



forestry



conservation



genes

Making Biodiversity a
Community Resource

**People's Biodiversity
Register**



A "How-To" Manual

species



ecosystems

land



animal



plant





forestry



conservation



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Foreword



Vilas Bardekar

Chairman,
Maharashtra State Biodiversity Board (MSBB)

India, a sub-continent, is home to a vast and rich diversity of biological resources, ecologies and ecosystems that have not only provided the means for living and livelihoods across millennia, but have been the bedrock and inspiration for India's civilizational accomplishments and its composite spiritual and cultural ethos. They have shaped the way we are and contributed to making us the amazingly diverse people and country that we are.

However, improvements in our standard of living have come at a steep cost to the environment and biotic endowments. Large numbers of species have become extinct in recent times and with them, a vast and priceless treasure trove of irreplaceable knowledge, technological innovations and ecological services evolved over millions of years – an incalculable loss.

Aware of the immense importance of preserving our rich biodiversity, India enacted the Biological Diversity Act in 2002 and notified the Biological Diversity Rules in 2004. The objective is to conserve the country's biodiversity and associated knowledge, facilitate its sustainable use and ensure that benefits accruing from use of biological resources are fairly and equitably shared with those who have been involved in their conservation, use and management.

A key operational component in the Act is the Biodiversity Management Committees (BMCs). These BMCs and related local bodies together with the statutory Boards are mandated and tasked with the implementation of the Act. And the key instrument for this is the People's Biodiversity Register (PBR). The PBR is a documented repository of a community's knowledge of its local bio and cultural resources in all aspects, which when approved by the State Biodiversity Board acquires legal protection and can be used to regulate access to this knowledge and resources by outside parties, as well as to secure benefits and recompense for the community, in the event of their use.

This publication, seeks to provide step-by-step guidance to non-experts on how to conduct and formulate a PBR with the engagement of the local community. Drawing upon practical learnings, the formats for data collection have been simplified and new sections like village history, soundscape and cultural diversity have been introduced together with a series of training modules to build the capacities of facilitators and local communities. It builds upon the 'Methodology Manual for PBR' published in 2006 by the National Biodiversity Authority (NBA) and draws upon several years of practical experience.

This Manual is the outcome of a joint effort of the Maharashtra State Biodiversity Board (MSBB) and the Watershed Organisation Trust (WOTR). I would like to compliment them, particularly WOTR, for helming this effort and for undertaking this much needed publication.

It is our hope that the widespread use of this Manual will increase awareness of our state's and country's rich biological and cultural diversity and inspire a citizen's movement to conserve, enhance and utilise it sustainably for the benefit of our country and people.

Preface



Dr. Marcella D'Souza
Executive Director,
Watershed Organisation Trust (WOTR)

People's Biodiversity Register (PBR) is a need of the time. Considered an area for experts, traditionally, only 'knowledgeable people' conducted biodiversity surveys for its documentation and assessment. With the help of such survey reports, governments designed policies. Whether unknowingly or consciously, local communities were left out of this process.

The impacts are startling: degradation and loss of our rich biodiversity. We realise, more than ever before, that to conserve and grow our biodiversity heritage, we need the active engagement of those who best understand and live with it – the local communities whose lives are woven together with their natural surroundings. The PBR is an effort to actively involve this crucial stakeholder, the local people, in owning, documenting and protecting the traditionally percolated knowledge of biodiversity.

Supported by legislation – the Biological Diversity Act, 2002 – the PBR promotes formation of a Biodiversity Management Committee (BMC) in each local governing body. BMCs are expected to conserve and promote the local biodiversity, through an approved process. The act also factors in local livelihoods, insisting on the sustainable utilisation and equitable sharing of benefits arising from commercial utilisation of the natural resources.

The concept of the PBR is not new. There are a few organisations and people conducting PBR in different parts of India. What then, is the significance of this document? What is WOTR doing different? Having established PBR registers in 25 villages of Maharashtra and eight villages of Madhya Pradesh, significant data is being gathered through these registers. This "How-to" Manual is an outcome of the lessons learnt while implementing the PBR process in these 33 villages.

The climatic uncertainties we have begun to experience are an added threat to biodiversity. However, it is human intervention that is its greatest enemy. If we humans are to survive, we will have to fall back on our biodiversity to sustain us in times of need; hence the urgency to protect, conserve and promote our local biodiversity.

This "How-to" Manual is prepared in collaboration with MSBB for the Indian context; however, it can very well be applied in any other country where facilitators or village community members are keen to promote their biodiversity.

This 'How-to' PBR manual will help protect and grow our natural heritage – the local biodiversity. When maximum number of local communities will be benefited from the PBR, the efforts put in towards developing this manual will have achieved its goal.

Message



Dr. Dilip Singh

Addl. Principal Chief Conservator of Forests and Member Secretary
Maharashtra State Biodiversity Board (MSBB)

Maharashtra is a land of rich biological and cultural diversity. It is one of the most developed and mega bio-diverse states in India. It is also a home to a large number of tribal groups, pursuing different kinds of nature-based livelihoods. In addition, a large number of farming and fishing communities and nomadic groups possess traditional knowledge of varying degrees. The development of modern science and technologies, notably biotechnology and information technologies, has increased the value of biodiversity and associated knowledge, including traditional knowledge.

The first step towards conservation is sustainable utilisation of biodiversity and its documentation. Biodiversity and associated knowledge is found in different ecosystems, under different management regimes; hence the results and manner of documentation will also differ.

Section 22 of the Biological Diversity Act, 2002, states that every local self government body shall constitute a Biodiversity Management Committee (BMC) within its area of jurisdiction. The main function of the BMC is to prepare a People's Biodiversity Register (PBR) in consultation with the local people. The register shall contain comprehensive information on availability and knowledge of biological resources, their medicinal or any other use. So, it is important to keep in mind some of the issues related to the PBR:

- It is to be undertaken in a participatory mode involving various sections of village society.
- Information provided by people needs to be collated, analysed and cross checked by the members of a Technical Support Group before documentation.
- The PBR is an important base document in the legal arena as evidence of prior knowledge and hence careful documentation is necessary.
- The document should be endorsed by the BMC and later publicized in the Gram Panchayat/Panchayat Samiti.
- The document could be a very useful tool in the management and sustainable use of bio-resources.
- The document can also be a very useful teaching tool for environmental studies at schools, colleges and university level.
- The document should be periodically updated with additional and new information as and when generated.

The Maharashtra State Biodiversity Board (MSBB) provides guidance and technical support to the BMC's for preparing PBRs. It also imparts training to the stakeholders and enables smooth functioning and aid in networking for creation and maintenance of PBR's.

In this endeavor, MSBB requested WOTR, which has vast experience of working in this area, to develop a Manual which would guide local community groups to easily understand the technical process of preparation of a PBR. The organisation responded spontaneously and within a short time developed this informative Manual.

It is our hope that the user community groups and TSG members will find it a handy tool to understand the process of developing PBRs for a particular area. MSBB appreciates the help rendered by Mr. Crispino Lobo, Managing Trustee, WOTR, and his team in developing this useful Manual.

Message



Dr. Erach Bharucha

Former Chairman, Maharashtra State Biodiversity Board (MSBB)
Director, Bharati Vidyapeeth Institute of
Environment Education and Research (BVIEER), Pune

The need for conserving the earth's biodiversity and our own national biological assets has become urgent in the wake of "economic growth". While poverty eradication, health care and education are seen as sheet anchors of sustainable growth, protecting biological wealth is rarely factored into global and national strategies aimed at bettering human wellbeing. As sustainable development cannot be achieved without conserving biological wealth, nation states have together drafted the Biodiversity Convention. They have also included the need for conservation in major earth agendas such as the MGDs, SDGs and the Aichi Targets.

The Biological Diversity Act, 2002, envisions an internalised mechanism, linked to our unique Panchayati Raj System, that could result in sustainable use of wilderness resources. It envisions that there would be local Biodiversity Management Committees (BMCs) at rural and urban administrative levels. It embodies the creation of People's Biodiversity Registers (PBRs) that would document bio-resources that people have traditionally used together with related local knowledge that they have transmitted through many generations as well as local governance systems that saw to it that overuse was prevented and bio-resources were distributed equitably.

This conservation ethic, however, has been gradually eroded in recent times leading to ecosystem degradation and even species loss through extinction. This is a form of cryptic and hidden impoverishment that is as serious as economic poverty, malnutrition, lack of housing, the spread of environment related diseases and natural or manmade disasters.

How can this knowledge of the need for a new conservation ethic be disseminated among every stakeholder in our rapidly changing society?

The Biological Diversity Act, 2002, has been framed to ensure that people who are the direct and even indirect beneficiaries of biodiversity can use it sustainably in the long term. The PBR is documentary evidence that the biological resource is what the community knows and has used over generations. This gives the local community the right to demand its rightful share of profits from the manufacture and sale of products developed from biological resources collected from their local landscape.

Across India (and Maharashtra) there are now hundreds of BMCs registered with State Biodiversity Boards that have made PBRs and through the Act's Access and Benefit Sharing (ABS) mechanism, local communities have begun to get returns from industry that depend on biodiversity as a raw material.

However, the appreciation of how this mechanism works for people at large has remained at a very miniscule level. Since the PBR is a key document to ensure the functioning of an ABS agreement between local people and external user groups, it is imperative to build local capacities to ensure that PBRs and ABS become operational locally. This is what this "How to" Manual will do.

I congratulate WOTR for this effort that I am sure will be of great use to people in documenting their own bio-resources and preserving their Traditional Knowledge Systems (TKS) that are inherent in India's diverse cultures.

Acknowledgements

This PBR Manual is the outcome of the consistent efforts of many. We are grateful to all who have helped us realise this. In particular, we would like to record our gratitude to Balu Bhangare, Devram Kondar, Mahadu Kondar and Javed Maniyar of Khadaki Budruk, Purushwadi and Kothe Burduk for their wholehearted support in realising this project on the ground.

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We are grateful to Devram Kondar of Purushwadi who has so remarkably captured in painting the various concepts pertaining to sustainability, ecosystems, culture, traditions and biodiversity. We are also grateful to Nitesh Parulekar and Vaibhav Sathe for sharing their photographs and to Atul Pagar for helping us design pictures for the Manual.

We thank the management of WOTR for their constant support and encouragement. Last but not least, we are grateful to the WOTR Team, especially Suchita Awasthi, who have helped us make this initiative successful.

We thank Dr. Erach Bharucha, Dr. Vilas Bardekar, Dr. Dilip Singh, Dr. Dilip Gujar and other members of the Maharashtra State Biodiversity Board (MSBB) for their guidance, support and cooperation.

We are indebted to the Swiss Agency for Development and Cooperation (SDC), Embassy of Switzerland and the National Bank for Agriculture and Rural Development (NABARD) for funding this project. It was in projects supported by the SDC and NABARD that we were able to gather experiences on the ground, test and validate the approaches developed in this Manual.

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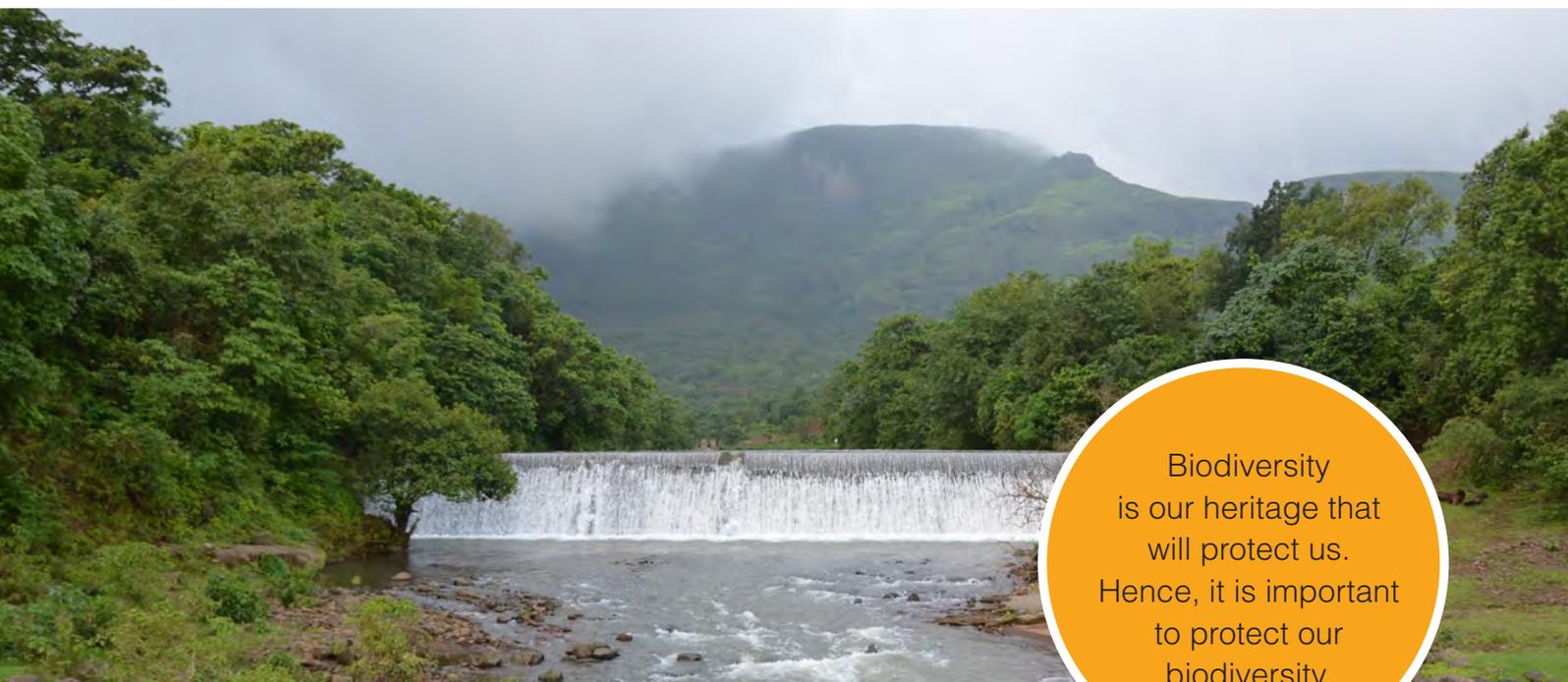


SECTION I

INTRODUCTION



Introduction



Biodiversity is our heritage that will protect us. Hence, it is important to protect our biodiversity.

Importance of protecting biodiversity

Biodiversity is our heritage that will protect us. Hence, it is important to protect our biodiversity.

With the the Biological Diversity Act, 2002, the goal of establishing people's rights over their natural resources and their involvement in its protection and conservation is put in place. There are various efforts being made countrywide for documenting the local biodiversity. Although there are defined formats for data collection, a systematic approach for the local community to develop the **People's Biodiversity Register (PBR)** was required. Without this, there was a lack of ownership. This manual is an attempt to bridge this gap.

The "How-to" manual emerged from a need expressed by the **Maharashtra State Biodiversity Board (MSBB)**. So as to document the local biodiversity in the many project villages, WOTR simplified the methodology and modified the formats to collect practical and precise data on biodiversity. These reworked formats along with the detailed process of PBR development are put together in this Manual. It is prepared such that a facilitator who does not have knowledge on the subject can easily develop capacities of rural communities to establish PBRs in their villages. The method adopted is the simplified PBR methodology designated by **National Biodiversity Authority (NBA)** of India in 2009¹. However, this tool has been modified

¹NBA, n. d., People's Biodiversity Register. Government of India. Accessed at <http://nbaindia.org/content/105/30//pbr.html>



Credit: Art Work by Devram Kondar

without disturbing the conceptual framework. Emphasis has been given to the active participation of communities, particularly of the elders and those groups who are the repository of specialised traditional knowledge.

There is barely any document which talks about the exact PBR process. The 'Methodology Manual for PBR' published by NBA in 2009 takes a broad view of the PBR. It refers to "what to do", rather than "how to do it".

The process in WOTR started with the PBR being introduced in its project villages, applying the ready PBR formats. However, it was not a simple task to gather villagers and tell them to form BMCs and then plan the establishment of PBR. Before handing it over fully to the villagers, the WOTR team and local Wasundhara Sevaks played a major role. After various in-house discussions, a rough plan was made and the PBR work began.

Awareness generation through rallies, meetings, selecting village youths, capacity building of selected group of locals, mock data collection and assessment, was done step-by-step. A major component – the village history was added later. This helped identify the knowledgeable persons in a village. A Technical Support Group (TSG) was formed at the institutional level to collect species specific data. Once a strong motivation was created within a village, it was followed by formation of BMCs; collecting more and more data and validating the same; transferring it to the registers; getting approved by the **State Biodiversity Board (SBB)**. However, it was found that timely monitoring is a must. While going through the whole process of PBR development, a need was felt for a "How to do" manual based on this experience which could guide others in developing the PBR.

In this manual, the essence of the conventional PBR knowledge base is intact. However, there are two important value additions that have been introduced: the simplification of the formats of PBR, and the development of a ready-to-use step-by-step process of conducting a PBR. There are some altogether new sections introduced into the existing PBR datasheet framework: The Village History, Soundscape and Cultural Diversity.

It has been observed that the data collected for these additional sections is significant for planning the utilisation as well as conservation of local biodiversity.

In this effort, the essence of the lessons learnt of including biodiversity concerns in the face of climate change has also been considered. We have engaged with communities, the MSBB and several experts on the subject.

Additionally, factoring climate change concerns in the PBR is very essential, because our survival depends upon protecting our rich biodiversity. The detailed process for the establishment of the PBR will guide a motivated facilitator to conduct the PBR process in any village. Linking the PBR with the SBB will see it to its logical conclusion.

How to Use the “How-to” Manual

This Manual is for those intending to facilitate the preparation of the People’s Biodiversity Register (PBR) in the context of the growing complexity and threat of climate change. The manual has six sections.

Section I outlines the importance of biodiversity and introduces the readers to the Manual.

Section II builds a perspective of biodiversity in the context of climate change. It provides an ecosystemic perspective and explains ecosystem services in detail. The source of these ecosystem services is the basis of livelihood of communities and, therefore, of the PBR. In short, this section gives a background to underline the need of the PBR.

Section III describes the process of PBR documentation in villages. It deciphers the process step by step. It provides the scope of actual things to be implemented in the PBR. It provides an insight on access and benefit sharing and the National Biodiversity Authority’s view on the concept.

Section IV is designed so as to prepare a facilitator to conduct the PBR process in a village. This section is full of activities which will help facilitators to understand “hands-on” the basics of biodiversity. Conducting the exercise for each activity may further be used to train villagers in developing their PBR. There are a few documents provided as annexures. This includes the modified PBR formats, guidelines for collection of village history, and a few more activities with reference to biodiversity.

Section V talks about modifications carried out in the existing PBR in order to make it more comprehensive. This section is partly a learning from the field which was used in preparing the PBR.

Section VI is more of guidance notes for facilitators, how they should carry out trainings to bring villagers and implementers on a common platform from where they can start the process of building the PBR in a village. A facilitator is expected to have a good understanding of the perspective, that is in Section II. Details of this are in **Annexure I**.



SECTION II
BUILDING A
PERSPECTIVE



Building a Perspective



Biodiversity is the variety of all forms of life. It is the variability among living organisms and their habitats.

Biodiversity is the variety of all forms of life. It is the variability among living organisms and their habitats, including the diversity within species, between species and within ecosystems.

Traditionally, biodiversity is defined as the sum of genes, species and ecosystems over a landscape. Genetic diversity is considered the building block of biodiversity, facilitating fitness, adaptation and evolution. Species diversity is the variety of genetically dissimilar organisms present in the region. Ecosystem diversity is the variety of distinct landscape patterns in a given region. Biodiversity also encompasses multiple and often conflicting and sometimes irreconcilable socio-cultural values. Cultural aspects are important in the context of an ecosystem approach. However, in the definition of biodiversity, generally the beliefs, customs, practices and unique ways of communities and cultures that are so connected to their natural environment, are overlooked. The conventional definition of biodiversity delinks humans from nature. When the cultural perspective is acknowledged, it recognises the important bond between humans and their environment, where culture and nature are mutually intertwined, each affecting the other.

Biodiversity and Ecosystem Services

There are 5-30 million distinct species on the Earth; most are microorganisms of which only about 1.75 million have been formally documented. The interactions



between the various components make up the total global biodiversity and have set the foundation on which human societies have evolved. Biodiversity and the interconnectedness of the various species within an ecosystem, provide services that sustain creatures living within, including humans. These are the essential goods that have value for current requirements and future needs and are of incalculable intrinsic worth.

Today, in the name of protecting biodiversity, only individual species that are depleting are highlighted and tracked. What is missed out in this debate is the interconnectedness and interaction of the various components of biodiversity which provide the ecosystem services. This in turn creates the ambience for survival of the species and of us humans. The richer the biodiversity, the greater the ecosystem services they provide, the greater the survival opportunities for humans.

A healthy biodiversity reflects an abundance of all the ecosystem services required for a good quality of life for the community. Its reverse should, therefore, immediately raise concerns about the quality of biodiversity in the system. **Depletion of native biodiversity is generally accompanied by a gradual loss of cultural diversity.**

Types of Ecosystem Services

Ecosystem services are the benefits that we receive from ecosystems, either directly or indirectly. These services are surprisingly numerous. The diversity of the services is the strength of an ecosystem. Below mentioned are just a few of the services known to us:

Provisioning Services



Food, Fibre and Fuel



Genetic Resources



Bio-chemicals



Fresh Water

Regulating Services

- ❖ **Protection against Invasive Species**
- ❖ **Fodder Regulation**
- ❖ **Pollination**
- ❖ **Seed Dispersal**
- ❖ **Climate Regulation**
- ❖ **Pest Regulation**
- ❖ **Disease Regulation**
- ❖ **Natural Hazard Protection**
- ❖ **Erosion Regulation**
- ❖ **Water Purification**

Supporting Services

- ❖ **Primary Production**
- ❖ **Provision of Habitat**
- ❖ **Nutrient Cycling**
- ❖ **Soil Formation and Retention**
- ❖ **Production of Atmospheric Oxygen**
- ❖ **Water Cycling**

Cultural Services

- ❖ **Spiritual and Religious Values**
- ❖ **Knowledge System**
- ❖ **Education and Inspiration**
- ❖ **Recreation and Aesthetic values**

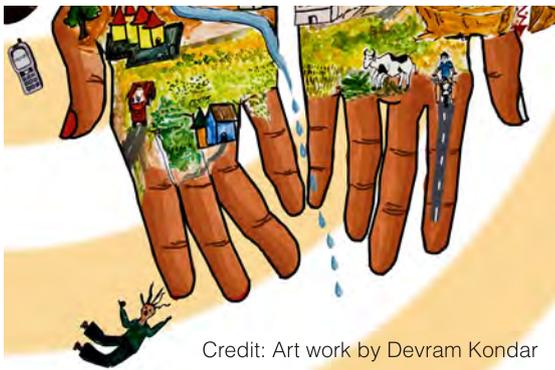


Human Beings within the Ecosystem

We live in ecosystems that are diverse, interrelated and dynamic. The ecosystem is not an object to be understood or managed by us as external agents. It is a place we call home. We are a part of the ecosystem. It is a space that provides us with services for our survival - the ecosystem services. Biodiversity contributes directly (through provisioning, regulating, and cultural ecosystem services) and indirectly (through supporting ecosystem services) to many constituents of human well-being. These include security, basic material for a good life, health, good social relations, and freedom of choice and action.

Biodiversity now faces a new type of change, brought on by human activities which affect the natural variability. Over the last couple of centuries, human beings have profited from the conversion of natural ecosystems to human-dominated ecosystems at the cost of biodiversity. At the same time, however, the losses in biodiversity and changes in ecosystem services have caused some groups of people to experience declining well-being, with poverty exacerbated in some social groups².

Disruption of Nature's Playground by Human-induced Activities



Credit: Art work by Devram Kondar

Transformation of the global environment is occurring very rapidly. Dedicated effort on the part of us humans to use the planet for our own material growth and benefit is now backfiring. Great swathes of temperate forest have been cleared over the past few centuries for agriculture, timber and urban development. Tropical forests are now on the

front line. Human-assisted species invasions by pests, competitors and predators are rising exponentially. Overexploitation of fisheries and forest animals is pushing the societies to the point of collapse. The gap between actions demanded by science (ecosystem services required for our own survival) versus that what we are prepared to deliver is huge and increasing. For us humans, we are hurtling towards an existential crisis. Clearly, this planet-wide domination by human society will have implications for biological diversity. The 2005 Millennium Ecosystem Assessment report (an environmental report similar in scale to the Intergovernmental Panel on Climate Change Assessment Reports) drew some bleak conclusions – 60 per cent of the world's ecosystems are now degraded and the extinction rate is now 100 to 1000 times higher than the "background" rate of long spans of geological time. In other words, development has changed and fragmented the landscape on which biodiversity depends. It has changed the conditions and created islands of isolated habitats. At the same time, exotic species have entered beyond their biogeographic boundaries. Chemicals have been introduced for which many species have no evolutionary experience. These stressors have created well-documented problems in the practice of conservation.

² Millennium Ecosystem Assessment, 2005. Ecosystem and Human Well-being: Synthesis. Island Press, Washington DC.



Biodiversity and Natural Climate Change – an Evolutionary Ballet

Biodiversity transforms itself continuously in response to a changing climate. These conditions and the environment have been in constant flux during the entire history of the earth. While these changes may be rapid or slow, large or small, they result in rearrangement of biological interactions and processes. This results in natural variability.

