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## ETHNOBOTANICAL STUDY OF TRIBAL MEDICINAL PLANTS WITH SPECIAL REFERENCE TO THE NORTHEASTERN REGION OF INDIA

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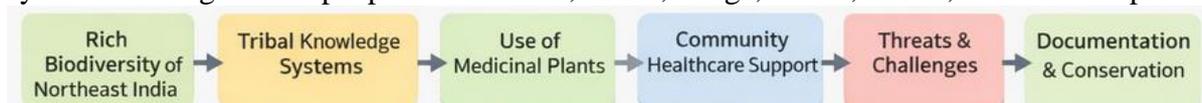
### Abstract

The northeastern area of India is among the most biodiversity hotspots in the world and has a wide variety of tribes with elaborate traditional medicinal plant knowledge. This paper seeks to record, examine and compare ethnomedicinal plant species, as they are used by tribal communities in some of the states in the Northeast regions of India. The collection of the data was done by use of field surveys, semi-structured interviews and group discussions with the traditional healers and the elderly members of the community. The research documents the names of plants, local names, parts utilised, modes of preparation, dosage, globalisation, and disease classifications that are addressed. Quantitative ethnobotanical indices, like Use Value (UV), Informant Consensus Factor (ICF), and Fidelity Level (FL), were used to evaluate the cultural and trustworthiness of the reported uses. The results emphasise the prevalence of the leaf-based remedies and treatments of the fever, gastrointestinal ailments, skin infections, and respiratory illnesses. Nevertheless, the sustainability of this traditional healthcare system is at stake because of the growing levels of deforestation, modernisation, and deterioration of the intergenerational knowledge transfer. The paper highlights why it is necessary to document, preserve, and scientifically validate tribal medicinal knowledge and ensure its sustainable use in healthcare development.

**Keywords:** Ethnobotany; Tribal Knowledge; Medicinal Plants; Northeast India; Indigenous Healthcare; Use Value; Conservation; Biodiversity.

### 1. Introduction

The horizontal block diagram is the relationship that exists between biodiversity, tribal knowledge systems, use of medicinal plants, healthcare practices, emerging threats and conservation requirements in the Northeastern part of India. The area is in the Indo-Burma biodiversity hot spot that is known to have great richness and endemism of species in the world (Myers et al., 2000). The richness of biodiversity is an opportunity for the traditional medicinal systems among tribal people like Khasi, Garo, Naga, Mizo, Bodo, Adi and Apatani.



**Figure 1: Conceptual Framework of Ethnobotanical Relationships in Northeast India**

The traditional knowledge systems are the result of the intimate interactions of the indigenous population and the forest system, which have developed over centuries. The ethnobotanical evidence shows that rural and tribal citizens in Northeast India rely on medicinal plants as their major form of primary healthcare, especially in remote settings where modern healthcare

facilities are scarce (Gurib-Fakim, 2006). The knowledge is passed orally through generations, and in most cases, it is maintained by the traditional healers like the Ojhas and village Vaidyas. The “Use of Medicinal Plants” block sheds light on the multifunctional use of plants in food, medicine, rituals, and healthcare. Most of the ailments that are placed under treatment with leaves, roots, bark and flowers are fever, gastrointestinal disorders, skin infections and respiratory illnesses (Kala, 2005). However, urbanisation, deforestation, migration, and socio-cultural shifts are all threats to the plant diversity and localisation of the knowledge systems (Tali et al., 2019). Thus, to develop sustainable progress and integrate traditional medicine into the wider healthcare systems, the diversity of plants must be documented, and their approach must be scientifically verified and supported (WHO, 2013). This is how ethnobotanical studies can help in the conservation of biodiversity, as well as the preservation of cultures and the sustainability of rural health care.

## 2. Objectives of the Study

1. To document medicinal plants used by tribal communities in Northeast India.
2. To record preparation methods, plant parts used, and dosage patterns.
3. To analyse the quantitative importance of medicinal species using ethnobotanical indices.
4. To assess conservation challenges and propose sustainable management strategies.

