activist named Chandra Bhal Singh filed a petition before the National Green Tribunal (NGT) in July 2016, for the non-implementation of the Biological Diversity Act, 2002, particularly the State's failure in the establishment of Biodiversity Management Committees and the documentation of People's Biodiversity Registers. An order passed by the NGT in August 2018 directed the Ministry of Environment, Forest and Climate Change (MOEFCC) and the National Biodiversity Authority (NBA) to monitor compliance on the constitution of BMCs and preparation of PBRs. However, noting the inadequate progress made, in Aug 2019, the NGT directed that every State should constitute 100% of BMCs, and complete documentation of People's Biodiversity Registers by January 2020. The NGT further directed that States not complying with the order should pay a monthly fine of ₹10 lakhs.

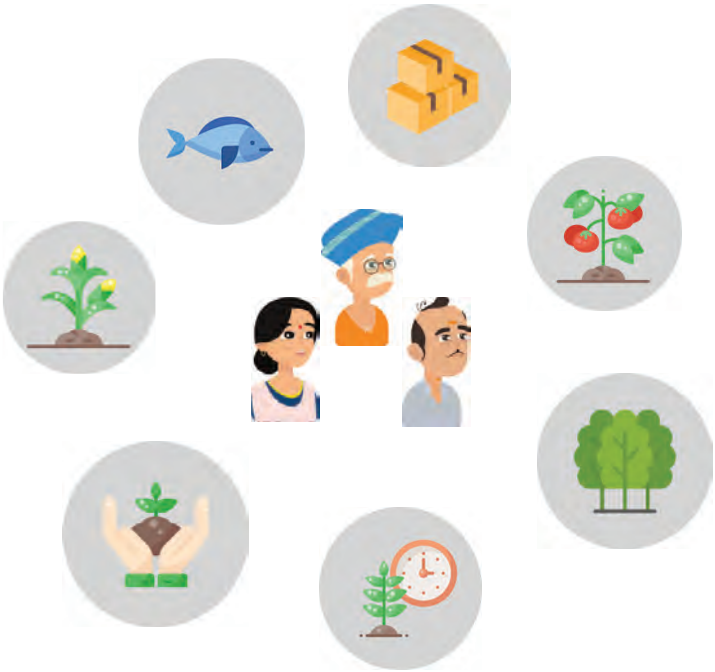


Photo Credits: Aravind Madhyastha

CONTENTS OF THE PBR

The People's Biodiversity Register is a document that contains comprehensive information on the availability and knowledge of local bio-resources, their medicinal or any other use or any traditional knowledge associated with them. In addition to biological resources, the PBR focuses on the following components:

- Local people and their dependency on biological resources
- Biodiversity and knowledge of the people, including agricultural and animal husbandry practices
- Landscape or waterscape of the area
- Perspectives of the people on management issues



The National Biodiversity Authority has prescribed indicative formats for the documentation of People's Biodiversity Registers in the country (pages 108-111)[3]. However, the State Biodiversity Boards may modify these formats to suit their state requirements. For example, the Access and Benefit Sharing partnership project, in addition to the prescribed formats, has included one on the trade of bio-resources to contain information on collectors, agents, agency and traders in the region. This information will help provide feedback on ABS applications (Annexure III).

CONTENTS OF A PEOPLE'S BIODIVERSITY REGISTER:

1. PROFILE OF THE STUDY AREA

Every region has its unique characteristics. The PBR provides information on the geographical location of the area, including information on the villages, taluks, blocks and districts. It includes details of the various levels of organisation such as Gram Sabha, Gram Panchayat or other local bodies, a map of the village with its demarcated boundaries and other physical parameters like its general topography, altitude, latitude, soil type, etc.



Photo Credits: Aravind Madhyastha



Photo Credits: Aravind Madhyastha

2. SOCIO-ECONOMIC PROFILE

Documentation of socio-economic profile is essential to understand the dependency of local people on the available biological resources around them. The most fundamental element of this profile is population data, collected through household surveys. Data on the total number of members in a house and the type of housing (kutcha or permanent), include age ranges, highest qualifications, occupations, source of drinking water, whether a functional toilet is present or not and details of land holdings such as sizes of agricultural land owned etc may be documented. Further information can include the monthly family income, whether the members avail healthcare, their dependency on traditional medicine, fuel use in the house, staple food, domesticated animals or cattle they own, including their number, type and breed. Additionally, documenting the awareness of the respondents on local biological resources is necessary.



Photo Credits: GIZ/Mira Amtmann

3. NATURAL RESOURCES

The PBR could include the natural resources of the area, such as the land and water resources. A land-use map of the area would serve as a vital tool in the management of local biological resources.

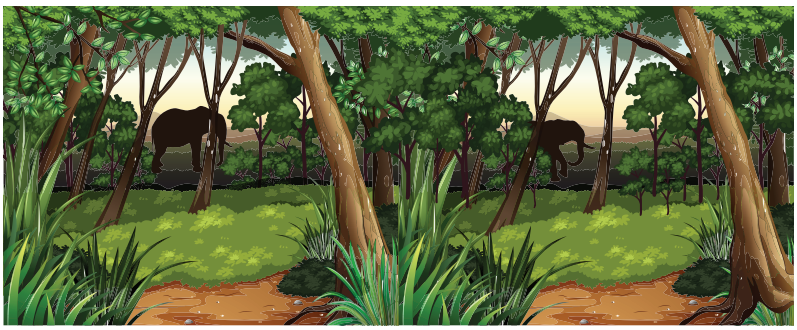
- **URBAN AREA -** Clear boundaries are required to map land use in an urban area, particularly for human settlements, with an analysis of the type of land preferred for these habitations. The details of the length of pucca and kutcha roads in the area, as well as industrial complexes, commercial spaces, markets and educational institutions or office buildings, are to be included. An aggregation of these details would help delineate human activities in the area. The total area allocated to green spaces, such as parks, gardens and open spaces,

should be calculated. If there are forests or wetlands in the region, then recording the local names, locations, details of ownership, and current uses is essential. The natural water sources in the city, such as rivers, canals, along with details of the length of the water source and its current uses should be included in the documentation.



- **NON-FOREST RURAL AREA -** In case of large agriculture-based rural areas, the data on land tenure system and socio-economic categories of land ownership should be collected from the local bodies. Revenue lands, reserved forests and other community lands are inventoried and mapped. The type of agriculture practised (rain-fed or irrigated, industrial/smallholder, contract farming), agroforestry practices, the major crops cultivated, rotation if any should be periodically updated. The number and type of livestock are updated from the Animal Husbandry Department. Inventory of fallow lands (seasonal or permanent), barren lands and wastelands in the area need to be maintained, which includes details of the human settlements, such as the type of land preferred for habitation, and the length of pucca and kutcha roads in the area.





FOREST AREA - The type of forest (evergreen, deciduous, savannah, or any other) should be noted. The extent of forest cover and % canopy cover measured and categorised: closed forests, open forests, degraded land, reserved forests, revenue forests, sacred groves or unclassified. The location and size of a forest in the village, if any, should be specified. Additionally, the types and lengths of any roads in and around the forest are recorded. Other details such as sacred trees, groves and temple ponds may be recorded.



