

Assessment of Non-Timber Forest Products (NTFPs) and Their Impact on Livelihoods in the Nagpur District of Maharashtra, India



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ABSTRACT

Non-timber forest products (NTFPs) are an integral part of forest ecosystems in the forest-rich Nagpur District of Maharashtra, significantly enhancing the livelihoods of populations that rely on forests for their sustenance. The current study assesses the variety of NTFPs, their usage patterns, and their relative significance to household income in a subset of the district's forest-fringe villages using structured field surveys and in-person interaction with residents. The record also includes seasonal availability trends, traditional harvesting methods, and indigenous knowledge, all of which have a significant impact on household reliance, resource sustainability, and involvement in regional NTFP markets. To prioritize conservation initiatives, promote site-specific planning, and develop livelihood-oriented forest management methods tailored to the socio-ecological context of Nagpur's forest landscapes, the results provide crucial baseline data. In the study area, 63 plant species were identified by the survey as widely accessible and frequently utilized NTFPs. Of them, 29 species (46.03%) serve mainly as food sources, 35 species (55.56%) have established medicinal value, 19 species (30.16%) facilitate commercial and revenue-generating operations, and 7 species (11.11%) are utilized for household and construction tasks. These findings demonstrate that the usage of local resources is dominated by edible and medicinal NTFPs, highlighting their crucial significance in primary healthcare, nutritional security, and additional revenue for rural households in Nagpur District. However, a significant portion of households depend on these non-timber products as sustainable substitutes for timber extraction, which lessens the strain on forest wood resources and advances more general ecosystem conservation objectives. Overall, the evaluation shows that this varied portfolio of NTFPs greatly enhances socioeconomic stability and livelihood resilience. It emphasizes the necessity of encouraging community-based conservation, value addition, and scientifically supported sustainable harvesting methods to ensure both long-term resource availability and fair income opportunities.

Keywords: Non-timber forest products (NTFPs), Livelihood security, Forest-dependent communities, Medicinal Plants, Sustainable resource use, Nagpur district, Maharashtra, India.

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Introduction

A key element of forest ecosystems, non-timber forest products (NTFPs) are essential to the livelihoods of populations that depend on forests. In areas like the forested areas of Maharashtra's Nagpur District, NTFPs offer essential resources for food, traditional healthcare, household needs, and financial revenue. The district's varied woodland environments sustain a variety of plant-based products that can be collected with little ecological damage, preserving biological diversity and forest cover. In order to create inclusive rural development strategies and science-based, community-oriented forest management plans, it is essential to comprehend the availability, usage patterns, and livelihood relevance of these resources.

A wide range of biological materials derived from forests without the removal of trees are referred to as non-timber forest products.

These materials include edible fruits, leafy vegetables, seeds that give oil, spices, medicinal herbs, roots, bark, fibers, resins, gums, honey, bamboo, and grasses. Unlike lumber, these products typically enable forests to meet daily subsistence demands while maintaining their species richness and structural integrity ^[1]. NTFPs are widely acknowledged as essential safety-net resources that diversify livelihood portfolios, increase household income, and lessen vulnerability in economically disadvantaged communities that depend on forests. Furthermore, NTFPs frequently have significant cultural and ceremonial value, and their prudent management can concurrently support locally led conservation governance, climate-resilient livelihoods, and biodiversity conservation. The market value, accessibility, and availability of non-timber forest products (NTFPs) influence usage patterns. While some very inexpensive things are gathered only for subsistence, others fetch higher prices and serve as significant sources of income for rural households.

According to recent estimates, around 131 of the more than 3,005 forest-based goods that have been documented globally have demonstrated commercial potential, highlighting the growing economic significance of non-wood forest resources in both domestic and global markets^[2].

