



SECTION I

INTRODUCTION



Introduction



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Importance of protecting biodiversity

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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



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.



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

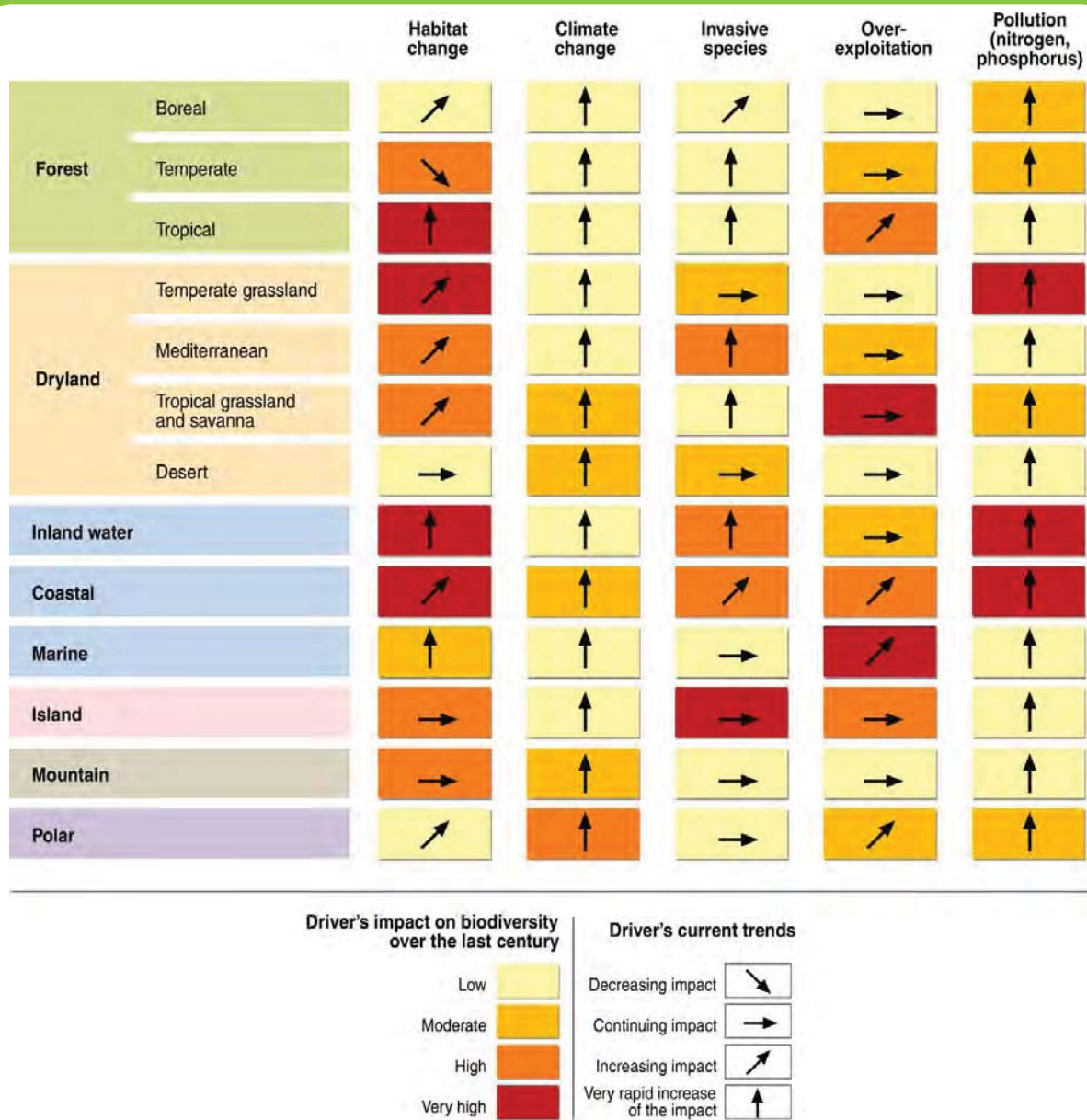
**Climate change is impacting biodiversity. Even though it is not specifically included in the current guidelines of the PBR, it is imperative that its effects also be considered when planning for and undertaking measures that conserve and enhance biodiversity at various scales, as envisaged by various 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

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



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.

⁶Brook, B.W., Sodhi, N.S. and Bradshaw, C. J. 2008. Synergies among extinction drivers under



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

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 on 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/cbs/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



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



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



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->

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 hotspot 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, ‘Home’¹⁸ 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., Dufield, G., and Melendez-Ortiz, R., 2003. Trading in Knowledge - Development Perspectives on TRIPS Trade and Sustainability. Taylor & Francis, New York.

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.