Photo credits: Aravind Madhyastha

WATER RESOURCES - The sources of water can be groundwater, lakes, rivers, canals or creeks. Sources of water for household purposes, agriculture or industry, should be noted. For groundwater, the number of open wells bore wells, pumps and hand pumps, and existing mechanism to monitor the levels of the groundwater table must be documented. For surface water, the extent of rivers, canals or creeks together with their points of origin, lengths, and current uses should be noted. Also, their common names, locations, size (hectares) recorded. Wild biodiversity such as fish, flowers, aquatic plants and vegetables, crops etc. documented. The utilisation of wetlands during floods and the recreational or occupational uses of water resources, such as swimming or fishing, should be documented.



Photo Credits : Aravind Madhyastha

4. GENERAL INFORMATION

The comprehensive information of the region recorded in the PBR is an introduction to the area. After this, some other general details need to be listed.

- The details of the Biodiversity Management Committee of the Panchayat or local body.
- A list of the practitioners of traditional medicine residing in the jurisdiction of the village/town or accessing biological resources from that region. All the vaids, hakims and other herbal medicine practitioners for humans as well as animals including cattle, can be listed here along with their contact details.
- A list of individuals perceived to hold traditional knowledge related to the use of biodiversity in agriculture, medicine, fisheries, forestry, etc. by the villagers.
- Details of the schools, colleges, government departments and agencies, universities, NGOs, members of the Panchayat or local body and other individuals involved in the preparation of the PBR recorded.
- Accurate records of the details of access to biological resources or traditional knowledge maintained. It includes information on the number of resources used, collection fee imposed, benefits derived from the access granted, and the mode of benefit-sharing.

5. PBR FORMATS

There are formats for the different types of information recorded in the PBR. The NBA has a list of indicative formats for recording data on biodiversity. Some examples are:

- In case of agro-biodiversity, details of crop plants, fruit plants, crops used as fodder, weeds and invasive species, local pests harmful to crops, types of soils, markets for cattle and other animals are recorded.
- The information on domesticated and cultivated biodiversity such as fruit trees, medicinal plants and herbs, ornamental plants, timber trees, domestic animals, culture fisheries, and details of the market and their trade need to be documented.



Photo credits: GIZ/Carrot Films



Photo credits: GIZ/Suddhabrata Chakraborty

- For wild biodiversity, recording information on the trees, shrubs, herbs, tubers, grasses and climbers, as well as wild plants of economic importance is essential. Further, information on aquatic biodiversity, wild aquatic plants of economic and cultural significance, plants that provide medicinal benefits, wild relatives of domesticated crops, timber plants, wild animals (including birds, reptiles, amphibians, insects and others), as well as other plants recorded.
- There are two formats for urban biodiversity- one for flora and another for fauna.
- Supplementing all this information in the PBR are pictures depicting the area, its local biodiversity, the functioning of markets, etc.



Photo credits: Aravind Madhyastha

BENEFITS OF DOCUMENTING PBR

Documentation of PBRs is vital to facilitate the ABS process. The information documented in PBR can help in addressing concerns relating to biodiversity and guide the sustainable management of forest resources, fisheries, agriculture and livestock to support the livelihoods of the local people. Thereby creating opportunities to generate local income in return for access to biological resources. Benefits of documenting PBRs are discussed below:

- The PBR can help local communities understand and become aware of the value of biological resources harvested from their region. In the Chikmagalur district of Karnataka state, villagers from the Kigga village, noted the large-scale collection of mosses from the area for export to urban centres, only after the process of documentation for PBR started. Consequently, the villagers were motivated to organise themselves to regulate the harvest of mosses and negotiate better prices as returns.
- In addition to facilitating the ABS process, the exercise of creating a PBR helps in creating awareness on biodiversity and capacity building of the community.
- Documentation of biodiversity and traditional knowledge in consultation with local people would bring their interpretations of ecological processes into perspective. These views could be of immense value in decision-making regarding resource management practices.
- The process involved in the making of a PBR could also recognise the value of traditional practices of resource use, such as sacred groves and river water stretches of religious significance.
- The preparation of PBR can play a crucial role in inspiring social mobilisation. Local communities, as they get exposed to concerns related to biodiversity management, can take steps to ensure the conservation and restoration of their ecological heritage. For example, in the Mandi district of Himachal Pradesh, the local villagers became aware of forest degradation and enclosed the forest for conservation. The regeneration of biodiversity in the previously degraded forest area was extremely encouraging[4].
- Traditional knowledge is fast eroding, and documentation of TK is ultimately for its preservation and use at the appropriate time[5].
- Documentation of PBR will help in connecting science and local traditional practices together for the benefit and well-being of our society, today and in the future.

DOCUMENTATION INCREASES LEGAL CERTAINTY

Documentation of local biodiversity and traditional knowledge in the PBR increases legal certainty and helps identify benefit claimers or providers of biological resources and traditional knowledge associated with it. On the other hand, not documenting traditional knowledge and biodiversity, would lead to issues in the acceptance of any evidence related to ownership of that biodiversity (particularly in domesticated biodiversity) or TK. A case study below illustrates how evidence about TK preserved through oral traditions was rendered inadmissible.

In 1986, an American scientist and entrepreneur, Loren Miller, was granted a U.S. patent on a strain of the 'Ayahuasca' vine. This vine is native to the Amazon rain forest where healers and religious leaders have used it for generations to treat diseases and healing practices. When the tribal leaders of the Amazon heard of this patent several years later, they consolidated into a council representing over 400 indigenous tribes and groups in South America. The council claimed ownership of the knowledge of this medicine, by elucidating how their ancestors discovered it and sought the revocation of the patent. A traditional healer from the Amazon offered to give oral evidence of the traditional knowledge. However, this kind of oral evidence was treated as unacceptable[6].

DOCUMENTING TRADITIONAL KNOWLEDGE IN PBR

Although knowledge associated with biodiversity forms an integral part of the PBR, it is not mandatory to document such knowledge should the holder not want it so. Only individuals holding such traditional knowledge are listed in the PBR. The registered traditional knowledge holder may decide how much information they want to share. There are three options. The first is, people can provide only their area of expertise and contact details. In the second, if they wish, they can document their specific knowledge – but they do not have to. In the third option, people in the village can provide names of persons perceived to hold traditional knowledge. The ultimate objective is to protect this knowledge and practice. The knowledge itself remains the property of its holders.







Photo credits: GIZ/Geetha Nayak

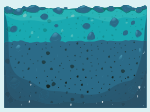
CONSERVATION PLANNING THROUGH PBRs

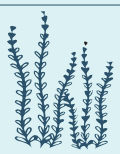
Conservation and promoting sustainable utilisation of bio-resources is the core objective of the Biodiversity Act. PBRs documented by the BMCs will aid in planning conservation at local levels.

- The enormous amount of information collected, verified and continually updated by the BMC also allows it to frame extremely relevant strategies to conserve local biodiversity.
- BMCs can use PBRs to prepare contextually specific biodiversity management.
- Based on the information about all the local species of flora and fauna, BMCs can implement specific measures to restrict the harvest of and trade in threatened, endemic or rare species.
- BMCs can also restrict activities which cause genetic erosion of the larger ecosystem and are thus detrimental to them.
- PBRs contain descriptions of resource markets in the area, based on which BMCs could develop new or enrich already existing markets of biodiversity-related products. The development of markets is pivotal and can have far-reaching effects on the conservation and sustainable management of local natural resources. A fully functional marketplace would become a source of stable livelihood for the local people and incentivise them to harvest biological resources sustainably. Traders can market their biological products through such a local market.
- The BMCs can identify specific ecologically rich, biodiverse areas within the region. These regions declared as Biodiversity Heritage Sites (BHS), can receive protection on many formal levels, thereby ensuring its conservation.