Human-Induced Climate Change

Of all the stressors to biodiversity, perhaps the most damaging is the human-induced climate change*. Biodiversity that is already under multiple threats is strained and stressed even further. Normal stressors like habitat fragmentation add to non-normal climate change in a non-linear and unpredictable manner, posing the biggest-ever challenge to biodiversity. There are four main reasons for the severity of impact on biodiversity by human-induced global warming:

- a) The already rapid human-induced global warming is expected to accelerate further. The **Intergovernmental Panel on Climate Change (IPCC)** storyline scenarios such as A1FI and A2³ suggest a rate of warming of 0.2 to 0.6°C per decade. The average change from 15 to 7 thousand years ago was only about 0.005°C per decade, although short duration abrupt climatic shocks, such as the Younger Dryas⁴, Dansgaard-Oeschger and Heinrich⁵ events were interspersed through this period.
- b) A low-range optimistic estimate of 2°C warming in the 21st century will shift the Earth's global mean surface temperature into conditions which have not existed since the middle Pliocene, three million years ago. On the other hand, more realistic estimates of heating – greater than 4°C – will, within a century, take the planet's climate back to the largely ice-free world that existed prior to about 35 million years ago. The lifetime of average "species" is only 1 to 3 million years. With rapidly rising temperature, within the "geological instant" of a century, planetary conditions will be transformed to a state unlike anything that most of the world's modern species will have encountered.
- c) It is critical to understand that ecosystems in the 21st century start from a massively "shifted baseline", due to which they have lost resilience. At this present time, most habitats are already degraded and their populations depleted, by the onslaught of human activities. From the last two thousand years up to the 18th century, human impacts were localised, although often severe. However, in the last couple of centuries we have unleashed physical and biological transformations on a global scale. Self-reinforcing feedbacks from global warming, ocean acidification, habitat loss, habitat fragmentation, invasive species, chemical pollution are likely to lead to cascading extinctions. For instance, over-exploitation, habitat loss and changed fire regimes will likely enhance the direct impacts of climate change and make it difficult for species to move to undamaged areas or to maintain a

**Climate change is impacting biodiversity. Even though it is not specifically included in the current guidelines of the PBR, it is imperative that its effects also be considered when planning for and undertaking measures that conserve and enhance biodiversity at various scales, as envisaged by various provisions of the Maharashtra State Biodiversity Rules, 2008, General Functions of the Board, subsection 14, Nos. 5,9,10,11 and 18*

³ IPCC, 2007: Summary for Policymakers. In: Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

⁴ NOAA, n. d., The Younger Dryas, National Climate Data Center, USA. Accessed at <https://www.ncdc.noaa.gov/paleo/abrupt/data4.html>

⁵ NOAA, n.d. Heinrich and Dansgaard-Oeschger events, National Climate Data Center, USA. Accessed at: <https://www.ncdc.noaa.gov/paleo/abrupt/data3.html>

Drivers of change as depicted by Millenium Ecosystem Assessment (MEA 2005)

| | | Habitat change | Climate change | Invasive species | Over-exploitation | Pollution (nitrogen, phosphorus) |
|--------------|--------------------------------|----------------|----------------|------------------|-------------------|----------------------------------|
| Forest | Boreal | ↗ | ↑ | ↗ | → | ↑ |
| | Temperate | ↘ | ↑ | ↑ | → | ↑ |
| | Tropical | ↑ | ↑ | ↑ | ↗ | ↑ |
| Dryland | Temperate grassland | ↗ | ↑ | → | → | ↑ |
| | Mediterranean | ↗ | ↑ | ↑ | → | ↑ |
| | Tropical grassland and savanna | ↗ | ↑ | ↑ | ↘ | ↑ |
| | Desert | → | ↑ | → | → | ↑ |
| Inland water | ↑ | ↑ | ↑ | → | ↑ | |
| Coastal | ↗ | ↑ | ↗ | ↗ | ↑ | |
| Marine | ↑ | ↑ | → | ↗ | ↑ | |
| Island | → | ↑ | → | → | ↑ | |
| Mountain | → | ↑ | → | → | ↑ | |
| Polar | ↗ | ↑ | → | ↗ | ↑ | |

Driver's impact on biodiversity over the last century

| | |
|-----------|--------------|
| Low | Light yellow |
| Moderate | Yellow |
| High | Orange |
| Very high | Red |

Driver's current trends

| | |
|-----------------------------------|---|
| Decreasing impact | ↘ |
| Continuing impact | → |
| Increasing impact | ↗ |
| Very rapid increase of the impact | ↑ |

Source: Millennium Ecosystem Assessment

“buffer” population size. One threat reinforces the other, or multiple impacts play off on each other, making the overall impact far greater than it would, had each individual threat occurred in isolation⁶.

- d) In the past, species adapted to climate change mainly by shifting their geographic range to higher or lower latitudes, or up and down mountain slopes, depending on whether the earth was warming or cooling. Now, unlike the past, the species (e.g. leopards, elephants etc.) attempting to migrate will find factories, railway tracks, expressways, farms and urban settlements in their path, leading to conflicts and further challenges. The only place they could possibly go to is up the mountains. As they move up the mountain towards its peak, they will increasingly find their habitats shrinking. Earlier there were evolutionary responses – individuals most tolerant to new conditions survived and made future generations intrinsically more resilient. However, because of the reasons stated above, this type of adaptation will, in most cases, simply not be possible or will be inadequate. Bluntly put, global change is too pervasive and occurring way too rapidly.

⁶ Brook, B.W., Sodhi, N.S. and Bradshaw, C.J., 2008. Synergies among extinction drivers under global change. Trends in ecology & evolution, 23(8), pp.453-460.



Climate change increases the challenges of conservation. Loss of habitat, which is presently seen as the greatest threat to biodiversity, will align with the climate change to make shifts within the threshold range very difficult, bordering on the impossible. Invasion by alien species, pollution, and use of forest resources will synergise with climate change impacts. When faced with multiple stresses, the ecosystem may be pushed past its threshold limits and behave in unpredictable ways. The nature of range shifts could result in new associations between the species, leading to new states of unstable transient population of species. While human beings can be prevented from migrating by physical measures, most other species under stress (particularly pests and vermin) have little respect for such measures since they are designed by nature not to acknowledge the latter's presence. The impact of climate change on human systems would result in changes that will exacerbate the impacts on biodiversity.

Links between biodiversity and climate change run in two ways: biodiversity is threatened by climate change, but proper management of biodiversity can reduce the impacts of climate change. Vast changes are expected in the world freshwater resources; hence in their provisioning of ecosystem services. Deforestation increasingly interacts with climate change in all scenarios, causing not only more flooding during storms but also more fires during droughts, thus greatly increasing the risk of runaway climate change. The impacts of climate change will increase the risk of extinction of certain species and change the nature of ecosystems. Shifts in species distribution as a result of climate change are well documented.

Biodiversity is richest in tropical areas and nearer the equator. However, inhabitants here are least likely to have resources or information needed for proactive adaptation to change in climate.

Ecosystem and Humans – From a Different Viewing Point

Conservation has so far operated in a relatively static world, though now it will have to attempt to succeed in a world of considerable flux. There is a distinct possibility of an abrupt climate change leading to scenarios difficult to envision. Conservation planning should now be seen in the context of both humans and ecosystems together. New strategies, which are dynamic and participatory, are required. Leaving human beings out of the equation of conservation efforts would only worsen the biodiversity situation. We need a new thought process that directs this collaboration, involving community management and monitoring in response. Continuous testing and refinements of these methods will be critical for an appropriate response to the challenges posed by climate change.

This section helps to generate new perspectives, introduce systems, ideas and develop a thinking process that forms the basis for addressing biodiversity concerns in the face of climate change, through a participatory methodology.

The following chart is a reproduction of a painting made by Devram Kondar, a resident of Purushwadi, a small tribal village in the Akole Taluka of Maharashtra, India. Devram's illustration communicates his emerging understanding of the ecological connections.

The Ecological Pyramid and an Inverted Ecological Pyramid



Credit: Art work by Devram Kondar

This insight came to him during the discussions on trophic levels shown in ecological pyramid. The vegetation forms the base, with the next layer occupied by herbivores, followed by small carnivores, and on the top are large carnivores. Each layer decreases proportionately forming a stable pyramid. The illustration shows a relationship between different layers of human development as also of provisioning services. At the base is the forest with forest dwellers. They live in a symbiotic relationship with the forest, deriving their sustenance from the biodiversity and its interactions. The agrarian communities – now formed into villages – occupy the next layer. Their life as well as livelihoods heavily depend upon the ecosystem services provided by the bottom layer of the pyramid. Healthy soil, water and pollinators for their farms, clean water and air, protection from extremes, their culture and language are all supported by the base. They grow food in surplus for towns and mega-cities further up the pyramid. On top of the pyramid are mega-cities, which necessarily seek their services from the layers below that support them.

When we reflect on this illustration the connections between various ecosystems become clear. In the pre-industrial era, the pyramid was balanced, with a wide base signifying biodiversity-rich ecosystems, on which depended the rural agrarian ecosystems, on which further depended towns and cities occupying the narrower part. Today, these scenarios have been reversed. Biodiversity is steadily eroding, with rural ecosystems getting converted into towns and cities leading to a reverse pyramid which signifies instability, as no system can stand firm on a narrow base and wide top.



Developing a Sense of Ownership of the Biological Diversity

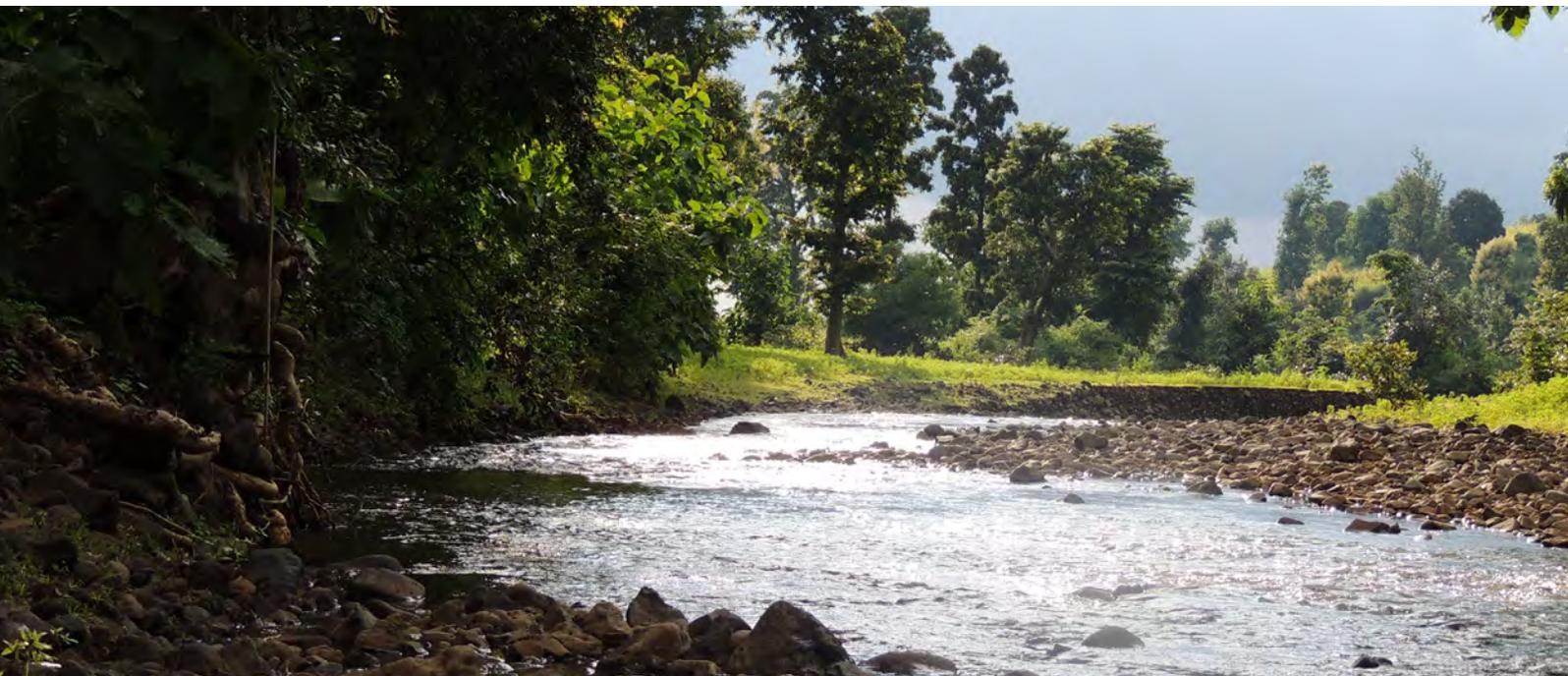
Years of following top-down approaches to conservation have only led to a sense of disconnect for those living closest to natural ecosystems. Village communities have traditionally drawn on various elements of biodiversity as part of their life and culture. They understand its importance and the interconnectedness very well, which is the key to long-term conservation. What is needed is to provide more power to the local Panchayat, a legal body that is part of the local community. Although the Biological Diversity Act, 2002, provides power to Panchayats, their influence has not yet been fully realised.

Insider View of Biodiversity

A discussion on biodiversity makes us aware that most of our knowledge and information is academic. The most important view of biodiversity is from within – the lived experience that can only come from local communities and the individuals within them. In that sense, local communities are “the insiders” of the ecosystem and as such their role in the process of ecosystem conservation is of great importance. In any system, the role of an insider is critical for sustaining that system.

People’s Biodiversity Register (PBR): Towards a Solution

In order to survive the onslaught of climate change and continue to receive the services the ecosystems provide, it is but necessary that we go to the very people who have been living in the respective eco-spaces, to learn from their intimate co-existence as part of their biodiversity. The People’s Biodiversity Register is a small but concrete step in this direction. It is here that science and native knowledge get intertwined. Tracking the history of indicators and indications of the health of an ecosystem, through its biodiversity together with the local inhabitants, will enrich our understanding of the ecosystem services it provides. When the PBR processes are undertaken with a new perspective, they can act as powerful mediators in the process of building resilience and adaptive capacities while reducing vulnerability of the community and the ecosystem to climate change.



The PBR has the following potential



1. Make nature's value visible

Nature's value is generally taken for granted. Blindness to the nature's bounty is pervasive and is one of the main reasons for it being degraded to such critical levels. Wherever the community or individuals can put a value to any of services provided by their ecosystems, they should be encouraged to record it. This valuation should be considered in discussions for selecting development as well as conservation activities.

Ecosystems and biodiversity provides innumerable services, which are priceless. It is simply not possible to put any monetary price on them. Paradoxically, therefore, the cost of these services is conveniently assumed to be zero. Continuous efforts should be made to encourage documentation of the priceless services provided by the biodiversity and ecosystems. These then shall be their priceless possessions, and should be regarded as such.

2. Pricing the priceless

3. Valuing the future

The value of ecosystems is not static as it continues to grow with time. Furthermore, its value for future generations should not be allowed to erode. These questions stimulate rich discussions and debate.

The ecosystems also provide spare capacity for periods of uncertainty. Acting as shock absorbers, they reduce risks. In many ways, taking care of one's ecosystem is like paying one's insurance premium. Communities should be encouraged to make this role of the ecosystem explicit by recording it, as also by discussing any potential erosion of its capacities in order to provide for uncertainties and shocks.

4. Risk reduction and accounting for uncertainty

5. Measuring and maintaining records for better management

It is not enough to simply record the occurrence of specific species in the PBR. Accurate narratives of uses, traditions, healing properties, state of the system and rate of change are just as important. Apart from qualitative techniques, interested youth and other groups should be introduced to quantitative techniques like scientific transects and quadrats as a regular good practice to be applied.

Biodiversity must be viewed as natural capital, and PBR an account of this capital. It is critical that this information is then used at all appropriate fora such as Gram Sabha (village general body meetings), Joint Forest Management Committee meetings, etc., to ensure equitable access to the ecosystem services, especially by the marginalised and vulnerable within the community.

6. Natural capital and poverty reduction

7. Changing the incentives

Incentives and disincentives can play a powerful role in conservation. They have the potential to change behaviour. To be effective, incentives and disincentives should be applied quickly - with little loss of time between the trigger and the consequent action. The reward or retribution should be rapid, even if small, so that its efficacy is not diluted due to the systemic delays in its implementation.

The ecological infrastructure determines the interactions between species, which in turn depends on the richness of the biodiversity, its density and factors such as state of their habitats. Sound ecological structures are more resilient to climate change. One should also be alert to changed baseline of the ecological infrastructure due to development and other human activities, or natural calamities in the past.

8. Ecological infrastructure and climate change



Why Protect Biodiversity – The Incentives

When we say we have to adapt to climate change, biodiversity conservation should normally be included. A robust biodiversity will help absorb shocks of climatic disasters. Where the biodiversity is exploited for monetary gains, it is but fair that communities and local inhabitants who are asked to conserve the biodiversity or who volunteer to do so should receive tangible incentives.

However, even when tangible incentives are considered, it is important to address issues faced by communities that are traditionally reliant upon ecosystems for their daily needs. For instance, these communities need fuel wood for cooking as also to earn from its sale. Hence, they will not immediately understand the need to stop chopping down trees for firewood. They will, therefore, need to have some tangible incentives before they are convinced to conserve the ecosystem. These eco-incentives need to be immediate if biodiversity protection is to be realised immediately. In the village of Mendha-Lekha (Gadchiroli district of Maharashtra) incentives have been provided in terms of supporting a livelihood of the community. In Mendha-Lekha, villagers have planted bamboo on a large scale. Its sustainable extraction provides the community with an alternative livelihood. Such initiatives are persuasive incentives to conserve ecosystems.

Nutritional benefits



Once an ecosystem has been restored, there are chances for biodiversity to prosper. There are often varieties of wild edibles available in the forests, which local communities earlier depended on for their nutritional needs such as carbohydrates, minerals, vitamins, fibre and so on. Restoration of an ecosystem will often provide such incidental advantages to a community, particularly that which is traditionally known to them.

Livelihoods



Numerous village livelihoods can thrive from the raw materials of the forests. Bamboo crafts, sale of local medicinal plants, making of food-plates and bowls from large leaves (locally called **patravali** and **dron**), etc. are some of the major livelihoods in villages. Only a healthy ecosystem can ensure a continuous supply of raw material for such livelihoods. A conserved ecosystem automatically ensures support and sustainability of such livelihoods.

Monetary valuation can illustrate the importance of some of the information obtained through qualitative and quantitative indicators. For example, the wastewater purification service provided by healthy wetlands can be valued in monetary terms through the equivalent cost of a wastewater treatment plant that would provide a similar service. Additionally, the revenues generated from tourism will indicate the importance of the cultural ecosystem services provided by wetlands. Some ecosystem services have a direct economic value that can be readily monetised, such as the local economic value of fish catches.



Monetary valuation will give an indication of a society's preferences which are understood and are communicable. It helps make explicit preferences that are normally hidden and not reflected in market prices (e.g. the preference for clean water).

In many cases, provisioning ecosystem services (such as food or timber) are more visible and favoured in the policy-making process because they have a market price. However, there are many other ecosystem services that are less visible and often overlooked or underrepresented in the policy-making processes. The economic valuation of traditionally less well-assessed provisioning services (e.g. the value of some genetic materials or of water provision from wetlands) and regulating services (e.g. water purification, waste-water treatment, and erosion control) contribute to the arguments for conservation, wise use and restoration.

A study carried out in 2009 by the International Union for Conservation of Nature (IUCN) together with the Environment and Agricultural Research Centre and the Economic and Social Policy Analysis Centre estimated that the annual economic benefits derived from agriculture in the Sourou Valley, Burkina Faso, were only 3% of the total ecosystem services (valued at US\$ 21.2 million), despite the fact that in the mid-1990s the government had launched a master plan for agricultural development in the region. Timber products instead accounted for 37%, non-timber forest products for 21%, pastures for 18%, and both fishery and transportation on water for 10%⁷. As another example, a recent study demonstrated that most potential carbon emissions due to mangrove loss could be avoided at a cost between \$4 and \$10 per ton of CO₂⁸. The outcome of any valuation process depends on what the various stakeholders value, whose values count, who benefits, and the manner in which social and ecological systems interlinkages are accounted for. Values and the process of valuation reflect the socially and culturally constructed realities linked to worldviews, mindsets and belief systems shaped by social interactions, as well as political and power relations operating within a realm of local, regional and global interdependencies^{9,10}.

⁷ Somda, J. and A. J. Nianogo, A.J., 2010. TEEB case: Wetland valuation changes policy perspectives, Burkina Faso. Available at: TEEBweb.org

⁸ Siikamäki, J., Sanchirico, J.N., Jardine, S., McLaughlin, D. and Morris, D.F., 2012. Blue Carbon: Global Options for Reducing Emissions from the Degradation and Development of Coastal Ecosystems. Resources for the Future. Washington, DC.

⁹ Wilk, R.R. and Cliggett, L.C., 2006. Economies and cultures: Foundations of Economic Anthropology. Westview Press, USA.

¹⁰ Hornborg, A., McNeill, J.R. and Alier, J.M., 2007. Rethinking Environmental History: World-System History and Global Environmental Change. Rowman Altamira.



SECTION III

**PEOPLE'S BIODIVERSITY
REGISTER (PBR)**



People's Biodiversity Register (PBR)



People's Biodiversity Register is a tool for collecting and documenting biodiversity data.

People's Biodiversity Register is a tool for collecting and documenting biodiversity data. Local communities need to be encouraged and trained to be the principal participants in this process. When communities maintain their own registers, it will foster greater conservation of this natural resource base. Despite the provisions within the Biological Diversity Act, 2002, which grants due rights to communities, it has not been fully translated into practice.

PBR is the first step towards bridging the gap between intellectual property rights of local people and benefits derived from genetic resources and associated traditional knowledge and enabling them to share those benefits. This helps empower the local communities, making them aware of their rights, as well as conserving biodiversity. The significance of biodiversity has now been well underlined. While biodiversity is normally associated with large forests, rivers and oceans, it is essential to remember the importance of smaller insects, birds and butterflies that reside in our own backyards. Biodiversity is all around us, in a droplet of water and a tiny particle of soil.

The Biological Diversity Act, 2002, India, primarily addresses the issues concerning access to genetic resources and associated knowledge by foreign individuals, institutions or companies, and equitable sharing of benefits arising out of the use of these resources and associated knowledge by the country and its people. The Act governs Access and Benefit Sharing (ABS) through a three-tier system, National Biodiversity Authority (NBA), State Biodiversity Board (SBB) and Biodiversity Management Committees (BMCs).



Although the Biological Diversity Act, 2002, has provided some muscle to conservation efforts, the competition from the economic drivers for development makes protection very difficult. Hence, there is a need for a paradigm shift in our approach to conserving our biodiversity, which is critical for nature and human survival.

The concept of PBR arose from the need to capture and conserve traditional knowledge and to vest decision-making power in local communities. Already successfully pioneered by Foundation for Revitalization of Local Health Tradition (FRLHT) in several regions, there remained a question over its ownership. Were these registers containing community knowledge only to be filled and owned by conventional experts?

Schoolchildren, youth groups, knowledgeable individuals and villagers have all to be involved in the observation, recording, reporting and documenting of the local biodiversity. There exist some wonderful examples of PBRs with amazing sample collections of plants, wild seeds, medicinal plants and wildlife observations. The motivation behind establishing the PBR in villages is to make people aware of their rights over natural resources and the need to protect them under the Biological Diversity Act, 2002.

Access and Benefit Sharing: Global Perspective¹¹

Access refers to granting permission to enter an area for the purpose of sampling, collecting and removing genetic or other resources. Benefit sharing refers to all forms of compensation for the use of genetic resources, whether monetary or non-monetary. This includes participation in scientific research and development of genetic resources and sharing the findings of any potential benefits resulting from this work.

Articles 1 and 8(j) of the **Convention of Biological Diversity (CBD)** encourage the equitable sharing of benefits arising from **Traditional Knowledge (TK)** for conservation and sustainable use of biological diversity. In benefit-sharing arrangements, all parties share the benefits arising out of the use of genetic material and the TK of their uses. For the local community, this involves the sharing of TK and resources with contracting parties and others who wish to use these for research and/or for developing new products based on this knowledge. The contracting parties in turn would share any advancements, benefits (including financial), or products that make use of local biodiversity resources with the local community. Article 15 of the CBD states that access to genetic resources and any transfer of technology be provided and/or facilitated under fair and mutually agreed-upon terms. This would include types of financial arrangements described later in the CBD (Articles 20 and 21).

Benefits include a wide range of options, and often beneficiaries may receive more than one type of benefit. These include:

Start-up/upfront benefits or payments paid as a lump sum (if a financial arrangement) or delivered (if a cooperative or capacity-building project). Such benefits may be equipment such as computer hardware, software or extraction and screening facilities.

¹¹ Convention on Biological Diversity, n.d., ABS Provisions in the Convention. Accessed at www.cbd.int/abs/background#provisions

Process benefits are derived during the process of research and development. In addition to financial payments, process benefits may include capacity, expertise and/or know-how building and training through joint research.

Product benefits are paid after the commercialisation of the final product. These may be royalty payments that are negotiated according to the contribution of the genetic resource or the amount or role of local knowledge that was used in creating the final product. Royalty rates may be based on a sliding scale, depending on the end-use of the research results and the magnitude of sales. Financial payments for benefit sharing would best be put into a trust fund for the community itself, rather than to specific individuals in the community. Such trust funds normally support community development projects and capacity building.

Moral and relation benefits – Unlike the financial benefits described above, moral and relation benefits are not transferred according to a formalised arrangement, but are based on the interaction between the local participants actually involved. Moral benefits include recognition of the originators and holders of knowledge in publications or proper attribution of the origins or role that traditional knowledge played in new product research and development. Relation benefits may include establishing or entering networks, access to publishers or the establishment of a producer company of sustainable harvesters to defend common interests.





Access and Benefit Sharing (ABS) – The NBA (India) Guidelines^{12, 13}

Guidelines issued by the National Biodiversity Authority (NBA) of India on Access to Biological Resources and Associated Knowledge and Benefits Sharing Regulations (ABS Regulations), 21 November, 2014, are based on the Nagoya Protocol.

Guidelines that are to be complied with are provided for ensuring the financial obligations of the users of genetic resources. It includes first determining the activity for which biological resources are to be obtained and then how the benefits accrued will be shared with the local community.

In a nutshell, the guidelines ensure the equitable sharing of benefits (both monetary and non-monetary) arising out of the use of accessed biological resources, their products, innovations and practices associated with their use and applications and knowledge relating thereto in accordance with mutually agreed terms and conditions between the persons applying for such approval, local bodies (BMC) concerned and the benefit claimers. The Biological Diversity Act, 2002, permits the benefits to be shared by:

- ❖ Grant of joint ownership of Intellectual Property Rights (IPR)
- ❖ Transfer of technology
- ❖ Location of production, research and development units in such areas that will facilitate better living standards to the local people and benefit claimers
- ❖ Association of Indian scientists, benefit claimers and the local people, research and development agencies working in biological resources, bio-survey and bio-utilisation
- ❖ Setting up of venture capital fund for aiding the cause of benefit claimers
- ❖ Monetary and non-monetary benefits

For more details please refer to **Annexure IV**.

¹² Wilson, N., 2015. Guidelines for Access and Benefit Sharing for Utilization of Biological Resources based on Nagoya Protocol Effective. *Journal of Intellectual Property Rights*, 20, pp 67-70.

¹³ NBA. 2013. Defining and Explaining ABS Terminology. Government of India. Accessed at <http://www.gsbb.in/pdf/ABsterminology-english.pdf>



SECTION IV

A STEPWISE PROCESS OF PBR APPLICATION



A Stepwise Process of PBR Application



Steps essential for implementing a PBR manual include formation of local institutions and awareness generation to motivate the community members.

This section takes one through the various steps essential for implementing the **People's Biodiversity Register (PBR)**. It includes the formation of the required local institutions; awareness-generation required to motivate the community/village to implement the PBR; important tips while preparing the register and methods for engaging the people in validation process.

