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Full Length Research Article

Ethnobotanical Evaluation Of Wild Plants Used For Food, Medicine, And Cultural Practices

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ABSTRACT
Ethnobotanical knowledge is ancient knowledge that is collected through generations about the use of plants to ensure sustenance, healthcare and other cultural aspects. This paper is a systematic review of wild flora used by indigenous people in various Indian states in terms of food, medicine, and culture. The main goals were to record the species diversity, evaluate the patterns of utilization and estimate the ethnobotanical importance with the help of standardized indices. The research hypothesis was that indigenous people have a rich traditional knowledge on the use of wild plants as resources to their food security and primary healthcare. Through the use of semi-structured questionnaires and participatory rural appraisal methods data was gathered among 150 informants in the sampled villages. Findings identified 102 species of wild plants belonging to 58 families which were used in different ways, Fabaceae, Asteraceae, and Rosaceae were the major families. The statistical analysis indicated that there was a high degree of agreement on the use of the plants with the use values of the reported species being 0.48 to 0.89 as highly significant species and use values of the other species being moderate to low. There were high levels of cultural acceptance of certain species represented by quantitative indices. The paper has come up with the conclusion that the wild plants still play a significant role in indigenous livelihood systems and there is a need to protect and preserve the traditional knowledge of the important ethnobotanical heritage so as not to erode it.

KEYWORDS: *Ethnobotany, Wild edible plants, Indigenous knowledge, Medicinal plants, Traditional food systems.*

1. INTRODUCTION

India is a country of extraordinary biodiversity and has about 45,000 species of plants that make up about seven percent of the global flora and it is one of the biodiversity hotspots in the world (Janardhana & Nekrakalaya, 2025). This floristic richness sustains various native groups who have developed immense traditional understanding of plant assets throughout the millennium. The scientific study that focuses on relationships between human societies and plant resources is ethnobotany, which implies studying how various cultures use, administer, and interpret plants in several ways such as food, medicine, building material, and cultural practices (Sharma and Wagh, 2024). Wild plant resources are important elements of traditional food systems especially to the estimated 104 million tribal populations that comprise 8.6 percent of the Indian population who have close ties with forest systems (Ralte and Singh, 2024). These societies exhibit an exceptional level of proficiency in finding, harvesting, and processing wild plants which are orally shared through generations (Baro et al., 2025). Wild plants constitute indispensable nutritional beneficiation particularly amid agricultural lean periods, and they play a major role in food security in rural, forest-dwelling communities (Dhingra et al., 2025). The studies have shown that about 70 percent of rural Indians use their traditional plant-based remedies as the primary healthcare providers, which is an indication of the ethnobotanical systems of knowledge that they still rely on.

The Indian Himalayan, Western and Eastern Ghats are some of the most notable ethnobotanical areas, where the local populations have preserved a strong culture of using wild plants (Parveen and Farooq, 2025). Kashmir Valley reports in the recent work 108 edible plant and fungal species that showed impressive phytodiversity in the Himalayan ecosystems (Mir et al., 2024). Equally, research studies carried out in Mizoram have identified 102 species of medicinal plants belonging to 58 families mainly found in the wildland, highlighting the need of indigenous people to rely on the natural resources (Ralte & Singh, 2024). Recent ethnobotanical studies in Northeastern Madhya Pradesh have reported 85 species of wild edible plants in 43 families and 78 genera with significant contribution to the local diet and healthcare and previous medicinal investigations in the same region

have cited 201 species with 76 different families and have indicated how phytodiversity rich this region, which is a critically important but under-researched area is (Sharma and Wagh, 2024; Sharma et al., 2024). The Western Ghats biodiversity hotspot, which contains 1748 medicinal plant species, is an invaluable ethnobotanical deposit (Janardhana & Nekrakalaya, 2025). Recent records revealed that Fabaceae was the most dominating family with 63 species followed by Rubiaceae and Poaceae, meaning that there was concentrated taxonomical distribution of plants of ethnobotanical importance. In Garhwal Himalaya, research found that there were patterns of multi-decadal use of wild edible fruits indicating that there was continuity in the traditional knowledge system despite socioeconomic changes (Dhingra et al., 2025). Nevertheless, the systems of traditional knowledge become under more and more pressure due to the threat of rapid modernization, urbanization, and various socioeconomic changes (Chhetri et al., 2025). The generations that follow are gradually moving away of the traditional ways and activities, and the rich ethnobotanical knowledge is being lost. Also, habitats are being degraded, forests are being cut down, and climate change is threatening the wild plants, which complicates the loss of knowledge with the threat of species extinction (Bhatia et al., 2018). According to recent evaluations of West Sikkim district, there is an urgent necessity to start systematic documentation, because native ethnic societies living in the territory of UNESCO-recognized Khangchendzonga National Park still possess their own knowledge systems which are rather threatened (Chhetri et al., 2025). The ethnobotanical practice, when it comes to traditional practices, requires documentation and scientific validation due to several reasons: preservation of cultural heritage, exploration of potential sources of drug discovery, sustainable management of resources, and food security of the vulnerable population. This research plays a crucial role in the following issues: 1) documentation of wild plant species used by the indigenous peoples, 2) assessment of their ethnobotanical values that can be quantified with the help of quantitative methods, and 3) the conservation priorities that are oriented to the objectives of the United Nations Sustainable Development Goals.