PBR FORMATS

FORMAT NO.	TITLE	DETAILS
1	 Crop Plants	Crops, Number of varieties along with the cropping season
2	 Fruit Plants	Most popular fruit crops and their management
3	 Fodder Crops	Fodder crops, uses and their landscape
4	 Weeds	Species and crops affected
5	 Pest of Crops	Crops affected and pests
6	 Markets for Domesticated Animals	Location, market name and number of livestock traded
7	 Peoplescape	Number of communities and their occupation
8	 Landscape	Area and number of the landscape elements present and their uses
9	 Waterscape	Waterscape element types and their uses

FORMAT NO.	TITLE	DETAILS
10	 Soil Types	Soil types and crops cultivated in them
11	 Fruit Trees	Fruit crops present
12	 Medicinal Plants	Details of endemic and common medicinal plants, their uses and their occurrence
13	 Ornamental Plants	Ornamental plants present in the respective block
14	 Timber Plants	Common species of timber trees cultivated
15	 Domesticated Animals	Domesticated livestock and their breeds
16	 Culture Fisheries	Common fish species cultivated
17	 Markets/ Fairs for Domesticated Animals, Medicinal plants and other products	Location, livestock sold and date of markets

FORMAT NO.	TITLE	DETAILS
18	 Trees, Shrubs, Herbs, Tubers, Grass, Climbers	Common/endemic species of Trees, Herbs and Climbers
19	 Wild plant species of importance	Wild plant species of importance
20	 Aquatic Biodiversity	Species of aquatic plants present along with their uses
21	 Wild Aquatic Plant Species of Importance	Wild aquatic plant species present along with their uses
22	 Wild Plants of Medicinal Importance	Species, parts collected, uses and occurrence
23	 Wild relatives of crops	Wild species with similarities to domesticated species
24	 Ornamental plants	Wild ornamental plant species
25	 Fumigate /Chewing plants	Species of chewing plants with their parts and uses.

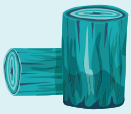
FORMAT NO.	TITLE	DETAILS
26	 Wild Timber Plants	Common/endemic Wild Timber Plants
27 A & B	 Other plants in the Coastal marine flora and fauna	Coastal flora and fauna present with their commercial uses
28	 Wild Animals Mammals, Birds, Reptiles, Amphibian, Insects & others	List of common/ endemic wild animals
29	 Urban Biodiversity (Flora)	List of common/ endemic Urban flora
30	 Urban Biodiversity (Fauna)	List of common/ endemic Urban fauna



Photo Credits: Aravind Madhyastha

- Linking the PBR to the planning processes and policies of the local bodies could help mainstream local biodiversity issues. The PBRs could capture perspectives from the local communities in decision-making processes.
- Information from the PBR could help determine the environmental impact of development projects and activities. The BMC could link the PBR to all EIAs (Environmental Impact Assessments) conducted in the area.

The process of PBR engages members from all sections of the community. BMCs could use it as a community-building exercise to encourage conservation and sustainable management of biological resources.

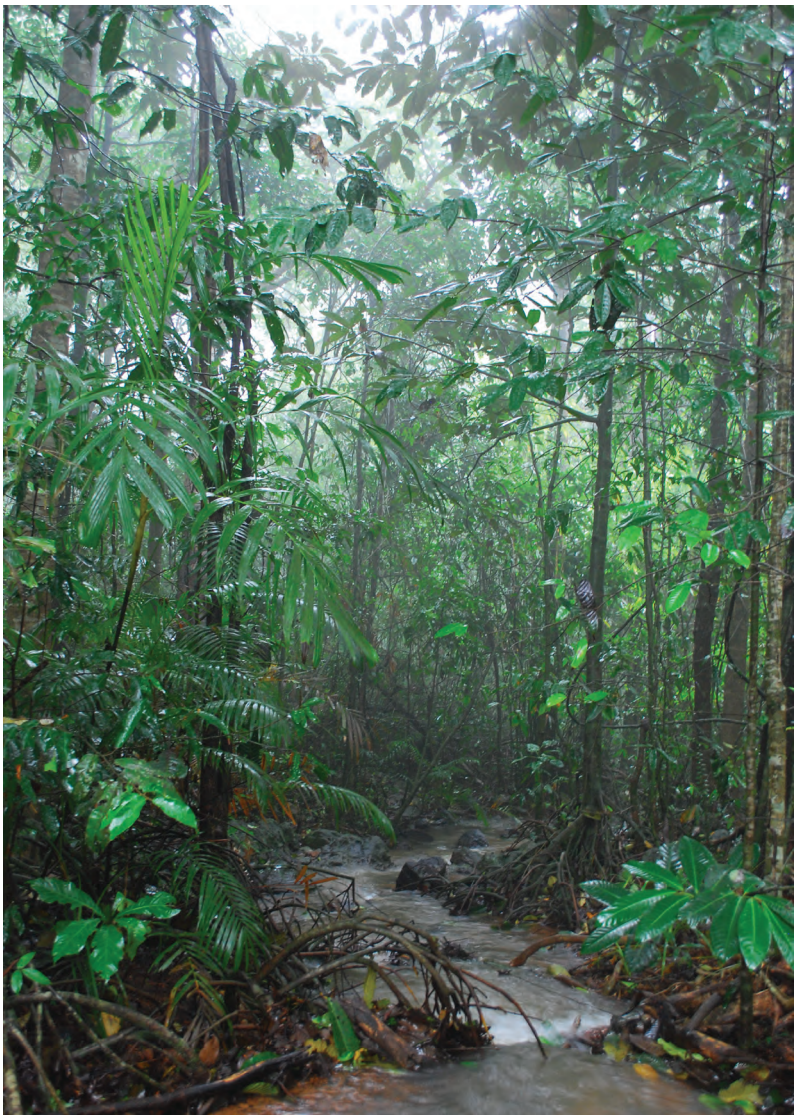


Photo Credits: Aravind Madhyastha

REFLECTIVE QUESTIONS

1. Reflect on benefits of documenting PBR in your village
2. Page through PBR formats listed at end of this chapter. Make a list of PBR formats that are relevant to your village. Also, identify experts and institutions to document the PBR.
3. A well-known nursery in the nearby city has recruited some people in your village to collect wild ornamental plants for propagation. As an advisor to the BMC in the village, what would you recommend about its collection?
4. Do you think it is necessary to document traditional knowledge in the PBR? (hint: read text box on Documenting Traditional Knowledge in PBR in page XX..)
5. Interview 2 traditional knowledge holders in your village. What did your learn about the past and present status of biodiversity?

NOTES



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ACCESS AND BENEFIT SHARING

— MODULE 6 —













INTRODUCTION

Access and Benefit Sharing (ABS) is a mechanism established under the Convention of Biological Diversity (CBD) to the benefits arising from the use of genetic resources with the providers in a fair and equitable manner. The legal framework for the implementation of the third objective of the CBD, i.e. the Access and Benefit-sharing, was defined through the adoption of the Nagoya Protocol in 2010 at Nagoya, Japan. India became a party to the Nagoya Protocol in 2012.



