

Sustainable Harvesting of Non-Timber Forest Products (NTFPs)

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SUMMARY

Non-timber forest products (NTFPs) have attracted considerable global attention due to the significant role played in benefiting people and industries. The growing knowledge and understanding of the contribution of non-timber forest products to local livelihoods is not matched with an equal understanding of the sustainability of direct consumption or market demand. It is a well-established fact that most tribals and villagers who live in forest regions depend on NTFPs as the source of their livelihood. Increasing subsistence, as well as commercial expectations from non-timber forest products, necessitates a more careful assessment of the resource base and sustainable harvesting scheme. There is a great need to ensure sustainable harvesting of these products, and in several instances, developing specific methods to cope with the threats posed by climate change.

INTRODUCTION

Biodiversity, the intricate web of life encompassing a wide array of species and ecosystems, is a cornerstone of the natural world. It underpins the health and stability of our planet, providing essential services, from clean air and water to food and medicine. The diversity of life on Earth, however, faces unprecedented challenges due to various anthropogenic factors, such as habitat destruction, climate change, pollution, and overexploitation. To effectively address these threats and assess the state of our environment, scientists and conservationists have turned to biodiversity indices as invaluable tools. Biodiversity indices come in various forms, each suited to specific research questions and ecological contexts. Some of the commonly used indices include species richness, Shannon-Wiener Diversity Index, Simpson's Diversity Index, Pielou's Evenness Index, and Jaccard Index, among others. Researchers select the most appropriate index based on their objectives, the type of data available, and the characteristics of the ecosystem under study. In summary, biodiversity indices are indispensable tools in the field of ecology and conservation. They offer a quantitative lens through which we can observe and understand the natural world. By quantifying biodiversity, we can better appreciate its value, monitor its health, and take proactive measures to safeguard the intricate tapestry of life that sustains our planet.

Diversity index

Non-timber forest products, or NTFPs, are essential safety nets for the underprivileged who depend on forests for their subsistence. It helps with cash income, health care, and food security. It also gives locals in the most distant places work opportunities. People in rural regions are marginalized, landless, and extremely impoverished; depending on several conditions, their required percentage of income ranges from 35 to 80 per cent (Bhattacharya and Hyatt 2004). Due to the nature of its manufacturing, amount, collecting method, processing, and local selling, women are mostly dependent on NTFPs. They have more resource expertise and consume the majority of NTFPs for themselves.

In the past, the NTFP sector was ignored by mainstream forestry for many years and was viewed as "small," despite its significance being acknowledged. Even though the NTFP's commercial aspect is highly amazing, historically, it has been used to meaningfully serve various regions of India. Out of all the exports from the forestry industry, 68% come from the export of NTFPs and their products. In recent times, NTFPs have garnered significant worldwide interest owing to the growing acknowledgement of their role in bolstering family economics and ensuring food security. Important community requirements for enhanced family food security, rural livelihood, and local and regional economies can be met by NTFPs. NTFP is a major source of monthly income and nourishment for several million households worldwide. However, the production of numerous NTFPs has decreased due to a number of factors. The local peasants were compelled to gather products from different forest ranges prematurely due to the overwhelming demand from the herbal enterprises. Traders and suppliers use local people to collect specific products. Plants are becoming more vulnerable and experiencing less regeneration as a result of destructive collecting methods. According to research based on actual field surveys, there has been a 30

to 85 % decrease in productivity from various forest divisions during the past 30 years. Experts in biodiversity have noted that the number of these trees is declining quickly, and that the populations of related animals, such as bird and honey bee species, have also declined sharply. This has had a detrimental effect on the reproductive biology of some NTFP tree species.

Threats to NTFPs

- Due to overharvesting, premature collection, Climate change (extreme draught and flood situation) production of several NTFP has gone down.
- Excessive demand by the herbal industries, forced premature product collection from various forest ranges through local villagers.
- Due to destructive collection practices regeneration of NTFP species is going down and plants are coming under threat.
- The population size of trees is coming down very rapidly manner, leading to decrease in the associated animals, honey bees and bird species (Bhattacharya,2013).
- This has compelled all stakeholders and Government to give a serious thought to evolve methods of sustainable harvesting practices to ensure sustainability

Sustainable Harvesting of NTFPs

The ability of a system to sustain itself over time and, if necessary, improve it in response to changing needs—either on its own or through connections with other systems—without jeopardising the system's vital ecological integrity or the long-term productivity of its resource base is known as sustainability.