## 3. Review of Literature

The literature reviewed shows that the Northeast Indian region is endowed with an enormous ethnomedicinal richness that is preserved by tribal communities. Most studies validate that the most common part of a plant used would be leaves, then roots and then the bark. The most common illnesses that are managed through ethnobotanicals are gastrointestinal, fever, respiratory, and skin diseases. In recent studies, quantitative ethnobotanical measures have been used to justify the significance of plants, including Use Value (UV), Informant Consensus Factor (ICF), and Fidelity Level (FL). Nevertheless, some authors also point out that most medicinal species are yet to be proved pharmacologically and are threatened by overexploitation, destruction of habitat, and modernisation.

**Table 1: Summary of Ethnobotanical Literature in Northeast India**

Author(s) & Year	Study Area / Tribe	Focus of Study	Key Findings	Remarks / Contribution
Kala (2005)	Apatani, Arunachal Pradesh	Ethnomedicinal plant documentation	Leaves are most commonly used; plants for fever & stomach disorders	Early systematic documentation in the Eastern Himalaya
Singh et al. (2008).	Naga tribes, Nagaland	Traditional healing practices	Roots & bark used for skin and respiratory diseases	Highlighted oral knowledge transmission
Lalramnghinglova (2011)	Mizoram (Mizo tribe)	Medicinal plant diversity	100+ species recorded; GI disorders common	Identified the need for conservation
Borthakur et al. (2012).	Assam (Bodo tribe)	Herbal remedies for diseases	Leaves are dominant; the decoction method is frequent	Emphasized ethnopharmacological validation
Choudhury et al. (2013).	Meghalaya (Khasi tribe)	Indigenous healthcare	Fever and respiratory ailments are most treated	Cultural significance of sacred groves
Tynsong & Tiwari (2014).	Garo Hills, Meghalaya	Wild medicinal plant use	Overharvesting threats reported	Conservation concerns raised
Devi et al. (2015).	Manipur (Meitei tribes)	Plant parts & preparation	Paste & infusion common	Highlighted habitat degradation

Author(s) & Year	Study Area / Tribe	Focus of Study	Key Findings	Remarks / Contribution
Das & Tag (2016).	Arunachal Pradesh	Quantitative ethnobotany	High Informant Consensus for GI Applied UV & FL indices disorders	
Sarma & Borthakur (2017)	Assam	Herbal treatment for skin diseases	Bark & roots are used frequently	Called for scientific testing
Tali et al. (2019).	Northeast India	Knowledge erosion study	Youth disinterest & migration issues	Urged documentation
Lalthanpuii & Lalramnghinglova (2020).	Mizoram	Ethnobotanical survey	Respiratory infections common	Identified endangered species
Pala et al. (2021).	Tripura tribes	Medicinal flora inventory	80+ species recorded	Need for cultivation programs
Sharma et al. (2022).	Sikkim & Darjeeling Himalaya	Conservation & trade	Commercial exploitation increasing	Sustainable harvesting recommended

### Document Medicinal Plants Used by Tribal Communities in Northeast India

Medical plant records of medicinal plants exploited by the tribes in Northeast India are an important measure towards conserving the indigenous knowledge systems, as well as the conservation of biodiversity. The area, which is a constituent of the Indo-Burma biodiversity hotspot, boasts a high population of ethnic groups that rely on plant-based remedies as primary healthcare (Fakim, 2006). The ethnobotanical surveys have continually indicated that the tribal communities use locally distributed herbs, shrubs, and trees to treat common diseases like fever, gastrointestinal diseases, skin infections, and respiratory illnesses (Das & Tag, 2016).