Photo Credits: GIZ/Mira Amtmann

ACCESS AND BENEFIT SHARING (ABS) – MECHANISM AND IMPORTANCE

The adoption of the CBD reaffirmed that the conservation of biological resources is a common concern of humankind, and countries are responsible for the conservation and sustainable utilisation of their biological resources. Biodiversity-rich countries could derive benefits from providing appropriate access to their genetic resources to meet the food, health and other needs of the growing population. The principle of ABS essentially has two elements – granting of Prior Informed Consent (PIC) by a provider country to the user for obtaining genetic resources based on Mutually Agreed Terms (MAT) in the form of an ABS agreement or permit. In India, the National Biodiversity Authority is the competent national authority to provide PIC for non-Indian users, and State Biodiversity Boards in the states or the Biodiversity Councils in the Union Territories are competent authorities to grant PIC to Indian users. In both scenarios, the BMC or the Local Body (or the provider of the resources/ TK holder) is consulted and provides feedback on the ABS application submitted by the user. The competent authority and the users then negotiate benefit-sharing conditions to establish Mutually Agreed Terms (MAT) and determine how to share the benefits between both parties[1].

Until the adoption of the CBD, biological heritage was considered a renewable resource assumed to belong to all of humanity. The adoption of the Convention recognised the sovereignty of all states over the genetic resources found within their boundaries. Benefit-sharing is thus, primarily a symbol of justice for the provider countries and the local communities. For users, it represents adherence to the principles of fair and sustainable use of biological resources. Further, benefit-sharing is an incentive to support the conservation and sustainable utilisation of biological resources. The concept of benefit-sharing also reaffirms the customary rights of indigenous tribes and communities.

TRANSLATION OF "ACCESS AND BENEFIT SHARING" IN INDIAN VERNACULAR LANGUAGES

The concept of Access and Benefit-sharing or ABS is new, complex and poorly understood. The exact translation of ABS in Indian vernacular languages sometimes leads to misinterpretation of the idea itself. For example, the term "access" when translated to some Indian languages indicates admission, entry, or entrance. This word, when combined with benefit-sharing, does not convey the actual concept of ABS. Therefore, the term "use" in vernacular language indicates "access", which translates to "benefit-sharing from the use (of biological resources or associated knowledge)".

LEGISLATIONS IN INDIA FOR THE PROTECTION OF BIODIVERSITY

India has established a robust legislative framework for the conservation of nature and natural resources, including biological resources. The Wildlife Protection Act, 1972, for example, was enacted for the protection of plants and animal species. The Biodiversity Act is all-encompassing with the scope far more expansive than any other legislation; it includes all biological diversity in all landscapes irrespective of ownership. The Act also decentralised biodiversity governance in India. It emphasises the need to involve local people in biodiversity conservation and sustainable utilisation, which in turn, renders greater scope to the application of the ABS mechanism in India.



KEY LEGISLATION AND POLICIES IN INDIA FOR THE PROTECTION OF NATURAL RESOURCES AND BIODIVERSITY

- Wildlife (Protection) Act, 1972
- Forest (Conservation) Act, 1980
- National Forest Policy, 1988
- Biological Diversity Act, 2002
- The Scheduled Tribes & other Traditional Forest dwellers (Recognition of Forest Rights) Act, 2006
- National Green Tribunal Act, 2010
- National Wildlife Action Plan
- National Biodiversity Action Plan
- National Environment Policy and
- National Action Plan on Climate Change

STAKEHOLDERS IN ABS

One of the most remarkable aspects of ABS is the involvement of an extensive array of actors right from the grassroots to the national level, from the local people and governments to private actors. The terrain of biodiversity governance in India is well-structured and participatory.



- **The National Biodiversity Authority (NBA)** at the national level, **State Biodiversity Boards (SBBs)** in states, the **Biodiversity Councils** in the Union Territories and **Biodiversity Management Committees (BMCs)** are the institutional structures established for the implementation of the Biodiversity Act.



- **Biodiversity Management Committees (BMCs)** represent local communities in an area. Members must be registered in the local electoral voter's list and preferably bring biodiversity-related expertise. BMCs are representatives of the local people, who are the custodians of these resources. Their mandate is to document biodiversity, provide feedback on ABS applications, and levy collection fees on biological resources collected for commercial purposes.



- **Line Departments,** such as agriculture, horticulture, animal husbandry or fisheries, are needed to help SBBs in the implementation of the Biodiversity Act. For example, the Rural Development and Panchayat Raj department support the establishment of BMCs, and other departments support in the documentation of People's Biodiversity Registers.



- **The Forest Department** is a strategic partner for SBBs in ABS implementation. It has a crucial role to integrate ABS in the trade of forest resources, and help establish BMCs and TSGs.



- **The Customs Office** has a more recent role in ABS to trace the trade of biological resources.



The Patent Office is a strategic partner of the NBA. Since 2003, the Indian Patent Act includes biological resources used in inventions. The Patent Office directs applicants to obtain PIC from the NBA, and forwards applications involving biodiversity to the NBA.



Technical Support Groups (TSGs) are constituted at the local level and tasked to provide training, capacity development and needs-based consultation for BMCs. They consist of individuals from NGOs, experts from various sectors of biodiversity such as forestry, horticulture, agriculture, etc. and government departments dealing with biodiversity.



Legal professionals have a crucial role in advising users and encouraging them to comply with regulations. However, given the novelty of the ABS concept – including trade, equity issues, biology, biotech - there seem to be very few specialised legal professionals.



Indian researchers do not come under the purview of the Act. However, as soon as their work involves partners from other countries, they require the approval of the NBA. All non-Indian researchers, including NRIs, require the approval of the NBA before accessing any biological resources or knowledge associated with it.



National companies form a substantial portion of users, predominantly in alternative medicines, nutraceuticals, cosmetics, herbal extracts, colours, flavours, etc. National companies must obtain permission from the State Biodiversity Board to access biological resources and associated knowledge.



International companies are mostly in pharmaceuticals, cosmetics, biotech, colour, flavours and oleoresins etc. They are mandated to obtain the permission of the NBA to access biological resources.



Industry Associations are key partners of the government for economic development and have a vital role in reaching out to companies. They can advocate the inclusion of ABS in corporate policies, facilitate consensus-building among companies, and provide advisory services to their members. Some associations have already formed policy groups to identify implementation challenges and hold dialogues with authorities.

ACCESS AND BENEFIT SHARING FROM INDIA - CASE STUDIES

The ABS process is implemented by the NBA, SBBs and Union Territories under the regulations and rules of the Biodiversity Act. Many ABS agreements signed in India are for accessing plants and microorganisms, with very few for accessing animal genetic resources. Some case studies are illustrated below:

SNAKE VENOM FROM TAMIL NADU –

Snake venom extraction is synonymous with the Irula tribal community in northern Tamil Nadu. The Irula Society is well-known, both locally and internationally, for their skills as snake catchers. The Irula Snake Catcher's Industrial Cooperative Society established in 1978, supports the sustainable trade of snake venom and the economic development of the Irula tribal community. The Irula Society is the largest organised supplier of snake venom in the country.

Snake venom is a derivative of biological resources as defined in the Biological Diversity Act, 2002. Snake venom extraction by the Irula Society is restricted to four species of venomous snakes, specifically the Spectacled Cobra, Common Krait, Russell's Viper and Saw-scaled Viper collected from three districts of Tamil Nadu – Chennai, Kancheepuram and Thiruvallur. The members of the society partially process the venom (freeze-drying). Industries and research institutions buy snake venom for various research and commercial purposes, such as the production of anti-snake venom (ASV) for the treatment of snakebites.

The Wildlife Wing of the Tamil Nadu Forest Department and the Department of Industries and Commerce has put in a mechanism to regulate the trade and obtain a fair price from the sales. However, there was no benefit-sharing arrangement in place as required under the Biological Diversity Act, 2002.