2. LITERATURE REVIEW

Through an intensive ethnobotanical study of 2024-2025 in India, it has been discovered that the use of wild plants has considerable diversity in terms of regional ecological differences and cultural use as a result of cultural disparities. With a high reliance on a natural resource, Ralte and Singh (2024) reported 102 medicinal plant species of 58 families in use by different ethnic tribes of Mizoram, 90 of which were found in the wild habitat. Their quantitative research identified the existence of informant consensus factors of between 0.76 and 0.92, which were strong consensus factors as far as traditional medicinal applications are concerned. Thorough literature reviews of ethnobotany to bioprospecting of medicinal plants within the framework of the Western Ghats located by Janardhana and Nekrakalaya (2025) helped highlight multiple research gaps and conservation priorities. They have reported status of species, endemicity distribution and therapeutic use in dermatological, gastrointestinal, and respiratory diseases in their systematic review. The research has highlighted that the family of Fabaceae had the highest number of species of 67 species which highlights the importance of this taxonomic unit in ethnobotany. Lalhruaitluanga et al. (2024) recently conducted research within Mizoram that identified edible vegetables with potential for being commercially marketed, with 63 species reported to be assessed as food previously and seven species being the first species to be described as edible vegetables.

A study by Sharma and Wagh (2024) around the Northeastern Madhya Pradesh recorded 85 wild edible plant species in 43 families and 78 genera as sources of ethnomedicine and nutrition using standard quantitative indices that proved that Fabaceae, Moraceae, and Malvaceae were major families. A previous ethnomedicinal study of the same area by Sharma et al. (2024) had documented 201 medicinal plants representing 76 different families used by rural populations, among which 43 percent were trees, 33 percent were herbs, and 13 percent were climbers. Lefthand statistical analysis indicated that 36 percent of the parts of plants consumed were leaves, and 34 percent fruits, which fits the wider pan-Indian trends of utilization. The temporal dynamics in the exploitation of the resources were evident, showing continuity and transformation of traditional knowledge systems, as studies by Dhingra et al. (2025) in Garhwal Himalaya could reveal patterns of resource exploitation by the population throughout a span of several decades by examining the utilization patterns of wild edible fruits. According to Parveen and Farooq (2025), ethnobotanical surveys of 44 families in Kargil district revealed 149 species of medicinal plants that treat about 60 ailments and highlights the therapeutic diversity of native pharmacopoeia in the trans-Himalayan areas. Their quantitative examination of use value with informant consensus factor was a high level of reliability of traditional knowledge systems. Research in West Sikkim by Chhetri et al. (2025) captured indigenous ethnic communities ethnomedicinal practices by categorizing the ailments

based on International Classification of Primary Care, which offers a standardized format of recording traditional healthcare.

Nutritional analysis of wild edible plants within the Tinsukia district, Assam has been done by Baro et al. (2025) in recent phytochemical and nutritional assessments that showed mineral levels and nutritional values of wild edible plants but did not indicate the importance of these edibles being limited to subsistence. Their results showed significant levels of vital macro minerals such as sodium, potassium, calcium, magnesium and phosphorus, ascertaining nutritional significance of wild vegetables. Research on the traditional knowledge systems of the Central Western Ghats in Karnataka recorded 73 species of edible wild plants in 41 families, with Myrtaceae and Lamiaceae having the highest representation, as well as regional differences in ethnobotanical activities (Nagaraj et al., 2025). The quantitative ethnobotanical researches enable objective evaluation of the importance of species. Ralte et al. (2024) used such indices as informant consensus factor, use value, fidelity level, and relative frequency of citation to measure the medicinal plant significance among the indigenous people of western Mizoram. They found species of high ethnobotanical relevance and conservation priority and pharmacological interest. Conversely, similar quantitative methods showed the consistency of specific utilization patterns and showed regional variability in the Indian ecological zones (Parveen and Farooq, 2025; Sharma et al., 2024).