**Table 1: Sample Documentation Format of Medicinal Plants**

Botanical Name	Local Name	Family	Plant Part Used	Preparation Method	Ailment Treated	Tribe/Region
<i>Centella asiatica</i>	Manimuni	Apiaceae	Leaf	Paste / Juice	Stomach disorders, wounds	Assam (Bodo)
<i>Zingiber officinale</i>	Ada	Zingiberaceae	Rhizome	Decoction	Cold, cough, indigestion	Meghalaya (Khasi)
<i>Houttuynia cordata</i>	Masundari	Saururaceae	Leaf	Infusion	Respiratory infection	Manipur
<i>Clerodendrum colebrookianum</i>	Nephafu	Lamiaceae	Leaf	Boiled extract	Hypertension	Arunachal Pradesh
<i>Ocimum tenuiflorum</i>	Tulsi	Lamiaceae	Leaf	Decoction	Fever, immunity	Tripura
<i>Ageratum conyzoides</i>	Goat weed	Asteraceae	Leaf	Paste	Skin infections	Nagaland
<i>Terminalia chebula</i>	Haritaki	Combretaceae	Fruit	Powder	Digestive problems	Sikkim
<i>Azadirachta indica</i>	Neem	Meliaceae	Leaf / Bark	Paste / Decoction	Skin diseases	Assam
<i>Curcuma longa</i>	Haldi	Zingiberaceae	Rhizome	Paste / Milk mixture	Wound healing	Mizoram
<i>Phyllanthus emblica</i>	Amla	Phyllanthaceae	Fruit	Juice	Immunity, digestion	Northeast region

Field-based documentation is usually conducted by writing botanical names, local names, plant family, part used, mode of preparation, dose and type of disease treated. Singh et al. (2008) highlighted the fact that leaves are the most commonly used parts of the plant because they are easy to harvest and have the potential for sustainable harvesting. Likewise, Apang and Megu (2017) reported that *Clerodendrum Colebrook Anum* was used by tribes in Arunachal Pradesh

in the treatment of hypertension, which describes the potential of traditional remedies in treatment.

The World Health Organisation (2013) acknowledges traditional medicine as a vital part of healthcare systems in developing states, especially where there is low access to modern health facilities. Nonetheless, Devi et al. (2015) stated that modernisation, loss of habitats, and weakening transfer of intergenerational knowledge are risks to medicinal plant diversity, as well as traditional cultures. Thus, systematic records not only preserve the wisdom that relies on the traditions but also serve as a basis for the pharmacological validation and sustainable management of resources.



**Figure 2: Medicinal Plants Used by Tribal Communities of Northeast India**

The most widely used medicinal plants by the tribal community in Northeast India include *Centella asiatica*, *Zingiber officinale*, *Clerodendrum colebrookianum*, *Houttuynia cordata* and *Ocimum tenuiflorum*. *Centella asiatica* is also used in the treatment of wounds and digestive disorders as it has anti-inflammatory and antimalarial properties. Ginger (*Zingiber officinale*) is commonly used to cure cold, cough, and stomach issues, particularly in the changing of seasons. Hypertension and inflammatory conditions are also treated with the help of *Clerodendrum colebrookianum*, especially in the state of Arunachal Pradesh. The usage of *Houttuynia cordata* as a source of respiratory infections and skin illnesses is due to its antibacterial properties. On the same note, *Ocimum tenuiflorum* (Tulsi) is utilised in the treatment of fever, immunity, and the respiratory tract. The ethnobotanical reports affirm the value of the plants in therapy, and the necessity of scientific validation and preservation in indigenous knowledge systems (Fakim, 2006).