NTFPs are the foundation of pastoral livelihoods in tropical and subtropical areas [3, 4, 5, 6]. A recent global assessment estimates that 503 million people who reside in or near forest landscapes directly depend on non-timber forest products for daily food security, basic healthcare, and additional income [7]. Smallholder farmers, landless workers, and Indigenous communities are among this diverse group, for whom NTFPs provide an essential safety net at times of crop failure, price shocks, or seasonal unemployment. NTFPs are a major source of income for many indigenous and tribal tribes of India, where over half of the population lives in rural areas [8]. The dependency is particularly high in parts of central India, like Maharashtra, where forest ecosystems provide a range of plant resources.

Nagpur District, which lies in eastern Maharashtra, is known for its vast expanses of tropical dry deciduous forest and rich floral diversity. This terrain includes a large number of forest-fringe settlements, whose inhabitants rely mostly on non-timber forest products for home usage, traditional healthcare needs, subsistence food needs, and cash-income creation [9, 10, 11, 12, 13]. NTFPs frequently offer a vital safety net during times of economic hardship and agricultural off-seasons, lowering vulnerability among rural households.

In history, non-timber resources were given little consideration in Indian forest management, which prioritized timber exploitation, particularly during the colonial era. Historically, sustainable forest plant gathering and efficient medical use were guaranteed by traditional knowledge systems. However, younger community members are less aware of the effectiveness of medicinal plants due to restrictive forest laws and a decline in intergenerational information transfer [14].

The National Forest Policy of 1989 represented a significant shift in policy by giving NTFPs precedence for improving the socioeconomic conditions of forest-dependent people before their utilization as industrial raw materials [15, 16]. According to later research, tribal-dominated forest areas in India account for approximately 73% of NTFP collection, underscoring the significance of these areas both economically and culturally^[17].

Non-timber forest products (NTFPs) are essential to maintaining household income and food security in forest-dependent areas. NTFPs are important sources of building materials, edible goods, traditional herbal treatments, and marketable commodities for tribal and other rural people, according to field evidence. This ongoing reliance on forest-based products emphasizes how crucial they are to the sustainability of livelihoods and emphasizes how urgent it is to improve effective conservation and management techniques to ensure long-term socioeconomic and ecological benefits in Nagpur District.

Material and Methods

Study Area:

The present research was conducted in the eastern region of Maharashtra, Central India, in the Nagpur District. Ramtek, Umred, Kalameshwar, Katol, Kamptee, Kuhi, Narkhed, Nagpur, Nagpur Rural, Parseoni, Bhiwapur, Mouda, Saoner, and Hingna are the 14 talukas that make up the political division of the Nagpur district (Fig.1) (Fig.2).

The district is located between latitudes 21°07'11" and 21°33'19" N and longitudes 78°45'17" and 79°19'23" E. The district's overall size is roughly 9,997 km², with tropical dry deciduous forests making up the majority of its topography. The region's elevation ranges from roughly 271 to 639 meters above mean sea level (MSL), which supports a variety of forest resources and flora types.

The state forest department oversees the forest divisions of Nagpur District, which collectively cover a registered forest area of roughly 31,309 ha and include revenue, protected, and reserved forests. A wide variety of non-timber forest products, such as edible fruits and seeds, medicinal herbs, leafy vegetables, fibers, resins, and gums that may be collected without significant canopy removal, are supported by these settings. The inhabitants of many forest-fringe settlements, which are located inside or close to these forests, rely largely on NTFPs for both financial support and sustenance needs. The main sources of income for these communities are forest-based businesses, wage labor, and small-scale agriculture; NTFPs serve as a crucial safety net against disruptions to food security and income.

Methods of Data Collection:

The experiment had been conducted over an eighteen-month period from January 2024 to June 2025 to capture seasonal fluctuations in NTFP availability and collection procedures. To record species diversity, usage patterns, and the extent of livelihood dependency on NTFPs, a thorough field survey was conducted in a few Nagpur District forest-fringe villages.