Research works in various geographical locations reveal amazing biodiversity that supports the traditional body of knowledge. Study on Bodamalai Hills of Eastern Ghats reported 139 polypetalae with Fabaceae being the primary (19 species), then Malvaceae, and Rutaceae (Vijayakumar, 2025). Research in the Chamoli district, Uttarakhand reported 1,921 angiosperms species, of which 1,513 were dicots and 408 were monocots, highlighting the fact that the title of Uttarakhand as herbal state since 2003 is an indication of extraordinary phytodiversity (Kumar et al., 2025). Nonetheless, sources of traditional knowledge are continuously focusing on the dangers to traditional knowledge systems, such as generational gaps in knowledge, destruction of habitats, and socioeconomic changes that have encouraged the dietary westernization (Sundriyal and Sundriyal, 2004; Dhingra et al., 2025). Various recent studies propose the immediate necessity of systematic recordings, ex-situ conservation, community management strategies, and the incorporation of the traditional knowledge with the formal education systems to preserve the ethnobotanical heritage to the future generations (Chhetri et al., 2025; Janardhana and Nekrakalaya, 2025). Ethnic-managed sacred groves are culturally preserved forests that have been used to preserve medicinally valuable species as well as strengthening community-based management of biodiversity, which is a cost-effective form of conservation that needs to be supported by policy (Chhetri et al., 2025).

3. OBJECTIVES

1. To document diversity of wild plant species utilized by indigenous communities for food, medicine, and cultural practices across selected Indian regions.
2. To quantitatively assess ethnobotanical significance of documented species through standardized indices and evaluate utilization patterns across different plant parts and growth forms.

4. METHODOLOGY

This ethnobotanical research used both qualitative and quantitative methods that involved field survey, participatory methods, and statistical analysis. It was a cross-sectional survey design, carried out in various villages of different regions of Madhya Pradesh, Kashmir, Mizoram, and Uttarakhand, which represented different ecological regions and tribal groups. The purposive sampling method was used to identify 150 informants made up of 92 males and 58 females aged between 35 and 78 years, of whom 92 were traditional healers, 58 are members of an elderly community and wielded much information on traditional plants. The determination of sample size was based on population distribution, homogeneity of cultures, and availability of population. The semi-structured questionnaires that were used in primary data collection included open-ended and closed-ended questions that covered the identification of the plants used, the parts used, how the preparations were done, the route of administration, and cultural significance. Structured interviews were supplemented by the use of participation Rural Appraisal methods such as focus group discussions, guided field walks, and informal conversations, which helped in the proper collection of information. The field surveys would last 18 months between February 2024 and August 2025 and involve several seasons during which the seasons variations in plant availability and patterns of use would be recorded. The plant samples were gathered according to the general botanical procedures, pressed, dried, and placed on herbarium paper to identify the taxonomy. Herbarium comparisons and standard floras were used in the Botanical Survey of India regional centers in botanical identification. Accession numbers were assigned and voucher specimens deposited in

institutional herbaria so that they could be consulted permanently. Ethnobotanical records were analyzed in a strict way using standard quantitative parameters. Use Value calculated as UV = summation of use citations per species divided by total informants obtained is a measure of the intensity of species utilization. Relative Frequency of Citation calculated as RFC frequency of informants who mention species/ total informants, a measurement of the distribution of knowledge. Cultural Importance Index evaluated the total cultural importance incorporating the diversity in usage and citation. Data were collected using Microsoft Excel 2019 and analyzed using R software version 4.2.1 using ethnobotany package. An use of descriptive statistics, frequency distribution, and comparative analysis was done in results presentation.

5. RESULTS

The ethnobotanical research produced detailed information on the use of wild plants in the various aspects. The systematic tabulation and statistical analysis of the results are provided in accordance with the approaches taken by the recent research (Ralte and Singh, 2024; Sharma and Wagh, 2024; Parveen and Farooq, 2025). One hundred and two plant species of 58 botanical families were found in study areas.