The Biodiversity Management Committee (BMC): Formation, Functions and Provisioning of Guidance and Support

The Biological Diversity Act, 2002, aims to promote conservation, sustainable use and equitable sharing of benefits of India's biodiversity resources. With this view, the **National Biodiversity Authority (NBA)** and **State Biodiversity Boards (SBB)** have been established. It has also mandated the establishment of **Biodiversity Management Committees (BMCs)** at the level of Gram Panchayat, Taluka, District, Municipality and City Corporation. The NBA document provides the protocol for the formation of the BMC, which should be as representative as possible of the various communities within the village. There should be adequate inclusion of women and those from the scheduled caste and scheduled tribe sectors of society. A Biodiversity Management Committee for its area of jurisdiction shall consist of a chairperson and six persons nominated by local bodies. It necessarily includes a minimum of one-third representation by women and 18% by SC/ST communities. In the case of Maharashtra, the SC/ST community representation is as per their proportion at district level.



Section 41 of the Act stipulates that "Every local body shall constitute a BMC within its area for the purpose of promoting conservation, sustainable use and documentation of biological diversity including preservation of habitats, conservation of land races, folk varieties and cultivars, domesticated stocks and breeds of animals and micro-organisms and chronicling of knowledge relating to biological diversity."

The BMCs are to be involved in four types of activities in the context of management of local biodiversity resources:

- ❖ Promoting conservation measures
- ❖ Organising sustainable harvests
- ❖ Fixing traditional knowledge rights and collection charges
- ❖ Organising value-added activities

Establishment and maintenance of the People's Biodiversity Register is one of the BMC's very important functions. The Register shall contain comprehensive information on availability and knowledge of local biological resources like folk varieties and cultivars, domesticated stocks, breeds of animals, land races, etc. and their medicinal or any other use, and/or any other traditional knowledge associated with them. The maintained PBR would require validation by the community, BMC and the SBB. Besides this, the committee shall also maintain a Register containing information about the details of the access to biological resources and traditional knowledge granted, collection of fees imposed, and benefits derived and the mode of their sharing.

The other functions of the BMC are to consult on any matter referred to it by the State Biodiversity Board or Authority for granting approval, and to maintain data about the local *vaid* (traditional healer) and practitioners using the biological resources.

The National Biodiversity Authority (NBA) specified format(s) of the People's Biodiversity Register are to be used. The particulars include the format for electronic database. The NBA and the SBBs shall provide guidance and technical support to the BMCs for preparing People's Biodiversity Registers.

Communities need to be capacitated and empowered to address the biodiversity concerns of their respective villages and to take responsibility as is recommended within the Biological Diversity Act, 2002. As BMC's main function is to prepare the PBR in consultation with the local people, the committee members will need support and training on the concepts of biodiversity, conservation concerns, tools and methods for documentation including mapping, and the safety, security and maintenance of the Register.

Awareness Building

Awareness campaigns are crucial to the process of PBR development. Local communities need to have a complete understanding of the objectives and the rationale behind collecting the data. *Prabhat Feri* (morning trail walks) that focus on biodiversity and the screening of appropriate documentary films help sensitise people to the objectives. It is especially important to involve schoolchildren in this process. An innovative way of generating awareness is the engagement of local folk-media groups, e.g. *Kalapathaks/Bharud, Bhajan-Kirtan,* etc. When these local artists are given information on topics related to biodiversity such as the effects of climate change and exploitation of bioresources by humans, they, in the local media

easily communicate and convince the local communities for its conservation and promotion. *Bharud* and *Kirtan* are popular folk art forms of Maharashtra which were initiated by Sant Eknath in the 16th century. *Bharud* is still used; it communicates messages through songs and drama.

Training of community members and handholding

Although communities possess immense knowledge of various facets of biodiversity, the method for documentation requires capacity building. Hence, focused workshops are of great assistance for developing the skills required for the systematic collection of data and establishing the rapport needed for ongoing monitoring. There are several Participatory Rural Appraisal (PRA) techniques which can be used for the process. However, WOTR's CoDrIVE-Visual Integrator was found more relevant for understanding the geography and mapping the resources. Details for this method can be accessed from the WOTR website (http://wotr.org/tools_frameworks/codrive-visual-integrator).

Training workshops are excellent seedbeds for rural youth who are often extremely interested in carrying out the objectives of the PBR. Trainers get the chance to screen and identify particularly knowledgeable and enthusiastic people, who often go on to take an active role in the methodology of collection and maintenance of the Register. In each village, a facilitator can conduct multiple trainings for the Biodiversity Committee on the concepts of biodiversity, the concerns of, and need for conservation, the rationale of documentation of such information at village level, mapping of biodiversity, tools and methods for documentation and safety, security and maintenance of the Register. A detailed training programme is discussed in **Section VI**.

Data Collection Process





This step emphasises on documentation; that includes photographs (including digital images), drawings, and audio and video recordings. Initially, the **Technical Support Group (TSG)** can accompany the committee and volunteers and explain them the process of data collection. The data collection formats are provided to BMC and volunteers (**Annexure I**). The groups then meet with key community members such as farmers, artisans and other knowledgeable sources and compile required information in the prescribed formats. While collecting data, the inclusion of views of women and elders must be given priority.

Validation Process

It is of immense importance that all collected PBR data be validated, especially when collected through interviews, as it may sometimes contain unintentional errors. There are a variety of validation methods available, some of which are stated in detail below:

Validating through exhibitions

Information collected through the PBR process can often pose difficulties to authenticate, given its scale. One way of validation that works well is to organise an exhibition and invite the villagers to comment on the representative data collected. Their comments are noted down and the required corrections made.

Exhibiting the collected data usually generates a great deal of discussion, allowing for corrections, deletions and additions. Sometimes discussions fail to reach a consensus, in which case the data requires further cross-checking. An added advantage of organising an exhibition is that the outcomes are multiple: it brings people together in a way that focuses their attention on their local environment. Individuals get the chance to enhance their knowledge, share ideas and opinions, and talk about their village history. Everyone thus gets a voice, be they children, elders or women. It also provides the opportunity to help people understand the project processes and the objectives of PBR.



Exhibitions also help develop awareness and, thus, it is important to pay attention to and record the discussions that emerge. For instance, if at an exhibition people are interested in a stall that has photos/text information on the snakes found in the region, visitors may provide their experience of snakes/snakebites in their villages. Information charts on first aid for snakebite can be shared. It is one way of spreading awareness about snakes.

Validation through personal discussions with communities

At times, a particular community/person having specific traditional knowledge may be reluctant to share this with others. Disclosure of unique traditional knowledge of the biological resources is one of the biggest threats to the particular community/person. In such situations, validation of the data should be done only at the level of the respective community/person. Once this information is included in the PBR, it becomes the responsibility of the BMC to protect the information. Validation by an expert group is also required to remove unwanted/erroneous information provided by the local communities.

Preparation of the Register

It is best (initially at least) that formats for collection of data are filled by the BMC and interested individuals within the village. The formats are to be endorsed by the facilitator/expert. The data is then transferred into the Register in the prescribed format.

The Importance of Limiting the Role of Expert Intervention

In order to get the maximum input into the PBR and ownership by the community, external "experts" should only be facilitators, eliciting knowledge from the local community and encouraging them to record their rich heritage. Any other role of the expert would amount to "interference" and will block the process. Hence, the expert's role is ONLY to guide and empower communities to collect their own data. The expert should bridge the gap between local knowledge and scientific information. The expert would, however, need to have checklists of flora and fauna of the region to ensure that nothing is missed. The checklist is only a supplement to catalyse the PBR process, encouraging a detailed exploration of the biodiversity. There is scope for scientists, subject experts and wildlife enthusiasts to add to these lists (refer **Annexure I**, PBR formats Part VIII), which can also serve as a promotional tool for ecotourism.

Capturing Indigenous and Traditional Knowledge through Discussions

The PBR register is not the only output of the PBR process. In fact, such a register can never fully encompass all of the information a community possesses.

A well triggered conversation within a group or community not only enhances the knowledge of each member of the group, but also provides a good platform to share various aspects regarding the local biodiversity. Village residents who are skilled in a particular field or craft, be they the *vaid* (traditional healers who use herbs), cobblers, honey hunters, blacksmiths or other traditional workers, can provide deeper insights regarding adaptation strategies as they have detailed knowledge of their subject. Such knowledge can be documented separately with individual interviews but as part of PBR.



Computerisation of the Information

Computerisation of the PBR database is essential. This aids in ensuring protection of persons'/communities' Intellectual Property Rights. It also helps in updating of the PBR information and in knowing the distribution of traditional knowledge associated with specific varieties across the state. A multilingual web-based secure and compliant software solution will assist local communities and enthusiasts, as well as experts and professionals.

Endorsement by the State Biodiversity Board (SBB) and the National Biodiversity Authority (NBA)

The PBR is a live document. However, when the PBR has all the basic information documented, it requires verification and approval by the SBB. The BMC should submit a print copy of the draft PBR to the SBB. A committee of experts appointed by the SBB verifies the information. Their role is restricted to verification of the provided information and guidance for corrections in the database where required. Recommendations are given to the BMC through the SBB for finalisation of the PBR, which is expected to be scientific and accurate. This includes gap filling and corrections required which are noted by the SBB. The latter informs and follows up with the respective BMCs. When the changes have been made, the BMC signs and submits four printed copies of the completed, corrected and verified PBR together with its certificate of completion (provided in **Annexure I**) to SBB for endorsement. The SBB endorses the four copies with the authorised signature and stamp and returns two copies back to village and one copy to NBA. This validation process of the PBR is of utmost importance and is crucial, without which the PBR cannot be accepted as a verified PBR.

Follow-up and Guidance Visits by Experts

This initiative needs regular support and follow-up from biodiversity experts. The Technical Support Group (TSG) should meet with the BMC regularly or at least once every three months and assist them in identifying species, matching the scientific name, and in the documenting process. Feedback to the committee and the facilitator is also required. The TSG can be appointed at district or taluka level. The SBB appoints the TSG with the help of the State Level Expert Committee and respective district level committee.

A Step Towards Conservation of Local Biodiversity

The most important part of documenting the PBR is to spread awareness and use the knowledge generated. In order to achieve this, the approach outlined in Section V of this Manual is suggested. The **Gram Sabha** (village general body meeting) is a very strong platform to promote conservation of biodiversity. Addressing biodiversity concerns should be emphasised in the Gram Sabha. The BMC should maintain copies of the minutes of Gram Sabhas to keep follow-up of biodiversity concerns in the village.



SECTION V
MODIFICATIONS
INTRODUCED INTO
THE CONVENTIONAL
PBR METHODOLOGY



Modifications Introduced into the Conventional PBR Methodology



The culture and traditions of the society have evolved around their biological diversity and both have become an integral part of rural life.

While the proposed **People's Biodiversity Register (PBR)** collects information and data, having the following points introduced into the methodology will enhance the value of the document.

Village History: Village history is an important aspect of the PBR. Unless one understands the history of a village, it is very difficult to create a picture and collect relevant aspects of the biodiversity. Activities taken up during the training also depend on this. Thus, the village history provides many important inputs in making sense of the data that is collected through the PBR. Guidelines for the same are attached in **Annexure II**.

Culture and Traditions: The culture and traditions of a society have evolved around their biological diversity and both have become an integral part of rural life. It is observed that many of the festivals are woven around nature. These provide a strong message for conservation of biodiversity. Therefore, these are very necessary and important factors to be documented.

Capacity Building of the Local People: It is observed that while villagers are very interested in collecting data, they do not know how to do so systematically. To overcome this, their capacity building is necessary. The selection of motivated local youth (both young women and men) interested in the subject and who have at least passed high school would be suited for this task. With capacity building, their skills for documentation will be enhanced. However, sufficient time and hand-holding would be required to build their confidence to document the biodiversity as expected.



Data Collector's Name: It is essential to ensure authenticity of the data. Hence, it is important that the data collector's name is included in the simplified format.

Date of Collection: This is very important. It helps in noting sightings. It also helps in protecting the Intellectual Property Rights of the community.

Invasive Species: Although the registration of invasive species may appear in different sections of the PBR, special emphasis on this data is required as this is one of the biodiversity concerns in the village. Presence of invasive species in biodiversity-rich regions poses a serious problem in many parts of the world. Unless one finds a strategy to check its further spread, the future of the local biodiversity remains bleak. UNDP's Millennium Ecosystem Assessment (MEA) has listed 'invasive species' as one of the major drivers of ecosystem degradation. Observing the destructive nature of invasive species, eg. lantana in Maharashtra, there is a separate section to address this information.

Making Biodiversity Real

When collecting data for the PBR, it is essential that the local inhabitants are engaged through creative processes. The local community should enjoy their engagement in these activities that bring benefits to individuals and/or the community, while at the same time conserve biodiversity and promote adaptation to climate change.

In the section below, a few activities are presented which may be taken up. Many more biodiversity-related activities can be introduced. The only limiting factor is the creativity and resourcefulness of the facilitators. Hence, a good preparation on the part of facilitators is necessary when introducing the PBR.





Seed Collection

Collection of native seeds and their documentation supplements PBR to a great extent. Organising such collection of seeds contributes to generating awareness, and also propagates seeds in the region. Seeds collected form a valuable gene bank while protecting the germplasm of indigenous varieties of crops and plants. Amidst the trend of growing cash crops and monocultivation, it becomes crucial to protect the indigenous varieties. These seeds carry codes of information and wisdom of the ecosystem. They have adapted and survived through many climatic changes and could be critical for the future.

Nurseries

Creating localised nurseries in a number of villages and forming their network is a step towards conservation. Nurturing indigenous plants encourages promotion of local varieties and also supports livelihoods of the local community. Selecting fruit species for such nurseries provides additional incentives for the planters. Such a network of nurseries can also be a source of supplemental local livelihood.

Herbarium



The herbarium is a scientific technique for preservation of plant samples. Leaves and twigs collected are kept pressed in a notebook or a folder. Once dried, they may be preserved for a long period for study purposes. In schools this would be a good educational activity that can capture the interest of students.

Mapping the Hotspots¹⁴

In every village, there are sites where the biodiversity is relatively rich. These are referred to as biodiversity hotspots. It may be a river bank, an old tree, hill slope or an ecotone between agriculture and forest. In 1996, Dr. P.T. Cherian of the Zoological Survey of India provided a good account on the “hotspot” concept. It harbours

More details on the subject can be accessed from:

¹⁴ MSBB, n.d., Identification, Prioritization and Management of Hotspots of Western Ghats – Maharashtra. Maharashtra State Biodiversity Board, Nagpur. Accessed at <http://maharashtrabiodiversityboard.gov.in/research-and-documentation/research-projects/biodiversity-hotspots-of-wg-of-maharashtra/>



a smaller area than a hotspot, but is equally important for ecosystem/biodiversity valuation.

These hotspots may be marked on a village map. However, when marked on a three-dimensional model of the landscape (WOTR's CoDrIVE-Visual Integrator tool¹⁵) that is constructed by the people, the impact is far more effective.

Such an exercise provides a fair picture of the biodiversity-rich areas in and around a village. Communities enjoy marking these spots. It further helps in specifically protecting such hotspots. Once visualised on a map, the community can be easily urged to take steps to promote, protect and conserve these.

Due to rich biodiversity, these hotspots encourage ecotourism. However, care must be taken to protect these spots. In case of any increase in the pressure on such areas, these must simultaneously be relieved by undertaking parallel activities to preserve them.

¹⁵ WOTR, 2014. CoDrIVE – Visual Integrator for Climate Change Adaptation: Guiding Principles, Steps and Potential for Use, Watershed Organisation Trust, Pune. Accessed at http://www.wotr.org/tools_frameworks/codrive-visual-integrator



Hotspots¹⁶

Hotspots (as distinct from the larger "hotspots"), are comparatively tiny areas of wild habitat containing large clusters of species, which are usually not found in such diversity or density in other area. Edward O. Wilson (1992) in his book 'Diversity of Life' emphasises the importance of recognising small areas, sometimes niches, that contain a very high concentration of "lower" life forms such as fungi, invertebrates, lower vertebrates and lower plants. These spots could lie either within a broader conservation area or outside it. Such species-rich areas are critical to conservation of biodiversity for they could be ideal breeding-grounds from where species disperse to other areas. Mangroves are a good example of hotspots, not only for their relatively small area, but also for their ability to support varied life forms which include fungi, invertebrates, algae, fish (estuarine and marine), angiosperms, sea grasses and many other forms.

Mangroves on the east coast of India do not come under the hotspots and are ideal candidates to be projected as hotspots, and therefore are critical conservation areas. The Sundarbans, not currently in any hotspot, could be included under the hotspots banner, though of course it is quite extensive in nature. Dr. P.T. Cherian of the Zoological Survey of India coined the term "Hotspot" and listed from his colleagues' experiences some places within the country that could be termed hotspots.

¹⁶ Kalpvriksh, 2014. n. d. National Biodiversity Strategy and Action Plan (NBSAP) – India. Accessed at http://www.kalpvriksh.org/images/Biodiversity/Bio_NBSAP/Chapter4.pdf

***Vanbhoj*: Wild Edibles**

The food security of people living in rural communities is met by more sources than what is cultivated. The natural biodiversity makes a direct significant contribution to the household food security, particularly where such biodiversity still exists and people have access to it.

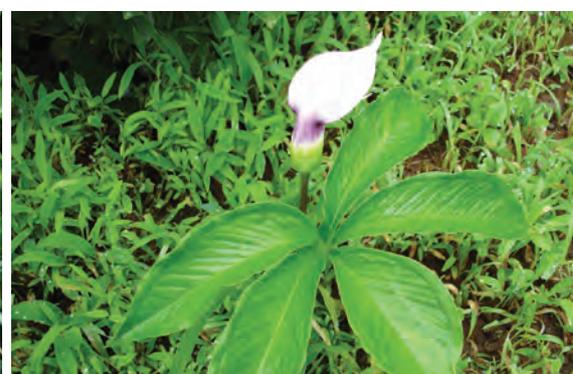
Forest biodiversity is important in the daily diet of tribal and rural people. They depend on the bark, young shoots, buds, flowers, fruits, nuts, leaves, gums, mushrooms, roots, tubers and meat from the forests. These resources are their means of survival in times of stress and during seasons of scarcity, when cultivated crops are not available. These foods are important supplemental source of proteins, carbohydrates and oils. While some may be eaten directly, others need special processing to make them edible. Roots, barks and tubers are often processed and ground into flour.

All rural and forest communities have experienced times of stress. During famines many have survived on the natural biodiversity. Records mention that seeds of bamboo saved several thousand lives during the Orissa famine in 1812. In Akole *taluka* of Maharashtra, wild edibles helped people to survive the drought of 1972.

However, many such traditional recipes and processes have faded from the memories of the younger generation which relies on inputs from the subsidised Public Distribution System (PDS). The PDS weans people from their traditional cereals and food towards fine grains like rice and wheat. The household basket of vegetables has also changed and its diversity diminished.

Activities like *Vanbhoj* help revive the memories of how people faced stress, and of practices and forgotten tastes and traditions and thus create a fallback in times of stress.

Culture and knowledge is transmitted when young and old participate together in such activities. Documenting information and knowledge of the elders, particularly the elderly women, of long-forgotten recipes of wild edibles is necessary, before this wealth is lost. Following the collection of such data, the group of interested villagers should check and document surviving wild edibles. The state of abundance of wild edibles should be recorded.



When wild edibles are available in abundance, or in the backyard, or on village commons, a way of enhancing the value for local foods is to organise a "traditional food competition". Samples may be brought home, prepared and processed. The food is then brought out to a common meeting ground. Children, women and men wait in anticipation. Tiny portions are offered to the elderly to taste. With bated breath the community waits for the sign of approval or a critique. Documentation is helpful and local youth may well be engaged for this. They record the ingredients, recipes, processes, any characteristics of the food, the side effects, precautions to be taken, their medicinal value and other special associated memories. For the various items of interest, participants could record the abundance or the lack of these. Many youngsters, both women and men, see these being prepared for the first time. They learn. The fading memories begin to get refreshed. Knowledge on the edge of being lost is revived, retained and passed on to the next generation.

The world may have little interest in these, but they are very interesting for local people and important for biodiversity. These findings are then reported to the BMC as well as the Gram Sabha. Concerns regarding protection and conservation of these resources should be discussed and resolutions for action passed.

Biodiversity Festival

To widen the scope of awareness, a biodiversity festival is helpful in bringing the village and neighbouring villages together to appreciate and celebrate biodiversity. The idea behind this initiative is to promote the value of local biodiversity through the sale of indigenous seeds, plants, arts and crafts, exhibition and sale of local breeds of livestock, promotion of cultural programmes such as local folk songs and dance, promotion of traditional dress, local food and games.

Involving Children: The Children Biodiversity Register (CBR)

Biodiversity is an interesting subject for children. It creates a good opportunity to engage children in collecting data on biodiversity through the Children's Biodiversity Register (CBR), specially prepared for schools (Refer to *A Field Guide to Children's Biodiversity Register*¹⁷ 2014).

¹⁷ WOTR, 2014. Children's Biodiversity Register (CBR), Watershed Organisation Trust, Pune. Accessed at http://wotr.org/sites/default/files/Children%27s%20Biodiversity%20Register%20Manual%20-%20Marathi_0.pdf





In villages where willing local participants for PBR are hard to find, it is worth recruiting schoolteachers to encourage their pupils to note down their observations, in the school vicinity or as part of a biodiversity field trip. This gives the children hands-on experience as also a means of validating data for the PBR.

Cultural Diversity

Many social and cultural traditions have evolved from the surrounding seasonal landscapes to become an integral part of rural life. It is observed that many festivals are linked to nature. Cultural aspects of rural life are equally a part of the overall diversity of the region and so have to be documented. This supplementary information is critical in biodiversity conservation. The cultural repository can decipher key aspects of the community. Such aspects or dynamics of the community would help while planning conservation strategies.

PBR – Advance, Medium and Basic

Based on the richness or paucity of the biodiversity, the PBR may be Basic, Middle level or Advanced. For the Advanced PBR, it is necessary to have people from the local community actively engaged, who will make it their project. They will have a register, map of biodiversity hotspots, herbarium of plants, collection of indigenous seeds of crops and wild plants. The Medium-level villages will have a register, herbarium and seed collection. Villages with a Basic PBR will have only a register.



The Soundscape

A SOUNDSCAPE is an atmosphere or environment created by or with a sound or combination of sounds, an example being the raucous soundscape of a city street. The soundscape refers to the natural acoustic environment as well as human induced sound. The natural acoustic environment consists of natural sounds, such as animal vocalisations, weather and natural elements. It also includes natural environmental sounds created by humans, through musical composition, sound design, and other ordinary human activities such as conversation, work and singing. The disruption in these acoustic environments due to anthropogenic activities such as mechanical and industrial sounds, are categorised as noise pollution.

The sounds of a village, both natural and anthropogenic, produce a rhythm that is unique to the culture and ecosystem. They indicate a lifestyle woven around nature. It varies from season to season. This can only be experienced. However, it is sadly observed that the rhythms of rural communities are fast disappearing, being replaced by noise. In order to understand and capture these and revive the experience, it is worth recording village sounds, such as bird calls, mooing of cattle, rustle of leaves, women fetching water from well, women grinding grain while singing songs, people returning from work in the field as they sing, the various songs and sounds particular to the festivals and seasons, and many more. The collection of these sounds when converted in an Audio CD will represent the soundscape of the village; it will capture its history. They will tell the story of the changing times.



SECTION VI

PREPARING THE FACILITATION TEAM



Preparing the Facilitation Team



PBR can be seen as an introverted dialogue of the identity of a community.

Introduction

The process of establishing and maintaining the **People's Biodiversity Register (PBR)** is an opportunity for all involved to learn and unlearn paradigms that affect our understanding and interactions. How we relate to our surroundings, fellow creatures and our own selves shapes our world in profound ways.

The document can, therefore, be seen as an introverted dialogue of the identity of a community, rather than documentation by outsiders of "what happens to exist". The epicentre of the PBR movement is undoubtedly anthropocentric – a "Peoplescape" based approach – but with an understanding of the seamless transition and ubiquitous presence of life which transcends any single entity. Hence, the attempt is to create an Identity document, which explores the story of a people in their own voice.

This section of the manual is aimed at resource persons/trainers from governmental and non-governmental organisations and those who work in the field of sustainable development. It is intended to act as a catalyst for the PBR process.

The ability to see the tree as well as the forest – the micro and the macro – simultaneously is stressed throughout. The intent is to enhance the process by making it even more participatory, contextual and more alive than before, while at

the same time embedding biodiversity concerns as a continuous undercurrent in all developmental activities that are carried forth by an enterprise, be it the government or private.

This document deliberately allows open ends at most junctures in order to maximise contextualisation by the users.

The process of PBR is also a strategic response to climate change. The core of this paradigm is the levelling and buffering effect that diversity provides. In order to cope with a system that fluctuates erratically and whose behaviour cannot be wholly anticipated in set patterns, a wide variety of potential solutions must be kept at hand. The PBR is therefore an important tool that may assist in adapting to climate change.

This is a balanced and sensitive approach – e.g. promotion of plant diversity as opposed to monoculture. For this, one would need to have a lifestyle that is attentive to one's surroundings. A PBR helps evoke a decentralised, varied and apt response to emergent changes. A community alive and attentive to its surroundings would be most suited to anticipate and adapt. The dependence on and use of wild edibles during times of agricultural stress or crop failures is an example of adaptation. So also are the implications of knowledge regarding local flora and fauna and their medicinal importance when facing newer waves of infections or diseases.





Apart from these much-cited and obvious adaptation-related “uses”, it is the continuous monitoring of changes in the surroundings by the community that is of essence. As this habit of continuous awareness grows, so will the ability to experiment, learn and respond which are critical to adaptation.

Sustainable development is an inclusive, integrated approach that must weave together a multitude of parameters. Biodiversity concerns seem to be largely lacking in most developmental efforts, which is generally seen as a separate discipline altogether, needing its own set of interventions and experts. The activities and processes to establish and maintain PBR coaxes an atmosphere that marries biodiversity concerns with otherwise well-meaning efforts carried out in a narrow spectrum of development. A diffusion of underlying values in all aspects of life would be beneficial in order to see the larger picture. Hence, activities concerning education, livelihoods, gender, agriculture, health, watershed or governance must be carried out in tandem with addressing biodiversity concerns, and vice versa.

The entire training process proposed is such that it helps the participants understand the linkages between use of biodiversity by the community locally and its magnified linkage in the national as well as global context.

To get participants to observe these delicate links in a wider context, the training needs to be initiated with a discussion on a few related global issues, such as sustainability, food crisis, etc. and interpret these with linkages to biodiversity.

Proposed here are motivational documentaries. One such, ‘Home¹⁸’ by Yann Arthus-Bertrand, contains some outstanding aerial views of the diverse landscapes throughout the world. It has footage on man-nature-resources interactions and their impact on sustainability. The idea is to look at and interpret the “man-biodiversity-resource-ecology” interaction through a different lens and impart an ability to think and form strong “local-global” linkages with biodiversity, while being conscious of an anthropocentric view.

Beginning with the broader perspective (a macro picture), one then zooms in to look at and understand specific concepts or subjects related to biodiversity/ecology, which may be taken up during later training sessions. The same approach is followed in the modules. In the beginning, the modules focus on the broader context of ecology, landscape, lifescape, peoplescape and waterscape mapping of these “scapes”, etc.

