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Livelihood and Socio-Economic Challenges in Medicinal and Non-Timber Forest Product Management in India: A Review

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Abstract: Non-timber forest products (NTFPs), natural products, or wild forest products are raw materials widely used as sources of food ingredients, construction materials, gums, resins, fibers, and pharmaceuticals. NTFPs have always played a primary role in economies reliant on forest resources. An estimated 147 million people live in 170,000 villages in and around India's forests, with 275 million villagers relying heavily on the forest for their livelihoods. The medicinal plants available in the Himalayan region of India have huge international market demand and significant market value. Challenges in the Indian context, such as gender bias, overexploitation of resources, forest policies, and climate change, affect NTFP collection, environmental sustainability, and management. This study aims to present detailed research on NTFP resources in India and their role in the livelihood of the rural population in the country. A detailed discussion involves various factors and challenges affecting its extraction and management.

Keywords: non-timber forest products, forest, GDP, gender bias, economic growth.

印度藥用和非木材林產品管理的生計和社會經濟挑戰：回顧

摘要：非木材林產品、天然產品或野生林產品是廣泛用作食品成分、建築材料、樹膠、樹脂、纖維和藥品來源的原料。非木材林產品在依賴森林資源的經濟體中始終扮演主要角色。據估計，印度森林及其周圍的 17 萬個村莊居住著 1.47 億人，其中 2.75 億村民的生計嚴重依賴森林。印度喜馬拉雅地區的藥用植物具有巨大的國際市場需求和巨大的市場價值。印度面臨的挑戰，例如性別偏見、資源過度開發、森林政策和氣候變化，影響非森林林產品的收集、環境永續性和管理。本研究旨在詳細研究印度的非木材林產品資源及其在該國農村人口生計中的作用。詳細討論涉及影響其提取和管理的各種因素和挑戰。

关键词：非木材林產品、森林、國內生產毛額、性別偏差、經濟成長。

1. Introduction

Forests were the base for the livelihood of human beings in a time without civilization, and people did not know agricultural practices. The main requirement at that time focused on food products from the forest fulfilled by fruits, roots, honey, and hunting of animals.

With the building of society and when the world was at the threshold of civilization, the role of the forest changed drastically from a food supplier to an essential tool for economic and social growth [1, 2]. Before the Industrial Revolution, harnessing natural resources was the measure of economic growth. Today, if we talk about it through forest products, it will only marginalize the GDP share but can create a difference. Non-timber forest products (NTFPs) are available from plants and animals except for timber. NTFPs have an economic role for both poor and rich peoples, but speaking about the country, NTFPs play a critical role in many developing countries due to the higher concentration of the population directly relying on the forest. A report [3] revealed that in developing countries, NTFP products generate 20%–25% of income [3]. Given the geological conditions of some areas with mountainous terrain, insufficient agricultural land for growing crops, and difficult access, these areas rely heavily on forest products. Approximately 80% of the developing world's population depends on NTFP for their primary and dietary needs. The NWFP value worldwide in 2015 was USD 7.71 billion. The Global Forrest Experts Panel acknowledged the value of forests in ensuring human nutrition and food security.

Despite the differences on each continent, edible fruits and plants account for the largest share of the NWFP market, followed by ornamental plants (22%), wild meat (9%), miscellaneous plants (8%), and honeybees (7%) [4]. In the Indian context, as reported, around 50 million Indian tribals depend on NTFP to meet their livelihood and income needs [5]. This study presents the issues and challenges related to NTFP collection and management in India. An extensive literature survey considered the NTFP scenario in India and worldwide. The next section, followed by the literature review, discusses the methodology.

2. Methodology

Research on NTFP and their applications has been extensively published. Fig. 1 illustrates the suitable screening procedure used in the review approach for this research. The literature review set the study objective to identify the problems associated with NTFP extraction and management and present the related policies and laws.