Household surveys, partially structured interviews, and interactive conversations with residents actively involved in NTFP collecting were used to acquire primary data. Local guides, elders, and young people with extensive traditional knowledge of forest resources were part of the survey crew, which contributed to the validation of local names and species identification. These interactions enabled thorough documentation of commonly used NTFPs, their seasonal availability, harvesting and processing techniques, and specific subsistence or commercial usage.

To complement field observations, secondary data were collected from forest department records, reports, published literature, and pertinent government papers. To ensure representation across socioeconomic classes, a straightforward random sample procedure was used to choose respondents from the examined villages.

183 people involved in NTFP collection were interviewed; approximately 23 respondents were chosen from each research village. A structured questionnaire was used to collect detailed information on age, gender, educational status, landholding size, social group, years of experience in NTFP collection, product categories and quantities harvested, household consumption levels, income contribution, and access to markets and intermediaries. To evaluate the impact of NTFPs on livelihood security, income diversification, and the general level of forest dependence among households in Nagpur District, the generated dataset was methodically assembled and examined.



Fig 1: Map of Maharashtra State, India

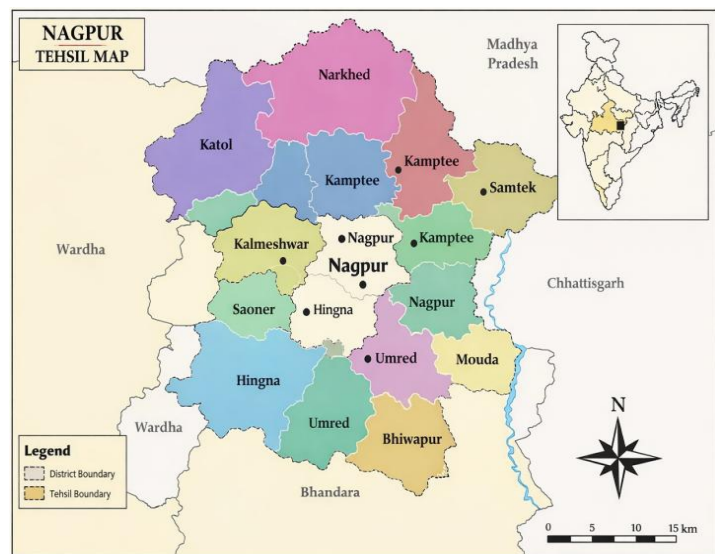


Fig 2: Map Showing Nagpur District

Result and Discussion

The survey found 63 non-timber forest product (NTFP) species in the forest-fringe villages of Nagpur District, indicating the great diversity and multipurpose use of local forest resources by nearby residents. Based on their major usage, these species were divided into four functional categories: edible, medicinal, commercial, and construction-related (Table-1) (Table-2). With 29 species (46.03%), edible NTFPs made up the biggest group, highlighting the vital role forests play in augmenting household diets, especially during times of agricultural scarcity; the primary edible components were fruits, leaves, seeds, and subterranean tubers. 35 species (55.56%) were found to be used medicinally, suggesting a heavy dependence on traditional phytotherapeutic knowledge and restricted access to professional healthcare facilities in several localities. 19 species (30.16%) were associated with commercial use, which helped diversify lifestyles and generated extra income through unofficial and local markets. In comparison, just 7 species (11.11%) were collected primarily for domestic and construction uses, indicating somewhat less direct strain on timber resources and structural wood, even though these goods are still necessary for basic housing and household needs (Fig.3) (Fig.4).