Tamil Nadu Biodiversity Board (TNBB) facilitated dialogue among various stakeholders, viz. Irula Society (providers or the benefit claimers as defined in the Biological Diversity Act, 2002), Tamil Nadu Forest Dept, Department of Industries and Commerce, and various researchers and companies using snake venom in their operations.





Photo credits: Archith Sridhar





Photo credits: Wikimedia Commons

A company, M/s iSERA Biological Pvt Ltd, which manufactures which antidotes for treating snake bites, applied under Rule 15 of the Tamil Nadu Biological Diversity Rules, 2017 in September 2019 to obtain snake venom from the Irula Society for commercial utilisation. The application listed four species of venomous snakes – Spectacled Cobra, Common Krait, Saw scaled Viper and Russell's Viper, as sources of venom. Tamil Nadu Biodiversity Board signed the first ABS agreement for access to snake venom with M/s iSERA Biological Pvt Ltd in January 2020.

The benefit-sharing obligation was 5% of the purchase price of the snake venom for three years. Thus far, in keeping with their benefit-sharing obligations, iSERA Biological has deposited ₹17,700 in January 2020 with the TNBB, which was shared with Thiruporur BMC and Irula society in Tamil Nadu. This example of benefit-sharing showcases the spirit of the Act, and the company's commitment towards the three objectives of conservation of biological diversity, sustainable use of its components, and fair and equitable sharing of benefits arising out of the use of biological resources.

KURINJI HONEY FROM TAMIL NADU

Firmenich Grasse, a fragrance and flavour industry based in France, applied for access to biological resources occurring in India for research. Firmenich Grasse sought to use headspace technology to collect volatile molecules from honey from the nectar of the *Strobilanthes kunthianus* flower, commonly called the Kurinji flower. The technique does not involve any physical extraction of the flower or honey but only requires a sample of the honey. The sample could lead to the reconstitution of the scent using ingredients in perfumers' palette for the potential development of a fragrance or flavour.

The Kurinji is a shrub found in the forests of Tamil Nadu, which flowers only once in 12 years. The honey is gathered by local communities and sold in the market through a local enterprise called "Hoopoe on a Hill" based in Kodaikanal.



Photo credits: Aravind Madhyastha

In March 2020, the NBA signed the ABS agreement with the Firmenich Grasse and negotiated an upfront payment of Rs. 7000 for using 1 kg of Kurinji honey for research, as suggested in the ABS guidelines. Additionally, the agreement sets out several conditions, including:

- Prior approval of the NBA before any commercial utilisation of the biological resource
- Prior approval of the NBA before applying for any intellectual property rights
- Approval of the NBA before transfer to a third party
- Presentation of annual progress reports.

The benefit-sharing amount of Rs. 7000 has been shared with the Kodaikanal BMC to support the activities of BMCs. This is an example of the company's commitment comply with India's Biodiversity Act and international Nagoya Protocol under CBD.

NUTRACEUTICAL RESEARCH ON COMMONLY AVAILABLE BIO-RESOURCES

Tata Chemicals Limited, a company registered in India, applied to the National Biodiversity Authority for access to commonly available foods and food products from various sources in Maharashtra. The company intended to study the physio-chemical properties of several components of the accessed biological resources, to conduct food product and nutraceutical research. The company is categorised under Section 3(2) of the Biodiversity Act, as it has non-Indian participation in its share capital or management. Of the 36 biological resources, only six were under the purview of the Act – Bayleaf (*Cinnamomum tamala*), Saffron (*Crocus sativus)*, Kewda *(Pandanous odoratissimus),* Mahua *(Madhuca longifolia)*, Cinnamon *(Cinnamomum verum),* and Safflower *(Carthamus tinctorius).* The remaining 30 bio-resources are in the normally traded as commodities list, and therefore, exempt from the purview of the Act.





Photo credits: Wikimedia Commons

The NBA referred the application to the Maharashtra State Biodiversity Board for their consent for the six bio-resources obtained from Maharashtra. Upon obtaining their approval, the company Tata Chemicals Limited signed an ABS agreement with the National Biodiversity Authority, agreeing to an upfront payment of Rs. 18,000 as benefit-sharing for the six bio-resources. Nutraceutical industries often use commonly available bio-resources as the primary ingredients for their products. The Biodiversity Act exempts a list of items called as “Normally traded as commodities” as per section 40 to promote trade and commerce.

COCCULUS HIRSUTUS FOR TREATING DENGUE FEVER

Sun Pharmaceuticals, a multinational company, collaborated with CSIR-Indian Institute of Integrative Medicine, and the International Centre for Genetic Engineering and Biotechnology, to study the anti-dengue properties of the *Cocculus hirsutus* plant, based on information found in ancient Ayurvedic texts. *Cocculus hirsutus* plant is a creeper belonging to the family Menispermaceae located across India, particularly in dry regions. The company applied to the NBA for access to 1500 kgs of *C. hirsutus* plant from the Chhindwara district of Madhya Pradesh for the preparation of about 50 kgs of extract for animal and pharmaceutical trials.



Photo credits: Wikimedia Commons

The company intended to research the clinical effectiveness of *C. hirsutus*-based defined extracts (drug) as per the Ministry of AYUSH guidelines, to develop medicinal preparations for the treatment of dengue fever.

Regulation 14(2) of the ABS Regulations, 2014 states that special consideration may be given to cases when developing technology for controlling epidemics/diseases. With this consideration, the NBA and the company negotiated and signed a benefit-sharing agreement, containing an upfront payment of ₹4,50,000 and a non-monetary component. The non-monetary component included providing technical support in the preparation of People's Biodiversity Registers of Biodiversity Management Committees from the areas where the bio-resources are accessed, and organising four biodiversity conservation awareness programmes in a year.

BIOFUELS FROM PLANTS

Reliance Industries Ltd requested access to the stems and leaves of four species of plants – Cotton *(Gossypium hirsutum)*, Castor *(Ricinus communis),* Red gram *(Cajanus cajan)* and Sugarcane *(Saccharum officinarum)* cultivated in Jetpur village of Gujarat. The company intended to research the possibility of extracting biofuels from the plants' components.

Reliance Industries Ltd. is an Indian entity having non-Indian participation in its management, and therefore, is under Section 3(2) of the Biodiversity Act. The company applied to the National Biodiversity Authority (NBA) for access to the four species of plants from Gujarat. The NBA referred the application to the Gujarat State Biodiversity Board for their consent as the cultivation of the accessed bio-resources was in Gujarat. On obtaining consent for their research, Reliance Industries Ltd signed an ABS agreement with the NBA in September 2019 with an upfront payment of Rs. 6,40,000 as benefit-sharing.



CHALLENGES IN ABS IMPLEMENTATION

There are some underlying challenges in the implementation of ABS. Very often, the legal principles of ABS are prone to misinterpretations as the language of the law is not simple. Although a clear set of rules and regulations are in place in India, the procedures associated with its enforcement have not been uniform among the different states. Some challenges in the implementation of ABS are presented in this section.

CHALLENGES IN IDENTIFYING END-USERS OF BIOLOGICAL RESOURCES



A well-known cosmetics company based in Europe applied for access to biological resources occurring in India for commercial utilisation. In particular, the company was interested in purchasing 500 kilos of oil extracted from the seeds of various species of sea buckthorn from the genus *Hippophae,* family Elaeagnaceae. These are deciduous shrubs growing in the high altitudes of the Himalayas.

The company intended to collect sea buckthorn fruits from the wild within the Union Territory of Leh and Ladakh, coordinated by an Indian oleoresin extraction firm, which also would clean, dry and extract the oil for use in existing skincare products.