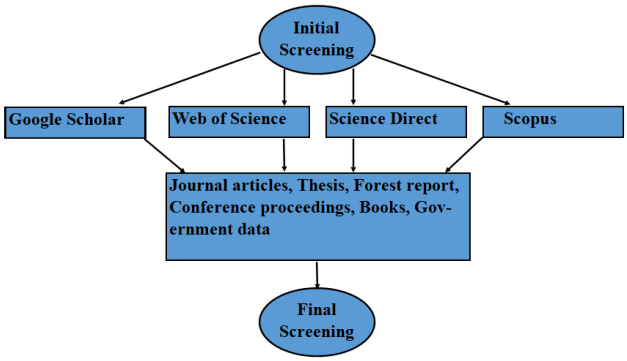

Fig. 1 Methodology of the current study

2.1. Initial Screening

In the initial screening, this article most frequently used the following keywords: "non-timber forest products," "Medicinal plants," "Indian forest resources," "Forest policy," "Himalayan Forest resources," "Marketing of forest products," and "Gender role in forest inhabitants." Numerous highly regarded research databases, including "Science Direct," "Web of Science," "Scopus," and "Google Scholar," have been investigated. Location, year, and article type were not limitations while looking for articles.

2.2. Final Screening

Based on the journal's indexing and review procedures, this article cited 64 references for this screening approach, including theses, conference proceedings, book sections, journal (research and review) articles, forest reports, and web pages. This review's main objective is to examine the livelihood and socio-economic issues that India's management of medicinal and NTFPs faces, including gender bias, forest policy, overexploitation, climate change, and marketing. In addition, this review covered the diverse uses of the NTFP for regional household income, medical purposes, the global market, and national GDP. Searching for specific keywords related to NTFPs yielded the research articles for this review. There are three sections in the NTFP review:

- NTFP World Scenario. This section provides a broad overview of NTFP use and its global application.
- The use of NTFP in India. This section includes the NTFP resources available in the country, their state-wise use, and role in livelihood.
- Challenges associated with NTFP collection, its sustainable use, and the dependence of livelihood on it. The challenges identified in the literature survey are gender bias, overexploitation, forest policies and certifications, climate change, and marketing.

This research examined 69 studies written between 1990 and 2022 and only 18 NTFP-related studies between 1990 and 2010. The NTFP relevance understood after 2010 caused the published research works. The data collected for the Scopus-indexed literature showed that research for the NTFP increased rapidly from 2010 to 2011, and then it has become nearly constant average data published per year around 50. This study did not limit itself to Scopus-indexed articles but also studied the published literature in other journals, books, papers, government data, and theses. This article also added some conference papers. After carefully reading each research article, a literature review involved each subsection of NTFP and its applications. The following sections discuss the usage and consumption of NTFPs globally and according to the Indian scenario.

3. World Scenario of NTFP Use

Approximately 1.6 billion people around the globe rely on NTFPs for their food and economy [5]. Research on NTFPs as a source of income and rural livelihoods has increased over the past few decades, with estimates placing the percentage of rural household income derived from NTFPs anywhere from 20% to 60% in communities located near forests around the world. Vietnam, a country in Southeast Asia, has a diverse forest reserve system with high species diversity [6]. There are over 12,000 species of vascular plants, 1,000 species of mosses, 2,500 species of algae, 826 species of mushrooms, 276 species of animals, 828 species of birds, 252 species of reptiles, 82 species of amphibians, 3,109 species of freshwater and saltwater fish, 1,340 species of insects [7, 8]. This NTFP reserve can contribute more to the country's natural resources and economic growth. Nepal's forests are vital to the economy of the rural areas. During times of food shortage, when grain stocks begin to deplete but a new harvest is not yet ready, wild food from the forest can supplement the diet of the rural people by filling their subsistence needs by providing fuelwood, feed, and waste. Many rural populations in Nepal now rely heavily on NTFPs for subsistence and income [9]. Communities in Nepal's outlying rural areas collect these NTFPs and sell them to traveling merchants; almost all of them are subsequently sent in their raw form to India, where they are refined and sold to other nations by Indian wholesalers [10]. The Himalayan region of Nepal is home to many medicinal plants that are effective in treating many illnesses, from diarrhea and skin conditions to coughs and colds, cuts and wounds, and fevers. Fig. 2 shows the mode of intake of these medicinal plants found as NTFP products in the Himalayan region of Nepal [11]. Data show that most medicinal plants can be taken in their raw form, i.e., making juice, decoction, and paste, which preserve its natural content and add good marketing value to local explorers.