Table 1: Use Category Distribution of NTFPs in Nagpur District

Use Category	Number of Species	Percentage (%)
Edible	29	46.03
Medicinal	35	55.56
Commercial	19	30.16
Construction/Household	7	11.11
Total documented NTFPs	63	-

Table 2: An Account of Edible Wild Plants Documented from Forest Dwellers Settled in the Study Area

Sr. No.	Botanical Name	Family	Local Name	Parts Collected	Edible	Construction / Household	Commercial	Medicinal	Seasonal Availability
1	<i>Acacia catechu</i>	Mimosaceae	Khair	Stem bark		✓	✓	✓	Throughout year
2	<i>Achyranthes aspera</i>	Amaranthaceae	Kutri	Seeds	✓			✓	Winter
3	<i>Aegle marmelos</i>	Rutaceae	Bel	Fruits	✓			✓	Summer
4	<i>Agaricus sp.</i>	Agaricaceae	Yeru satya	Fruiting body	✓			✓	Monsoon
5	<i>Alangium salvifolium</i>	Alangiaceae	Akawal	Fruits	✓			✓	Summer
6	<i>Aloe vera</i>	Liliaceae	Korphad	Leaves	✓		✓	✓	Throughout year
7	<i>Alternanthera sessile</i>	Amaranthaceae	Galighosh	Leaves	✓			✓	Monsoon-Winter
8	<i>Amorphophallus campanulatus</i>	Araceae	Suran	Tuber	✓			✓	Winter
9	<i>Annona squamosa</i>	Annonaceae	Sitaphal	Fruits	✓		✓	✓	Winter
10	<i>Azadirachta indica</i>	Meliaceae	Kadunimb	Leaves, Seeds			✓	✓	Summer
11	<i>Bauhinia purpurea</i>	Caesalpiniaceae	Kanchan	Flowers	✓			✓	Winter
12	<i>Boerhavia diffusa</i>	Nyctaginaceae	Punarnava	Leaves	✓			✓	Monsoon