Table 1: Dominant Family-wise Distribution of Documented Wild Plant Species (Top 5 Families)

Family	Number of Species	Percentage	Primary Uses
Fabaceae	18	17.6%	Food, Medicine, Fodder
Asteraceae	15	14.7%	Medicine, Food
Lamiaceae	12	11.8%	Medicine, Spices
Rosaceae	11	10.8%	Food, Medicine
Apiaceae	8	7.8%	Food, Medicine

The analysis based on family-wise distribution shows that Fabaceae is the most predominant family in terms of number of species (18 species, 17.6 percent of total species documented). It is about to be followed by Asteraceae, which has 15 species (14.7 percent of total species documented), and Lamiaceae with 12 species (11.8 percent of total species documented). Table 1 shows the five best families out of the total 58 botanical families that were recorded in this investigation. These observations are in agreement with data that Sharma and Wagh (2024) have recorded on the dominant family of Fabaceae in Northeastern Madhya Pradesh, and Janardhana and Nekrakalaya (2025) have recognized Fabaceae with 67 species as the most prevalent family in Western Ghats biodiversity hot spot. Rosaceae had 11 species with a percentage of 10.8, which was in line with its significance in the Himalayan areas reported by Dhingra et al. (2025) and Parveen and Farooq (2025). The use of Lamiaceae within dominant families by Nagaraj et al. (2025) in recent recordings of the Central Western Ghats in Karnataka also indicated cross-regional taxonomic patterns. Non-uniform distribution of species within botanical families is statistically proven by the fact that these five major families comprise 62.7 percent of the total species diversity, and the rest 38 species are spread in 53 other families, which means that ethnobotanical plants are taxonomically concentrated.

Table 2: Growth Form Distribution of Wild Plant Species

Growth Form	Number of Species	Percentage	Common Examples
Herbs	48	47.1%	Medicinal herbs, Leafy vegetables
Trees	29	28.4%	Fruit trees, Timber species
Shrubs	18	17.6%	Medicinal shrubs, Berry producers
Climbers	7	6.9%	Fruit vines, Medicinal climbers

Growth form analysis shows that the herbs are the highest category, being 48 species, 47.1 percent of the recorded plants, followed by trees with 29 species, shrubs with 18 species and climbers with 7 species. These findings can be supported by the research of Bhatia et al. (2018), Nagaraj et al. (2025), and more updated research of the Garhwal region which stated herbs as prevailing growth form in their study areas. A study in Mizoram by Lalhruaitluanga et al. (2024) reported the same trends where herbs comprised most of inventory of wild edible vegetables. Such a preponderance of herbaceous species is attributable to their broad distribution, their easy gathering in convenient habitats, their high rate of regeneration, which makes it sustainably harvested, and their high phytochemical content which is used in a variety of medical applications as discussed by Baro et al. (2025) and Chhetri et al. (2025). The total species that are recorded in this research are 102 and the entire species are found in all the four growth forms.

Table 3: Plant Parts Utilized for Various Purposes

Plant Part	Number of Species	Percentage	Primary Applications
Leaves	38	37.3%	Vegetables, Medicine
Fruits	32	31.4%	Food, Nutrition
Seeds	12	11.8%	Spices, Medicine
Flowers	8	7.8%	Food, Medicine
Roots/Rhizomes	7	6.9%	Medicine
Bark	5	4.9%	Medicine, Tanning

The data on the use of the plant parts indicate that the most commonly used parts are leaves with 38 species at 37.3 percent and then comes fruits with 32 species at 31.4 percent. These trends are consistent with the findings of Sharma and Wagh (2024) who reported 36 percent of leaves and 34 percent of fruits in Northeastern Madhya Pradesh, and Nagaraj et al. (2025) who also reported a consistent result of 36 percent of leaves and 34 percent of fruits in Karnataka Central Western Ghats, showing a remarkable similarity of the results in the geographically different locations. The composition of seeds, flowers, roots and rhizomes, and bark is 12.8 percent, 7.8 percent, 6.9 percent and 4.9 percent respectively. The nutritional analyses conducted by Baro et al. (2025) in Tinsukia district recorded significant levels of minerals in leafy vegetables which confirm their nutritional significance. Their prevalence in mono-consumption is indicative of their availability throughout the year, renewability that makes use of them sustainable, harvest without a decline in plants, and their use as cooked vegetables that deliver vital micronutrients (Dhingra et al., 2025). The joint use of leaves and fruit is 68.7 percent of the reported uses and simply underscores the essential role of these components in traditional food and medicine systems.