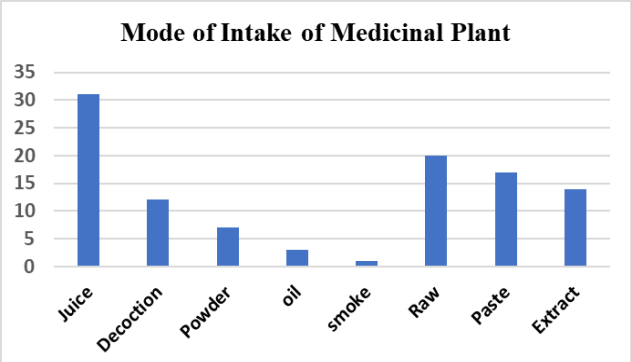

Fig. 2 Mode of intake of medicinal plants

Another Himalayan country, Bhutan, a country with a maximum area covered with mountain terrain, hosts 5500 species of vascular plants, 770 species of birds, and 165 species of mammals, with many endemic depending on the NTFP activities to cover its agricultural needs [12]. In Bangladesh, until the 1990s,' the collection and sale of NTFP products employed over 300,000 people, contributing 1.3 billion Bangladeshi takas to their national income [13]. Compared to the 1990s, the population in Bangladesh has increased exponentially; it is one of the most densely populated countries in the world, having over 150 million people, of which 40% are below the poverty line, depending heavily on NTFPs [14]. Bamboo is the most lucrative NTFP in annual household income, followed by wild vegetables and sungrass that, among these three NTFPs, produce nearly twice as much as wild vegetables or sungrass. Most people in Bangladesh now prefer home gardens because forest land is limited, and the agricultural area is shrinking daily for food security. Rattan, a forest product, is reported as Indonesia's most important NTFP used for furniture products due to the availability of abundant human resources trained in Rattan processing for furniture and potential markets [15]. Fig. 3 shows furniture made from rattan. These products are a source of livelihood for people, starting from their collection, distribution, and transportation to artisans, but also conserve the forest ecology. The Yunnan province in China, which is one of the most biodiversity places in the world, is blessed with 850 species of mushrooms out of 2000 species available in the world that are edible and harvested to a large extent, and there is an increase in their production and export value from 2001 by 37% and 18%, respectively [16]. As reported, most Ethiopians (more than 80%) rely on NTFPs for conventional medical care [17].

Fig. 3 Rattan product

Research conducted in the Southeast Asian country of Borneo showed that its residents once hunted wild boars and sambar deer and gathered wild fruits, firewood, vegetables, and mushrooms. Edible bird nests made from cave swiftlets, gaharu or fragrant wood, and ammar or resins from dipterocarp trees are among the most sought-after products collected for export [18]. The supply of food for livelihood from the forest is also the leading cause of exploring NTFPs. Fig. 4 shows some of the wild vegetables.

Fig. 4 Wild vegetables

Similarly, other parts of the globe recognize the importance of NTFPs, such as Africa [19], North America [20], and Europe [21]. However, the role of NTFPs in livelihood and their use as medicine and food is more in underdeveloped countries with large rural populations [22]. India has a large percentage of rural population, and there are many tribal areas where people still fight for their livelihood due to a lack of awareness of government aid and education. The following section highlights NTFPs in India.