13	<i>Buchanania cochinchinensis</i>	Anacardiaceae	Charoli	Seeds	✓		✓	✓	Summer
14	<i>Careya arborea</i>	Lecythidaceae	Kumbhi	Fruits	✓	✓		✓	Summer
15	<i>Carissa carandas</i>	Apocynaceae	Karvanda	Fruits	✓			✓	Monsoon
16	<i>Cassia fistula</i>	Caesalpiniaceae	Bahava	Flowers	✓		✓	✓	Summer
17	<i>Cassia tora</i>	Caesalpiniaceae	Tarota	Leaves	✓			✓	Monsoon
18	<i>Coccinia grandis</i>	Cucurbitaceae	Kundru	Fruits	✓			✓	Monsoon
19	<i>Colocasia esculenta</i>	Araceae	Alu	Leaves, Corm	✓			✓	Monsoon
20	<i>Commelina benghalensis</i>	Commelinaceae	Kena	Leaves	✓			✓	Monsoon
21	<i>Cordia dichotoma</i>	Boraginaceae	Bhokar	Fruits	✓		✓	✓	Summer
22	<i>Curcuma longa</i>	Zingiberaceae	Halad	Rhizome	✓		✓	✓	Winter
23	<i>Cymbopogon nardus</i>	Poaceae	Gavti chaha	Leaves			✓	✓	Monsoon
24	<i>Dendrocalamus strictus</i>	Poaceae	Bamboo	Young shoots	✓	✓	✓		Monsoon
25	<i>Dioscorea alata</i>	Dioscoreaceae	Matalu	Tubers	✓			✓	Winter
26	<i>Diospyros melanoxylon</i>	Ebenaceae	Tendu	Fruits, Leaves	✓		✓	✓	Summer
27	<i>Emblica officinalis</i>	Euphorbiaceae	Amla	Fruits	✓		✓	✓	Winter
28	<i>Ficus racemosa</i>	Moraceae	Umbar	Fruits, Bark	✓			✓	Summer
29	<i>Grewia asiatica</i>	Tiliaceae	Phalsa	Fruits	✓		✓	✓	Summer
30	<i>Holarrhena pubescens</i>	Apocynaceae	Kutaj	Flowers				✓	Summer
31	<i>Lantana camara</i>	Verbenaceae	Ghaneri	Fruits	✓			✓	Winter
32	<i>Limonia acidissima</i>	Rutaceae	Kawath	Fruits	✓			✓	Winter
33	<i>Lygodium flexuosum</i>	Polypodiaceae	Jatashankar	Leaves	✓			✓	Monsoon
34	<i>Madhuca longifolia</i>	Sapotaceae	Mahua	Flowers, Seeds	✓		✓	✓	Summer
35	<i>Mangifera indica</i>	Anacardiaceae	Aam	Fruits	✓		✓		Summer
36	<i>Marsilea quadrifolia</i>	Marsileaceae	Jal bhaji	Leaves	✓			✓	Monsoon
37	<i>Momordica dioica</i>	Cucurbitaceae	Katwel	Fruits	✓			✓	Monsoon
38	<i>Moringa oleifera</i>	Moringaceae	Shevaga	Pods, Leaves	✓		✓	✓	Winter
39	<i>Musa paradisiaca</i>	Musaceae	Kela	Fruits	✓		✓		Throughout year
40	<i>Nymphaea pubescens</i>	Nymphaeaceae	Kamal	Rhizome, Flowers	✓			✓	Monsoon
41	<i>Ocimum tenuiflorum</i>	Lamiaceae	Tulsi	Leaves				✓	Throughout year
42	<i>Oroxylum indicum</i>	Bignoniaceae	Tetu	Flowers	✓			✓	Summer
43	<i>Phoenix sylvestris</i>	Arecaceae	Shindi	Fruits, Leaves	✓	✓	✓		Summer
44	<i>Pithecellobium dulce</i>	Mimosaceae	Chichbili	Fruits	✓			✓	Summer
45	<i>Semecarpus anacardium</i>	Anacardiaceae	Bibba	Fruits			✓	✓	Monsoon
46	<i>Syzygium cumini</i>	Myrtaceae	Jambhul	Fruits, Bark	✓		✓	✓	Monsoon
47	<i>Tamarindus indica</i>	Caesalpiniaceae	Chinch	Fruits	✓		✓	✓	Winter
48	<i>Terminalia bellerica</i>	Combretaceae	Behada	Fruits	✓		✓	✓	Winter
49	<i>Termitomyces sp.</i>	Lyophyllaceae	Bhombodi	Fruiting body	✓			✓	Monsoon
50	<i>Trapa natans</i>	Trapaceae	Shingada	Fruits	✓		✓		Winter
51	<i>Ziziphus mauritiana</i>	Rhamnaceae	Ber	Fruits	✓		✓	✓	Winter
52	<i>Morus alba</i>	Moraceae	Shetut	Fruits	✓		✓	✓	Summer
53	<i>Portulaca oleracea</i>	Portulacaceae	Ghol	Whole plant	✓			✓	Monsoon
54	<i>Bombax ceiba</i>	Bombacaceae	Kate savar	Flowers	✓	✓		✓	Summer
55	<i>Centella asiatica</i>	Apiaceae	Brahmi	Leaves	✓			✓	Monsoon
56	<i>Chenopodium album</i>	Chenopodiaceae	Bathua	Leaves	✓			✓	Winter
57	<i>Corchorus capsularis</i>	Tiliaceae	Jute bhaji	Leaves	✓	✓	✓		Monsoon
58	<i>Oxalis corniculata</i>	Oxalidaceae	Chukri	Leaves	✓			✓	Monsoon
59	<i>Smilax zeylanica</i>	Smilacaceae	Sherdi	Tendrils	✓			✓	Monsoon
60	<i>Borassus flabellifer</i>	Arecaceae	Tad	Fruits, Leaves	✓	✓	✓		Summer
61	<i>Bridelia retusa</i>	Euphorbiaceae	Kasai	Fruits	✓			✓	Winter
62	<i>Pergularia daemia</i>	Asclepiadaceae	Utaran	Fruits				✓	Winter
63	<i>Tamilnadia uliginosa</i>	Rubiaceae	Kala Fendra	Fruits	✓			✓	Summer
				Total	29	7	19	35	