Peoplescape¹⁹ – This comprises different occupational segments of society such as farmers, fishermen, labourers, forest produce collectors, traditional healers, etc.

Landscape and Waterscape²⁰ – This involves noting and mapping the mosaic of land and water habitats from which the concerned people/community acquire most living resources, thereby helping to understand biomass resource flows and serving as a benchmark for monitoring future changes.

Lifescape²¹ – This refers to levels of abundance, harvests and uses of different elements of biodiversity known to people and their distribution in different land and water elements.

¹⁸ Home. 2009, Online Video. Accessed at <https://www.youtube.com/watch?v=jqxENMKaeCU>

¹⁹ Bellmann, C., Dutfield, G., and Melendez-Ortiz, R., 2003. Trading in Knowledge - Development Perspectives on TRIPS Trade and Sustainability. Taylor & Francis, New York.

²⁰ Ibid.

²¹ Ibid.



Training modules that follow pertain to the detailed documentation of each of these “scapes” and their methodologies, as related to the community. Maintaining the conscious anthropocentrism throughout the process of documentation is at the core, where all mapping as well as documentation of the landscape, lifescape, and ecology revolves around the “Peoplescape”.

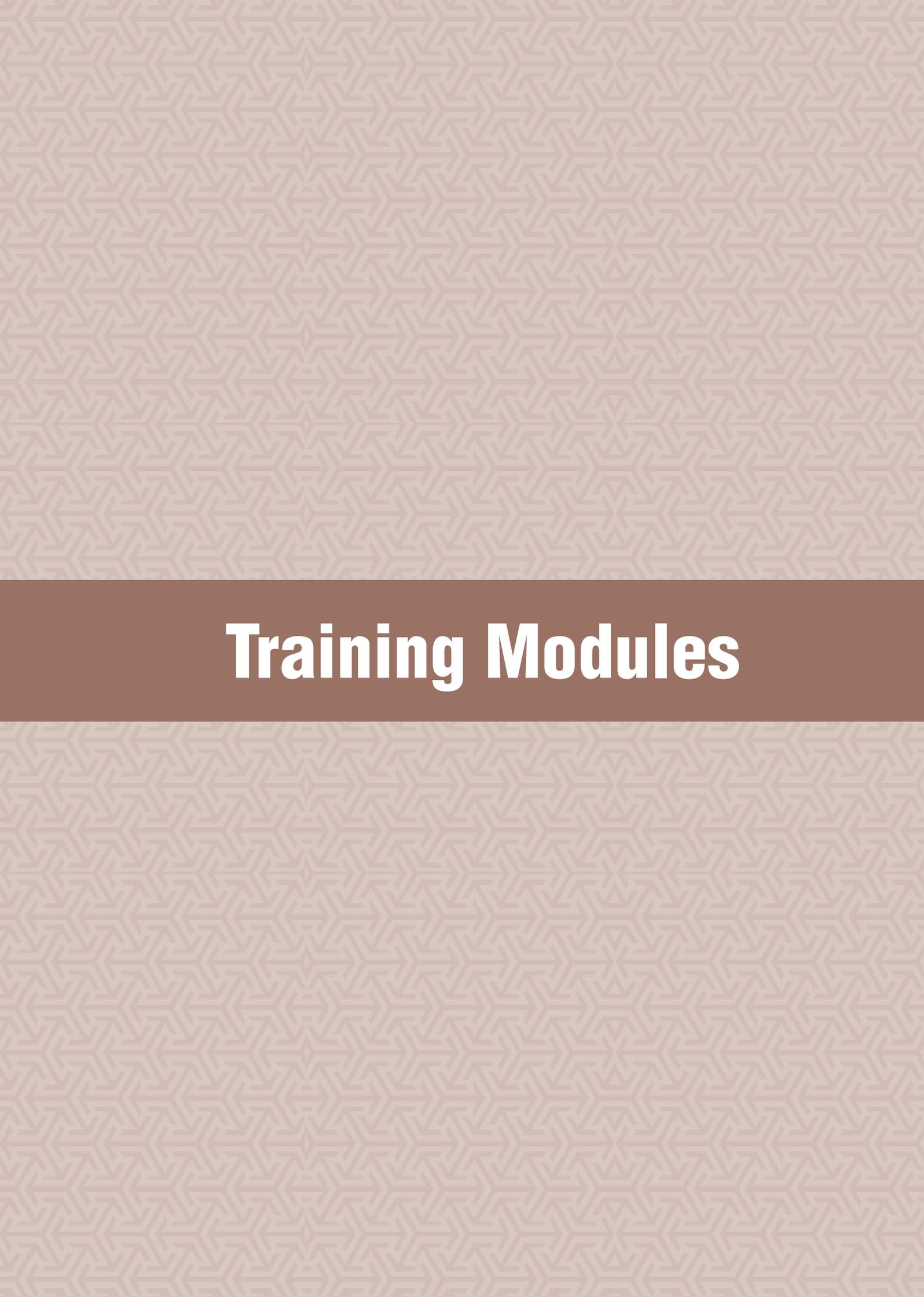
Through the modules, it is attempted to touch various important aspects of human ecology linked with biodiversity, resources, etc. While these modules may appear distinct, they need to be seen as integral and interlinked in the larger picture. This is one of the core approaches that are considered important. The three “scapes” are discussed separately merely for the sake of conceptual clarity. However, it is essential that they are not studied in isolation, especially when it is proposed to undertake the PBR process as a tool to attain sustainability or even as tool for adaptation to climate change.

Location of the PBR training

A PBR training is best conducted within a village setting. Many of the modules require practical activities relating to the immediate context, in order to understand the concept and their linkages with the three “scapes”.

The five training sessions proposed can span a few months. The break between two successive sessions is necessary to encourage the participants to undertake practical assignments and document the biodiversity aspect addressed in the session, and to explore the concepts further.





Training Modules

Training I

Understanding Biodiversity and Humans within Biodiversity (3 days)

| Date | Session Time | Session Topic | Methodology | Expected Result |
|-------|-------------------------|--|--|--|
| Day 1 | S1: 9.00 to 10.00 am | <u>Introduction</u> Each Individual introduces her/himself based on six points: | <ol style="list-style-type: none"> 1. Name 2. Village (hometown) 3. Experience (work and education) 4. Local village/town: current scenario 5. Local village/town: future scenario 6. An activity that would lead to the vision being realised | Participants and resource persons get to know some information about each other |
| | S2: 10.00 to 11.00 am | <u>Movie screening</u> 'Home' (2009 documentary by Yann Arthus-Bertrand) | Film screening | Participants are exposed to a sequential spectrum of diversity and interactions between biotic as well as abiotic factors |
| | 11.00 to 11.30 am | BREAK | | |
| | S3: 11.30 am to 1.30 pm | <u>Listing and organising entities and themes</u> Observations from the film | Based on their observations in the film, participants list all entities or themes worthy of a mention. These are simply listed randomly on a board. Can we see patterns in the keywords? How can they be segregated or grouped? | Mapping the extent of diversity as understood collectively |
| | 1.30 to 2.30 pm | BREAK | | |
| | S4: 2.30 to 4.00 pm | <u>Scapes</u> Landscape Lifescape Peoplescape | Real-time discussion (board and markers) | <ul style="list-style-type: none"> ❖ Is the human being a part of biodiversity? ❖ Establishing basic framework, specific yet comprehensive. ❖ Extents of the domains. |
| | 4.00 to 4.30 pm | BREAK | | |
| | S5: 4.30 to 6.00 pm | <u>Host village</u> Landscape Lifescape Peoplescape | <ul style="list-style-type: none"> ❖ Group work (three groups) Each group is given a "scape" to explore without any further brief. ❖ Presentations in any media | Participants discuss and debate the understanding of "scapes" and their overlaps |



| Date | Session Time | Session Topic | Methodology | Expected Result | |
|---------------------------------|---------------------------------|---|---|--|---|
| Day 2 | S6: 9.00 to 10.30 am | <u>Recap of the previous day</u> Mapping | Micro-assignments and real-time board discussions | Deconstructing elements and perspectives in mapping | |
| | 10.30 to 11.00 am | BREAK | | | |
| | S7: 11.00 am to 12.00 pm | Why conserve biodiversity? | Discussion (board and markers) | Anthropocentrism; inherent value | |
| | 12.00 to 1:30 pm | People's Biodiversity Register | Real-time discussion (board and markers) | ❖ Intent ❖ History ❖ Spirit ❖ Extent | |
| | 1.30 to 2:30 pm | BREAK | | | |
| | 2.30 to 4.00 pm | <u>Micro-PBR</u> Goats/Medicinal Practices/Wheat | <ul style="list-style-type: none"> ❖ Group work (groups should be decided depending on the number of participants) ❖ Each group is given a topic to explore ❖ Presentations in any media | Zooming into specific elements | |
| | 4:00 to 4:30 pm | BREAK | | | |
| | S8: 4.30 to 6.00 pm | <u>Group Presentations</u> Micro-PBR | Any Media | Extents of individual elements mapped | |
| | Day 3 | S9: 9.00 to 9.30 am | <u>Recap of previous day</u> Clarification of doubts | Sharing and discussion | Clarity about the assignment |
| | | 9.30 to 11.00 am | <u>The way ahead</u> Additional assignments of Micro-PBR | Discussion | Understanding the process of undertaking PBR by doing a Micro-PBR |
| 11.00 to 11:30 am | | BREAK | | | |
| S10: 11.30 am to 1.00 pm | | Evaluation and feedback | Questionnaire and discussion | Suggestions for improvement and assessing the training | |
| | | TRAINING ENDS | | | |

S4 Basics of “Landscape–Lifescape–Peoplescape”



Comments for trainers

- ❖ The trainer should have a good understanding of ecology as also be well conversant with the interactions that take place with and within these scapes and the biosphere.
- ❖ Possible confusion may ensue while explaining the significance of keeping Peoplescape a separate category instead of including it in Lifescape.



Brief introduction

The session is designed to help participants understand the basics of different ingredients of the earth’s biosphere and under what categories the various components of this sphere are to be classified.

- ❖ Two basic categories, “Living” and “Non-living”, seem to incorporate various strains of organisation in the biosphere.
- ❖ Discuss the characteristics and significance of these three “scapes”.
- ❖ The “Non-living” can be absorbed into “Landscape” (the base strata or lithosphere).
- ❖ The “Living” can further be divided into “Lifescape” and “Peoplescape”.
- ❖ Ask: “Is the human being part of biodiversity?”
- ❖ If the answer is YES, why then is there a separate category referred to as Peoplescape instead of including this in Lifescape?
- ❖ What is the role played by humans with and within these spheres?
- ❖ The three “scapes” are created for the basis of the PBR concept, i.e. the whole documentation is categorised under these artificial heads.



Objectives of the session

To familiarise the participants with the three terminologies – Landscape, Lifescape and Peoplescape

This session should help initiate a thought process in the participants about how the Landscape and Lifescape elements determine the fate and growth of Peoplescape, which is completely dependent on both of these.



Expected results

The participants will be able to

- ❖ Better understand the significance of following the three-scape system.
- ❖ Categorise various entities and assign them to the respected scape.
- ❖ Have a clear idea about keeping the human element separately in a different scape.
- ❖ Have an emergent understanding of the three interlinked elements of the Earth’s biosphere – Landscape, Lifescape and Peoplescape – and what they mean individually and what they are when together?



Material needed

Whiteboard, markers, newsprint paper to be kept ready before the training starts



Time required

1½ hours

- ❖ Introduce the biosphere - 5 minutes
- ❖ Various systems to categorise the different elements - 10 minutes
- ❖ Explain the advantages and disadvantages of each system - 15 minutes
- ❖ Introducing the three scapes - Landscape, Lifescape, Peoplescape -10 minutes
- ❖ Explain characteristics of each scape and how they exist individually and inclusively at the same time - 35 minutes
- ❖ Discussion and clarifications - 15 minutes



Post session

This session is immediately followed by screening of the documentary 'Home' (2009 documentary by Yann Arthus-Bertrand). This documentary of about one-and-a-half hours can be downloaded from the link <http://www.youtube.com/watch?v=jqxENMKaeCU>

Activities after the participants have seen the movie

List and organise entities and themes:

- ❖ Participants list out noteworthy elements, patterns, ideas and themes as perceived through keywords. These are randomly listed on a blackboard.
- ❖ Can we see patterns in the keywords? How can they be segregated or grouped? Participants propose and discuss various heads under which the keywords are organised.
- ❖ The participants list the different entities shown in the documentary and categorise them under various heads/groups. This is to provoke thinking and to encourage their own categories and groups with a proper justification for the same.
- ❖ Usually there lies a point of confusion within the participants about where some of the listed entities need to be put as they possess characteristics common to two or three groups at a time. It is at this juncture that we introduce the concept of three scapes.

S6 Mapping



Comments for trainers

The trainer should have basic knowledge of drafting, cartography and ecology, having innovative ideas to use mapping as a tool for documentation and representation.



Brief introduction

- ❖ A map is a visual representation of an area, a symbolic depiction highlighting relationships between elements of that space such as objects, regions and themes.
- ❖ Many maps are static, two-dimensional, geometrically accurate (or approximately accurate) representations of three-dimensional space, while others are dynamic or interactive, even three-dimensional. Although mostly used to depict geography, maps may represent any space, real or imagined, without regard to context or scale.
- ❖ Maps of the world or large areas are often either "political" or "physical". The most important purpose of the map is to show territorial borders; to show

features of geography such as mountains, soil type or land use; etc. Geological maps show not only the physical surface, but characteristics of the underlying rock, fault lines and subsurface structures.

- ❖ This session helps participants understand the various methods and ways of utilising mapping technique as a tool to document and demonstrate the three scapes as also their interactions with each other and not merely the two-dimensional cartographic representation.



Objectives of the session

To familiarise the participants with the concept of mapping



Expected results

Participants will be able to understand

- ❖ What a map is
- ❖ How to map an object
- ❖ Experiential measures
- ❖ Introduction of scale
- ❖ Elements of a map
- ❖ Multi-sensual maps
- ❖ Maps as a communication of an experience

At the end of this session, the participants will have a clear understanding about how mapping is conducted and in what different formats maps may be prepared.



Material needed

Whiteboard, markers, newsprint paper, any object such as a book, pen, etc. that may be mapped



Time required

1 hour interactive session followed by practice

- ❖ Introduce the maps - 5 minutes
- ❖ Different types of maps - 5 minutes
- ❖ Significance of maps and mapping - 10 minutes
- ❖ Introduction of scale and making a map of small to large objects, various formats of presentations - 35 minutes
- ❖ Discussion and clarifications - 5 minutes



Steps to conduct the session

- ❖ While discussing various aspects of a map, ask the participants to prepare the map (using duster and pencil) to understand drawings, representations, scale and measurements, so that they thoroughly understand the concept of mapping.
- ❖ This activity is followed just after the basics of Landscape, Lifescape and Peoplescape.
- ❖ After the classroom session, the participants are divided into groups according to the number of participants and each group is asked to map the Landscape, Lifescape and Peoplescape of a particular area of the village. Later, the same groups present this data using any media.
- ❖ This helps make the participants understand the documentation and mapping of Landscape, Lifescape and Peoplescape.



S7 Why Conserve Biodiversity?



Brief introduction

- ❖ Various forms of living organisms that exist on Earth, together, form the biodiversity. The unique features and characters in the varied forms of organisms, varied abiotic factors in different climatic zones, organisms' response to it in the form of an anatomical and physiological adaptation, etc., that enhance or increase the biodiversity of a region.
- ❖ Genetic diversity, species diversity and ecosystem diversity are the three forms of diversity varying from a small microbe to a whole living system in larger areas.
- ❖ This biodiversity has various values - economic, social, cultural, ecological, aesthetic, others - which determine the exploitation or utilisation rate of biodiversity.
- ❖ Depletion of native biodiversity is generally accompanied by and is a partial result of loss of cultural diversity.
- ❖ We, therefore, propose another definition of biodiversity: **"Biodiversity is an emergent property of a collection of entities living in a region"**.
- ❖ For human beings and the communities living within an ecosystem, these emergent properties of the biodiversity of their system express themselves as ecosystem services.
- ❖ Most industries depend on this diversity for raw materials and of them, some are to do with food, agriculture, pharmaceutical, textiles, etc.



Objectives of the session

To familiarise the participants with the conservation value of biodiversity



Expected results

Participants will be able to better understand

- ❖ What is biodiversity
- ❖ Its role in our life
- ❖ Various value systems - economic, ecological, cultural, etc.
- ❖ Dependence on biodiversity
- ❖ Anthropocentric and ecological views
- ❖ The importance of biodiversity and how it sustains our life



Materials needed

Whiteboard, markers, newsprint paper to be kept ready before the training starts



Time required

1 hour

- ❖ Defining biodiversity - 5 minutes
- ❖ Different types of diversities - genetic, species, ecosystem, others - 5 minutes
- ❖ Significance of biodiversity - 10 minutes
- ❖ Problems and threats to biodiversity and environment, changing patterns - 35 minutes
- ❖ Discussion and clarifications - 5 minutes

S7 Introducing PBR – People’s Biodiversity Register



Comments for trainers

The trainer should have basic knowledge and experience of the PBR processes and activities.



Brief introduction

- ❖ The PBRs are developed, at the level of villages and together with villagers, by the teachers in local schools or colleges, and students or NGO researchers.
- ❖ PBRs from villages may be compiled at the level of talukas, districts, states and the nation in the form of computerised databases, to provide relevant information to the people, government and industry.
- ❖ PBRs have been recognised by the Biological Diversity Act, 2002, as a measure to ensure equitable access to information on sharing of benefits, by recognising such registration as prior art to scrutinise related Intellectual Property Rights (IPR) applications. Similar provisions for recognising these registers through their consolidated Indian digital database at the global level would help in reconciling the equity and conservation concerns in the context of globalisation.
- ❖ These global processes include Clearing House Mechanism of the international Convention on Biological Diversity (CBD), screening by the World Intellectual Property Organization (WIPO) and also the Trade Related Intellectual Property Rights (TRIPS).
- ❖ Important lessons learnt during the registration process include the fact that its sustenance requires quick social recognition of local knowledge and practices of innovative or sustainable use and conservation using local human resources. For, value addition to this knowledge and/or its IPR protection requires more time and resources at higher spatial scales, than grassroots stakeholders can imagine.
- ❖ The registers can be protected not by keeping in local custody but by publicising their claims. Unique knowledge may be best used for rewarding innovative traditions and practices of sustainable use and conservation, beginning with local social functions, besides incorporating in the national innovations register.
- ❖ It is best that any income in the nature of royalty earned from the commercialisation of biodiversity and related public knowledge be distributed across villages in relation to their conservation efforts as promotional incentives.



Objectives of the session

To familiarise the participants with the concept of People’s Biodiversity Register



Expected results

- ❖ Information on the origin of PBR – its history
- ❖ Importance of traditional knowledge
- ❖ Value of PBR – economic, ecological, cultural, etc.
- ❖ Way ahead for sustainable living – livelihoods
- ❖ Anthropocentric and ecological views
- ❖ At the end of this session the participants will have an emergent understanding of the concept of the PBR



Materials needed

Whiteboard, markers, newspaper sheets, book - 'Nisarg Niyojan Loksahabhagatun²²' to be distributed to all



Time required

4 hours (1 hour indoors + 2 hours Micro-PBR activity + 1 hour presenting Micro-PBR)

- ❖ Origin and history of PBR - 5 minutes
- ❖ Importance of Traditional Knowledge - 10 minutes
- ❖ Various kinds of value of PBR - economic, ecological, culture - 20 minutes
- ❖ Way ahead for sustainable living - livelihoods - 10 minutes
- ❖ Anthropocentric and ecological views - 5 minutes
- ❖ Maintenance of such information - Register - 5 minutes
- ❖ Discussion and clarifications - 5 minutes
- ❖ Data collection in Field - 2 hours
- ❖ Presentation on findings - 1 hour



Steps to conduct the session

- ❖ On completion of the one-hour session and discussion on the concept of PBR, the participants are divided into groups and assigned a topic on which they will collect basic information, i.e. Micro-PBR.
- ❖ The groups are assigned topics such as goats, wheat, medicinal practices in the particular village, etc.
- ❖ In the field activity, the groups try to understand and collect information from the village on the economic, ecological, cultural, traditional, environmental aspects of the topic assigned and will try to document their interactions with and within the Landscape, Lifescape and Peoplescape in the surrounding region.
- ❖ This field activity helps participants understand the basics of the PBR process and to document information on ecological interactions that are taking place in the vicinity.

²² Gadgil, M., Edlabadkar, V., Heda, N, Rekha, N. and Tofa, D. ParyavaranVigyan, n.d., *Nisarg Niyojan-Lok Sahbhagane*. Paryavaran Vigyan, Ballarpur. Accessed at www.paryavaranvigyan.org/pbr_docs/PBRMrthiManualUnicode.doc

Training II

Steps towards Documentation in the People's Biodiversity Register (4 days)

| Date | Session Time | Session Topic | Methodology | Expected Result | |
|--------------|--------------------------------|---|--|--|--|
| Day 1 | S1: 9.30 to 11.00 am | <u>Review of first training, discussion on Biodiversity (BD) & PBR</u> Recall the topics discussed in the first training | Discussion with all the participants | Recall all the issues discussed in first PBR session | |
| | 11.00 to 11.30 am | BREAK | | | |
| | S2: 11.30 am to 1.00 pm | <u>Scientific classification of biodiversity</u> To make participants aware of scientific classification | Lecture and discussion using flow charts and arrow diagrams | Participants will have better understanding of the different groups of organisms and their characteristics for identification | |
| | 1.00 to 2.30 pm | BREAK | | | |
| | S3: 2.30 to 4.30 pm | <u>Biodiversity documentation</u> To document existing biodiversity on field | <ul style="list-style-type: none"> ❖ Groups formed are assigned to an area ❖ Prepare a check list of the organisms present ❖ Organise the data | <ul style="list-style-type: none"> ❖ Understand the concept of documentation ❖ Understand the process ❖ Participants will be able to document the biodiversity of an area | |
| | 4.30 to 5.00 pm | BREAK | | | |
| | S4: 5.00 to 6.30 pm | <u>Presentations</u> Presenting the documentation of biodiversity to all the participants | <ul style="list-style-type: none"> ❖ Groups organise their data in a presentable form ❖ Presentation before all participants ❖ Clarifications if required | <ul style="list-style-type: none"> ❖ Understand the process of identification ❖ Understand the variations in BD in different areas | |
| | 6.30 to 7.00 pm | BREAK | | | |
| | 7.00 to 8.30 pm | Documentary screening – 'Planet Earth - Forests' – open to all villagers | | | |
| | 8.30 to 8.45 pm | Explanation of the following day's field activity | | | |



| Date | Session Time | Session Topic | Methodology | Expected Result |
|--------------|---------------------------------|--|---|--|
| Day 2 | S5: 7.30 to 9.30 am | <u>Biodiversity assessment</u> Assessment of biodiversity on the field | <ul style="list-style-type: none"> ❖ Groups are assigned to undertake quadrats and transects in different areas ❖ Organise the data in presentable form | Will understand basics of BD assessment on the field due to practical experience |
| | 9.30 to 10.00 am | BREAK | | |
| | S6: 10.00 am to 12.00 pm | <u>Presentations</u> Presenting the assessment of BD to all the participants | <ul style="list-style-type: none"> ❖ Groups organise their data in presentable form ❖ Present in front of all participants ❖ Clarification of doubts | <ul style="list-style-type: none"> ❖ Will understand the process of assessment ❖ Will understand the variations in BD in different areas |
| | S7: 12.00 to 1.30 pm | <u>Biodiversity assessment</u> Basics of scientific assessment of biodiversity | Discussions on basics of sampling, sampling techniques, quadrats, transects, difference in checklist and assessment | <ul style="list-style-type: none"> ❖ Will understand scientific sampling and assessment of BD ❖ Techniques of assessment |
| | 1.30 to 2.30 pm | BREAK | | |
| | S8: 2.30 to 4.00 pm | <u>Formats for documentation</u> To discuss formats for documentation - tangibles and intangibles | Discussion on <ul style="list-style-type: none"> ❖ Different methods of gathering data ❖ Various forms and structures for presentation, dissemination and propagation of data | Understanding appropriate formats and methods of documenting and organising information |
| | 4.00 to 4.30 pm | BREAK | | |
| | S9: 4.30 to 7.00 pm | <u>Street plays/puppet shows</u> Introduction and use of street plays and puppet shows | <ul style="list-style-type: none"> ❖ Participants are divided into groups ❖ Each group decides its theme for a play and performs it | <ul style="list-style-type: none"> ❖ Understand the effectiveness of these tools ❖ Understand themes, script, directing and other issues |
| | 7.00 to 8.30 pm | Presentations of street plays – open to all villagers | | |
| | 8.30 to 8.45 pm | Explanation of the activity for the next morning | | |



| Date | Session Time | Session Topic | Methodology | Expected Result |
|--------------|---------------------------------|---|---|---|
| Day 3 | S10: 7.30 to 9.30 am | <u>Biodiversity assessment</u> Assessment of biodiversity on the field | Interchange of activity between groups i.e. groups who did quadrats will do transects and vice versa | <ul style="list-style-type: none"> ❖ Both groups will understand basics of biodiversity assessment on field due to practical experience ❖ They will get familiar with both the techniques |
| | 9.30 to 10.00 am | BREAK | | |
| | S11: 10.00 am to 1.00 pm | <u>Presentations</u> Micro-PBR: Wheat/sorghum | <ul style="list-style-type: none"> ❖ Presentation using charts, boards ❖ Discussing various issues | <ul style="list-style-type: none"> ❖ Will understand various approaches in PBR ❖ Understand many interlinkages and factors |
| | 1.00 to 3:00 pm | BREAK | | |
| | S12: 3.00 to 5.00 pm | <u>Understanding biodiversity concerns in drainage line</u> To understand biodiversity concerns in drainage line and watershed development | <ul style="list-style-type: none"> ❖ Participants and resource persons go on the field for drainage line survey ❖ After selecting site to put treatment structures the ecological concerns are discussed ❖ Alternatives and modification are suggested and discussed | <ul style="list-style-type: none"> ❖ Will understand what are the ecological concerns while constructing watershed structures ❖ This knowledge will help in the future |
| | 5.00 to 7.30 pm | BREAK | | |
| | 7.30 pm | Documentary screening – ‘Ridge to Valley’ – open to all villagers | | |
| Day 4 | S13: 10.00 to 11.30 am | <u>Climate Change Adaptation (CCA) and PBR</u> Establishing linkages between CCA and PBR | <ul style="list-style-type: none"> ❖ Discussion on CCA activities ❖ Importance of PBR and links with CCA | Will have justification for undertaking PBR in a CCA project |
| | 11.30 am to 12.00 pm | BREAK | | |
| | S 14: 12.00 to 1.00 pm | Feedback and evaluation | Oral and written feedback | Further improvements to PBR |
| | | TRAINING ENDS | | |



S1 People's Biodiversity Register (PBR) Discussion



Brief introduction

- ❖ The session helps participants understand the meaning of PBR, the meaning of P and B separately and together and R.
- ❖ Discuss the co-existence and interactions with and within the People and the Biodiversity: how and to what extent we all are dependent on the surrounding biodiversity, the role that biodiversity plays in our daily life, the various forms of diversity, etc.
- ❖ Emphasise on the traditional knowledge of the community on utilising biodiversity.
- ❖ What is meant by registering People's biodiversity? What is the significance of doing so? In what format should the said register be maintained?
- ❖ The objective of the People's Biodiversity Register is to build an open and transparent information resource system on biodiversity resources from village level upwards with the intention of promoting sustainably managed biodiversity resources.
- ❖ This is an interactive discussion to gauge people's knowledge on biodiversity in the surroundings and their interactions with each other on this.