4. India in the Use of NTFPs

India has the seventh spot on the list of countries by total land area, with 2.5% of the world's forest cover. Forests cover 706,820 square kilometers of India or 23.83% of its total land area [23]. NTFPs contribute US$2.7 billion to India's annual income, supporting over 55% of the country's forest sector employment. NTFPs provide significant household income to one-third of India's rural population [24]. India has NTFP products in almost every state, as shown in Fig. 5 as the state-wise availability of NTFPs [25]. Approximately 147 million people live in 170,000 villages in and around India's forests, and another 275 million villagers heavily depend on the forest for their livelihoods [26]. Most NTFP products in India are in the Himalayan region. Research [3] in the Kangchenjunga region, commonly shared by India, Nepal, and Bhutan, has concluded that over 377 species of NTFP are found in India and are used for livelihood and marketing as a medicinal plant and others [3]. The data reveals that most plant species grow between 1000 and 2000 m above sea level in the states of Himachal, Jammu and Kashmir (J&K), Uttarakh, and North India. Fig. 6 shows the data on the availability of NTFP species found ecologically based on the height from sea level.

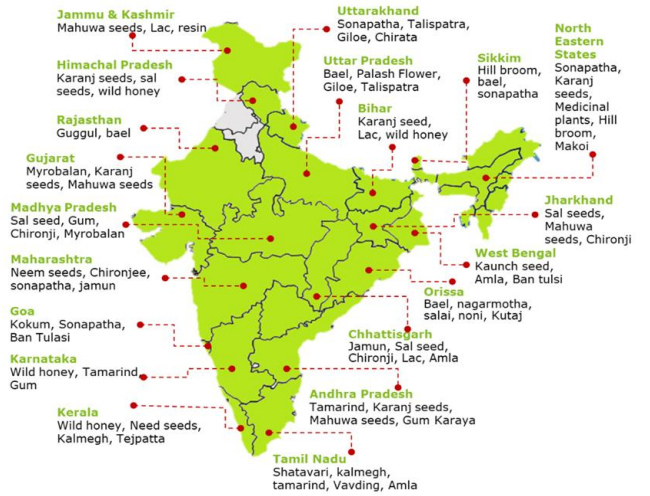

Fig. 5 State-wise availability of NTFPs in India

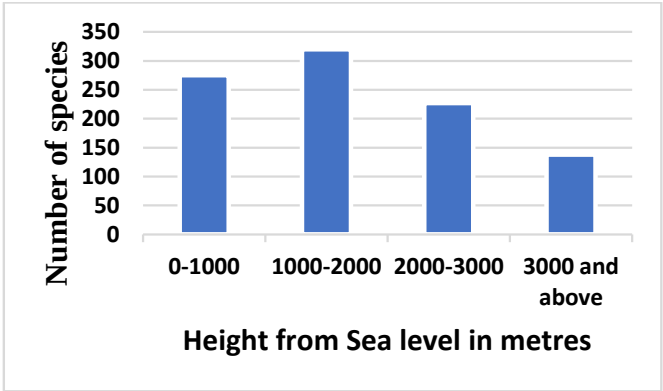

Fig. 6 Availability of plant species according to height from sea level

More than 60% of the population of India's J&K collects NTFPs for food, nutrition, medicine, income, and employment [27]. Himachal Pradesh, one of the Himalayan states in India, has a tremendous potential for NTFP, with 811 species under 18 different categories [28]. Taking medicinal plants as NTFP products, India has a very high percentage of medicinal plants out of total flora, about 44% of which is very high compared to the world average of 10-18% [29]. Himachal Pradesh offers a wide diversity of species, habitats, groups, populations, and ecosystems (300–7,000 meters above sea level). According to reports, Himachal Pradesh is home to approximately 3,400 plant species. Thousands of aromatic and medicinal plant species have been documented in the state's temperate forests, Shivalik highlands, and alpine and sub-alpine pastures [30]. Locals in the Nargu Wildlife Sanctuary in Himachal Pradesh (India) still rely on wild medicinal plants to treat many illnesses, assuming that effective conservation planning is necessary to safeguard these priceless plant species [31]. Traditional ethnoveterinary methods for caring for animals are as old as the domestication of livestock. They comprise traditional livestock care knowledge, beliefs, practices, and skills. Traditional medicines can significantly reduce costs when applied to cattle healthcare. Furthermore, they are easily accessible and cost-free in

our immediate surroundings [32]. Table 1 shows the different medicinal plants available in the Himalayan states of India.