Photo credit: Wikimedia Commons

In its application, the company proposed sharing benefits through paying three per cent of the price of raw material - that is, the sea buckthorn oil purchased from the Indian intermediary company. As part of the approval process, the consultation with the BMC in Shey village was conducted, which revealed that tons of sea buckthorn, collected from private and public lands, were sold to different companies through local traders. However, it was not possible to trace the end-users or companies.

The cosmetics company withdrew its application submitted to the NBA without citing the exact reasons for the withdrawal. This case indeed demonstrates challenges in ABS implementation and highlights that not all ABS potential cases succeed, resulting in the loss of potential benefits to the providers of the resources. Therefore, a mechanism to establish traceability and identify end-users of resources is vital in the ABS process.

LACK OF TRACEABILITY OF BIO-RESOURCES

A laboratory developing active ingredients in France considered a project involving research into the extract of the leaves of *Ocimum tenuiflorum* as a potential cosmetic ingredient. That is, they intended to research the plant material for its biochemical composition, define an extraction process, and evaluate its cosmetic efficacy. Samples of the dried plant material would be purchased from traders and processed in Europe. The traders were not able to provide the information required in the application, such as the location, farmers, exact date of harvest or the actual quantity harvested or traded. As a result, the company did not wish to proceed with the project. This resource would have come under the scope of ABS, and prior permission from the NBA would be mandatory.

APPLICABILITY OF ABS FOR ITEMS LISTED UNDER NORMALLY TRADED AS COMMODITIES (NTC)

“Commercial Utilisation” as defined in the Biodiversity Act is not the same as “trade and commerce” in common parlance. The Biodiversity Act defines commercial utilisation as the “end uses of biological resources for products such as drugs, industrial enzymes, food flavours, fragrance, cosmetics, emulsifiers, oleoresins, colours, extracts and genes used for improving crops and livestock through genetic intervention, but does not include conventional breeding or traditional practices in use in any agriculture, horticulture, poultry, dairy farming, animal husbandry or bee-keeping”

Whether the provisions of the ABS mechanism apply to biological resources listed in the NTC category, when used for a product or as part of a process, is determined based on “common practice”. For example, the use of amla in Triphala churna is an age-old practice, and therefore, considered as common practice. However, when using amla for an entirely new product which resulted from research, then the exemption under NTC is not applicable.

One such case is illustrated here - A cosmetics company based in France considered purchasing mango butter, obtained from *Mangifera indica* kernels. A group of the local community in Chhattisgarh would collect the mangoes and crush the mango kernels. A local company would extract the butter and export it to Europe through traders. The cosmetic company would only have access to the butter (not the kernels or other parts). It would only include the ingredient in existing cosmetic products. Although mango butter used in cosmetic products is under the purview of ABS, the cosmetics company did not proceed with the purchase. The company in India sourcing the mango butter was not convinced about the applicability and implications of the Indian Biological Diversity Act - specifically as Mango fruits are in the list of biological resources normally traded as commodities.

TRANSACTION COST OF ABS COMPLIANCE

Resources required and time taken for obtaining ABS permits can sometimes incur a high cost to the company. A laboratory producing ingredients in India and falling under Section 3(2) of the Biodiversity Act, considered a project involving the purchase of Boswellia gum, a resin obtained from the *Boswellia serrata* tree. Farmers in the Shivpuri district of Madhya Pradesh would collect the Boswellia gum. A local trader would gather and sell the Boswellia gum to the company, which would then manufacture a natural extract. Companies may purchase the Boswellia extract for use in various products. Given the time and resources required for the process of compliance with ABS requirements, the company did not proceed with the project.

VIOLATIONS UNDER BIODIVERSITY ACT

The Biodiversity Act is quite technical, and its process for compliance vary for different regulated activities and biological resources. The BMCs and the authorised officers from within the forest department should check with the Nodal Officer of the district, State Biodiversity Boards and National Biodiversity Authority before booking an offence.

A FEW INSTANCES OF VIOLATIONS UNDER THE BIODIVERSITY ACT ARE PRESENTED BELOW:

ILLEGAL EXTRACTION OF SANDWORMS FROM THE SEASHORES OF PUDUKOTTAI

In July 2018, Forest Guards patrolling the Manamelkudi area were alerted to the illegal harvesting of sandworms from the coasts. Manamelkudi is a coastal town in the Pudukkottai district, Tamil Nadu, India. The sandworms, transported to cities, were useful as feed in aquaculture. Sandworms are known to contain fatty acids affecting the reproductive organs of shrimps, prawns, and fish by rapidly increasing their egg-laying capacity. Upon receiving the information, the Forest Department followed the trail and arrested three persons and confiscated 25 kgs of sandworms heading towards Chennai. Recognising the damage to the seacoast and marine life due to the rampant collection of sandworms, the Forest Department of Pudukottai booked a case under section 24(2) of the Biological Diversity Act, 2002. As per Section 58 of the Act, offences booked are cognisable and non-bailable. The detailed investigation brought to light several such cases of illegal collection of sandworms from many coastal districts such as

Thanjavur, Ramanathapuram and Pondicherry. The District Forest Officer of Pudukottai, Mr M. Anandakumar believes that this case leading to the arrest of the accused has created awareness among villagers who now regularly inform the Forest Department of any such attempts of collection of sandworms.

It is essential to note in this case that extracting sandworms from the seashore has detrimental effects on marine life and the sand-dune ecosystem, and falls under the activities that are contrary to the first objective of the Biodiversity Act. i.e. conservation of biodiversity. Therefore, sandworms are not and cannot be 'ABS potential' biological resources. BMCs must decline to collect fees or provide consent for the collection of species that will cause damage to the ecosystems



Photo Credits: Tamil Nadu Forest Department

KERALA – ARREST OF JAPANESE NATIONALS

In the year 2015 Japanese nationals were charged under the Biodiversity Act for collecting reptiles from the Athirappally forest in Kerala without prior approval of the National Biodiversity Authority. The Kerala Forest Department filed a case for the violation of the provisions of the Act. The punishment for this offence would be a jail term of up to 5 years or a fine extending to 10 lakh rupees.

IMPORTANCE OF MAINTAINING PBRs FOR ABS COMPLIANCE

The People's Biodiversity Register (PBR) is a comprehensive document prepared by the BMC in consultation with knowledgeable people and traditional knowledge holders, with the support of the technical support group (TSG). It maintains a record of local biological resources and details of traditional knowledge holders. The document also contains the innovations associated with biodiversity like its use in medicines, cosmetics, dyes, pest control, bioremediation etc. The PBR thus becomes the fundamental document legally construed as evidence of prior knowledge. The BMC of the region validates the information in the PBR and supports to keep bio-piracy in check.

Another critical point about maintaining a PBR is that it increases the bargaining power of the local communities during negotiations for ABS agreements as they have a clear idea of the status of biological resources in their region. The local communities can negotiate for a fair benefit-sharing in return for providing access to the resources.

In general, PBR can also play a vital role in estimating the economic value of biological resources. If benefit-sharing arises from the use of traditional knowledge, then the PBR discloses the number of people from the local community who are the custodians of that knowledge and should receive the benefits for the commercial use of the knowledge[3].

ABS AND BIODIVERSITY CONSERVATION

India is a mega biodiverse country, with a large section of its population directly dependent on biological resources for food, medicine, and livelihood. The nation has a rich tradition of conserving nature through the worship of trees, rivers, forests, mountains, animals, birds and reptiles. Therefore, the preservation of biodiversity assumes significant importance. The efficient implementation of the ABS mechanism can serve as a useful tool for the conservation and sustainable use of biodiversity.