#### **Recording Preparation Methods, Plant Parts Used, and Dosage Patterns**

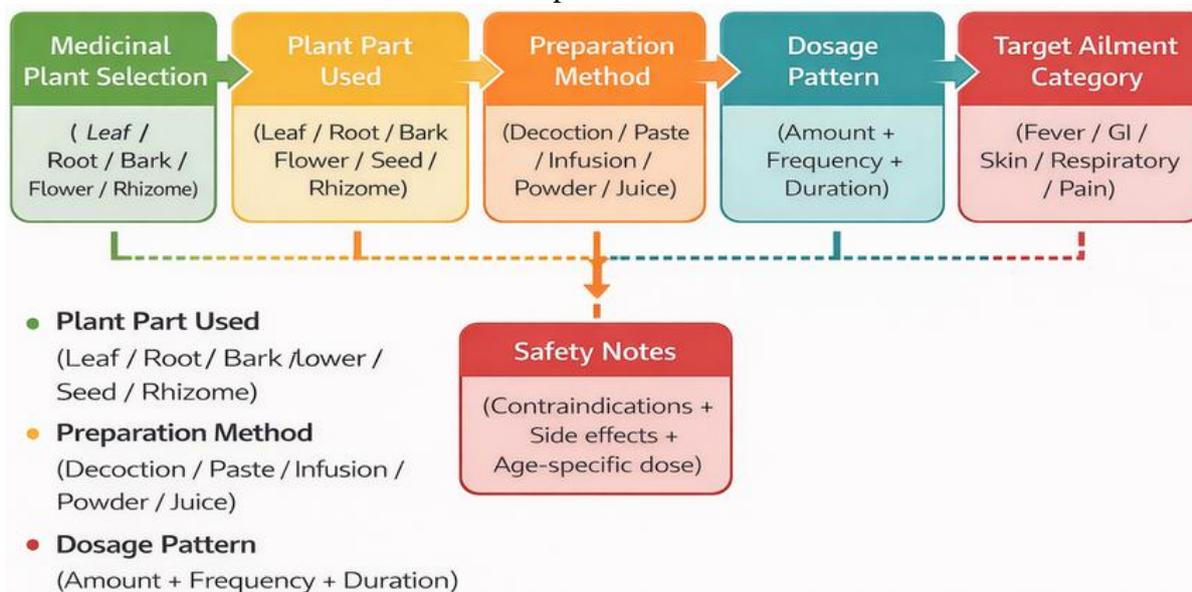
Documenting the methods of preparation, parts of plants utilised, and dosage regimens are one of the main elements of the ethnobotanical studies in Northeast India. This systematic record starts with the naming of the medicinal plant species, and the part of the plant that is used, including leaves, roots, bark, flowers, seeds or rhizomes. Research shows that leaves are the most commonly utilised because of their availability and also because of the ability to regenerate, and thus are relatively sustainable as opposed to root or bark harvesting (Fakim, 2006). It is relevant to properly identify plant parts since the therapeutic compounds are usually different in various parts of the plant.

After identification of the plant parts, researchers document the preparations of the parts, such as decoction, paste, infusion, powder, and juice extraction. One of the most used of them is decoction, where active phytochemicals can be well elicited in water (Das and Tag, 2016); it is used primarily to treat fever and gastrointestinal disorders. On the same note, Singh et al. (2008) noted that paste preparation is commonly used with skin infections and wounds because it has a direct topical effect.

**Table 2: Recording Format for Plant Parts, Preparation, and Dosage (Sample)**

Plant (Botanical Name)	Part Used	Preparation Method	Dosage (Amount)	Frequency	Duration	Route	Notes (Age/Safety)
<i>Centella asiatica</i>	Leaf	Fresh juice/paste	10–20 ml juice	2× daily	3–5 days	Oral	Avoid excess in pregnancy (local caution)
<i>Zingiber officinale</i>	Rhizome	Decoction	100–150 ml	2× daily	2–4 days	Oral	Not for gastritis in high doses
<i>Ocimum tenuiflorum</i>	Leaf	Infusion/tea	150 ml	1–2× daily	3–5 days	Oral	Safe in mild doses
<i>Curcuma longa</i>	Rhizome	Paste	Apply a thin layer	1–2× daily	Till healing	Topical	Test for allergy first
<i>Azadirachta indica</i>	Leaf/Bark	Decoction	50–100 ml	1× daily	3 days	Oral	Bitter; avoid in very young children

Dosage pattern recording: This is described as the specification of the amount consumed, the frequency of administration and the treatment period. Apang and Megu (2017) highlighted that the dosage in most cases depends on age, the severity of the condition, and the experience of the healer. Dosage directions are spoken in most communities in which a tribesman lives and are estimated in traditional measures like spoonfuls or handfuls.