Table 1 Medicinal plants in the Himalayan states of India

No.	Biological name	Local name	Part used	Medicinal use	Region	Source
1	Boerhavia diffusa L. (Nyctaginaceae)	Peelia	Roots	Jaundice	Uttrakhand	[33]
2	Alstonia scholars (L.) R. Br.	Devil's Tree	Bark	Skin Diseases	Arunachal Pradesh	[34]
3	Ajania tibetica	Tibetan Tansy	Leaves and flowers	Jaundice, bleeding nose	Lahual Spiti, Leh	[35]
4	Acorus gramineus Aiton	Japanese Sweet Flag	Roots and leaves		Arunachal, Sikkim	[36]
5	Alternanthera sessilis	Sissoo spinach, Brazilian spinach	Leaves		J&K	[36]
6		Yogeshwar	Roots, flowers	Fever, snakebite	Himachal, Uttrakhand	[37]
7	Berberis aristata	Dāruhaldhi	Roots	Bites of rats snakes; boils, eye complaints	Himachal Pradesh	[37]
8	Rosa brunonii Lindl.	Karer, Kuji, Kunja, Kuja, and Kwiala	Roots	Joint pain	Himachal Pradesh	[38]
9	Acantholimon lycopodioides	Long-zay	Flowers	Cardiac disorders	Leh	[39]
10	Angelica glauca Edgew	Chora, Choru, and Gandrayan	Roots	Bronchitis, constipation	Himachal Pradesh, J&K	[36]
11	Asparagus racemosus	Kurilo	Tuberous roots and leaves	Memory loss and fertility problem	Sikkim	[40]

Regarding the economy, Fig. 7 shows the top cash-generating states in India [41]. The maximum cash-generating state is Maharashtra, with 42,899 million rupees in NTFP collection. As day-by-day food demand in a country like India is increasing due to overpopulation, this data looks promising to overcome the problem of not only food but also unemployment. The government of India is looking for areas of improvement in NTFP collection, trading, and marketing for economic support at a lower level of society for their upliftment.

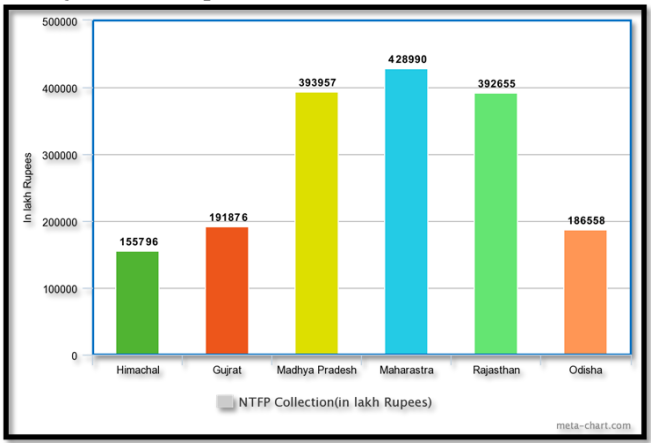

Fig. 7 Top NTFP cash-generating states in India

5. Challenges

NTFP collection and marketing have several challenges, which affect its processing and use. The following subsections discuss various challenges.

5.1. Gender Bias: Women's Participation

As for economic opportunities, such as the commercialization of NTFP, women are sometimes disadvantaged because of gender-differentiated responsibilities and rights. Women who rely on the NTFP trade, for instance, are often impoverished, uneducated, and even illiterate; as a result, they often face discrimination and other disadvantages that males do not face. The fact that they are often an unpaid member of family labor or an employee with no say over crucial operations also does not help matters. Such unseen women's labor is often underappreciated. Household and caregiving responsibilities often prevent women from actively participating in value chain activities or practicing in commerce as a career [42].