Objectives of the session

To familiarise participants with the scientific methodology of assessing biodiversity in a given area



Expected results

Participants will be able to

- ❖ Begin understanding the scientific assessment of biodiversity.
- ❖ Understand methodologies like Quadrat and Transect of assessing biodiversity.

Towards the end of this session, participants will have an emergent understanding of sampling, its various forms, merits and demerits of each of these and will be able to undertake biodiversity assessment surveys on the field.



Materials needed

Whiteboard, markers, newsprint paper, photocopied material to be kept ready before the training starts



Time required

1 hour

- ❖ Introduce the concept of PBR - 5 minutes
- ❖ Explaining meaning of People's - 15 minutes
- ❖ Explain meaning of Biodiversity - 15 minutes
- ❖ Explaining meaning of Register - 15 minutes
- ❖ Discussion and clarifications - 10 minutes

S2 Basics of Scientific Assessment of Biodiversity & Sampling Methodology



Comments for trainers

- ❖ The trainer should have experience in biodiversity assessment surveys with good knowledge of the various scientific methodology of assessment.
- ❖ Possible issues that may occur – difference between general biased assessment and the scientific assessment has to be discussed thoroughly.



Brief introduction

- ❖ The session helps participants understand the basics of scientific assessment and documentation of biodiversity.
- ❖ The session starts with various methods and parameters/factors, based on which a fair assessment of the existing biodiversity in an area may be done.
- ❖ It gives the participants a brief idea about surveys sampling and various methods of scientific sampling to get more accurate information on the existing conditions in nature.
- ❖ This also helps participants understand the significance of assessing and sampling biodiversity in addition to merely listing species diversity existing in the regions. Such sampling helps in understanding the concept of species/habitat abundance, which are important for sustainable extractions, consumption, etc.
- ❖ Transects and Quadrats are the two commonly used methods for the biodiversity survey.
 - Transect may be a line transect or belt transect, where we count the organisms existing on that line or within the belt.
 - Quadrat involves a square to be marked on the ground vegetation of 1M², 5 M² OR 10 M² and the number of organisms of each species within that square are counted.
- ❖ These two methods help in determining the density, abundance and frequency of the organisms in a particular habitat.
- ❖ The participants will understand the basics of biodiversity assessment and will be able to undertake such surveys on the ground.



Objectives of the session

To familiarise the participants with the scientific methodology of assessing biodiversity in an area



Expected results

Participants will be able to

- ❖ Better understand how to do a scientific assessment of biodiversity.
- ❖ Understand the methodologies like Quadrat and Transect for assessing biodiversity.

At the end of this session, participants will have an emergent understanding of sampling, its various methods, merits and demerits of the chosen method(s) and will be able to undertake biodiversity assessment surveys on the ground.



Materials needed

Whiteboard, markers, newsprint paper, texts for reading to be kept ready before the training starts



Time

4 hours (1 hour indoor session + 3 hours field activity + presentation)

- ❖ Introduction of the subject - 5 minutes
- ❖ Importance of assessing biodiversity - 5 minutes
- ❖ Various methods of sampling - 10 minutes
- ❖ Characteristics, merits and demerits of each method - 30 minutes
- ❖ Discussion and clarifications - 10 minutes
- ❖ Field activity and presentation - 3 hours



Steps to conduct the session

Part 1: Introduction to scientific assessment of biodiversity and different methods involved in doing so

Part 2: Field activity – assessment of biodiversity

- ❖ Divide the participants in groups (four members per group).
- ❖ Assign a specific region of the village to each group.
- ❖ Two groups will undertake quadrats and the other two, transects.
- ❖ The groups go to the given site to assess the biodiversity of that site and the traces of organisms.
- ❖ Participants prepare the tabulations (qualitative as well as quantitative) of organisms and assign them to the taxonomic groups (already discussed in the session).
- ❖ Participants tabulate the data collected and present it to others.
- ❖ Doubts are clarified regarding classification of organisms.
- ❖ On the following day, the task is interchanged, i.e. the groups that undertook quadrats shall be assigned to do transects and vice versa, to familiarise each participant with the methodology.

S7 Sampling Questionnaire (matrix) – Different Methods and Approaches



Brief Introduction

- ❖ Documentation of true data is crucial to the success of any project.
- ❖ Discuss the various methods of gathering the data on specific fields related to the project.
- ❖ Discuss methods for framing various questionnaires so as to get data. Also discuss the form of documenting “tangible and intangible data”, i.e. qualitative and quantitative fields.
- ❖ The aim is to adapt a different approach in gathering information or in generating data on anthropocentric ecological interactions.
- ❖ The methods discussed here may be similar to existing techniques like Participatory Rural Appraisal (PRA). These tools may be modified to document detailed linkages between Landscape, Lifescape and Peoplescape, and not just in terms of the monetary values that is to be obtained.
- ❖ In this session, one tries to develop a questionnaire that reveals both tangible as well as intangible data in a comparative scale and that may be put into a matrix format.



Objectives of the session

To familiarise the participants with the questionnaires and various formats of data collection



Expected Results

Participants will be able to

- ❖ Better understand various formats for framing a questionnaire.
- ❖ Understand the different ways of documenting tangible and intangible data fields in comparative format.

At the end of this session, the participants will have an emergent understanding of the difficulties of documenting intangible data which cannot be quantified, and what are the possible method(s) of documenting it.



Materials needed

Whiteboard, markers and newsprint paper to be kept ready before the training starts



Time

1 hour

- ❖ Introduction to the concept of questionnaires - 5 minutes
- ❖ Types of question framing and formats - 5 minutes
- ❖ Methods for qualitative and quantitative data fields - 10 minutes
- ❖ Difficulties in documenting the intangible fields, scales for comparative data fields - 35 minutes
- ❖ Discussion and clarifications - 5 minutes



Documentation of Seasonal Biodiversity (3 Days)

| Date | Session Time | Session Topic | Methodology | Expected Result |
|--------------|---------------------------------|---|--|--|
| Day 1 | S1: 8.00 am to 1:00 pm | Pre-monsoon transition/ Preparatory phase | <ul style="list-style-type: none"> ❖ Discussion ❖ Group field activity | <ul style="list-style-type: none"> ❖ Understanding interseasonal changes in the village ❖ Preparing for the monsoon season and ecological changes in culture, construction, livelihood, agricultural, etc. |
| | 1.00 to 2.30 pm | BREAK | | |
| | S2: 2.30 to 5.00 pm | <u>Presentations</u> Three groups on interseasonal changes | Any media | Revision of the subjects and enhanced understanding of season and culture |
| | 5.00 to 5.30 pm | <u>Puppet show</u> Theme and preparation | Four groups working on four different themes | Puppet show |
| | 5.30 to 6.00 pm | BREAK | | |
| | Evening session | Classification/ Identification – reptiles, birds and mammals | Slide presentation and discussion | Basic information for identification of reptiles |
| Day 2 | S3: 8.00 to 10.00 am | <u>Revision</u> PBR 1st, 2nd, 3rd trainings | Discussion and clarifications of doubts | Enhancing self-confidence to undertake PBR in villages |
| | 10.00 to 10.30 am | BREAK | | |
| | S4: 10.30 am to 12.00 pm | Thematic documentation on various subjects | Participants develop a topic and method for documenting diversity through exhibits | Collecting information for exhibit and the whole process |
| | 12.00 to 1.00 pm | <u>Discussion</u> Discussing format for documenting the exhibits | Discussion with participants | Preparing a standard format |
| | 1.00 to 2.30 pm | BREAK | | |
| | 2.30 to 4.00 pm | <u>Exhibition</u> Preparation – cooking time | Gathering villagers and recipes for exhibit activity | Revival of the traditional recipes and awareness about their importance |
| | 4.00 to 4.30 pm | BREAK | | |
| | 4.30 pm onwards | <u>Exhibition</u> Traditional recipes | <ul style="list-style-type: none"> ❖ Exhibit and presentation ❖ Discussion | Revival of the traditional recipes and awareness about their importance |



| Date | Session Time | Session Topic | Methodology | Expected Result |
|--------------|------------------------------|--|--|--|
| Day 3 | S5: 8.00 to 10.00 am | <u>Puppet show</u> Presentation by four groups on four themes | Any media | Better understanding of the subject amongst participants |
| | S6: 10.00 to 10.30 am | Assignments and Presentations on previous session | Any media | Discussions and clarifications of queries raised |
| | 10.30 to 11.00 am | BREAK | | |
| | 11.00 am to 12.30 pm | Assignments and Presentations on previous session | Any media | Revision of subjects |
| | S7: 12.30 to 1.00 pm | New assignments | Discussion on various related subjects | Finalising themes for assignments |
| | 01.00 to 2.30 pm | BREAK | | |
| | S8: 2.30 to 4.00 pm | PBR – future action plan | Group activity | Preparation of the action plan and budget for the year |
| | S9: 4.00 to 4.30 pm | Feedback on workshop | Questionnaire and suggestions | |
| | TRAINING ENDS | | | |



S1 Documenting Inter-Seasonal Changes



Brief introduction

- ❖ The Earth Year is divided into three basic seasons – summer, monsoon and winter.
- ❖ Each of the seasons is at its peak at a specific time.
- ❖ When a season is in its termination phase, it shows the characters of either both seasons or extremes. For instance, summer has its own characteristics, but towards its end, heat increases and then the rains begin.
- ❖ As the weather and climatic conditions change along with changing seasons, living organisms also change their habit/habitats/lifestyle/livelihood, etc., continuously adapting to surrounding situations.
- ❖ This session helps participants understand the importance of documenting such inter-seasonal ecological changes under various heads and categories, so as to document how people prepare themselves for the coming season. The changes could be in their food habits, clothes, livelihoods, constructions and maintenance.
- ❖ This module intends to document how people utilise biodiversity for the above purposes to prepare and adapt for the seasonal changes.



Objectives of the session

To familiarise the participants with documenting inter-seasonal changes in the region



Expected results

Participants will be able to understand

- ❖ Seasonal changes
- ❖ Change in flora and fauna
- ❖ Changing lifestyle
- ❖ Changing livelihood
- ❖ Climatic conditions
- ❖ Activities involved in preparing for the coming season

At the end of this session, the participants will have an emergent understanding of the importance of documenting such inter-seasonal ecological changes in the region.



Materials needed

Whiteboard, markers, newsprint paper to be kept ready before the training starts



Time

4 hours

- ❖ Introduction to seasonal changes - 15 minutes
- ❖ Types of seasonal changes - 10 minutes
- ❖ Significance of documenting such changes - 20 minutes
- ❖ Preparing three groups for documenting changes on the field - 5 minutes
- ❖ Discussion among group members - 10 minutes
- ❖ Field work - 2 hours
- ❖ Preparing presentation/data organisation - 30 minutes
- ❖ Presentations by groups - 30 minutes

S4 Thematic Documentation on Various Subjects



Comments for trainers

Points for extra preparation – the resource person should be familiar with the existing situation and issues in the village and must have a good understanding of research documentation.



Brief introduction

- ❖ This session is especially attractive to the youth and older children, hence they are important participants.
- ❖ This session is meant to make the participants think and undertake a research documentation project in their village in a given time frame. Possible themes are agriculture, water supply, forest resources, fuel wood, important trees, hunting techniques and others.
- ❖ The unique point of this exercise is that the children select the theme for documentation after discussion in a group. They decide the methodology to conduct it in a predetermined time period.
- ❖ Such a process sharpens their skills at questioning, surveying and observing. It is designed to make them think about the various formats for documentation and impart a sense of confidence to self-document similar subjects.



Objectives of the session/Expected results

- ❖ To trigger the creative skills of participants
- ❖ To make the young think about the current important issues in their village
- ❖ To make the young understand the importance of conducting research at their level and deciding on the correct method of documenting the same
- ❖ To capacitate the young to present information in various formats
- ❖ Participants will be able to
 - Define the current important issues in the village through discussion
 - Design a research documentation project within limited time
 - Present the information in various forms
 - Come up with a small output booklet (if possible)



Materials needed

White A4 sheet, card sheets, colours, sketch pens, whiteboard and markers to be kept ready before the training starts



Time

3 hours

- ❖ Introducing research documentation (how to document information scientifically) - 10 minutes
- ❖ Formation of children's groups - 5 minutes
- ❖ Finalising themes for documentation - 15 minutes
- ❖ Developing questionnaires and methods - 30 minutes
- ❖ Field documentation - 1 hour
- ❖ Gathering information in various formats - 30 minutes
- ❖ Group presentation - 30 minutes



Steps to conduct the session

- ❖ Discuss with participants the importance of research documentation.
- ❖ Initiate discussion on the various important issues in the village.



- ❖ Finalise a few subjects selected by children like
 - Village cleanliness
 - Places in the village having tourism-related potential
 - Fuel wood
 - Electricity supply
 - Water supply
 - Winter crops
 - Unique valley landscape in __ (insert name) __ village
 - Pet/domesticated animals in the village
- ❖ Divide participants in groups.
- ❖ Explain to the participants the concept of "Questionnaire" and ways to develop the same.
- ❖ Send participants to the field for an hour to undertake a minimum of five interviews in the village.
- ❖ Participants to document the information in presentable formats .
- ❖ Participants present the information gathered to other groups.
- ❖ This material is to be collected as a documentation output (useful for the exhibition).

S2 Basic Taxonomic Identification – Mammals/Birds/Reptiles/Amphibians



Comments for trainers

The trainer should know well the basics of taxonomy and be able to identify different species amongst the vertebrates.



Brief introduction

- ❖ The session helps the participants to understand the different features used in the identification of biodiversity – snakes, amphibians, birds and mammals.
- ❖ Taxonomic identification is the recognition of the identity or essential character of an organism. Taxonomists often present organised written descriptions of the characteristics of similar species so that other biologists can identify unknown organisms. These organised descriptions are referred to as taxonomic keys. A taxonomic key is often published with pictures of the species it describes.
- ❖ Written descriptions are usually preferred over pictures, since pictures cannot convey the natural variation in the morphology of a species, nor the small, yet characteristic, morphological features of a species. Taxonomic keys often require knowledge of the morphology of the taxa in question and consequently rely upon technical terminology.
- ❖ In this session, complex scientific terminologies are explained to make them understand the documentation of the key characters of species to be identified which has some strong linkages with human ecology, livelihood generation, adaptation, etc.
- ❖ Participants are also shown the common fauna belonging to the above mentioned classes found in the region, with their key characteristics.



Objectives of the session/Expected results

To familiarise the participants with the basic taxonomic keys to be able to identify reptiles, birds and mammals of the region

Participants will be able to

- ❖ Identify the common reptiles, birds, and mammals in the area

- ❖ Differentiate between the similar species
- ❖ Have some idea about the uses of and threats to these organisms

At the end of this session, the participants will have emerging ability to identify and differentiate between the various species of reptiles, birds and mammals present in the region.



Materials needed

Whiteboard markers, LCD projector, computer, etc. to be kept ready before the training starts



Time

1½ hours

- ❖ Introduce taxonomy - 5 minutes
- ❖ Classification of mammals - 15 minutes
- ❖ Classification of birds - 25 minutes
- ❖ Classification of reptiles - 15 minutes
- ❖ Classification of amphibians - 15 minutes
- ❖ Discussion and clarifications - 15 minutes



Steps to conduct the session

- ❖ The session should be initiated with a discussion on the basic features identifying and differentiating the vertebrate groups, i.e. mammals, birds, reptiles, amphibians and fish.
- ❖ Using photographs (slide/powerpoint presentation) of the organisms, the unique identifying characteristics are explained to the participants along with their common vernacular names.

S4 Traditional Cooking Recipes – Wild Edibles



Comments for trainers

Additional preparation required – The resource person should be familiar with a few wild edibles used in the region and with the basic knowledge of the formats for documentation.



Brief introduction

- ❖ This session is meant to make children aware of the preparations of wild edible and traditional cooking recipes in their village and to guide them to document this information.
- ❖ Here participants/children in groups select and prepare the traditional dishes, mostly of the wild edibles, in small quantities and present them to all the participants/children. This encourages the participants to know about their importance and the method/s of cooking. Simultaneously, children document the information on the plant species that are used in the recipe.
- ❖ This module helps children be more aware of the existence and importance of the wild edibles in their natural setting and how these play a crucial role in our food habits as nutritive supplements. Children truly enjoy collecting these, documenting their existence and cooking them.
- ❖ A small booklet is prepared at the end of this session on the cooking of wild edibles, which contains the documentation prepared by the children. This helps build their confidence to undertake similar work on their own or in groups. It even provides an opportunity to establish ownership and authorship on the



published document apart from the fun part. Such a process will enhance their curiosity and awareness about the wild edibles that are used in the village.

- ❖ Together with knowledgeable adults of the village, children gather wild edibles. Children also learn to identify the non-edible fruits, leaves and roots.
- ❖ Cooking by children is to be undertaken under supervision of the adults in the group.



Objectives of the session/Expected results

- ❖ To trigger curiosity in the participants
- ❖ To make children aware of the many wild edible plant species in the vicinity
- ❖ To make children understand the importance of wild edibles
- ❖ Children learn to identify the edible and non-edible wild plants and to document them
- ❖ To make children experience the cooking of wild edibles
- ❖ To present information of wild edibles in the form of a booklet
- ❖ Participants will be able to
 - Identify a few wild edible plant varieties in the surroundings
 - Cook a few preparations containing wild edibles
 - Come up with a small output booklet on preparations of wild edibles



Materials needed

White A4 sheet, whiteboard, markers, varieties of wild edibles, cooking arrangements



Time

3 hours

- ❖ Introducing wild edibles - 10 minutes
- ❖ Dividing children into groups (an adult villager is in each group) - 5 minutes
- ❖ Preparing the formats to document the cooking recipe and plant information - 15 minutes
- ❖ Collection of wild edibles by groups of children - 30 minutes
- ❖ Actual cooking of wild edibles - 1 hour
- ❖ Documenting the information on cooking and wild edible used - 30 minutes
- ❖ Group presentation - 25 minutes
- ❖ Preparing the booklet - 5 minutes



Steps to conduct the session

- ❖ Discuss with participants/children the varieties of wild edibles used in the village.
- ❖ Divide participants/children into groups to prepare few edibles.
- ❖ Explain and prepare a format to document the information about cooking recipe and the plant(s) used.
- ❖ Send participants/children to collect wild edibles for cooking.
- ❖ Children (under guidance) note down the non-edibles, particularly those that they had mistaken.
- ❖ Participants/children to prepare the dish(es) based on above-mentioned recipe.
- ❖ Participants/children to document the information in presentable formats.
- ❖ Participants/children to present the prepared dish to other groups for the latter's views.
- ❖ Views of all the examiners/participants who tasted the dish are to be compiled in an established format and published into a small booklet, which can be used as a documentation output for further dissemination at various points.

Training IV

Basic Principles of People's Biodiversity Register (3 Days)

| Date | Session Time | Session Topic | Methodology | Expected Results |
|--------------|-----------------------------|--|---|---|
| Day 1 | S1: 9.30 to 11.00 am | <u>Recap and summarising</u> PBR training sessions 1,2,3 | Group activity and presentations, any media | Evaluation of the understanding of PBR |
| | 11.00 am to 12.00 pm | Assignments and Presentations on previous session | Any media | Evaluation of the assigned work |
| | 12.00 to 12.30 pm | BREAK | | |
| | 12.30 to 1.00 pm | Assignments and Presentations on previous session | Any media | Evaluation of the assigned work |
| | 1.00 to 2.30 pm | BREAK | | |
| | 2.30 to 3.30 pm | Assignments and Presentations on previous session | Any media | Evaluation of the assigned work |
| | 3.30 to 4.00 pm | BREAK | | |
| | 4.00 to 4.30 pm | Assignments and Presentations on previous session | Any media | Evaluation of the assigned work |
| Day 2 | S2: 9.30 to 9.45 am | Assignments and Presentations on previous session | Any media | Evaluation of the assigned work |
| | 9.45 to 10.30 am | Basics of botany | Discussion/PPT | Improving observations for identification |
| | 10.30 to 11.00 am | BREAK | | |
| | 11.00 am to 1.00 pm | Botanical identification | Field work | Identification of trees, shrubs, herbs, grasses and climbers around the village |
| | 1.00 to 2.30 pm | BREAK | | |
| | 2:30 to 03:00 pm | Field work | Data organisation | Writing down the names and characteristics of the plants |
| | 3.00 to 4.00 pm | Presentations | Any media | Evaluation of the assigned work |





| Date | Session Time | Session Topic | Methodology | Expected Results | |
|--------------|------------------------------|--|-------------------------------|--|--|
| | 4.00 to 4.30 pm | BREAK | | | |
| | S3: 4.30 to 5.30 pm | Photographic documentation | Discussion and practicals | Photographs of the individual plants | |
| Day 3 | S4: 9.30 to 10.30 am | <u>Economic interactions</u> Social capital and cashless transactions | Discussion | Understand the barter system and its importance | |
| | S5: 10.30 to 11.30 am | <u>Ecological significance</u> History, culture, traditions | Discussion | Understand the value systems in culture and traditions which support conservation | |
| | 11.30 am to 12.00 pm | BREAK | | | |
| | S6: 12.00 to 1.30 pm | PBR future action plan and CBR implementation | Discussion – PBR/ CBR, etc. | <ul style="list-style-type: none"> ❖ A framework for action based on PBR ❖ Introduction of CBR in village school | |
| | 1.30 to 2.30 pm | BREAK | | | |
| | S7: 2.30 to 4.00 pm | Feedback and new assignment | Questionnaire and suggestions | Understand difficulties in implementation | |
| | TRAINING ENDS | | | | |

S2 Basic Plant Identification – Documentation



Comments for trainers

The trainer should have sound knowledge of plant identification and its ecological significance.



Brief introduction

- ❖ The session helps participants understand the basic features used in the identification of plant diversity.
- ❖ Participants understand the plant characteristics needed to document plant varieties of ethno-botanic significance which are used by the people or that possess any cultural/economical value.
- ❖ Taxonomic identification is the recognition of essential characters of an organism that helps in identifying unknown organisms.
- ❖ These organised descriptions are referred to as taxonomic keys which are often published with pictures of the species it describes. However, written descriptions are usually preferred over pictures, as the latter cannot convey the natural variation in the morphology of a species, nor the small, yet characteristic, morphological features of a species.



Objectives of the session/Expected output

To familiarise participants with the basic taxonomic keys so as to identify plants

Participants will be able to

- ❖ Document the plant characteristics useful in its identification
- ❖ Differentiate between similar species of plants
- ❖ Have a clear idea about the uses of and threats to these organisms

At the end of this session, the participants will have an emerging ability to identify and differentiate between the various species of plants in the region and document their scientific characteristics.



Materials needed

Whiteboard, markers, LCD projector, computer, etc. to be kept ready before the training starts



Time

4½ hours

- ❖ Introduction to taxonomy - 5 minutes
- ❖ Classification of plants - 15 minutes
- ❖ Plant documentation - 25 minutes
- ❖ Format for plant documentation - 15 minutes
- ❖ Field work - 120 minutes
- ❖ Data compilation and presentation - 75 minutes
- ❖ Discussion and clarifications - 15 minutes



Steps to conduct the session

- ❖ The session should be initiated with discussion on the basic features/ characteristics to identify plants and to document them.
- ❖ Thereafter, participants are divided into five groups for field work.



- ❖ Categories, based on uses, are identified and participants are assigned to them.
 - Fruits
 - Fuel wood
 - Trees used for construction of huts and for agricultural implements
 - Medicinal plants
 - Hunting and other uses
- ❖ The participants are then sent to the village to document the five most preferred plant varieties under each category.
- ❖ Participants identify the assigned plants on the field and document the characteristics to be presented.

S3 Basic Photographic Documentation – Quality and Composition



Brief introduction

- ❖ Photographs are a great tool to document any condition or process when used efficiently.
- ❖ This session is to make participants understand the basics of photography, to be more precise, the quality/size of a photograph and the composition of the frame, which later determine the quality of the picture captured.
- ❖ The session gives the participants a fair idea and basic knowledge of equipment used for photography on the field such as cell phones, digital cameras, etc.
- ❖ Discussion on the differences between digital and optical zoom options, and the different photo sizes – the resolution and the quality options that should be chosen according to the situation.
- ❖ The composition of the photograph, where to locate the horizon, sky, the main object to be photographed, angle, etc. are discussed and explained.
- ❖ This session helps participants understand the importance and basic aspects of photography, which is necessary on the field, so as to click better quality pictures for pictorial documentation of any ecologically significant process, species, etc.



Objectives of the session

To familiarise the participants with the basics of photographic documentation



Expected results

Participants will be able to understand

- ❖ Use of various equipment for photography
- ❖ Size and resolution concept
- ❖ Composition
- ❖ Factors determining the quality of a photograph

At the end of this session, the participants will have an emergent understanding of the size, resolution and composition of photograph, and how a good photograph can be obtained using an array of equipment.



Materials needed

Whiteboard, markers, newsprint paper, cell phones with cameras, digital camera, LCD projector, etc. to be kept ready before the training starts



Time

2 hours

- ❖ Introduction - 10 minutes
- ❖ Various equipment that may be used - 10 minutes
- ❖ Significance of size, resolution, quality - 20 minutes
- ❖ Composition of photographs - 25 minutes
- ❖ Field work - 40 minutes
- ❖ Clearing participants' doubts on the field - 15 minutes



Steps to conduct the session

- ❖ After the basic discussion, participants are taken to the field to experiment with various compositions, angles and options to shoot and that which delivers the best results.
- ❖ The pictures taken by the participants are examined and modifications for improvements are suggested.

S5 Ecological Significance of History, Culture and Traditions



Comments for trainers

- ❖ Need to read material on various interpretations of culture, especially the ones that view culture from the ecological perspective.
- ❖ Perspective of the trainer – the person should have clear understanding of the inter-relations between history, culture and biodiversity.

The trainer should be able to explain the concept through examples such that participants can understand or comprehend the same.