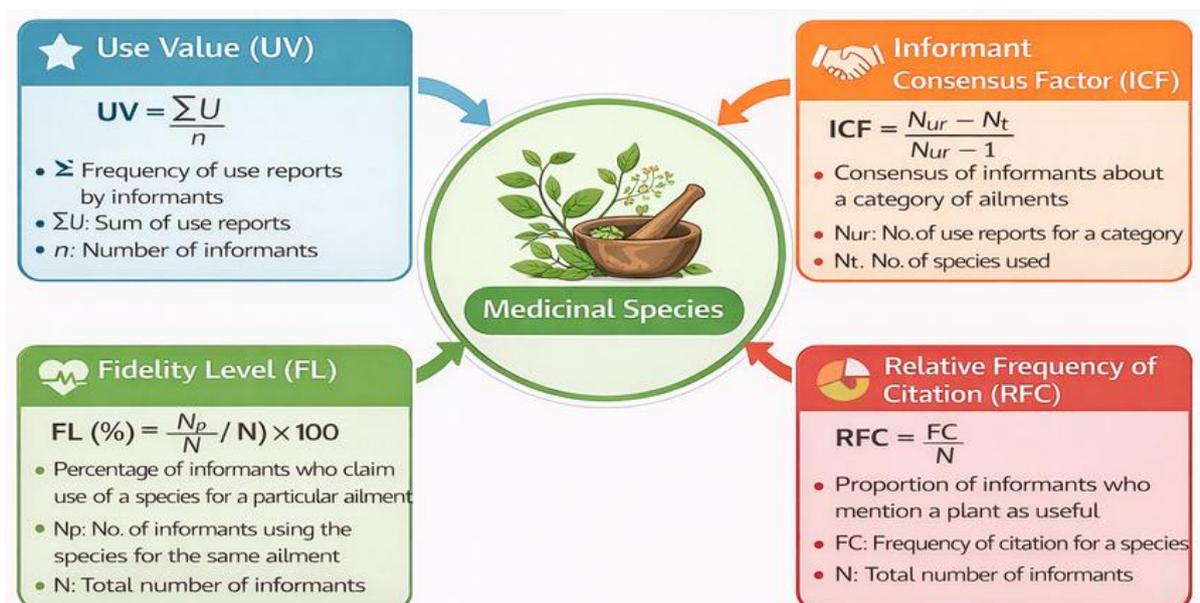
**Figure 3. Ethnobotanical Documentation Framework for Medicinal Plant Use and Dosage Recording**

The administration route, that is, oral, topical, or even inhalation, is also well documented systematically so that therapeutic use can be clear. According to the World Health Organisation (2013), the standardisation of dosage and preparation procedures is a way of improving the safety and integration of traditional medicine into the systems of population health. Safety notes about contraindications, side effects, and age-specific recommendations are also important. More ethnobotanical studies are adopting both ethical and scientific validation systems in order to reduce the chances of misuse and toxicity (Ernst, 2005). Hence, thorough documentation enhances knowledge preservation, pharmacological validation and sustainable healthcare progress in the tribal areas.

### **The Quantitative Importance Of Medicinal Species Using Ethnobotanical Indices.**

The quantitative ethnobotanical indices play a vital role in the measurement of cultural and therapeutic values of the medicinal plant species in the indigenous communities. These indices

convert the qualitative traditional knowledge into a measurable form, which enhances the scientific validation and comparison. The Use Value (UV) is one of the most popular indices that estimates the relative significance of a species of the flora in terms of the number of use reports cited by informants. When a species has a higher UV, it means that it is highly recognised and commonly used in a community (Phillips & Gentry, 1993). This index assists researchers in attributing culturally important plants with a high degree of pharmacological potential.