An annual value of approximately USD 700 million includes the items that women living in forests collect [43]. Animal hunting is a common source of NTFPs in rural Africa, where males do most of the hunting and females do most of the catching, butchering, transportation, processing, and storage of the meat. Sometimes, in urban African contexts, selling bushmeat is the only job available to women [44]. Regarding household income, it depends more on women than on men in rural and low-income families. For instance, a study in West Bengal, India, reveals that more than three times more women than men are indulging in NTFP collection, two times as many women as men are involved in the NTFP product selling in markets, and while men harvest 23 NTFP species, women harvest 71 NTFP species [12].

The workforce participation in Uttarakhand state of India by women in the rural district is higher than that in urban areas, as men have job opportunities on planes, and women have to work in forests and agricultural fields. However, these activities do not result in economic development because of landslides, deforestation, and over-exploitation of resources that caused the men to deploy to sustain a family income [45].

Women collect most forest products, such as those used for food and fuel, and play a crucial role in the collection, processing, and selling of NTFPs. NTFPs are typically sold at markets, and women play an essential role in gathering them. Timber, poles, and some medicinal plant collections are primarily men's work, while women collect some plants for medical purposes. Women are more likely to participate in the collection of NTFPs, such as Mahua flowers, Mahua seeds, Chironji, Jamun, and Olame, according to a study conducted in a region of the Maharashtra state of India. Men played a more significant role than women in the Hirada harvest, which included gathering Tendu leaves, tadi, and Rosha grass. Women are underrepresented in the NTFP industry as a whole [46]. Data from virtually all countries in Asia, Africa, and Latin America confirms the role of women in harvesting forest products. Researchers in Pakistan's NWFP found that women and children pick up 78% of the morel mushrooms [47]. Researchers found that while women and children undertake the bulk of the collecting and drying, men have a much bigger role in morel sales (53%). Similarly, children and women collect 90% of medicinal herbs, and all drying is done exclusively by women. Women and children sell about 71% of the herb, and men – 29%.

Giving more of a role to women in forest co-management increases their collective bargaining power. In rural India, collective bargaining is critical for women to have a stronger voice in managing resources, negotiating and enforcing rules and conditions for using community-controlled forests, and enforcing norms of behavior towards them [48]. In setting behavioral rules for community forests, women escape a situation of unreasonable expectations of forest use and extraction; norms that can turn women into criminals and threaten their ability to protect much-needed forest resources. In this respect, the state plays a significant role to play. Simply delegating responsibility to a group for the village forests does not ensure that women's interests are covered. Decentralization of decision-making in an unequal society does not automatically result in all parts of the population making decisions. The disempowered groups will more than likely continue to be deprived of any such process. In such a situation, it is essential to promote social institutions that actively give voice to the disempowered. Although these institutions must operate independently of the state, the state must be active in promoting its development. Contrary to current conceptions of the state's position, natural resource management cannot and should not be extracted fully from the state.

5.2. Overexploitation

Overexploitation is the excessive use of anything beyond its intended limits. People have exploited timber products for several reasons, such as fuelwood, construction, and household use. A study conducted in Myanmar found that the factors that affect the overexploitation of resources are poverty and fuelwood use by people without land for agriculture [49]. Several economists have recently regarded the production and marketing of NTFPs as a safer alternative to timber processing as a strategy for rural livelihood. Harvesting and selling NTFPs can achieve the dual objectives of conserving natural forests and generating income for the rural population [50]; however, the point remains the same. The main challenge faced due to NTFP collection and exploration is the overexploitation of forest resources, which is causing the degradation of ecology. A case study in the forest of Telangana state of India has revealed that unscientific extraction of non-timber forest products in the form of plants for medicines, spices, and other uses has caused rapid degradation of these species, which can further in the future become a reason for their extinction [51]. A study conducted in the poor state of Odisha in India has reported that the factors responsible for the overexploitation of forest resources are increasing population and unemployment in the region; however, poverty has an insignificant impact on overexploitation [52]. This type of problem can create an ecological imbalance. Excess demand for NTFPs inevitably results in unsustainable economic cycles of "boom and bust," increasing marginalization of rural communities, and over-exploitation of agricultural resources to the brink of extinction [53]. Overexploitation of NTFPs can be avoided, and local subsistence and cash income from NTFPs can be increased through development interventions if the site-specific role of NTFPs is studied and other factors inherent in NTFP–livelihood linkages are considered [14], especially true in areas with degraded forest resources. Considering the current environmental crisis and the worrisome global trend of deforestation, it is crucial to examine different forest management systems to comprehend their efficacy, benefits, and limitations. While protecting forests should be a top priority, so should ensure the long-term financial security of communities that depend on forest products for their livelihoods.