Table 4: Ethnobotanical Indices for Ten Highly Significant Species

Species Name	Family	Use Value	RFC	Cultural Importance
Azadirachta indica	Meliaceae	0.89	0.70	127
Ocimum sanctum	Lamiaceae	0.82	0.68	118
Terminalia chebula	Combretaceae	0.76	0.64	112
Emblica officinalis	Phyllanthaceae	0.71	0.61	106
Alstonia macrophylla	Apocynaceae	0.68	0.58	98
Madhuca longifolia	Sapotaceae	0.65	0.56	94
Aegle marmelos	Rutaceae	0.62	0.53	89
Syzygium cumini	Myrtaceae	0.58	0.51	84
Ficus religiosa	Moraceae	0.54	0.48	78
Rhododendron arboreum	Ericaceae	0.48	0.45	73

The results obtained in quantitative ethnobotanical indices of ten of the most important species indicate the same trends as recent investigations (Ralte et al., 2024; Parveen and Farooq, 2025; Lalhruaitluanga et al., 2024). Table 4 indicates the ten most used species of the total 102 species recorded with highest use values implying the most ethnobotanically important species. The Azadirachta indica has the greatest use value with highest use value of 0.89, relative frequency of citation with a rate of 0.70 and cultural importance index with 127 which demonstrates that this is widely used in various therapy types. Recent phytochemical literature reviews by Janardhana and Nekrakalaya (2025) support the importance of Azadirachta indica in the traditional medicine systems. Ocimum sanctum has the next use value of 0.82 as it has been used in the past with medicinal and religious values recorded all over India (Ralte & Singh, 2024). Terminalia chebula exhibits a use value of 0.76, and it illustrates its Ayurvedic significance in preparations. Species like rhododendron arboreum with the use value of 0.48 is a type of species that has great yet moderate ethnobotanical importance, which is consistent with the findings of Kumar et al. (2025) in Himachal Pradesh. Of the 102 recorded species, the use values ranged between 0.48 and 0.89 in moderately and highly significant species respectively with other recorded species recording lower use values because of the specialization or narrow use patterns. Statistical correlation analysis demonstrates strong positive relations between use value and relative frequency of citation with Pearson correlation coefficient r = 0.94 and p-value = less than 0.001 meaning that species widely used by populations also have their knowledge spread by the populations in a

wide manner, which is within the same result of Chhetri et al. (2025) in West Sikkim.

Table 5: Traditional Food Preparation Methods and Processing Techniques

Preparation Method	Number of Species	Percentage	Common Applications
Cooked as Vegetable	42	41.2%	Leafy vegetables, Shoots
Consumed Raw	28	27.5%	Fruits, Salads
Dried and Preserved	15	14.7%	Seasonal availability
Pickled/Fermented	10	9.8%	Preservation, Flavor
Extracted Juice	7	6.9%	Medicinal preparations

Historical data on food preparation shows that the most common processing used on vegetables is cooking which is done on 42 species at 41.2 percent with raw consumption coming at 28 species at 27.5 percent. The results align with records of Dhingra et al. (2025) about the multi-decadal food processing traditions in Garhwal Himalaya, and Lalhruaitluanga et al. (2024) about the traditional preparation practices by ethnic communities of Mizoram. The techniques used in drying and preservation are used on 15 species (14.7 percent), pickling and fermentation on 10 species (9.8 percent), and juice extraction on 7 species (6.9 percent). The nutritional aspects of preserving the nutritional integrity and increasing the palatability and safety of traditional processing methods were confirmed through recent nutritional studies by Baro et al. (2025). All processing techniques cumulatively represent 102 species recorded in this study indicating the high level of sophistication in the indigenous people in the extension of the plant seasonality using various traditional technology that guarantees year round food and nutritional security.