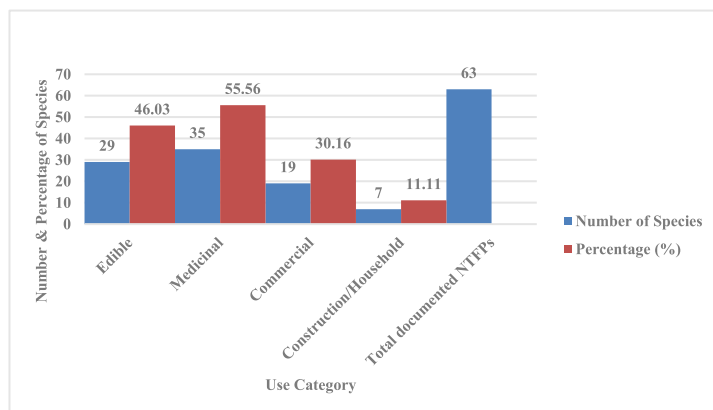


Fig 3: Distribution of NTFP Species by Use Category in Nagpur District

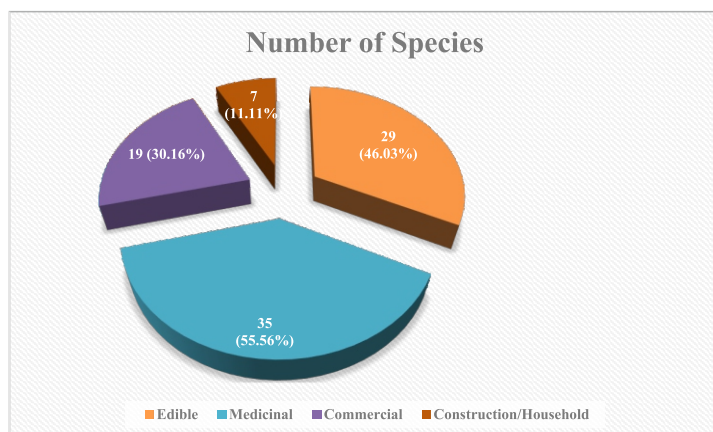


Fig 4: Percentage Distribution of NTFPs by Use Category in Nagpur District

Conclusion:

The present exploration points out how important non-timber forest products (NTFPs) are to the survival of populations in the Nagpur District of Maharashtra that depend on forests. Rural and tribal households rely heavily on NTFPs for food, traditional healthcare, and additional income due to their proximity to forest ecosystems and lack of alternative sources of income. The results verify that non-timber forest products serve as an essential socioeconomic safety net, especially for low-income households residing in and near forested areas. However, the advantages of NTFPs are still not uniform. Inadequate processing and storage facilities, weak and exploitative market connections, limited technical expertise, and wider social and economic marginalization are common challenges faced by collectors who rely largely on these resources. These limitations significantly limit their capacity to go beyond low-return, raw-material sales and fully realize the economic potential of harvested items. However, the district's reported diversity and quantity of NTFPs indicate significant unrealized potential for enhancing livelihoods through better resource management, value-addition projects, and fairer market arrangements. Enhancing NTFP-derived incomes while preserving resource sustainability and encouraging equitable benefit sharing among forest-dependent communities can be achieved by integrating market-oriented interventions, focused skill-development programs, and community-based forest management. According to the study, encouraging methodical, scientifically based harvesting practices can increase household incomes, create jobs locally, and lessen the strain on timber supplies.

Equitable access to NTFP-based benefits can be further enhanced by strengthening institutional support systems like cooperatives, self-help organizations, and Van Dhan-type value-addition centers, as well as by increasing community involvement and continuing capacity building. In general, maintaining forest ecosystems while boosting livelihood resilience and socioeconomic stability in Nagpur District requires the sustainable use of NTFPs, supported by supportive policy frameworks and ongoing research.

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