5.3. Forest Policies and Certifications

As the population increased in the twentieth century, the overexploitation of forest resources caused the implementation of forest policies, which also affected the extraction of NTFP; the problem has influenced the household income of poor people and mainly tribal communities, which has also affected their livelihood. The strategy also established the idea of national interest that, hence, prohibited the village community from using the forest and its products. More laws and regulations followed. The Conservation Forest Act of 1980 (Government of India) and the Wildlife Sanctuary Act of 1972 (Government of India) focused on protection and conservation. Threats of

eviction and harassment of forest people have increased under the name of preservation and conservation [54]. However, with time, the government in India felt this problem and modified its policy with more involvement of local forest peoples, stating the national forest policy under the National Forest Policy, 1988 and the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006, provides for the participation of citizens in forest growth and security. The fodder, fuelwood, and small timber requirements, such as building materials for families, tribes, and other villages living in and near the forests, should be regarded as the first charge on forest development. As one of the fundamentals of forest management, the policy paper expects that forest communities should be encouraged to associate with the growth and conservation of forests from which they derive benefit [55]. The international body Forest Stewardship Council (FSC) emphasizes the sustainable use of NTFP and certifies NTFP production. In 1999, the FSC started approving NTFP development for important NTFP-based products. The advantages of FSC certification include the largest global reach, primary certification globally, diversity in stakeholders, and approval and recognition by most NGOs and various agencies.

One of the challenges associated with FSC certification is a lack of data, knowledge, and documentation for most NTFPs regarding their overall procedure of production, marketing, and consumption. Further understanding of international laws, trade, and regulations also comes into the picture [56]. Agroforestry and farm forestry are encouraged through farm trees, afforestation, and reforestation of denuded or degraded forests, as well as other areas outside of forests, according to the National Agroforestry Policy 2014 (Government of India) and the proposed National Forest Policy 2018 in India [57]. In April 2018, Indian Prime Minister Mr. Narendra Modi introduced the Pradhan Mantri van Dhan Yojana (PMVDY), declaring that Van Dhan, Jan Dhan, and Govardhan would establish the foundations for future rural and tribal economic change. This initiative is in addition to the government's attempts to secure equitable returns to the tribal people via the MSP scheme for the NTFP. Under the Van Dhan Yojana, the government seeks to overcome gaps such as diminishing the region under the NTFPs because of timber-first policies. Because of their mutual inclusion and interdependence, sustainable conservation and local community livelihoods require strong policy and legal support to achieve optimal results.

5.4. Climate Change

The effects of climate change on agriculture, biodiversity, rural livelihoods, and food security can disrupt many of the mutual linkages between rural populations and natural resources (forests). The global temperature increased by 0.078 degrees Celsius last century and can rise by 0.3–4.8 degrees Celsius by the end of the 21st century. Long-term climate change affects the distribution of vulnerable natural resources such as biodiversity, forests, and water on a large scale [58]. Plants react to climate change in four ways: phenotypic plasticity (the ability of a species to adapt to various environments), evolutionary adaptation to new climates, migration to more favorable environments, and extinction. Climate change affects the nature of plant distribution along altitudinal, latitudinal, and longitudinal gradients, as well as the stages of their life cycle [58]. Climate change, along with human activities of deforestation and construction, causes either the extinction of some NTFP or the shifting of some species to a higher altitude or favorable natural conditions. A study [3] predicted the effect of climate change on such NTFPs as M. longifolia, B. lanzan, E. officinalis, T. bellirica, T. chebula, and S. urens found in the Madya Pradesh state of India using the MaxEnt model, predicting that these all species will shift to wetter forest land under climate change in the coming decades [3]. [59] surveyed the Chilapata reserve forest in West Bengal, India. The study from responses of the community concluded that the climate is changing, as well as the effects of climate change on their livelihood, as evidenced by indicators such as decreased fish catch, NTFP collection, and ill or unproductive cattle [59]. They feared that as their reliance on the forest for survival decreased, their drudgery and misery would increase. [60] studied the various factors responsible for forest vulnerability and climate change in India using several models and predicted a shift in forest biodiversity to wetter land by 2086.