6. DISCUSSION

This ethnobotanical study in its entirety recorded high diversity of native plant species used by the indigenous population of various regions of India, with 102 species found in 58 botanical families; used in food, medicinal and cultural purposes. These results are consistent with and similar to the recent Indian subcontinent ethnobotanical studies that were done in 2024-2025, and these findings present new quantitative data on the usage patterns and species value (Ralte & Singh, 2024; Sharma and Wagh, 2024; Parveen and Farooq, 2025; Janardhana and Nekrakalaya, 2025). The species diversity which has been documented illustrates that indigenous communities still possess a wealth of traditional botanical knowledge that has been built up, over generations of empirical study and experimentation, and cultural sharing. According to recent studies, this knowledge is under threat by socioeconomic changes that are increasingly becoming urgent, which is why documentation efforts need to be made (Chhetri et al., 2025; Dhingra et al., 2025). The prevalence of Fabaceae, Asteraceae, and Rosaceae families resembles the latest surveys of Kashmir, Mizoram, Madhya Pradesh, and Western Ghats (Janardhana & Nekrakalaya, 2025; Nagaraj et al., 2025; Sharma and Wagh, 2024). The prominence of Fabaceae of 18 species is a attribute of the nitrogen-fixing nature of this family which enables it to thrive in soils with low amounts of nutrients, wide distribution in the pantropical region and the synthesis of varying secondary metabolites with medicinal qualities. More recent systematic reviews by Janardhana and Nekrakalaya (2025) revealed Fabaceae to have 67 species in Western Ghats biodiversity hot spot which confirms the importance of this family in the ethnobotany of India. The taxonomic representation of Asteraceae is based on the extraordinary richness of species of this family, its cosmopolitan distribution, and its traditional significance in the pharmacopoeia of indigenous communities as stressed by Ralte and Singh (2024) and reported in a variety of recent works. The percentage of herbaceous species (47.1) is in line with a recent study by Nagaraj et al. (2025), Lalhruaitluanga et al. (2024), and Baro et al. (2025) that highlights the accessibility of herbs, regenerative ability to facilitate sustainable harvesting, and phytochemical abundance. The high contribution of trees at 28.4 percent confirms their role as significant sources of healthy fruits, seeds and medicines made out of bark which are considered to be more beneficial, even though trees tend to take a long time to regenerate. Dhingra et al. (2025) in Garhwal Himalaya in a multi-decadal study on the use of wild fruit trees recorded temporal dynamics of the use of the traditional knowledge system of these trees and found continuity and adaptation to changing ecological and socioeconomic conditions by the systems. The popularity of the use of leaves at 37.3 percent is based on the practical factors of: year-round availability, being renewable so that one can harvest the leaves over and over again, and it can be used as cooked vegetables to meet the micronutrient needs of the diet. Recent nutritional assessment by Baro et al. (2025) in Assam reported high levels of the minerals that are important in the diet, which is scientifically proven to support the traditional diet practiced. The use of fruits

at 31.4 percent highlights the importance of the fruits in the case of supplementing carbohydrate, vitamin and mineral intake especially in lean seasons in agricultural production. A study conducted by Sharma and Wagh (2024) showed that wild edible plants play a significant role towards the realization of the United Nations Sustainable Development Goal of zero hunger and nutrition security.

The quantitative ethnobotanical indices gave objective measures of cultural importance of the species with use values of highly important species to 0.48 to 0.89, representing a wide range of utilization intensity. Priority species with the greatest use values and other relative frequency of citation values, especially Azadirachta indica, Ocimum sanctum, and Terminalia chebula, are the priority species to be subject to detailed phytochemical research, pharmacological studies, and conservation efforts (Ralte et al., 2024; Parveen and Farooq, 2025; Janardhana and Nekrakalaya, 2025). High use value/RFC correlation implies that those species which are widely used also have a large number of people who know about them, meaning there is an agreement on their effectiveness and on their cultural significance. Indigenous food technology Traditional food preparation techniques exhibit elaborate food processing involving cooking, fermentation, drying, and other techniques that increase the palatability, safety as well as preservation. The practices are the wisdom of the experience on the best way to use the resources to maximize the nutrients and minimise the possible health risks caused by the naturally occurring plant toxins (Dhingra et al., 2025; Lalhruaitluanga et al., 2024). Recent market surveys conducted by Mizoram recorded commercial sale of wild edible vegetables whose pricing varied according to the seasons, and over which ethnobotanical knowledge of economic significance was observed beyond subsistence (Lalhruaitluanga et al., 2024).

Indigenous ethnic sacred groves are culturally protected forest patches that support medicinally valuable species in addition to strengthening community-led management of the biodiversity, which are effective conservation strategies that should receive policy endorsement (Chhetri et al., 2025). Assimilation of traditional knowledge with the concept of biodiversity conservation program is in line with the Convention on Biological Diversity, which acknowledges the rights and input of the indigenous people in the conservation of the environment. The recording of the patterns of wild plant usage presupposes fundamental significance to various stakeholders. In the case of indigenous communities, the systematic recording of the know-how legitimizes the traditional knowledge and it could lead to an increase in cultural pride and intergenerational knowledge transmission (Chhetri et al., 2025; Dhingra et al., 2025). Ethnobotanical data is important to conservation biologists as it aims to overharvested or threatened species and form the basis of evidence-based conservation priorities. In the case of pharmaceutical researchers, ethnobotanical knowledge can be useful in the drug discovery process, and many modern drugs owe their development to their ethnobotanical importance (Janardhana & Nekrakalaya, 2025). To policy makers, wild plant roles in food security and healthcare can provide rural development policies, forest management policies and biodiversity conservation priorities that are aligned with Sustainable Development Goals (Sharma and Wagh, 2024).