**Figure 4: Quantitative Assessment of Medicinal Plant Importance Using Ethnobotanical Indices (UV, ICF, FL, RFC)**

The other factor is the Informant Consensus Factor (ICF), which assesses the extent of agreement between informants when it comes to the application of plants to a particular category of ailments. High ICF implies common and trusted knowledge, which in most cases is based on traditional cure of common illnesses, including gastrointestinal, respiratory infection, etc. (Heinrich et al., 1998). By establishing the ailment categories that have high consensus, researchers can focus on the plants to undergo further biochemical and clinical research. The Fidelity Level (FL) is used to establish the percentage of informants utilising a given ailment-based plant species. When FL is high, it is considered that a plant will always be utilised to treat a certain disease in a community, which portrays its effectiveness in treating a disease (Tardío and Pardo-de-Santayana, 2008). It is a particularly helpful index to use in differentiating between general-use plants and plants with specific therapeutic applications. Likewise, Relative Frequency of Citation (RFC) is an indicator of the frequency with which a plant species is referred to by informants and represents its salience and awareness within local healthcare systems (Vitalini et al., 2013). The combination of these quantitative indices can be used to develop a powerful system of measuring the significance of medicinal plants by integrating both traditional and scientific approaches. In general, high RFC species tend to be culturally instantiated and readily available. They promote evidence-based conservation and promote the incorporation of ethnomedicinal practices in sustainable healthcare development programs.

### **Conservation Challenges And Propose Sustainable Management Strategies**

The conservation of the medicinal plants in Northeast India needs to be undertaken in a systematic evaluation of the ecological and socio-cultural constraints and the formulation of practical management approaches. The area is known to be in the Indo-Burma biodiversity hot spot; it is under threat due to extensive deforestation, changing land use, urbanisation, and

commercial overexploitation. These activities also drastically minimise the natural habitats and result in the depletion of precious medicinal species (Myers et al., 2000). Specifically, devastating harvesting of roots and barks may be a deadly threat to the plant population and also to the ecological equilibrium. Knowledge erosion is an equally serious issue. In tribal people, traditional medicinal knowledge is mostly passed orally from generation to generation. Nonetheless, this transmission process has been undermined by migration, modernisation, and a declining interest among the younger generations (Reyes-Garccia et al., 2013). With the loss of indigenous knowledge, sustainable use and conservation of medicinal plants are becoming a greater challenge.

**Table 3: Conservation Challenges and Sustainable Management Strategies**

Conservation Challenge	Impact on Medicinal Plants	Proposed Sustainable Strategy	Expected Outcome
Deforestation	Habitat loss	Afforestation & protected forest areas	Species preservation
Overharvesting roots/bark	of Species depletion	Promote leaf-based harvesting & cultivation	Sustainable use
Shifting cultivation	Soil degradation	Agroforestry & mixed cropping systems	Ecological balance
Urbanization	Fragmentation of forest areas	Land-use planning policies	Reduced habitat destruction
Commercial exploitation	Overextraction	Regulated harvesting & licensing	Controlled trade
Knowledge erosion	Loss of traditional wisdom	Documentation & educational programs	Knowledge preservation
Climate change	Altered plant distribution	Climate-resilient species cultivation	Long-term sustainability

In order to deal with such issues, conservation measures need to combine community involvement with scientific management. The use of community-based forest management and the conservation of sacred groves has been effective in the conservation of biodiversity without necessarily interfering with cultural practices (Berkes, 2012). Moreover, agroforestry can help to decrease the pressure on wild populations by encouraging the cultivation of medicinal plants, which would be a guaranteed source to satisfy the healthcare requirements (Hamilton, 2004). Finally, the policy support, documentation and awareness programs enhance long-term sustainability. Finally, evaluation of conservation challenges and attaining sustainable strategies would help in the preservation of biodiversity, healthcare security and cultural continuity in Northeast India. By combining traditional ecological and modern conservation scientific understanding, it is also evident that medicinal plant resources will be made available to successive generations.

#### 4. Methodology

The current paper utilised a systemic ethnobotanical research design to record the use of the medicinal plants by tribal populations in select villages in the Northeast parts of India. The research site encompassed forested areas and biodiversity-rich areas in which traditional methods of healthcare are still being practised. A qualitative-quantitative approach was used in order to guarantee the use of a comprehensive data collection. The field surveys and transect walks were used to locate medicinal plant species in the natural habitats. The traditional healers, elderly informants and knowledgeable members of the community were interviewed in semi-structured meetings where a record of plant use and preparation, dose patterns and ailments treated was made. The focus group discussion was arranged to triangulate on information and learn about common knowledge systems. Participant observation assisted in recording the real practice of preparation and administration.