5.5. Marketing

NTFPs collection and sale are significant ways to enhance the socioeconomic conditions of forest dwellers. Because it offers rural residents income security during lean agricultural seasons or crop failures, the marketing of NTFP products is crucial. Due to a lack of knowledge, cooperation, and coordination among stakeholders, there are many issues with the marketing of NTFPs. The medicinal plants, which are very costly, can be sold by increasing their shelf life by drying them using various techniques [61, 62]. Another big gap is that the NTFPs' trade system at the "key local market level" remains highly discriminatory to the tribals because when market prices seem spectacular, the cash that comes into the tribals' hands remains small, and a long chain of intermediaries reaps profits. The problem is that their market leverage capacity depends on what the tribal people get for what they earn. Many are individual small-time collectors who cannot obtain an enticing return, whereas a more structured lot may enter a broader market and have better prices. Decent returns

on NTFPs can go a long way in ensuring better livelihoods, mainly through value addition through processing. The marketing of NTFP also faces the problem of market demand and extraction of products; the two things should balance between overexploitation and shortage of supply. [63] proposed a mathematical model for this problem, which includes when and how a forest manager wants to control the exploitation of resources, depending on his objective role. A forest manager may have one of several goals, such as optimizing forest returns, optimizing the scenic environment, maximizing social welfare, or minimizing conflict. A study conducted in the Jammu region reported that several obstacles prevent the marketing of NTFPs [64]. According to the collectors, these obstacles include a lack of/poor quality/unorganized markets for NTFPs, improper material weighting, price fluctuations, and a lack of awareness regarding collection. We can conclude that NTFP trade faces risks and challenges because it only leads to short-term returns rather than sustainable businesses.

6. Conclusion

Even though NTFPs have the potential to reduce poverty, improve livelihoods, and promote environmental sustainability, there is evidence to assume that their potential influence on household income should not be exaggerated. This is crucial because landowners who collect NTFPs live in substandard conditions without access to the most basic healthcare and educational facilities. NTFPs represent a substantial proportion of forestry sector revenues and provide jobs and subsistence for large indigenous tribal groups in tropical countries. Therefore, the NTFPs need more support from economists and foresters. Studying the NTFP's economic value requires determining its economic importance. In addition to highlighting their economic value, the NTFP valuation will enable resource managers and policymakers to decide between different forest uses and how to choose the best combination of timber and NTFPs sustainable and profitable over time. It is also necessary to examine the sustainability of the NTFP's economic value since the economic value of NTFP alone is not enough to propose its future utility. The involvement of women as NTFP collectors cannot be neglected as a significant role in their economic development, and they should be encouraged to play a more active role in marketing and policymaking. The large international market for medicinal plants available in the Himalayan region of India is necessary to explore. Knowledge of its identification and cultivation needs preservation by establishing state-of-the-art institutes for its study. Policymaking and awareness of NTFP extraction, which generates the scope for employment, should be encouraged more because of issues such as overexploitation, climate change, and knowledge of proper marketing channels. The academic contribution of the present study is to impart a state-of-the-art literature review on different challenges associated with NTFP collection and how NTFP can be used as a source of income and generate employment in a country such as India, where most live in rural areas. Few review articles discuss these areas in the context of Indian NTFP resources. The limitation of this study is that the literature review presented here uses secondary data from earlier published articles, government sources, and websites. The one-to-one interaction based on the open-ended questionnaire will give the actual picture of the problem related to the current study.

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