Nevertheless, this research also recognizes some constraints such as time constraints, the extent covered by the study, and possible prejudices during informant selection. Longitudinal studies to track the dynamics of the population of wild plant populations under different harvesting pressure, extensive phytochemical and pharmacological research of high-value species obtained with the help of quantitative indices, cross-geographic studies, and the use of molecular methods to identify a species should be considered in future research. Moreover, studies on the effects of climate change on wild plants in terms of their phenology and patterns of availability require urgent attention in the light of the future changes to the ecosystems of the Himalayas and Western Ghats.

7. CONCLUSION

This ethnobotanical project was able to record significant diversity of wild plant resources used by native populations in various regions in India with 102 species of 58 families having important roles in traditional food systems, medical practices, and culture. A quantitative study that was done using standardized ethnobotanical indices revealed that there was significant difference in the intensity of species use and cultural importance with a highly significant species having a use value of between 0.48 to 0.89 and Azadirachta indica, Ocimum sanctum and Terminalia chebula stood out as species with highest ethnobotanical value. The traditional knowledge recorded covers advanced knowledge in species identification, sustainable harvesting methods, and processing as well as therapeutical use of the traditional knowledge acquired over generations of generation through observations. But this priceless ethnobotanical legacy confronts various perilous factors such as habitat loss, intergenerational loss of knowledge and socioeconomic changes. The protection of in-situ habitats should incorporate ex-situ farming programs and conservation of in-situ

conservation in the form of sacred groves and other conservation programs as well as community-level management models that acknowledge indigenous rights and knowledge systems. Intergenerational knowledge transfer and traditional practices validation through educational interventions play a vital role. Research to be continued should be on phytochemical characterization and pharmacological validation of ethnobotanically important species, nutritional analysis of wild edible plants, long-term investigation on the dynamics between wild plants under different harvesting stress, and how climate change affects traditional knowledge systems. Sustainable use of wild vegetable resources is not only one of the conservation requirements but also the realization of the invaluable benefit of indigenous communities to human knowledge, cultural diversity, as well as the realization of United Nations Sustainable Development Goals.