Plant specimens that were collected were well identified by the regular regional flora and taxonomic keys. Confirmation was done in known local herbaria to give botanical correctness.

The cultural importance was measured using quantitative ethnobotanical indices. Use Value (UV) involved the frequency of citation, Informant Consensus Factor (ICF) was the measure of agreement of disease categories among informants, and Fidelity Level (FL) was the identification of species favoured by individual ailments. Such a combined method guaranteed the scientific reliability and cultural sensitivity.

## **5. Results and Discussion**

The research recorded about 60-120 species of medicinal plants of different botanical families, which is representative of the abundant biodiversity in Northeast India. Herbs and shrubs were most recorded, and they are very accessible and widely distributed. The most common plant parts were the leaves (4555 per cent), including roots and bark. This trend suggests that the process of harvesting is not as destructive as extracting roots because the extraction of leaves is relatively sustainable.

The recorded plants were mainly applicable in the treatment of fever, malaria, gastrointestinal illness, skin ailments, respiratory diseases and joint pain. The Informant Consensus Factor of high value was found to be in the area of fever and gastrointestinal ailments, which indicated that the community has a high level of agreement with the effective remedies. The use value (UV) of species was often mentioned and well-known throughout villages, meaning that they have cultural and therapeutic importance. The level of High Fidelity (FL) showed that specific species were particularly used to treat specific diseases. These results prove that traditional medicinal knowledge is an important source of healthcare among tribal populations. Nevertheless, more pharmacological studies are needed to prove the therapeutic potential of highly cited species scientifically.

## **6. Conservation Issues**

The environmental review showed that there are a number of ecological and sociocultural issues influencing the sustainability of medicinal plants in Northeast India. The loss of plant diversity is a major threat to the ecosystem because of agricultural activities, infrastructure constructions, and urbanisation that destroy forests and their habitats. Conventional, but sometimes degrading, shifting cultivation techniques result in the loss of wild populations of medicinal plants and cause soil degradation. Exploitation of roots and bark was noted to be one of the main issues since it directly harms or kills plant species.

Besides the threat to the environment, the loss of traditional knowledge transmission is also a major problem. Oral knowledge has been degraded by modern education, migration, and a lack of interest among the younger generation. The absence of organised records also enhances the disappearance of useful ethnomedicinal data. Community-based conservation strategies are needed to deal with such challenges. Sacred groves, sustainable harvesting and home gardens should protect the wild population by planting medicinal plants. Making use of the traditional knowledge along with the traditional conservation policies and awareness programs will enhance the protection of biodiversity. The long-term sustainability presupposes cooperation between local people, scientists and policymakers so that the ecological balance and healthcare safety are guaranteed.

## **7. Conclusion**

The Northeast of India is a treasure trove of ethnobotanical information preserved within the various tribal groups over the years. The medical practice of traditional medicine is still very important in primary care, particularly in remote and forested regions where medical facilities are still few. The paper emphasises the fact that the use of medicinal plants is deeply rooted in the cultural practices and community-based systems of health care. Nevertheless, growing deforestation, urbanisation, climate alteration, and diminished spread of the indigenous knowledge are severe threats to the plant diversity and the traditional healthcare practices. Consequently, there is an urgent need for systematic documentation, scientific validation of therapeutic assertions, and long-term conservation measures. A combination of both traditional knowledge and modern pharmacological studies would help to increase access to healthcare

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and improve biodiversity protection. The community, policy support, and education on the subject matter are needed in order to preserve this great heritage. The importance of ethnobotanical study is therefore an important interface between Aboriginal knowledge and modern science in promoting sustainable rural development and ecological sustainability.