Benefit-sharing acts as an incentive for communities to protect the biological resources in their surroundings. Local communities are aware of the potential value of natural resources, and for many, it is the source of monetary and non-monetary benefits.



Photo Credits: Aravind Madhyastha

The application of the principle of ABS can scale up the conservation and sustainable use of biological resources in India. Benefit-sharing can inspire the preservation of not just entire ecosystems but also the traditional knowledge of people who have been a part of these habitats for centuries. Successful cases of ABS would function as a boost to create awareness as people will be able to identify with the mechanism practically, and not just as a concept.

In India, the BMC receives 95% of the benefits obtained as part of the ABS agreement for its functions. The BMC may also levy a collection of fees for the biological resources collected for commercial purposes from its territorial jurisdiction. The ABS framework in India also has provisions for non-monetary benefits that can include a contribution to socio-economic activities. These can also provide livelihood security to the local people.



Photo Credits: Aravind Madhyastha

REFLECTIVE QUESTIONS

1. Illustrate an example of offence under the Biodiversity Act and explain how you would file a complaint. (please refer to module 2 and 6)
2. List various government departments that are dealing with biological resources, and traditional knowledge relating to medicine, livestock etc in your district.
3. How would you explain ABS process to people in your village in your vernacular language?
4. A researcher from a foreign country wishes to collect, an indigenous variety of millet from your district. Does this activity come under the purview of the Biodiversity Act?
5. A person from your village has been selling Amla pickle to various stores in the city. Is the Biodiversity Act applicable to this?

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ANNEXURE I

Format for giving notice to the court on the violations under The Biological Diversity Act, 2002*

FORM VII
FORM OF NOTICE
(See rule 24(1))

By Registered Post / Acknowledgement due

From,

_____
_____
_____

To

_____
_____
_____

Sub: Notice under section 61(b) of the Biological Diversity Act, 2002.

Whereas an offence under the Biological Diversity Act, 2002 has been Committed/is being committed by _____

2. I/ we hereby give notice of 30 days under Section 61(b) of the Biological Diversity Act, 2002 of my / our intention to file a complaint in the Court against _____ for violation of the provisions of the Biological Diversity Act, 2002.

3. In support of my /our notice, I am / we are enclosing herewith the following documents as evidence of proof.

Place: _____ Date: _____ Signature: _____

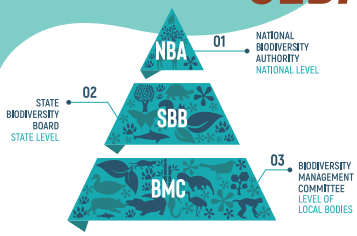
. — (1) In case the notice to be given in the name of a company, documentary evidence authorizing the person to sign the notice on behalf of the company shall been enclosed to the notice.
(2) Give the name and address of the alleged offender. In case of using biological resource/ knowledge/ research/ bio-survey and bio utilization / the intellectual property right/patent, without the approval of the Authority, the details thereof and the commercial utilisation if any, may be furnished.
(3) Documentary evidence shall include photograph, technical report etc., for enabling enquiry into the alleged violation / offence.

*This is to be used by any persons other than officers authorised to complaint under Section 61 of the Biological Diversity Act, 2002. For example, members of BMCs or the general public.

ANNEXURE II

SAMPLE POSTER

OUR BIODIVERSITY MANAGEMENT COMMITTEE
SEDAPATTI BLOCK



THE BIODIVERSITY ACT IS IMPLEMENTED THROUGH A 3-TIER STRUCTURE

The Government of India enacted the Biological Diversity Act, 2002 for the conservation of biological diversity, sustainable use of its components and fair and equitable sharing of the benefits arising out of the use of biological resources and associated knowledge.

WHAT IS BMC?

BMC is a seven-member committee at every local body consisting of people enlisted in the local electoral rolls. The BMC is formed under the Biological Diversity Act, 2002 for the management, conservation, and sustainable utilisation of bio-resources.

Some of the key functions of BMCs are:

- Promoting the sustainable use of bioresources
- Preparation of People's Biodiversity Register (PBR)
- Conservation of local varieties, breeds and traditional knowledge
- Raising awareness about biodiversity and the need for its sustainable use

PBR

People's Biodiversity Register (PBR) is a record that contains information on the availability of biological resources (wild and domestic species of plants and animals) in the local area along with its traditional knowledge, medicinal value and other uses. PBR is documented in consultation with local people, farmers, fisherfolk, traditional knowledge holders, etc. PBR facilitates in sustainable harvests and knowledge-based management of biological resources.

INTERESTING FACTS ABOUT BIODIVERSITY

- The most commonly traded medicinal plants in Sedapatti are Korai ***(Cyperus rotundus)***, Saranathi ***(Boerhavia diffusa)***, Vembu ***(Azadirachta indica)*** and Nilavakai ***(Cassia angustifolia)***.
- Sedapatti is known for its local varieties of brinjal (Ramakkai Blue and Ramakkai Green), barnyard millet (Sadai Kudiraivaali and Pullu Kudiraivaali) and kodo millet (Peruvaragu and Siruvaragu).
- Animal Husbandry is an important source of income in Sedapatti, and the Malai Maadu is a renowned local cattle breed found in the region.
- The Srivilliputhur Grizzled Squirrel ***(Ratufa macroura)*** wildlife sanctuary is part of Sedapatti block. The sanctuary is also inhabited by endangered and vulnerable species like the slender loris, sambar, Nilgiri tahr, Nilgiri langur and sloth bear.

Sedapatti is located in the upper part of Gundar river basin in the Madurai District. The Sathuragiri hills that pass through Sedapatti is known for its diversity of wild plants. The block is also known for its great diversity of medicinal plants.

43,063 ha of forest area

14 varieties of cultivated crops

11 breeds of livestock

12 wild relatives of crops

80 medicinal plant species

50 Traditional knowledge holders



"For generations, our community has been collecting and consuming Adhalaikai ***(Momordica cymbalaria)*** from the wild. But currently, it is becoming more popular among traditional healers who are using it as a substitute for bitter gourd in Ayurvedic medicine. If this species gets commercially cultivated, it would not have the same anti-diabetic properties as that of the wild species. Therefore, we need to conserve our wild crops so that its medicinal properties are not lost."

- Mr. Pandurangan, Native Healer, Kudipatti, Sedapatti Block



Sedapatti Biodiversity Management Committee, Sedapatti Panchayat Union Office, Alampatti- Sedapatti Road, Tirumangalam, Tamil Nadu – 625703, Email: sedapattibmc2018@gmail.com

This poster is part of "Know Your BMC" campaign in Tamil Nadu by the Access and Benefit Sharing Partnership Project implemented by the Ministry of Environment, Forest and Climate Change, National Biodiversity Authority, Tamil Nadu Biodiversity Board and Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH | Data source: People's Biodiversity Register of Sedapatti Block, field data collected by the Covenant Centre for Development (CCD), Madurai and Census of India, 2011 | Compiled by: Ashley Thomas Paul, Ezhilan Nambi, John Britto, Vishvak Kannan.