Types of Unsustainable Harvesting

- Destructive Harvesting
- Premature Harvesting
- Overharvesting
- Tendency to collect unripe fruits
- Tendency to damage the tree
- New recruitments are poor / absent
- Determining Sustainable Harvesting Limits

Protocols for NTFP sustainable harvest (Source: Bhattacharya,2013)

- Plant species should be harvested under the best possible conditions avoiding wet soil, dew, rain or exceptionally high air humidity.
- Leaves, stems or flowers should always be gathered on a sunny day after the dew has evaporated off the plants but before the full heat of the day.
- Based on the gatherer's perception, the following retentions of different plant parts are recommended during collection:
 - For harvesting fruits, 25% have to be left for regeneration.
 - For harvesting seeds 30% must be left for regeneration.
 - During the harvest of flowers, 30% of flowers of each plant and 20% of the population must be left untouched.
 - In case of harvesting leaves, 70% of the plant leaves have to be left out.
 - Similarly, for harvesting roots or bulbs 80% of the plant population has to be left untouched.
 - For harvesting whole plant at least 30 % of population should be left untouched.
- Leaves and roots of annual plants should be collected after flowering to ensure regeneration and better product quality unless otherwise recommended.
- For harvesting roots, a hole should be dug straight down and to one side of the roots. Gradually remove soil on one side of the hole towards the root. Then simply pull the root sideways into the hole. This method will damage the roots less than the common practice of digging down.
- For harvesting bark from trees or shrubs, the entire tree or shrub should not be girdled by removing the bark around the tree, unless the tree has been or is to be removed for other purposes, e.g.for timber harvest, or is otherwise is to be destroyed.
- Rain water washes away some of the aromatic oils from many herbs, so after a rainstorm, harvesting should be done after 2-3 days after rains to let the plants oil collect again.

- The collectors should select harvest sites where the target plant could be readily found and the plant materials are likely to be of good quality and free of contamination from pollution and other negative environmental influences.
- Picking of herbs alongside highways or farm fields unless it is organic must be avoided.
- If herb leaves are to be harvested, the harvested stems or branches must be hanged upside down in bunches for few days. This will bring the sap present in the stems or branches into the leaves.
- Sharp cutting tools like chopper, sickle, secateurs, scissor, and hedge scissor must be used to avoid undue damage to the tree.
- With tender, non-woody stemmed herbs, gathering of leaves, stems, or flowers can be accomplished easily with the help of scissors or sharp knife.
- Cutting tools must be cleaned and sharpened between two collections to reduce contamination.
- For harvest that involves taking the entire plant (e.g. roots) the harvest should be limited in any population to leave a portion sufficient for regeneration of that population.
- Harvesting should be done only after the fruit has ripened and the seed has been released, if the species is seed propagated.
- Plant species listed under RET or on of the Convention of International Trade in Endangered Species (CITES) or those which are not allowed to be harvested under State regulations due to concern about over harvest should not be harvested (e.g. *Taxus baccata* in Himalayas, Sarpagandha in M.P. & Chhattisgarh).
- Collection must be made from the abundant stands. Harvesting from stands where the plant is sparse or that are outside the species normal range should be avoided. For harvest only well grown and adult plants should only be selected.
- Whenever possible and acceptable for meeting quality standards the bark should be harvested from the branches rather than the tree trunk.
- While harvesting roots of perennial plants, some plants from each life stage should be left out.
- For species that regenerate from portions of roots or root crown a portion of the root should be left in the ground or the whole or divided crowns should be replanted, as appropriate
- For propagation by seeds, the seeds of collected species that reproduce sexually in a suitable environment should be planted.
- For asexual propagation, the whole or divided root crown, as appropriate, or other asexual propagation material should be prepared and planted in a suitable environment.
- All containers used during harvesting must be clean and free of contamination from the previous plant material.
- When the containers are not in use, they must be kept under dry conditions free of pests and inaccessible to rodents, livestock and domestic animals.

CONCLUSION

The forest department is supposed to be in charge of preserving and implementing sustainable harvesting, but there are many parties involved, thus the system has to move quickly to address this issue. There isn't currently a single NTFP policy at the national level. Instead, there are a number of acts, policies, or administrative orders, such as JFM resolutions and other legislations, that only partially address NTFPs in terms of ownership, benefit sharing, monopolies, transit regulations, taxation, and the need for conservation, both nationally and in individual states. In order to promote NTFP resource improvement over the next ten years, large-scale plantations under the Green India Mission and the establishment of baseline data require extensive national attention to information on sustainable NTFP resource management. In the future, forestry may embark on a number of scientific initiatives to advance the sustainable harvesting of numerous additional species and create sophisticated protocols to address the need for conservation and economic development while taking environmental audit and certification requirements into account. Field realities indicate that the wild populations of NTFP species experience significant yield changes in many states. These fluctuations are attributed to unsustainable harvesting practises that affect individuals, populations, ecosystems, and genetic diversity. To accomplish sustainable forestry, NTFP integration into forest management is required. It is essential to design forest management technologies that include both timber and non-timber values since forestry technologies are developed with timber values as their primary consideration. Global examples demonstrate that in situ experimentation will enhance silvicultural regimes, and traditional knowledge might play a crucial part in their development.

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