Brief introduction

- ❖ Culture: The total, generally organised way of life, including values, norms, institutions, and artefacts. This is passed on from generation to generation by learning alone (*Dictionary of Modern Sociology*).
- ❖ Culture is the tool by which human society has been shaping nature around itself. In an ancient country like India, the mutual interactions between changing environment and culture have contributed to stability and sustainability.
- ❖ Culture is a long-standing feature, which reflects how, traditionally, human beings in particular regions have adapted to nature and environment around them.
- ❖ The documentation of various aspects of culture and changes will give a historical perspective to adaptations.
- ❖ In the present context of climate change, this exercise aims to develop an understanding of the trajectory of changes in community as a response to the changing environment which are most effectively reflected in "culture".
- ❖ This exercise also acknowledges and documents the lesser known and habitual aspects of culture which though deep-rooted in reasoning are more often than not, forgotten or neglected.



Objectives of the session

To familiarise the participants with various aspects of culture and its ecological significance in the context of climate change



Expected results

Participants will be able to understand

- ❖ The concept of culture
- ❖ Scope of culture
- ❖ How it is different from tradition and history
- ❖ Various elements of culture
- ❖ Culture in the regional context
- ❖ Relevance in the context of PBR
- ❖ Linkages with biodiversity and climate change

At the end of this session, the participants will have an emerging understanding of what encompasses culture and how to link cultural aspects with biodiversity and climate change.



Materials needed

Markers, whiteboard to be kept ready before the training starts



Time required

1½ hours

- ❖ Introduction to the concept and scope of culture - 10 minutes
- ❖ Various elements of culture, elicited through discussion with the participants and listed - 30 minutes
- ❖ Understanding the difference between history, culture and traditions: a discussion - 10 minutes
- ❖ Relevance in the present context of PBR - 10 minutes
- ❖ Documenting culture at the village level - 10 minutes
- ❖ Linkage with biodiversity and climate change, through examples - 20 minutes

Capacity Building and Taking PBR to the Community (4 Days)

| Date | Session Time | Session Topic | Methodology | Expected Result |
|--------------|---------------------------------|--|--|--|
| Day 1 | S1: 8.30 to 9.30 am | <u>Recap and summary</u> Previous PBR training I, II, III and IV | Group activity and presentations (any media) | Evaluation of the understanding of PBR |
| | 9.30 to 10.30 am | <u>Introduction and orientation</u> Global Positioning System (GPS) | <u>Lecture</u> Usage of GPS instrument | Participants are familiar with the GPS, its use and importance |
| | 10.30 to 11.00 am | BREAK | | |
| | S2: 11.30 am to 12.30 pm | Field demonstration and hands-on training | Demonstration in groups and practical exercise | Participants are able to use GPS and feel confident in using it |
| | 12.30 to 1.00 pm | <u>Presentation</u> GIS and remote sensing | Video presentation | People are aware of the use and importance of GIS and remote sensing |
| | 1.00 to 1.30 pm | ❖ Identification of topics ❖ Data collection for PBR | Discussion | A list of the prioritised important topics is available |
| | 1.30 to 2.30 pm | BREAK | | |
| | S3: 2.30 to 4.00 pm | Grouping the topics | Discussion | Participants are able to collect the data of related topics during the interactions with the villagers |
| | 4.00 to 4.30 pm | BREAK | | |
| | S4: 4.30 to 6.00 pm | Preparation of formats (Annexure I) | Discussion | Finalisation of formats for data collection |
| | 6.00 to 8.00 pm | BREAK | | |
| | S5: 8.00 to 8.30 pm | Gram Sabha | Discussion | ❖ People are aware of the project ❖ Selection of BMC |
| Day 2 | S6: 9.00 to 9.30 am | Revision | Discussion | Revision of previous day |
| | 9.30 to 11.00 am | Village mapping | Input session and practical exercise | Participants understand land use, landscape and the important sites in village |
| | 11.00 to 11.30 am | BREAK | | |
| | S7: 11.30 am to 1.00 pm | <u>Field work</u> Group formation and field work on a PBR topic | Interviews, observations | Data collection on given PBR topic |
| | 1.00 to 2.00 pm | BREAK | | |



| Date | Session Time | Session Topic | Methodology | Expected Result |
|--------------|---------------------------------|---|--|--|
| | 2.00 to 5.00 pm | <u>Field work</u> Group formation and field work on a PBR topic | Interviews and writing down the observations | Data collection on given PBR topic |
| | S8: 5.00 to 6.00 pm | Data collation | Discussion | Data organised in prescribed format |
| Day 3 | S9: 9.00 to 10.00 am | ❖ Experience sharing ❖ Sharing of data collected | Presentations | Everyone is aware of the data collected |
| | 10.00 to 11.00 am | Action plan | Discussion | Protocols set for the execution of the PBR |
| | 11.00 to 11.30 am | BREAK | | |
| | S10: 11.30 am to 1.00 pm | Children's Biodiversity Register | ❖ Input session ❖ Discussion | Participants understand the importance of the Children's Biodiversity Register. They are familiar with the process and how to implement it |
| | 1.00 to 2.00 pm | BREAK | | |
| | 2.00 to 2.45 pm | Preparation for exhibition | Any media | Ready for the exhibition |
| | 2.45 to 3.30 pm | Informing villagers about the exhibition and the venue | Individual home visit and drum beats | Villagers aware of the exhibition |
| | 3.30 to 4.00 pm | BREAK | | |
| | S11: 4.00 to 5.00 pm | Herbarium | Input session and demonstration | Participants know how to prepare a herbarium |
| | 5.00 to 6.30 pm | Exhibition | Presentations | Data collected is verified by the villagers; missing points are added by the villagers; villagers are aware of their biodiversity |
| | 6.30 to 7.00 pm | Feedback | Questionnaire | Feedback regarding the training session |
| | 7.00 to 7.30 pm | Handing over of the PBR project to the village or the implementation team | | Implementation team accepts to implement the project |



| Date | Session Time | Session Topic | Methodology | Expected Result |
|---------------------------|----------------------------------|--|---------------------------|---|
| Day 4 | S12: 9.30 to 10.00 am | Recap and summary | Presentations (any media) | Evaluation of previous day |
| | 10.00 to 11.00 am | Sensitisation of the Biodiversity Management Committee | Game: Web of Life | Participants understand 1. Interconnection, interdependence, interrelation of various components of the ecosystem 2. How a balanced ecosystem absorbs the natural shocks and how it is unable to take shocks if any component of the system is diminished 3. The importance of conserving and promoting biodiversity |
| | 11.00 to 11.30 am | BREAK | | |
| | S13: 11.30 am to 12.30 pm | Conservation and promotion of biodiversity | Input session | Participants understand the importance of conservation and promotion of biodiversity; how plants and animals learn adaptation to the changing environment; how knowledge is transferred to the next generations |
| | 12.30 to 1.30 pm | Roles, responsibility and protocols | Discussion | Participants define the roles, responsibilities and protocols for the implementation of the project |
| END OF TRAINING PROGRAMME | | | | |



S2 Knowing about Geographic Information System (GIS)



Comments for trainers

Resource person should be well acquainted with GIS and remote sensing. They should also have hands-on knowledge of reading maps, Global Positioning System and GIS software.



Brief introduction

This session helps participants to get information about the GIS, a spatial database system. It also helps them to visualise where the data goes and what the usage is after collecting it from the field.



Objectives of the session/Expected results

- ❖ Participants have a basic idea about the data collected from the field that is used for further spatial analysis.
- ❖ GIS data is useful for thematic mapping and solving cartographic problems.
- ❖ When participants know the concept of GIS, they can assist in collecting various spatial data from the field.
- ❖ Knowledge of maps will help them in doing participatory mapping.



Materials needed

LCD projector, laptop, whiteboard, markers to be kept ready before the training starts



Time required

1½ hours

- ❖ Introduction and definition - 10 minutes
- ❖ What is a map? - 10 minutes
- ❖ Scales of maps - 5 minutes
- ❖ How GIS works - 10 minutes
- ❖ Sources of GIS data - 15 minutes
- ❖ Feature representation in GIS system - 10 minutes
- ❖ Application of GIS - 20 minutes
- ❖ Discussion and questions by participants - 10 minutes



Steps to conduct the session

- ❖ Introduction to GIS, using LCD
- ❖ Introduction to the above-mentioned topics
- ❖ Discussion on topic and questions by participants

S6 Village Mapping



Comments for trainers

Points for extra preparation – the resource person should have a basic knowledge of the physical and political geography and location of village or city.



Brief Introduction

- ❖ The presentation takes the participants on a journey of the entire universe, zeroing down to their village settlement. It helps participants understand the various parts and locations and the land use in the village.
- ❖ In this session, all the participants collectively draw a map of their village on the floor of the classroom. This activity acts as an icebreaker, in addition to helping them understand the mosaic of the landscape and the settlements in the village.
- ❖ Through this activity, we get a clear idea about the children's relationship, understanding, affinity, and knowledge about their own village and its vicinity.
- ❖ Along the way, attention is drawn to the various landscape elements seen, thus strengthening the knowledge of school geography. This exercise is aimed as an introduction to the mapping activity.
- ❖ Through the normal school curricula, participants (students) generally "see" the Earth, its continents, India, and their respective state, which are bigger political landscapes. Rarely does a normal school child come across her/his own village or city and "where it is" from a higher plane. It is important to understand the geographical setting of one's village and its location in the wider context.
- ❖ This exercise serves the above purpose. The presentation and discussion also challenge the directional sense and geographical knowledge of participants.



Objectives of the session/Expected results

- ❖ To familiarise the participants with the location of her/his village settlement or city as a part of bigger landscapes
- ❖ To familiarise the participants with the mosaic-like arrangements of landscapes in the village and its vicinity
- ❖ Participants will be able to
 - Identify the location of their settlement in a bigger landscape
 - Differentiate between various land forms in and around village
 - Have a clear idea about the land use, landscapes, important sites, etc. in the village



Materials needed

LCD projector, computer, card-paper sheets and GPS instruments to be kept ready before the training starts



Time required

1½ hours

- ❖ Introduction to mapping - 10 minutes
- ❖ Drawing the village map - 60 minutes
- ❖ Presentation – actual photographs through satellites and/or topographic maps of the village - 20 minutes



Steps to conduct the session

- ❖ The session should be initiated with a discussion on the types and sizes of maps connecting to important sites in the village. Later, all participants are given coloured chalks to draw the village map on the classroom floor where the different colours indicate different entities.
- ❖ Four participants as a group should draw a similar map on a card-paper sheet.
- ❖ The mapping activity starts from visuals of the Earth and gradually comes down showing the continents, Asia, India, states, district, taluka, village, etc.

- ❖ A discussion is encouraged on the various landforms, both familiar and unfamiliar, to participants. Show the village map if available. If not, question participants whether they have seen one.
- ❖ Upon entering the mapping session, the participants are asked to prepare a map based on their actual experiences.

S10 Children's Biodiversity Register (CBR)²³



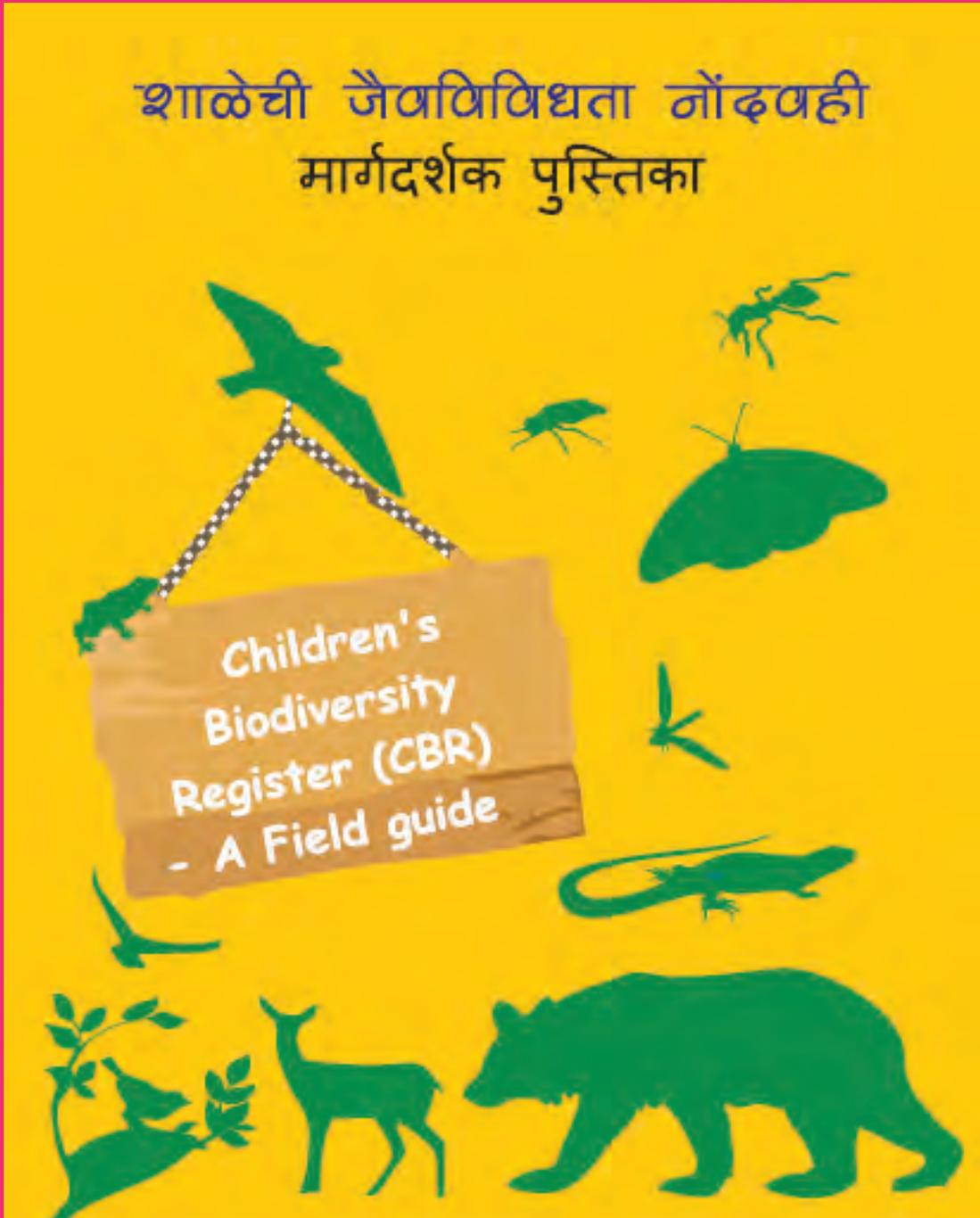
Introduction to the process

- ❖ We love listening to stories from far-off lands with fantastic characters. But when was the last time we heard stories from our own village? Probably never. That being the case, why not write stories ourselves?
- ❖ The Children's Biodiversity Register is named so because it explores the values advocated by this PBR process at a primal level. The idea is to encourage children to explore their surroundings, their village, their community, their peers and themselves fundamentally.
- ❖ Almost all proceedings are activity-based explorations designed to arouse and involve a child completely. These are reinforced with curricular and co-curricular elements.
- ❖ This CBR process is divided into four core workshops to be conducted in an academic year to sensitise and promote awareness among children towards their surrounding Landscape, Lifescape, Peoplescape and the ecological connections between them.
- ❖ Two CBR workshops are conducted in each semester of the school schedule with theme projects assigned to children to be undertaken in the time in between two successive workshops, which are continuously monitored and guided.
- ❖ These ecological modules are to be modified/designed specific to each village based on the surrounding landscape ecosystems and other ecological factors unique to the village environments. A few preliminary visits are made by the resource persons to get a basic understanding of the existing ground conditions before designing these modules.
- ❖ In these four workshops, children are exposed to many concepts of ecology and the various modes of interaction with the ecosystems as also the three scapes in the vicinity. This is to make them realise and understand how the surrounding Landscapes and Lifescapes determine their growth and development, and how the crucial balance amongst all these is maintained by the forces of nature.

²³ WOTR, 2014. Children's Biodiversity Register (CBR), Watershed Organisation Trust, Pune. Accessed at http://wotr.org/sites/default/files/Children%27s%20Biodiversity%20Register%20Manual%20-%20Marathi_0.pdf

List of some topics that may be selected by children for their project work

- 1) Wild and pet animals
- 2) Wild edibles
- 3) Diverse Landscapes around the village
- 4) Honey bees
- 5) Types of crabs
- 6) Traditional hunting techniques
- 7) Medicinal plants
- 8) Traditional songs for auspicious occasions
- 9) Story of the village – history
- 10) Agriculture and crops
- 11) Types of butterflies
- 12) Types of soil
- 13) Water supply systems
- 14) Birds and their nests
- 15) Diverse carvings on door frames
- 16) Lifestyle in selected villages
- 17) Cattle and fodder
- 18) Wild fruits





S11 Herbarium



Comments for trainers

Care should be taken to protect the specimens from moisture.



Brief introduction

Preparing a herbarium is exciting and rewarding. Each plant you press provides you with a valuable experience, allowing you to connect more closely with the plant through observing and working with it, and helping you to understand and remember it in a way that is never possible from just reading about it in a book. It consists of a three-part process – collecting the plant material, pressing and drying, and mounting.



Objectives of the session/Expected result

Participants should understand the importance of the collection of plant samples and the need to authenticate the plant species in the village in scientific manner, in order to make their biodiversity visible.



Materials needed

Plant press, newspapers, cardboard sheets, glue, plastic covers, boric powder or fungicide solution to be kept ready before the training starts



Time required

2 hours



Steps to conduct the session

This process can be done in three simple steps:

- 1. Collection of plants:** Participants should go around the village along with the villagers and collect as many plants as possible. The plants preferably should have flowers, which makes identification easier at later stage. While collecting the plant the participant should make sure to write down a short note in consultation with the villager. The note should cover local name of the plant, habitat where it was found, its use, season of flowering and fruiting, date of collection, name of the information provider (villager). For one species not more than one twig should be collected. The overall plant should be healthy and deformity-free.
- 2. Pressing and drying:** On return and while the plants are still fresh, they should be properly spread on the newspaper sheets. Each newspaper sheet should have a single specimen. A short note of each plant should be kept along with the newspaper to retain the local information. Pile up all the newspapers and put some weight over it. Keep the pile of papers in sunlight for drying for 2-3 days. When dried, sprinkle boric powder on each specimen. Now, place the entire



Source of Image: <http://aubreecherie.com/horticulturebyheart/wp-content/uploads/2009/11/Morris-Arboretum-11-19-09-Botany-5.jpg>

pile of papers with the specimens between two wooden frames of 2' x 2' size. Tie the two frames together and keep this away from moisture.

- 3. Mounting:** After the specimens are completely dried and free of moisture they are ready for mounting. Take a white cardboard sheet appropriate to the size of the specimen. Place the specimen on card sheet and fix it with glue or plastic tape. Write the relevant information legibly on the card sheet. Keep space to write the scientific name of the species. After getting scientific name from a botanist, this sheet is ready. When all the information is ready the sheet can be covered with plastic.

S12 Web of life²⁴



Comments for trainers

The resource person should have a basic knowledge of ecosystem and ecology.



Brief introduction

In this simulation game, participants will represent plants and animals living in an ecosystem. Sitting in a circle, they will connect themselves to each other using a ball of wool/string to represent the ways they depend on each other. As they make



connections, the string forms a visual web (The web of life). They will begin to experience what happens when this web is under pressure, how resilient it is and if one element vanishes what effect it has on the entire system.



Objectives of the session/Expected results

- ❖ To demonstrate the interconnectedness of various elements in the environment
- ❖ Improved understanding among the participants about interconnectedness of a system and how each element in the system affects every other element

²⁴ CEE, 1996. Joy of Learning: Handbook of Environmental Education Activities, Centre for Environmental Education, Ahmedabad.



Materials needed

Chart paper, colour pencils, scissors, a ball of wool/string, safety pins

Cards with following names:

| | | | | |
|---------|----------|-----------|-------------|------------|
| Sun | Fish | Rat | Grasshopper | Kingfisher |
| Air | Eagle | Butterfly | Seed | Tiger |
| Water | Turtle | Ant | Mongoose | Deer |
| Soil | Insect | Leaf | Dragonfly | Squirrel |
| Tree | Frog | Grass | Monkey | Deadwood |
| Fruit | Mosquito | Dead leaf | Spider | Honeybee |
| Sparrow | Lizard | Earthworm | Snake | Human |



Time required

45 minutes



Steps to conduct the session

- 1. Divide the participants into groups:** The ideal group size is 8 to 12. Maximum group size may be 15. Each group should sit in a circle with an adult leader.
- 2. Assign each participant an identity:** Give each student a plant or animal card. Be sure they know a little about the plant or animal on their cards. To play the game, participants will need to know how the plants and animals are connected in food chains.
- 3. Start the game:** Show the group the ball of string and explain that the string will let us see the connections between plants and animals. Explain that you will represent the sun. You will start, because all energy comes from the sun. Model the game by saying, "I am the sun. I am passing the ball of string to the neem tree because I give the tree energy to grow." You hold onto the string and pass the ball to the tree.
- 4. Continue the play:** The "tree" now chooses a plant or animal in the circle that is connected to it in some way. The "tree" holds onto the string and passes the ball to that plant or animal. For example, the tree might pass the ball to the deer that eats tree leaves, the woodpecker that eats the bugs in its bark, or the owl that roosts in its branches. Keep the string tight, but not too tight! Play continues until everyone is holding onto the string. Some plants or animals may have more connections, but everyone should be a part of the crazy web!
- 5. Explore other connections:** It is easy to understand how the sun influences the connections between plants and animals, because the sun is the source of all energy. What would happen if the mushroom (or some other plant or animal) disappeared? Mushrooms aren't that important, are they? Try the game again with the mushroom gently tugging on the web. As each plant or animal in the circle feels the tug, he/she should call out the plant or animal he/she represents.
- 6. Discuss impacts to the web:** Talk about things that might happen that would change the way the plants and animals are connected. What would happen if:
 - A species goes extinct
 - An extreme weather event happens
 - An invasive species enters the system

Frequently Asked Questions

1. What is PBR?

PBR stands for People's Biodiversity Register. It's a tool to document local biodiversity along with traditional knowledge associated with it.

2. What is BMC?

BMC stands for Biodiversity Management Committee. It is a village-level committee set up according to the guidelines provided by the State Biodiversity Board.

3. Does the BMC have a legal implication?

Yes. Chapter X of the Biological Diversity Act, 2002, specifically mentions the formation of a BMC at village level.

4. Who collects the data for the PBR?

The data should be collected by the villagers. Help of technical experts, individuals or NGOs, may be taken.

5. Who can undertake the PBR process?

Practically anybody can, provided the due process is followed. Any individual, NGO can take up the PBR activity in any village. Yet, they can only act as facilitators. The actual authority rests with the respective BMC or the local Panchayat.

6. What is the use of the data collected in the PBR?

It helps establish the rights of the local community over the local biodiversity. It also helps in planning the sustainable utilisation and equitable sharing of natural resources.

7. How may the confidential data be protected?

Protection of data is to be ensured by the local people themselves. The BMC defines a strategy about dissemination of such information. The act itself empowers them to have such a strategy for benefit sharing and access to information.

8. How may one take PBR to the State Government?

Each state has a State Biodiversity Board which is responsible for the formation of BMCs and guiding on PBR. A copy of BMC resolution can be submitted to the Board. In case of existence of taluka and district level BMCs, a village can submit the resolution to these BMCs.

9. How can the PBR support local livelihoods?

The PBR collects data of all available natural resources within the limits of a particular village. The BMC of the respective village has the authority over providing or not the extraction of such resources. Many village level livelihoods are dependent on such natural resources. Once the BMC has information of the existing stock of these resources, it will be easy to manage/extract it sustainably and share the benefits equitably.

10. How many persons are in the Biodiversity Management Committee?

There should be 7 persons in the committee nominated by the Gramsabha.

11. Who should be the Secretary of the Biodiversity Management Committee?

A government employee under the Grampanchayat (ex. Gramsevak) should be the Secretary.

12. What are the reserved seats in Biodiversity Management Committee?

Reservation is applicable as per the Panchayat Raj System. For Maharashtra, it is as per the population of SC/STs in the respective district/s.



Glossary

Biodiversity

Biodiversity or biological diversity refers to the variability among living organisms and their habitats (terrestrial, marine, aquatic, atmospheric), including diversity within and between species and ecosystems.

Climate Change

Climate change is a significant and lasting change in weather patterns over extended periods ranging from decades to longer. It may be a change in "normal" or average weather conditions, or in the distribution of weather events (i.e. more or fewer extreme weather events).

CBR (Children's Biodiversity Register)

Register prepared by school children for their school and own village. The CBR is an attempt to make use of their natural curiosity and enthusiasm. They don't need to travel places for this purpose; all they have to do is make a record of biodiversity in their surroundings.

Ecology

Ecology is the scientific study of interactions living organisms have with each other and with their environment or surroundings.

Ecosystem

An ecosystem refers to the complex set of interactions and relationships living organisms (plants, animals, and microbes) have with each other and with their physical, non-living environment (such as air, water and mineral soil).

Ecosystem Services

Ecosystem services refer to the various benefits, services and resources for living and livelihoods that are the product of processes operating within and between ecosystems. These services include supply of clean water and air, crop pollination, pest and disease control, mitigation of environmental hazards, cleaning up, decomposing and de-toxifying the wastes that we generate and carbon sequestration. Together, these benefits are known as ecosystem services.

Access and Benefit Sharing

Access refers to granting permission to enter an area for the purpose of sampling, collecting, and removing genetic or other resources. Benefit sharing refers to all forms of compensation for the use of genetic resources, whether monetary or non-monetary.

Habitat

It is the natural environment in which an organism lives. It also refers to the ecological niche of a particular species – the physical environment or attributes that a species requires to sustain itself.

Land use

Land use is the management and modification of the natural environment or wilderness into built environment such as fields, pastures, and settlements. It refers to the set of arrangements, activities and inputs undertaken in a certain land to produce, change or maintain it. The term land use is also used to indicate the purposes for which land is put to use or managed (e.g., grazing, timber extraction, and conservation).

Livelihood(s)

Livelihood comprises of activities, capabilities and assets (both material and social) that enable a person to make a living and secure the resources needed to live a life of dignity.

Sustainable Livelihood(s)

A sustainable livelihood allows a person or group to not only cope with and recover from shocks but also enhance capabilities and assets to address present and future needs without undermining the natural resource base.

Resilience

It is the ability of a social or ecological system to absorb disturbances while retaining the same basic structure and ways of functioning. It is the capacity for self-organisation and ability to adapt to stress and change.

Resources

A resource is a source or supply from which a benefit is produced. Typically, resources are material, money, services, staff, and other assets that are transformed into products that benefit people. Benefits of resource utilization may include increased wealth, meeting needs or wants, the proper functioning of a system, or enhanced well-being.