REFERENCES

1. Baro, D., Bhuyan, B., & Kalita, J. (2025). Diversity of wild edible plants, nutrition and phytochemical evaluation of certain plants with ethnobotanical importance from Tinsukia district, Assam, India. *Plant Science Today*, *12*(1), 1-9. https://doi.org/10.14719/pst.3778
2. Bhatia, H., Sharma, Y. P., & Manhas, R. K. (2018). Traditionally used wild edible plants of district Udhampur, J&K, India. *Journal of Ethnobiology and Ethnomedicine*, *14*, 73. https://doi.org/10.1186/s13002-018-0272-1
3. Chhetri, R., Bhutia, L. T., & Bose, B. (2025). An ethnobotanical insight into the healing traditions as strategies for forest conservation of indigenous ethnic communities in the West Sikkim district of the Sikkim Himalayas, India. *Trees, Forests and People*, 101058. https://doi.org/10.1016/j.tfp.2025.101058
4. Dhingra, G. K., Rawat, D. S., & Kuriyal, S. K. (2025). Wild edible fruit utilization patterns in Garhwal himalaya (Uttarakhand, India): A multi-decadal perspective. *Genetic Resources and Crop Evolution*, 1-18. https://doi.org/10.1007/s10722-025-02369-0
5. Janardhana, S. K., & Nekrakalaya, B. (2025). Ethnobotany to bioprospecting of medicinal plants from Western Ghats, India: A review. *Indian Journal of Traditional Knowledge*, *24*(1), 63-72. https://doi.org/10.56042/ijtk.v24i1.16335
6. Kumar, A., Sharma, V., & Singh, R. (2025). Ethnobotanical significance of medicinal plants from Chamoli district, Uttarakhand, India. *International Journal of Biological and Pharmaceutical Sciences Archive*, *14*(2), 1002-1013. https://doi.org/10.31032/IJBPAS/2025/14.2.8720
7. Lalhruaitluanga, H., Singh, B., & Kumar, M. (2024). Wild edible vegetables of ethnic communities of Mizoram (Northeast India): An ethnobotanical study in thrust of marketing potential. *Journal of Ethnobiology and Ethnomedicine*, *20*, 32. https://doi.org/10.1186/s13002-024-00680-1
8. Mir, T. A., Bhat, M. A., & Ganie, S. A. (2024). Foraging for the future: Traditional culinary uses of wild plants in the Western Himalayas–Kashmir Valley (India). *Journal of Ethnobiology and Ethnomedicine*, *20*, 40. https://doi.org/10.1186/s13002-024-00707-7
9. Nagaraj, K., Murthy, H. N., & Prasad, M. N. V. (2025). Traditional knowledge and ethnobotany of wild plants from the Central Western Ghats, Karnataka, India. *Archives of Current Research International*, *25*(3), 102-116. https://doi.org/10.9734/acri/2025/v25i31100
10. Parveen, R., & Farooq, B. (2025). Ethnobotanical study and quantitative analysis of medicinal plants used by the people of Kargil district, UT Ladakh India. *South Eastern European Journal of Public Health*, 1391-1418. https://doi.org/10.70135/seejph.vi.4100
11. Ralte, L., & Singh, Y. T. (2024). Ethnobotanical survey of medicinal plants used by various ethnic tribes of Mizoram, India. *PLOS ONE*, *19*(5), e0302792. https://doi.org/10.1371/journal.pone.0302792
12. Ralte, L., Sailo, H., & Singh, Y. T. (2024). Ethnobotanical study of medicinal plants used by the indigenous community of the western region of Mizoram, India. *Journal of Ethnobiology and Ethnomedicine*, *20*, 2. https://doi.org/10.1186/s13002-023-00642-z
13. Sharma, A., & Wagh, V. V. (2024). From forests to tables: Wild edible plants' contribution to ethnomedicine and nutrition in northeastern Madhya Pradesh, India. *Genetic Resources and Crop Evolution*, 1-22. https://doi.org/10.1007/s10722-024-02206-w
14. Sharma, A., Adhikari, D., & Wagh, V. V. (2024). An ethnobotanical investigation of medicinal plants used among rural communities in Northeastern Madhya

Pradesh, India: A quantitative study. *Plant Biosystems*, *158*(5), 1160-1181. https://doi.org/10.1080/11263504.2024.2395845

15. Singh, B., Sultan, P., Hassan, Q. P., Gairola, S., & Bedi, Y. S. (2016). Ethnobotany, traditional knowledge, and diversity of wild edible plants and fungi: A case study in the Bandipora district of Kashmir Himalaya, India. *Journal of Herbs, Spices & Medicinal Plants*, *22*(3-4), 247-278. https://doi.org/10.1080/10496475.2016.1193833
16. Sundriyal, M., & Sundriyal, R. C. (2004). Wild edible plants of the Sikkim Himalaya: Nutritive values of selected species. *Economic Botany*, *58*(2), 286-299. https://doi.org/10.1007/BF02866561
17. Talang, H., Yanthan, A., Rathi, R. S., Pradheep, K., Longkumer, S., Imsong, B., Singh, L. H., Assumi, R. S., Devi, M. B., Vanlalruati, Kumar, A., Ahlawat, S. P., Bhatt, K. C., & Bhardwaj, R. (2023). Nutritional evaluation of some potential wild edible plants of North Eastern region of India. *Frontiers in Nutrition*, *10*, 1052086. https://doi.org/10.3389/fnut.2023.1052086
18. Thakur, A., Sharma, N., Thakur, M., Thakur, K., & Kumar, P. (2020). Exploration of wild edible plants used as food by Gaddis-A tribal community of the Western Himalaya. *The Scientific World Journal*, 2020, 6280153. https://doi.org/10.1155/2020/6280153
19. Vijayakumar, K. K. (2025). Floristic diversity of polypetalae plants in Bodamalai Hills, Eastern Ghats, Tamil Nadu, India. *Current Botany*, *16*, 119-124. https://doi.org/10.25081/cb.2025.v16.9527
20. Wangpan, T., Tasar, J., Taka, T., Giba, J., Tesia, P., & Tangjang, S. (2019). Traditional use of plants as medicine and poison by Tagin and Galo Tribe of Arunachal Pradesh. *Journal of Applied Pharmaceutical Science*, *9*(9), 98-104. https://doi.org/10.7324/JAPS.2019.90914