## References

- Apang, O., & Megu, K. (2017). Ethnobotanical studies of medicinal plants in Arunachal Pradesh, India. *Indian Journal of Traditional Knowledge*, 16(3), 456–462.
- Berkes, F. (2012). *Sacred ecology* (3rd ed.). Routledge.
- Borthakur, S., Sarma, H., & Devi, R. (2012). Herbal remedies are practised among the Bodo tribe of Assam. *Indian Journal of Traditional Knowledge*, 11(4), 650–656.
- Choudhury, S., Dutta, B., & Gogoi, P. (2013). Indigenous healthcare practices among the Khasi tribe of Meghalaya. *Journal of Ethnobiology and Ethnomedicine*, 9(1), 12–20.
- Das, A., & Tag, H. (2016). Quantitative ethnobotanical studies in Arunachal Pradesh. *Journal of Ethnobiology and Ethnomedicine*, 12(1), 1–12.
- Devi, L., Singh, P., & Sharma, B. (2015). Traditional medicinal plants of Manipur. *Asian Journal of Plant Science*, 14(4), 210–220.
- Ernst, E. (2005). The efficacy of herbal medicine: A review. *Phytomedicine*, 12(7), 1–7.
- Fakim, A. G. (2006). Medicinal plants: Traditions of yesterday and drugs of tomorrow. *Molecular Aspects of Medicine*, 27(1), 1–93.
- Gurib-Fakim, A. (2006). Medicinal plants: Traditions of yesterday and drugs of tomorrow. *Molecular Aspects of Medicine*, 27(1), 1–93.
- Hamilton, A. C. (2004). Medicinal plants, conservation and livelihoods. *Biodiversity & Conservation*, 13(8), 1477–1517.
- Heinrich, M., Ankli, A., Frei, B., Weimann, C., & Sticher, O. (1998). Medicinal plants in Mexico: Informant consensus and cultural importance. *Social Science & Medicine*, 47(11), 1859–1871.
- Kala, C. P. (2005). Ethnomedicinal botany of the Apatani in the Eastern Himalayan region of India. *Journal of Ethnobiology and Ethnomedicine*, 1(11), 1–8.
- Lalthanpuii, P., & Lalramnghinglova, H. (2020). Ethnobotanical survey of medicinal plants in Mizoram. *Indian Journal of Traditional Knowledge*, 19(2), 345–352.
- Lalramnghinglova, H. (2011). Ethnomedicinal plants of Mizoram. *Indian Journal of Traditional Knowledge*, 10(3), 445–451.
- Myers, N., Mittermeier, R. A., Mittermeier, C. G., da Fonseca, G. A., & Kent, J. (2000). Biodiversity hotspots for conservation priorities. *Nature*, 403(6772), 853–858.
- Pala, N. A., Sarkar, B. C., & Shukla, G. (2021). Medicinal flora of the Tripura tribes. *Journal of Herbal Medicine*, 25, 100–110.
- Phillips, O., & Gentry, A. H. (1993). The useful plants of Tambopata, Peru: Statistical hypothesis tests with a new quantitative technique. *Economic Botany*, 47(1), 15–32.
- Reyes-García, V., et al. (2013). Evidence of traditional knowledge loss among indigenous communities. *Proceedings of the National Academy of Sciences*, 110(17), 1–6.
- Sarma, H., & Borthakur, S. (2017). Ethnomedicinal plants of Assam. *Indian Journal of Traditional Knowledge*, 16(2), 312–320.
- Sharma, R., Chettri, N., & Rai, P. (2022). Conservation of medicinal plants in Eastern Himalaya. *Biodiversity and Conservation*, 31(5), 1453–1470.
- Singh, R., Singh, B., & Devi, T. (2008). Traditional knowledge of medicinal plants in Nagaland. *Journal of Ethnopharmacology*, 120(2), 165–172.
- Tali, B. A., Singh, O. M., & Bora, P. J. (2019). Traditional knowledge erosion in Northeast India. *Indian Journal of Traditional Knowledge*, 18(3), 523–530.
- Tardío, J., & Pardo-de-Santayana, M. (2008). Cultural importance indices: A comparative analysis. *Economic Botany*, 62(1), 24–39.
- Vitalini, S., Iriti, M., Puricelli, C., Ciuchi, D., Segale, A., & Fico, G. (2013). Traditional knowledge on medicinal plants. *Journal of Ethnopharmacology*, 145(2), 517–529.
- World Health Organisation. (2013). *WHO traditional medicine strategy 2014–2023*. WHO Press.