Sustainable Development

Sustainable development recognizes the fact that while human wants are infinite, the resources to meet them are limited given that we live on a finite planet. It is an organising principle whereby living conditions and resource use meet human needs in the present and future without undermining the viability of natural systems and the environment. Sustainable development acknowledges an obligation of the present generation to ensure that future generations can also have their needs met.

Sustainable Utilisation

Sustainable resource use means that our rate of consumption does not lead to the long-term decline of biological diversity or the environment, thus ensuring that the needs and aspirations of present and future generations are met.

Contact Details for Additional information

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Watershed Organisation Trust (WOTR)

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Pune Satara Road,

Pune - 411009

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MSBB (Head Office)

Maharashtra State Biodiversity Board (MSBB)

Jaivavidhata Bhavan, Civil Lines,

Nagpur - 440001

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msbb.ngp@gmail.com

MSBB (Pune Office)

Maharashtra State Biodiversity Board (MSBB)

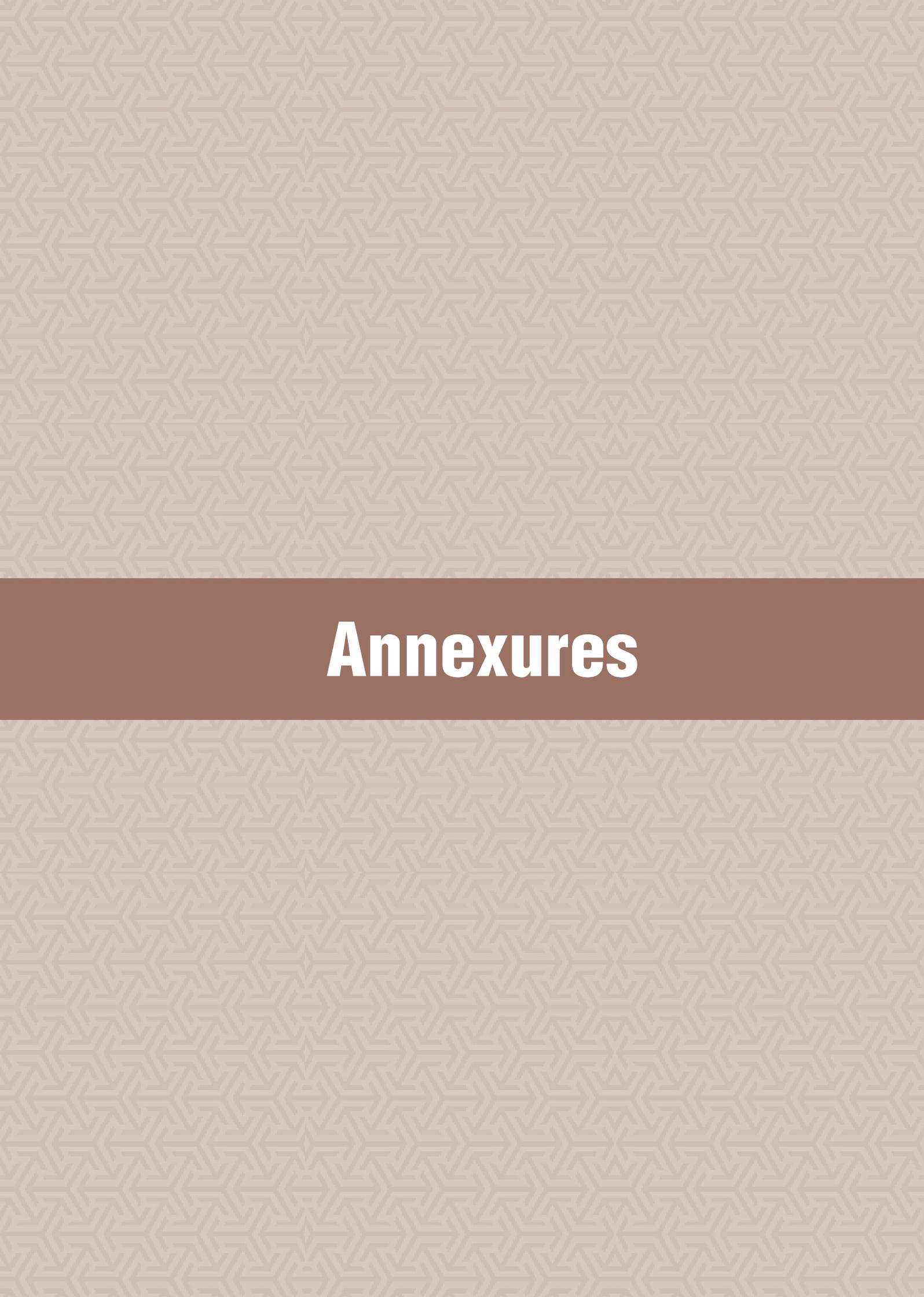
Jaivividhata Bhavan, Survey No. 49, Forest Colony,

Near Salunkhe Vihar, Wanwadi,

Pune- 411002

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Annexures

ANNEXURE I

PBR Formats

Part I – General Information

1. Village history – Detailed format given in **Annexure II**
2. General information of the village
Its geographical location, state, district, block/taluka, gram panchayat etc. Include village map, area map, ward map, altitude, latitude, longitude (whenever possible). The boundary of the study area and also its connectivity should be additional points in the general profile.
3. Details of the Biodiversity Management Committee (BMC) of the panchayat (One elected Chairperson and six persons nominated by the local body; not less than one third to be women and not less than 18% belonging to SC/ST)

| |
|-----------------------------|
| 1) Name of the Chairperson: |
| Age: |
| Gender: |
| Address: |
| Area of specialization: |
| |
| 2) Name: |
| Age: |
| Gender: |
| Address: |
| Area of specialization: |
| |
| 3) Name: |
| Age: |
| Gender: |
| Address: |
| Area of specialization: |
| |
| 4) Name: |
| Age: |
| Gender: |

| |
|-------------------------|
| Address: |
| Area of specialization: |
| |
| 5) Name: |
| Age: |
| Gender: |
| Address: |
| Area of specialization: |
| |
| 6) Name: |
| Age: |
| Gender: |
| Address: |
| Area of specialization: |
| |
| 7) Name: |
| Age: |
| Gender: |
| Address: |
| Area of specialization: |



4. List of *vaids*, *hakims* and traditional health care (human and livestock) practitioners residing and/or using biological resources occurring within the jurisdiction of the village

| |
|--|
| Name: |
| Age: |
| Gender: |
| Address: |
| Area of Specialization: |
| Location from which the person accesses biological material: |
| Perception of the practitioner on the resource status: |

| |
|--|
| Name: |
| Age: |
| Gender: |
| Address: |
| Area of Specialization: |
| Location from which the person accesses biological material: |
| Perception of the practitioner on the resource status: |

5. List of individuals perceived by the villagers to possess Traditional Knowledge (TK) related to biodiversity in agriculture, fisheries and forestry

| |
|--|
| Name: |
| Age: |
| Gender: |
| Address: |
| Area of Specialization: |
| Location from which the person accesses biological material: |
| Perception of the practitioner on the resource status: |

| |
|--|
| Name: |
| Age: |
| Gender: |
| Address: |
| Area of Specialization: |
| Location from which the person accesses biological material: |
| Perception of the practitioner on the resource status: |

6. Details of schools, colleges, departments, universities, government institutions, Non-Governmental Organisation (NGO) and individuals involved in the preparation of the PBR

| |
|-------------------|
| 1) Contact Person |
| Name and Address: |
| |
| 2) Contact Person |
| Name and Address: |

| |
|-------------------|
| 3) Contact Person |
| Name and Address: |
| |
| 4) Contact Person |
| Name and Address: |

You may add names of more institutions / NGO / Individuals, etc. if necessary.

7. Details of access to biological resources and traditional knowledge granted, details of the collection fee imposed and details of the benefits derived and the mode of their sharing

| Sr. No. | Name and address of the person/institution/company/others | Local and Scientific Name of the biological material Accessed and quantity | Date and resolution of the BMC and endorsement by the panchayat | Details of collection fee imposed | Anticipated mode of sharing benefits or quantum of benefits shared |
|----------------|--|---|--|--|---|
| | | | | | |
| | | | | | |
| | | | | | |

Part II – Various Scapes

Peoplescape

1. Community and Population
2. Families and Major occupation
3. Sub-occupation
4. Depending Landscape
5. Major Resources Accessed and Seasons of Access
6. Landscape Management Practices
7. Resource Management Practices
8. Cast/Tribe
9. Social Condition
10. Nature of Inhabitants
11. No. of HHs
12. Name of the Informant
13. Date of Information Collection
14. Name of Information Collector

Landscape

1. Major Landscapes Agricultural land
Pond Fallow Land
2. Sub-Landscapes
3. Features and approx. area
4. Ownership
5. General Flora
6. General Fauna
7. User Groups
8. Management Practices
9. General Uses
10. Associated Traditional Knowledge (TK)
11. Other Details
12. Community Accessed
13. Name of the Informant
14. Date of Information Collection
15. Name of Information Collector



Lifescape

1. Major Lifeforms Terrestrial Aquatic
2. General Uses
3. User Groups
4. Associated TK
5. Other Details
6. Community Involved in Use
7. Name of the Informant
8. Date of Information Collection
9. Name of Information Collector

Waterscape

1. Water Scape Element Type
2. Sub-type Features and approx. area
3. Ownership
4. General Flora
5. General Fauna
6. Major Uses
7. User Groups
8. Management Practices
9. General Uses
10. Associated TK
11. Other Details
12. Community Accessed
13. Name of the Informant
14. Date of Information Collection
15. Name of Information Collector

Soundscape

Various sounds both natural and anthropogenic can be recorded using recording equipment.

1. **Natural sounds** - calls of birds, animals, domestic animals, flowing water, wind, lightning, etc.
2. **Manmade sounds** - songs, poems, sounds of worship, rituals and religious events, prayers, woodcutting, grinding, bullock cart, engine, water pump, etc.

Part III – Agrobiodiversity

Format 1: Crop Plants

1. Crop
2. Scientific Name
3. Local Name
4. Variety
5. Landscape/Habitat
6. Approximate Area Sown
7. Local Status
 - a. Past
 - b. Present
8. Special Features
9. Cropping Season

10. Uses
11. Associated Traditional Knowledge (TK)
12. Other Details
13. Source of Seeds/Plants
14. Related Knowledgeable Person/Community
15. Name of the Informant
16. Date of Information Collection
17. Name of Information Collector

Format 2: Fruit Plants

1. Plant
2. Scientific Name
3. Local Name/s
4. Variety
5. Landscape/Habitat
6. Local Status
 - a. Past
 - b. Present
7. Source of Seeds/Plants
8. Season of Fruiting
9. Associated TK
10. Uses
11. Other Details
12. Market/Own Use
13. Related Knowledgeable Person/Community
14. Name of the Informant
15. Date of Information Collection
16. Name of Information Collector

Format 3: Fodder Crop

1. Plant
2. Scientific Name
3. Local Name/s
4. Landscape/Habitat
5. Local Status
 - a. Past
 - b. Present
6. Source of Plants/Seeds
7. Associated TK
8. Part Used
9. Other Details
10. Related Knowledgeable Person/Community
11. Name of the Informant
12. Date of Information Collection
13. Name of Information Collector





Format 4: Weeds

1. Plant
2. Scientific Name
3. Local Name/s
4. Crop/s Affected
5. Impact on Crop
6. Landscape/Habitat
7. Local Status
 - a. Past
 - b. Present
8. Uses if any
9. Management Options
10. Associated TK
11. Other Details
12. Related Knowledgeable Person/Community
13. Name of the Informant
14. Date of Information Collection
15. Name of Information Collector

Format 5: Pests of Crops

1. Host
2. Insect/Animal
3. Scientific Name
4. Local Name/s
5. Habitat
6. Time/Season of Attack
7. Local Status
 - a. Past
 - b. Present
8. Management Mechanism
9. Associated TK
10. Other Details
11. Related Knowledgeable Person/Community
12. Name of the Informant
13. Date of Information Collection
14. Name of Information Collector

Format 6: Markets for Domesticated Animals

1. Name of the Market and Location
2. Weekly/Fortnightly/Monthly/Bi-annual/Annual
3. Types of Animals Bought and Sold
4. Types and Average Number of Animals Transacted in a Day
5. Places from Which Animals are Bought
6. Places to Which the Animals are Sold/Transported
7. Name and Location of Fish Market
8. Types of Fish Sold
9. Source of Fish
10. Name of the Informant
11. Date of Information Collection
12. Name of Information Collector



Format 7: Soil type

1. Soil Type
2. Colour and Texture
3. Features
4. Soil Management
5. Plants/Crop Suitable
6. Flora and Fauna
7. Associated TK
8. Other Information
9. Name of the Informant
10. Date of Information Collection
11. Name of Information Collector

Part IV – Domesticated Biodiversity

Format 8: Domesticated Fruit Trees

1. Plant
2. Scientific Name
3. Local Name/s
4. Variety
5. Landscape/Habitat
6. Local Status
 - a. Past
 - b. Present
7. Source of Seeds/Plants
8. Season of Fruiting
9. Associated Traditional Knowledge (TK)
10. Uses
11. Other Details
12. Market/Own Use
13. Related Knowledgeable Person/Community
14. Name of the Informant
15. Date of Information Collection
16. Name of Information Collector

Format 9: Domesticated Medicinal Plants

1. Plant
2. Scientific Name
3. Local Name/s
4. Variety
5. Landscape/Habitat
6. Local Status
 - a. Past
 - b. Present
7. Source of Seeds/Plants
8. Season of Fruiting
9. Parts Used
10. Associated TK
11. Uses
12. Other Details
13. Market/Own use



14. Related Knowledgeable Person/Community
15. Name of the Informant
16. Date of Information Collection
17. Name of Information Collector

Format 10: Domesticated Ornamental Plants

1. Plant Type
2. Local Name/s
3. Scientific Name
4. Variety
5. Source of Plant/Seeds
6. Commercial/Non-Commercial
7. Uses
8. Associated TK
9. Other Details
10. Related Knowledgeable Person/Community
11. Name of the Informant
12. Date of Information Collection
13. Name of Information Collector

Format 11: Domesticated Timber Trees/Plants

1. Plant Type
2. Local Name/s
3. Scientific Name
4. Habitat
5. Local Status
 - a. Past
 - b. Present
6. Other Uses (Multiple)
7. Associated TK
8. Other Details
9. Related Knowledgeable Person/Community
10. Name of the Informant
11. Date of Information Collection
12. Name of Information Collector

Format 12: Domesticated Animals

1. Animal Type
2. Local Name/s
3. Scientific Name
4. Local Status
 - a. Past
 - b. Present
5. Breed
6. Features
7. Method of Keeping
8. Uses
9. Associated TK
10. Commercial Rearing
11. Other Details Including Products and Services

12. Related Knowledgeable Person/Community
13. Name of the Informant
14. Date of Information Collection
15. Name of Information Collector

Format 13: Traditional Fish Culture Species

1. Fish Type
2. Local Name/s
3. Scientific Name
4. Variety
5. Features
6. Waterscape (Pond/bheri/Talao, etc.)
7. Local Status
 - a. Past
 - b. Present
8. Uses
9. Associated TK
10. Commercial Rearing
11. Other Details
12. Related Knowledgeable Person/Community
13. Name of the Informant
14. Date of Information Collection
15. Name of Information Collector

Format 14: Markets/Fairs for Domesticated Animals, Medicinal Plants and Other Products

1. Name of the Weekly Market/Fair
2. Location
3. Weekly/Fortnightly and Others (Bi-annual/Annual)
4. Day held
5. Month in Case of Bi-annual or Annual Market Fair
6. Types of Animals Bought and Sold
7. Number of Animals (average) Transacted in a Day
8. Places from Where the Animals are Bought
9. Places to Where the Animals are Transported
10. Name of the Informant
11. Date of Information Collection
12. Name of Information Collector

Part V – Wild Biodiversity

Format 15: Trees, Shrubs, Herbs, Tubers, Grasses, Climbers

1. Plant Type
2. Local Name
3. Scientific Name
4. Habit
5. Habitat
6. Local Status
 - a. Past
 - b. Present
7. Market/Own Use





8. Part Collected
9. Associated Traditional Knowledge (TK)
10. Other Details
11. Related Knowledgeable Person/Community
12. Name of the Informant
13. Date of Information Collection
14. Name of Information Collector

Format 16: Wild Plant Species of Importance

1. Local Name
2. Scientific Name
3. Variety
4. Importance
5. Status
6. Name of the Informant
7. Date of Information Collection
8. Name of Information Collector

Format 17: Aquatic Wild Animals

1. Local Name
2. Scientific Name
3. Variety
4. Features
5. Habitat
6. Local Status
 - a. Past
 - b. Present
7. Uses
8. Associated TK
9. Other Details
10. Related Knowledgeable Person/Community
11. Name of the Informant
12. Date of Information Collection
13. Name of Information Collector

Format 18: Aquatic Wild Plants

1. Local Name
2. Scientific Name
3. Variety
4. Features
5. Habitat
6. Local Status
 - a. Past
 - b. Present
7. Uses
8. Associated TK
9. Other Details
10. Related Knowledgeable Person/Community
11. Name of the Informant
12. Date of Information Collection
13. Name of Information Collector



Format 19: Wild Plants of Medicinal Importance

1. Plant (Herb, Shrub, Tree)
2. Local Name
3. Scientific Name
4. Variety
5. Landscape/Habitat
6. Local Status
 - a. Past
 - b. Present
7. Associated TK
8. Uses (usage)
9. Part/s Used
10. Other Details
11. Related Knowledgeable Person/Community
12. Name of the Informant
13. Date of Information Collection
14. Name of Information Collector

Format 20: Wild Relatives of Crops

1. Local Name
2. Scientific Name
3. Associated Crop
4. Landscape/Habitat
5. Local Status
 - a. Present
 - b. Past
6. Uses (usage)
7. Part/s Used
8. Associated TK
9. Other Details
10. Related Knowledgeable Person/Community
11. Name of the Informant
12. Date of Information Collection
13. Name of Information Collector

Format 21: Wild Ornamental Plants

1. Local Name
2. Scientific Name
3. Associated Crop
4. Landscape/Habitat
5. Local Status
 - a. Present
 - b. Past
6. Uses (usage)
7. Part/s Used
8. Associated TK
9. Other Details
10. Related Knowledgeable Person/Community
11. Name of the Informant
12. Date of Information Collection
13. Name of Information Collector



Format 22: Fumigate/Chewing Plants

1. Plant (Herb, Shrub, Tree)
2. Local Name
3. Scientific Name
4. Variety
5. Landscape/Habitat
6. Local Status
 - a. Past
 - b. Present
7. Associated TK
8. Uses (usage)
9. Parts Used
10. Other Details
11. Related Knowledgeable Person/Community
12. Name of the Informant
13. Date of Information Collection
14. Name of Information Collector

Format 23: Wild Timber Trees/Plants

1. Plant Type
2. Local Name/s
3. Scientific Name
4. Habitat
5. Local Status
 - a. Past
 - b. Present
6. Other Uses (multiple)
7. Associated TK
8. Other Details
9. Related Knowledgeable Person/Community
10. Name of the Informant
11. Date of Information Collection
12. Name of Information Collector

Format 24: Coastal and Marine Plants

1. Plant Type
2. Local Name/s
3. Scientific Name
4. Habitat
5. Local Status
 - a. Past
 - b. Present
6. Other Uses (multiple)
7. Associated TK
8. Other Details
9. Related Knowledgeable Person/Community
10. Name of the Informant
11. Date of Information Collection
12. Name of Information Collector



Format 25: Coastal and Marine Animals

1. Animal Type
2. Local Name/s
3. Scientific Name
4. Habitat
5. Local Status
 - a. Past
 - b. Present
6. Other Uses (multiple)
7. Associated TK
8. Other Details
9. Related Knowledgeable Person/Community
10. Name of the Informant
11. Date of Information Collection
12. Name of Information Collector

Format 26: Wild Animals (Mammals, Birds, Reptiles, Amphibians, Insects, Others)

1. Animal Type
2. Local Name/s
3. Scientific Name
4. Habitat
5. Description
6. Season When Seen
7. Local Status
 - a. Past
 - b. Present
8. Uses (if any)
9. Associated TK
10. Mode of Hunting, Collecting (if any)
11. Other Details
12. Related Knowledgeable Person/Community
13. Name of the Informant
14. Date of Information Collection
15. Name of Information Collector

Part VI – Urban Area Biodiversity

Format 27: Trees, Shrubs, Herbs, Tubers, Grasses, Climbers

1. Plant type
2. Local name
3. Scientific name
4. Habit
5. Habitat
6. Local status
 - a. Past
 - b. Present
7. Market/Own use
8. Part Collected
9. Associated Traditional Knowledge (TK)
10. Other Details



11. Related Knowledgeable Person/Community
12. Name of the Informant
13. Date of Information Collection
14. Name of Information Collector

Format 28: Wild Animals (Mammals, Birds, Reptiles, Amphibians, Insects, Others)

1. Animal Type
2. Local Name/s
3. Scientific Name
4. Habitat
5. Description
6. Season When Seen
7. Local Status
 - a. Past
 - b. Present
8. Uses (if any)
9. Associated TK
10. Mode of Hunting, Collecting (if any)
11. Other Details
12. Related Knowledgeable Person/Community
13. Name of the Informant
14. Date of Information Collection
15. Name of Information Collector

Part VII – Cultural Diversity

Format 29: Festivals

1. Name of the Festival
2. Duration
3. Purpose of the Festival
4. Since when is it celebrated?
5. Which natural resources are used?
6. How is it celebrated?
7. Traditional Dress/Costumes
8. Traditional Food Items
9. Related Traditional Knowledge (TK)
10. Additional Information
11. Related Knowledgeable Person/Community
16. Name of Information Provider
17. Name of Information Collector
18. Date of Information Collection

Format 30: Wedding Rituals

1. Duration and Month
2. Natural Resources Used
3. Method of Celebration
 - a. Earlier
 - b. Now
4. Dresses/Costumes
5. Prepared Food Items

6. Related TK
7. Additional Information
8. Related Knowledgeable Person/Community
9. Name of Information Provider
10. Name of Information Collector
11. Date of Information Collection

Format 31: Dress/Garments/Clothing (Possibly season-wise)

1. Boys' Dress/Clothing
 - a. Earlier
 - b. Now
 During Festivals/Ceremonies
 Name of Information Provider
 Name of Information Collector
 Date of Information Collection

2. Men and Elderly Men's Dress/Clothing
 - a. Earlier
 - b. Now
 During Festivals/Ceremonies
 Name of Information Provider
 Name of Information Collector
 Date of Information Collection

3. Girls' Dress/Clothing
 - a. Earlier
 - b. Now
 During Festivals/Ceremonies
 Name of Information Provider
 Name of Information Collector
 Date of Information Collection

4. Women and Elderly Women's Clothing
 - a. Earlier
 - b. Now
 During Festivals/Ceremonies
 Name of Information Provider
 Name of Information Collector
 Date of Information Collection

Format 32: Diversity in Food Items

1. Name of the Traditional Food Item
2. When is it prepared – Duration and Month
3. Things Needed to Make it
4. Process of making it
5. Durability
6. Related TK
7. Additional Information
8. Use
9. Related Knowledge-Holder Person/Community
10. Name of Information Provider
11. Name of Information Collector
12. Date of Information Collection





Format 33: Diversity of Traditional Food Items

1. Name of the Traditional Food Item
2. When is it Prepared – Duration and Month
3. Things Required to Prepare it
4. Process of Preparation
5. Shelf Life
6. How is it Stored
7. Related TK
8. Additional Information
9. Use
10. Related Knowledge-Holder Person/Community
13. Name of Information Provider
14. Name of Information Collector
15. Date of Information Collection

Format 34: Wild Vegetables

1. Plant's Local Name
2. Scientific Name
3. Breed/Variety
4. Landscape/Area
5. Status
 - a. Past
 - b. Present
6. Origin of Saplings/seed
7. Season/Months of Availability
8. Process of Making
9. Related TK
10. Use
11. Additional Information
12. Related Knowledgeable Person/Community
13. Name of Information Provider
14. Name of Information Collector
15. Date of Information Collection

Part VIII - Checklists of flora and fauna

This Section is optional and meant only for scientists, subject experts and wildlife enthusiasts. The motive behind this section is to create checklists of flora and fauna, which may not be reflected in the PBR. It is observed that the plants and animals which are not of much significance to the community members are generally ignored. In this process, some very important flora and fauna are missed out which may have global significance. The following is a brief list of the items which may be included. Practitioners can add or subtract from the list according to their convenience.

1. Checklist of Fungi
2. Checklist of Bryophytes
3. Checklist of Pteridophytes
4. Checklist of Plants – Angiosperms
5. Checklist of Annelids – earthworms and other worms
6. Checklist of Labiates – centipedes, millipedes

7. Checklist of Crustaceans – crabs, shrimps, crayfish, etc.
8. Checklist of Arachnids – spiders, scorpions, whip scorpions
9. Checklist of Insects – dragonflies, damselflies, bs, grasshoppers, beetles, etc.
10. Checklist of Fishes
11. Checklist of Amphibians
12. Checklist of Reptiles
13. Checklist of Birds
14. Checklist of Mammals
15. List of aquatic microorganisms with period of abundance
16. List of soil microorganisms with period of abundance
17. List of airborne microorganisms with period of abundance





CERTIFICATE

(As per Rule 22 (10) of the Biological Diversity Rules, 2004)

This People's Biodiversity Register (PBR) has been endorsed vide resolution no. dt by the Biodiversity Management Committees (BMC) under the supervision and guidance of an NGO/national institution/organisation under the overall supervision of the Maharashtra State Biodiversity Board (MSBB). The data has been processed, analysed and interpreted by an NGO/national institution/organisation, Biodiversity Board, school teachers, subject-matter specialists, students and others. This is the I/II/III/final phase of preparation of PBR.

Biodiversity Management Committees

1. Chairperson Signature with seal & date

2. Secretary of BMC Signature with seal & date
(if appointed)

3. Counter signature of representative of NGO/organisation/individual involved in PBR exercise.

Counter Signature with seal & date
Member Secretary, MSBB
or
Authorised official of MSBB

ANNEXURE II

Village History Guidelines

Village Profile

Origin of Village

- ❖ When did the village come into existence?
 - This would be an approximation since it is difficult to have an exact year.
- ❖ Other villages in proximity
 - Villages located nearby the study site, details about the interactions with them.

Population and Culture

- ❖ Indigenous People
 - Who were the people who originally resided in this area?
 - Are they still living in the area?
- ❖ How did the village get its name?
- ❖ Gods/deities worshipped
 - Sometimes this helps in establishing age of the village since some gods/deities are ancient whereas some are relatively modern.
- ❖ Community Composition
 - Is community homogenous/heterogeneous?
 - How many religions/castes is community composed of?
 - What is the proportion of each?

Geology and Topography

- ❖ How is topography of the village and what are the geological components found in this landscape?