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ANNEXURE III

Indicative templates for the data collection on stakeholders and the trade of biological resources. For more information, please write to biodiv.india@giz.de

PART 1: VALUE-CHAIN AND STAKEHOLDERS

A. Primary gatherer's profile (benefit claimer)

Code for Gatherer:
Name of the gatherer:
Gender:
Age:
Annual income from BR collection (INR):
Annual income from other source (INR):
Education:
Village:
Street:
Post Office:
PIN code:
Contact no of the respondent:
No. of family members involved in collection:
Membership in Self-Help Group/Community-Based Organization:

B. Details on bio-resource collection

Gatherer code:
Local name of the medicinal plants:
Botanical Name of the medicinal plants:
Collection season (duration in months):
Collection season - peak season (month):
No of days collected during these seasons:
Medicinal plant's part collected:
Phenology of plant while collection:
Collection / harvest technique:
Average fresh weight (kg/day) collected:
Processing at village level (cleaning, grading, drying, Packing, Nil, etc.):
Sold to (mention the name):
Rate per unit (kg):
Is the quantity got reduced what extent (no of seasons, no of days, No of gatherers, Quantity etc.,):
Reasons for reduction according to gatherer (eg: weedicide, no permit etc.):
Village:

C. Cultivator's profile

Code for Cultivator (assign a unique code):
Name of the Farmer:
Gender:
Age:
Annual income from Cultivation (INR):
Annual income from other source (INR):
Education:
Village:
Street:
Post Office:
PIN code:
Contact no of the respondent:
Area allocated for cultivation (in acres):
Number of family members involved in cultivation:
Years of experience in cultivation:

D. Details on bio-resource cultivation

Cultivator Code:
Local name of the crop:
Source of seed materials:
Duration of the crop:
Cultivation season:
Any Specific cultivation practices to be adopted (eg: Mono-cropping):
Acres cultivated (Acres):
Yield per acre (kgs):
Processing involved at farm:
Sold to whom:
Sale price Rate per kg (INR):
No. of years under cultivation:
Village:

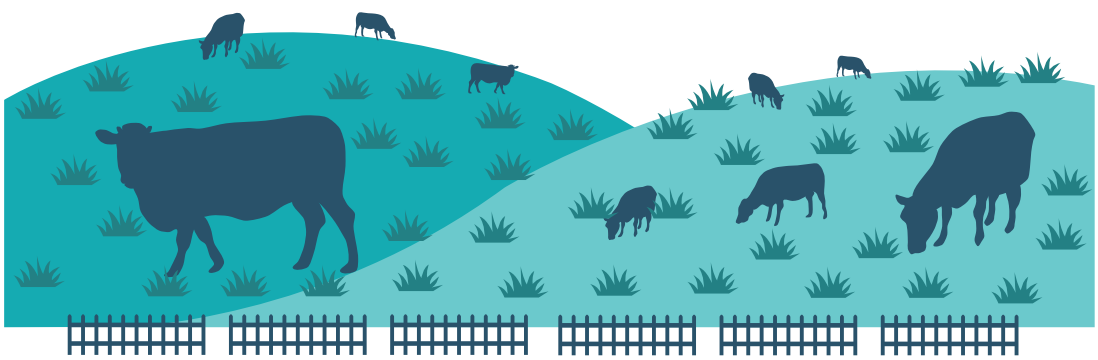


E. Profile of the Livestock holder (domesticated animals)

Code for livestock holder:
Owner Name:
Gender:
Age:
Total no. family members:
Annual income from all source (INR):
Village:
Street:
Post Office:
PIN code:
Contact no of the respondent:

F. Livestock details

Livestock holder Code:
Local name of the livestock:
Livestock category (Cow/Bull//Buffalo/Sheep/Goat/Birds):
Name of the breed:
No of Livestock:
Experience (Since / No of Generation):
Trends (increase/decrease/no change):
Reasons:
Type of shelter:
Used for (dairy/meat/other):
Total income per annum:
Expenditure:
Net profit:
Village:



G. Traditional knowledge holder/healer's profile

Code for Traditional healer:
Name of the healer (knowledge holder):
Gender:
Age:
Annual income from healing practice (INR):
Annual income from other source (INR):
Education:
Village:
Street:
Post Office:
PIN code:
Contact no of the respondent:
No of years of practice:
Specialised in treatment (specify conditions):
No of family members involved in healing practice:

H. Details of medicinal plants used in traditional medicine/healing

Traditional healer code:
Local name of the medicinal plant:
Parts used:
Sourced from:
Quantity used in a year (kg):
Rate per kg (INR):
Details of uses:
Method of preparation:
Trends in availability of resources:
Alternate plants used:
Village:



Part 2: Indicative templates for collecting data on traders, agents and agencies involved in bio-resource trade

A. Profile of agent/trader/agency

Code:
Sector (forest resource/ agriculture/ livestock):
Agent/ Agency/ Trader:
Name of the firm / individual:
Village:
Street:
Post Office:
PIN code:
Phone (landline):
Mobile no.:
Email:

B. Details of biological resources traded

Code
Local Name
Botanical name
Season of collection
Parts purchased
Collection procedure (from whom – Primary Producers/ multiple sources)
Mode of payment
Total quantity (yearly)
Turnover value (INR)
Quality - Moisture %
Quality - Colour
Quality - Appearance
Quality - Taste
Quality - Smell
Quality - Size
Purchase rate (INR/kg)
Semi processing if any
Storage method
Storage period (no. of months)
Special storage method employed
Transport method
Average transport cost (Rs.) applicable per kg
Marketing centre
Agent/Agency/Trader

C. Details of livestock trade

Code:	
Name of the livestock:	
Breed name:	
Livestock category (Cow/ bull/ Buffalo /Sheep/ Goat/ Birds):	
Marketing Schedule (Daily Weekly / Fortnightly/ Monthly / Quarterly/ Annual):	
Purpose (dairy / breeding/ meat /others):	
No of Livestock sold in a year:	
Value in kg /unit:	Purchase cost:
	Sale cost:
	Commission:
Name of the market:	



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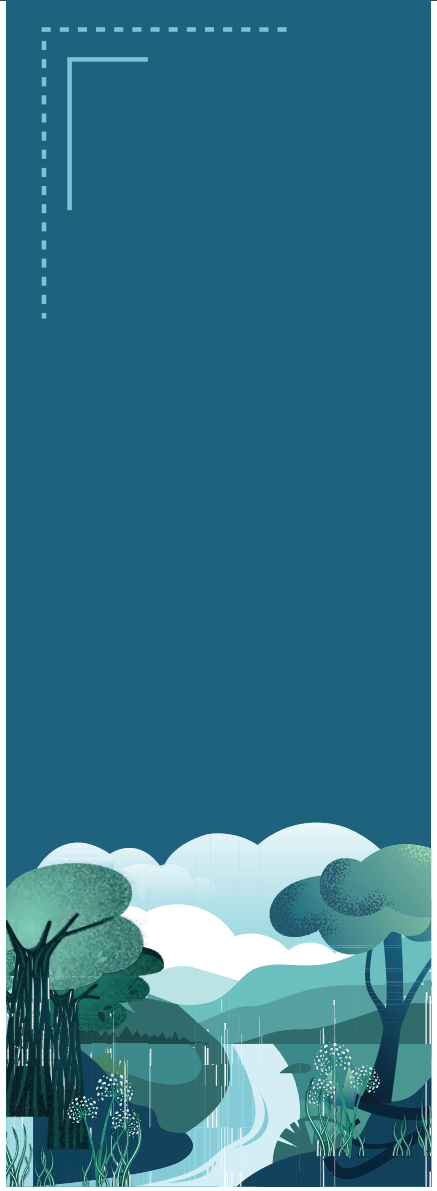
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