Agricultural and Livestock

- ❖ What were the crops cultivated in the past?
- ❖ What crops do they cultivate currently?
- ❖ Is there any change in agricultural cycle or activities?
- ❖ What is the reason for change in cropping pattern, if any?
- ❖ What are the climatic/non-climatic factors responsible for this change?
- ❖ Any particular observations?
- ❖ Which crops are damaged by climate change weather variations and which benefit from the same?
- ❖ What is the proportion of indigenous and hybrid crops in the total crops cultivated?
- ❖ What is the frequency of pest attacks, past and present?
- ❖ What are the challenges faced in agriculture today?
- ❖ What was the quantity of livestock possessed in the past?
- ❖ What is the quantity of livestock possessed now?
- ❖ What is the reason for change, if any?
- ❖ What are the climatic/non-climatic factors responsible for this change?
- ❖ What is the proportion of indigenous and crossbred cattle?
- ❖ What are the difficulties or challenges faced in the face of climate change?





Food

- ❖ What does the food basket comprise of?
- ❖ What food grains constituted their diet in the past?
- ❖ What are the reasons for change, if any?
- ❖ Is forest food part of their diet, past and present?
- ❖ What are the reasons for change, if any?
- ❖ What were the drivers for change, if any?

Medical and Health

- ❖ Major epidemics/pandemics faced by community in the past
- ❖ Commonly occurring diseases in the area
- ❖ Has frequency of any diseases increased/decreased over time?

Climatic Profile

Climate Variations and Change

- ❖ What is the duration of the rainy season – past and present?
- ❖ What are the number of rainy days – past and present?
- ❖ Does it rain in winter – past and present?
- ❖ What is average season-wise temperature – past and present?

Ecosystem Profile

Wildlife and Ecosystem

- ❖ What is the current state of the forest compared to past (10/20/30 years ago)
Note: Often it is difficult for community members to visualise changes in terms of percentage. For example, the question can be worded as if forest was equal to Rupee 1 (= 100 paise). At this time, how many paise of it remain?
- ❖ Flora and fauna of the past and present
- ❖ Forest food and medicinal plants – their availability and corresponding traditional knowledge

Economic Profile

Currency and Barter Trade

- ❖ If the barter functioned in the past, what is the status now?
- ❖ How did trades and transactions take place in the past?
- ❖ What was the medium of exchange in these transactions?

Ecosystem Services

- ❖ In the past, what were the services/products the ecosystem provided?
- ❖ What is the present situation?
- ❖ What may be reasons for change, if any?

Infrastructure and Communication

- ❖ What means of communication existed in the past?

Intermediate and Nearby Markets

- ❖ Where are the nearby markets for selling agricultural produce?
- ❖ How do the interactions take place in these nearby markets?

ANNEXURE III

Case Study: The PBR of SHISWAD



Background

The Biological Diversity Act, 2002, states that there shall be a **Biodiversity Management Committee (BMC)** at the village level. This committee will play a role of conservation, sustainable utilisation and equitable sharing of the natural resources within the village limits. As a first step, as guided by the **National Biodiversity Authority (NBA)**, the BMC takes responsibility to develop the PBR for the respective village. The PBR documents the local biodiversity and takes stock of all possible natural resources.

WOTR works in some villages that lie in biodiversity-rich regions. Shiswad is one such village. Located in the northern part of Maharashtra's Western Ghats, it is one of the most remote villages from the Ahmednagar district headquarters. A step-by-step PBR was initiated here.

PBR Initiation

Approval of the Gram Sabha

The first intervening point in any village should be the Gram Sabha. The plan of developing the PBR was discussed in a Gram Sabha in Shiswad. Questions did arise, particularly regarding the need of the PBR and its benefits. Once villagers were assured that the activity is for the benefit of local community, they willingly endorsed its implementation in Shiswad.

Awareness and Sensitisation

The first step was to create awareness and sensitise the villagers regarding the need for the PBR. However, a preparatory step was to introduce the concepts of biodiversity, the Biological Diversity Act, 2002. Although the Gram Sabha approved the PBR, it was necessary to explain the concept through various effective ways.

a. Rallies

Rallies were carried out with the help of schoolchildren who were motivated with information and literature. Villagers also joined the rallies. Informative slogans were displayed that drew the attention of the villagers to the PBR.



A Rally

b. *Bharud* (folk media)

This folk media, *Bharud*, was successfully conducted to generate awareness on topics such as climate change, biodiversity and other related issues that require general motivation. *Bharud* is a popular folk art form of Maharashtra, which was initiated by Saint Eknath in the sixteenth century. *Bharud* is performed through songs and drama. With guidance from WOTR, a youth group of Khadki Budruk village prepared songs and drama on Climate Change Adaptation (CCA) topics and performed these in Shiswad and other villages. The group spread awareness on 14 different CCA related topics.

The *Bharud* performance explained to the villagers of Shiswad the importance and details of the PBR.

The Group Performing *Bharud*

c. Films

Nature documentaries like 'Home', 'Vanishing Vultures', 'Animals are Beautiful People' and other such films were shown to the villagers in the late evening when people were free. Such audio-visual accessories helped highlight the significance of biodiversity.

Initiation to Form BMC

The villagers were motivated and mobilised to establish the BMC for their village. Special sessions were conducted on the steps towards its formation.

PBR – Data Collection

1. Village History – Gram Sabha

Collection of village history is the first actual step of data collection under PBR. The Gram Panchayat was given prior intimation to have the PBR put on the agenda for the Gram Sabha. The WOTR team attended the subsequent Gram Sabha and facilitated a discussion of the various aspects of history of Shiswad. The information that emerged was duly recorded.

2. Identification of key people and village youths

This discussion helped in identifying knowledge holders of Shiswad. Names of these villagers were noted down. It was ensured that elderly villagers and women also become part of this group of knowledge holders. Suggestions were called from the villagers to provide names of the villagers having subjectwise expertise, e.g. blacksmith, cobbler, *vaid* (traditional healer), traditional farmers, nomads and others.





3. Capacity Building

A special training was planned for the youth groups and for the villagers having fair knowledge of biodiversity. Trainings focused on teaching villagers the concepts of biodiversity, ecosystem, climate change and other related topics. These youths, along with the village-level workers of WOTR's project (Wasundhara Sevaks) collected data for the PBR. Below are the key topics on which sessions were conducted.

1. People's Biodiversity Register – history, origin, concepts
2. Why conserve biodiversity?
3. BMC formation process
4. PBR formats in detail – flora, fauna, culture
5. Scientific classification of biodiversity – basic taxonomy – identification of birds, mammals, amphibians, reptiles
6. Interconnection between PBR and CCA
7. Ecological significance of history, culture, traditions, etc.

4. Collection of Biodiversity Data with the Participation of the Local Villagers

From the outset, it was ensured that the data collection would be done only in a participatory way. Interviewing knowledge holders, crosschecking the information with other elderly people of the villagers; assessing things on own observations are some of the ways that data was collated.

5. Limited Expert Intervention

WOTR's Biodiversity team having specialisation in identification of birds, mammals, plants has played the role of technical support group. This team collected substantial data on species composition around the village during their visits. Checklists of birds, mammals, reptiles, amphibians, butterflies and plants were developed by the team. These checklists were incorporated in the PBR as expert inputs. However, the knowledge generated by the community was not judged on the basis of this information. The team did not interfere in the collective knowledge system of the community. The role of expert intervention was supplementary information.

6. Training to BMC on Biodiversity and the PBR

The BMC of Shiswad was formed following guidelines set up by the National Biodiversity Authority. According to the Biological Diversity Act, 2002, the BMC was formed of seven villagers, having adequate representation of women and STs/SCs population of the village.

The BMC members were provided with the required training after which the BMC members along with the Wasundhara Sevaks, continued collection of data using each format of the PBR. Thus, in a few months' time a rich harvest of data on flora, fauna and culture of Shiswad was collected.

7. Validation through Exhibition

The raw data that was collected by the villagers/Wasundhara Sevaks requires validation, following which it was entered into the PBR. To validate the data by villagers, an exhibition was organised at Shiswad. Villagers were informed well in

advance about the exhibition so that they could attend the exhibition and provide their inputs. The raw data was displayed and all inputs were noted and the data was corrected/modified accordingly. Some data was validated by subject experts during the exhibition with consent of the community. Majority of the data was validated by the community members.

8. Transferring the data to PBR Register

Once validation was done, the data was transferred into the register. The transfer was done sectionwise with appropriate indexing.



PBR Registers of Shiswad and Khadki Budruk

9. BMC's approval of the register

The register is kept in the Shiswad Panchayat office so that it is accessible to every villager. Most importantly, it is ensured that each BMC member is made aware of the data that is documented in the register. The PBR being a living document, the data is to be continuously updated and modified, if required. Although significant data of Shiswad's biodiversity has been collected, more data for quantification of the biodiversity is still to be collected. Once this is collected and validated, Shiswad's BMC will approve the same.

10. State Biodiversity Board's approval to BMC and PBR

Since establishment of the Shiswad BMC, the Maharashtra State Biodiversity Board (MSBB) was informed about its activities. The BMC formation resolution has been duly submitted to the Board and a copy of the register will be shared with them in due course of time. Shiswad's BMC is being supported by the MSBB to develop the PBR of the village further.



PBR-Allied Activities

Participatory Mapping of Biodiversity

Along with documentation of biodiversity, it is important to map the biodiversity, especially of the biodiversity-rich spots. Such locations have been marked on a map with the help of villagers of Shiswad. These are the places that will be conserved on priority. Boards of such mapping are on display in the village.

Herbarium Preparation

Herbarium is a technique of preserving plant-twigs for their identification. The technique of preparation of the herbarium was explained in the trainings and villagers were motivated to develop one for plant species found within Shiswad village. The herbarium developed has been kept in the Panchayat office.



Seed Collection

Shiswad's BMC, together with the help of the Wasundhara Sevak, has prepared a collection of indigenous seeds. These are the seeds that have been traditionally cultivated in the village. Conservation of such varieties is an important step. Such seed collections are also retained in the Panchayat office of Shiswad.





Children Collecting Data on Biodiversity of their Village

The Local School: A Potential Resource for the PBR; Conducting the CBR

Schoolchildren of Shiswad collected data mainly on flora-fauna and crops using the Children’s Biodiversity Register (CBR). Data sheets provided in the field guide are used to collect data. This data is being collected and later it will be handed over to Shiswad’s BMC in order to validate and use for the PBR. Besides collection of data, it ensures sensitising young minds towards significance of the biodiversity of their region.

Shiswad Biodiversity Festival

As a further step towards promoting awareness on biodiversity, the Biodiversity Festival at Shiswad was organised in December 2011. This two-day event aimed at exhibiting the biodiversity of the region along with showcasing traditional practices. Local communities were invited to put up stalls of their traditional products, such as wild edibles, wild medicinal plants, indigenous grain and others. WOTR put up stalls that displayed exhibits of the local biodiversity on posters, solar lamps, traditional food stalls. It provided the visitors with a wider view of biodiversity. More than 5000 villagers of Shiswad and nearby villages benefited from this festival.



Glimpses of the Shiswad Biodiversity Festival



ANNEXURE IV

Guidelines on Access to Biological Resources and Associated Knowledge and Benefits Sharing Regulations, 2014²⁵

Ministry of Environment, Forests and Climate Change (National Biodiversity Authority)

Notification

New Delhi, 21st November 2014

G.S.R 827.— In exercise of the powers conferred by section 64 read with sub-section (1) of section 18 and sub-section (4) of section 21 of the Biological Diversity Act, 2002 (18 of 2003), hereinafter referred to as the Act, and in pursuance of the Nagoya Protocol on access to genetic resources and the fair and equitable sharing of benefits arising from their utilization to the Convention on Biological Diversity dated the 29th October, 2010, the National Biodiversity Authority hereby makes the following regulations, namely.—

Short title and commencement

- (1) These regulations may be called Guidelines on Access to Biological Resources and Associated Knowledge and Benefits Sharing Regulations, 2014.
- (2) They shall come into force on the date of their publication in the Official Gazette.

1. Procedure for access to biological resources and/or associated traditional knowledge for research or bio-survey and bio-utilisation for research

- (1) Any person referred to under sub-section (2) of section 3 of the Act, who intends to have access to biological resources and/ or associated traditional knowledge for research or bio-survey and bio-utilisation for research shall apply to the National Biodiversity Authority (NBA) in Form I of the Biological Diversity Rules, 2004 for obtaining access to such biological resource and/or associated knowledge, occurring in India.
- (2) The NBA shall, on being satisfied with the application under sub-regulation (1), enter into a benefit sharing agreement with the applicant which shall be deemed as grant of approval for access to biological resource for research referred to in that sub-regulation: Provided that in case of biological resources having high economic value, the agreement may contain a clause to the effect that the benefit sharing shall include an upfront payment by applicant, of such amount, as agreed between the NBA and the applicant.

²⁵ MOEF, 2014. Guidelines on Access to Biological Resources and Associated Knowledge and Benefits Sharing Regulations, 2014, National Biodiversity Authority. Government of India, New Delhi. Accessed at http://nbaindia.org/uploaded/pdf/Gazette_Notification_of_ABS_Guidlines.pdf

2. Procedure for access to biological resources, for commercial utilisation or for bio-survey and bio-utilisation for commercial utilisation

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

3. Mode of benefit sharing for access to biological resources, for commercial utilisation or for bio-survey and bio-utilisation for commercial utilisation

- (1) Where the applicant/trader/manufacturee has not entered into any prior benefit sharing negotiation with persons such as the Joint Forest Management Committee (JFMC)/Forest dweller/Tribal cultivator/Gram Sabha, and purchases any biological resources directly from these persons, the benefit sharing obligations on the trader shall be in the range of 1.0 to 3.0% of the purchase price of the biological resources and the benefit sharing obligations on the manufacturer shall be in the range of 3.0 to 5.0% of the purchase price of the biological resources: Provided that where the trader sells the biological resource purchased by him to another trader or manufacturer, the benefit sharing obligation on the buyer, if he is a trader, shall range between 1.0 to 3.0% of the purchase price and between 3.0 to 5.0%, if he is a manufacturer: Provided further that where a buyer submits proof of benefit sharing by the immediate seller in the supply chain, the benefit sharing obligation on the buyer shall be applicable only on that portion of the purchase price for which the benefit has not been shared in the supply chain.
- (2) Where the applicant/trader/manufacturee has entered into any prior benefit sharing negotiation with persons such as the Joint Forest Management Committee (JFMC)/Forest dweller/Tribal cultivator/Gram Sabha, and purchases any biological resources directly from these persons, the benefit sharing obligations on the applicant shall be not less than 3.0% of the purchase price of the biological resources in case the buyer is a trader and not less than 5.0% in case the buyer is a manufacturer.
- (3) In cases of biological resources having high economic value such as sandalwood, red sanders, etc. and their derivatives, the benefit sharing may include an upfront payment of not less than 5.0%, on the proceeds of the auction or sale amount, as decided by the NBA or SBB, as the case may be, and the successful bidder or the purchaser shall pay the amount to the designated fund, before accessing the biological resource.



4. Option of benefit sharing on sale price of the biological resources accessed for commercial utilisation under regulation 2

When the biological resources are accessed for commercial utilisation or the bio-survey and bio-utilisation leads to commercial utilisation, the applicant shall have the option to pay the benefit sharing ranging from 0.1 to 0.5% at the following graded percentages of the annual gross ex-factory sale of the product which shall be worked out based on the annual gross ex-factory sale minus government taxes as given below:-

| Annual Gross ex-factory sale of product | Benefit sharing component |
|---|---------------------------|
| Up to Rupees 1,00,00,000 | 0.1% |
| Rupees 1,00,00,001 to 3,00,00,000 | 0.2% |
| Above 3,00,00,000 | 0.3% |

5. Collection of fees

Collection of fees, if levied by Biodiversity Management Committee (BMC) for accessing or collecting any biological resource for commercial purposes from areas falling within its territorial jurisdiction under sub-section (3) of section 41 of the Act, shall be in addition to the benefit sharing payable to the NBA/SBB under these regulations.

6. Procedure for transfer of results of research relating to biological resources

- (1) Any person who intends to transfer results of research relating to biological resources occurring in or obtained from India, to persons referred to under sub-section (2) of section 3 of the Act for monetary consideration or otherwise, shall—
 - (a) apply to the NBA in Form II of the Biological Diversity Rules, 2004, for transfer of the results of research relating to biological resources occurring in or obtained from India for any purpose;
 - (b) provide evidence of approval of NBA for access to the biological resource and/or associated knowledge involved in the research: Provided that the requirement of evidence under this clause shall not apply to an applicant who is a citizen of India or a body corporate, association or organisation which is registered in India and not having any non-Indian participation in its share capital or management;
 - (c) provide complete information on potential commercial value within the knowledge of the applicant, of the results of research.
- (2) The NBA shall, on being satisfied with the application under sub-regulation (1), enter into a benefit sharing agreement with the applicant which shall be deemed as grant of approval for transfer of the results of research referred to in that sub-regulation.

7. Mode of benefit sharing for transfer of results of research

Applicant shall, in case of transfer of results of research under regulation 6, pay to the NBA such monetary and/or non-monetary benefit, as agreed between the applicant and the NBA: Provided that in case of monetary benefit received by him, if any, on such transfer, the applicant shall pay to the NBA 3.0 to 5.0% of the monetary consideration.

8. Procedure for obtaining Intellectual Property Rights (IPR)

- (1) Any person who intends to obtain any intellectual property right by whatever name called, in or outside India, for any invention based on any research or information on any biological resources obtained from India, shall make an application to the NBA in Form III of the Biological Diversity Rules, 2004: Provided that if the applicant is a person referred to under sub-section (2) of section 3 of the Act, he shall provide evidence of approval of NBA for access to the biological resources and/or associated knowledge used in the research leading to the invention:

Provided further that any person applying for any right under the Protection of Plant Varieties and Farmers' Rights Act, 2001 (53 of 2001) shall be exempted from this sub-regulation.

- (2) The NBA shall, on being satisfied with the application under sub-regulation (1), enter into a benefit sharing agreement with the applicant which shall be deemed as grant of approval for obtaining IPR.

9. Mode of benefit sharing in IPR

- (1) The applicant shall, in case of commercialising the IPR obtained, pay to the NBA such monetary and/or nonmonetary benefit, as agreed between the applicant and the NBA.
- (2) Where the applicant himself commercialises the process/product/innovation, the monetary sharing shall be in the range of 0.2 to 1.0% based on sectoral approach, which shall be worked out on the annual gross ex-factory sale minus government taxes.
- (3) Where the applicant assigns/licenses the process/product/innovation to a third party for commercialisation, the applicant shall pay to NBA 3.0 to 5.0% of the fee received (in any form including the license/assignee fee) and 2.0 to 5.0% of the royalty amount received annually from the assignee/licensee, based on sectoral approach.



10. Obligations of applicant in the event of commercialisation of IPR

- (1) An applicant, granted IPR, who is a citizen of India or a body corporate, association or organisation which is registered in India and not having any non-Indian participation in its share capital or management, shall give prior intimation to the concerned SBB for access to biological resources, in the form prescribed by the SBB, and shall comply with such terms and conditions, if any, imposed by the SBB in the interest of promoting conservation and sustainable use.
- (2) An applicant, granted IPR, who is a person or a body corporate or an association or an organisation referred to under sub-section (2) of section 3 of the Act shall apply in Form I of the Biological Diversity Rules, 2004 to the NBA for access to biological resources.

11. Procedure for transfer of accessed biological resource and/or associated knowledge to third party for research/ commercial utilisation

- (1) Any person who intends to transfer the biological resources and/or associated knowledge which has been granted access under regulation 1 to a third party for research or for commercial utilisation, shall apply to NBA in Form IV of the Biological Diversity Rules, 2004, for transfer to such third party.
- (2) The NBA shall, on being satisfied with the application under sub-regulation (1), enter into a benefit sharing agreement with the applicant, which shall be deemed as grant of approval for transfer of accessed biological resource and/or associated knowledge referred to in that sub-regulation.

12. Mode of benefit sharing for transfer of accessed biological resource and/or associated knowledge to third party for research/commercial utilisation

- (1) The applicant shall pay to the NBA such monetary and/or non-monetary benefit, as agreed between the applicant and the NBA.
- (2) Applicant (transferor) shall pay to the NBA 2.0% to 5.0 % (following a sectoral approach) of any amount and/or royalty received from the transferee, as benefit sharing, throughout the term of the agreement.
- (3) In case the biological resource has high economic value, the applicant shall also pay to the NBA an upfront payment, as mutually agreed between the applicant and the NBA.

13. Conducting of non-commercial research or research for emergency purposes outside India by Indian researchers/ Government institutions

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

14. Determination of benefit sharing

- (1) Benefit sharing may be done in monetary and/or non-monetary modes, as agreed upon by the applicant and the NBA/ SBB concerned in consultation with the BMC/Benefit claimer, etc. Options for such benefit sharing are provided in **Annexure I**.
- (2) Determination of benefit sharing shall be based on considerations such as commercial utilisation of the biological resource, stages of research and development, potential market for the outcome of research, amount of investment already made for research and development, nature of technology applied, time-lines and milestones from initiation of research to development of the product and risks involved in commercialisation of the product:
Provided that special consideration may be given to cases where technologies/ products are developed for controlling epidemics/diseases and for mitigating environmental pollution affecting human/animal/plant health.
- (3) The amount of benefit sharing shall remain the same whether the end product contains one or more biological resources.
- (4) Where the biological resources of a product are sourced from the jurisdiction of two or more SBBs, the total amount of the accrued benefits shall be shared among them in proportion as decided by the NBA/SBBs concerned, as the case may be.



15. Sharing of benefits

- (1) Where approval has been granted by the NBA for research or for commercial utilisation or for transfer of results of research or for Intellectual Property Rights or for third party transfer, the mode of benefit sharing shall be as under:—
 - (a) 5.0% of the accrued benefits shall go to the NBA, out of which half of the amount shall be retained by the NBA and the other half may be passed on to the concerned SBB for administrative charges.
 - (b) 95% of the accrued benefits shall go to concerned BMC(s) and/ or benefit claimers:

Provided that where the biological resource or knowledge is sourced from an individual or group of individuals or organisations, the amount received under this clause shall directly go to such individual or group of individuals or organisations, in accordance with the terms of any agreement and in such manner as may be deemed fit: Provided further that where benefit claimers are not identified, such funds shall be used to support conservation and sustainable use of biological resources and to promote livelihoods of the local people from where the biological resources are accessed.

- (2) Where approval has been granted by State Biodiversity Board under these regulations.—

The sharing of accrued benefits shall be as under.— the SBB may retain a share, not exceeding 5% of the benefits accrued towards their administrative charges and the remaining share shall be passed on to the BMC concerned or to benefit claimers, where identified: Provided that where any individual or group of individuals or organisations cannot be identified, such funds shall be used to support conservation and sustainable use of biological resources and to promote livelihoods of the local people from where the biological resources are accessed.

16. Processing of applications received by NBA

- (1) Every application shall be complete in all respects, including all the enclosures referred thereto.
- (2) Incomplete applications devoid of any relevant information specifically sought, including ambiguous replies, incomplete disclosure, absence of proof, etc., shall be returned to the applicants.
- (3) The time limit specified for processing the applications shall commence only when the application complete in all respects including fee prescribed is received.
- (4) Any information specified in the application as confidential shall not be disclosed, either intentionally or unintentionally, to any person not concerned thereto.



- (5) While processing the application for access to any biological resource (including plants and/or animals and/or their parts or genetic material or derivatives), the NBA may consider the following factors, namely:--
Whether the biological resource is –
- (i) cultivated or domesticated or wild;
 - (ii) rare or endemic or endangered or threatened species;
 - (iii) accessed directly through the primary collectors living in natural habitat or obtained through intermediaries like traders;
 - (iv) developed or maintained under *ex-situ* conditions;
 - (v) of high value/importance to livelihoods of local communities;
 - (vi) restricted under the Act or any other law for time being in force;
 - (vii) exempted under section 40 of the Act;
 - (viii) included in crops listed under Annex I to the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA), to which India is a contracting party;
 - (ix) included in the Appendices of the Convention on International Trade on Endangered Species (CITES).
- (6) The NBA while taking any decision on the application relating to the use of biological resources and/or knowledge associated thereto may consult through the SBBs, the BMCs within whose jurisdiction the biological resources and/or the knowledge occur.
- (7) The NBA shall reject the application requesting access to biological resources for the reasons specified under rule 16 of the Biological Diversity Rules, 2004.
- (8) On receipt of application, the NBA may make enquiries, as it may deem fit, and if necessary, may consult an expert committee constituted for this purpose.
- (9) The NBA may upon such enquiry and/or consultation referred to in sub-regulation (8), by order, grant approval or reject the application: Provided that where the NBA has rejected such application, the reasons for such rejection shall be recorded in writing after giving an opportunity of being heard to the applicant.
- (10) Approval granted by the NBA shall be in the form of written agreement duly signed by an authorised officer of the NBA, the applicant and others as applicable: Provided that the NBA may grant approval without a written agreement for the purposes of conducting of non-commercial research or research for emergency purposes outside India by Indian researchers/ Government institutions under regulation 13.
- (11) Based on any complaint or *suo moto*, the NBA may withdraw the approval granted for access and revoke the written agreement on the grounds specified under rule 15 of the Biological Diversity Rules, 2004: Provided that a copy of the order of such revocation shall be issued to the concerned State Biodiversity Board and the Biodiversity Management Committees for the purposes of prohibition of access.



- (12) Where a request has been made by the applicant for withdrawal of his application or the applicant fails to respond to queries of the NBA within the stipulated time, the NBA shall close the applications or initiate action under these regulations as it deems appropriate: Provided that if the applicant wishes to revive the application, he shall make a fresh application with the requisite fee.

Note: Application forms for access to biological resources and/or associated knowledge, guidelines for filling them and form of agreements, are available in the NBA website: www.nbaindia.org.

17. Certain activities or persons exempted from approval of NBA or SBB

The following activities or persons shall not require approval of the NBA or SBB, namely:--

- (a) Indian citizens or entities accessing biological resources and/or associated knowledge, occurring in or obtained from India, for the purposes of research or bio-survey and bio-utilisation for research in India;
- (b) collaborative research projects, involving the transfer or exchange of biological resources or related information, if such collaborative research projects have been approved by the concerned Ministry or Department of the State or Central Government and conform to the policy guidelines issued by the Central Government for such collaborative research projects;
- (c) local people and communities of the area, including growers and cultivators of biological resources, and *vaid*s and *hakims*, practising indigenous medicine, except for obtaining intellectual property rights;
- (d) accessing biological resources for conventional breeding or traditional practices in use in any agriculture, horticulture, poultry, dairy farming, animal husbandry or bee keeping, in India;
- (e) publication of research papers or dissemination of knowledge, in any seminar or workshop, if such publication is in conformity with the guidelines issued by the Central Government from time to time;
- (f) accessing value added products, which are products containing portions or extracts of plants and animals in unrecognizable and physically inseparable form; and
- (g) biological resources, normally traded as commodities notified by the Central Government under section 40 of the Act.



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