

Research paper

# Non-Timber Forest Products Enterprises in Pakistan: Opportunities, Challenges and Pathways to Sustainable Development

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## ABSTRACT

Non-Timber Forest Products (NTFPs) play a pivotal role in sustaining the livelihoods of rural communities in Pakistan, particularly in mountainous regions where they contribute significantly to household income generation and local economic stability. This review synthesizes existing literature on NTFP enterprises in Pakistan, highlighting their diversity, economic potential, and role in advancing sustainable development. Pakistan's diverse ecosystems support a wide array of NTFPs, including medicinal plants, mushrooms, fruits, nuts, honey, and fibers. Key production areas including Swat, Mansehra, Sharan Valley, the Himalayan region, Ayubia National Park, Chitral, and the Indus Basin (encompassing flood-prone areas in Punjab and parts of Sindh) yield substantial harvests. Species such as *Saccharum munja*, *Typha latifolia* and *Eucalyptus camaldulensis* are widely used in construction and cottage industries. Additional opportunities exist in Punjab for mushroom cultivation and in the coastal mangroves of Sindh for fiber and medicinal resources, whereas Baluchistan's arid zones, though poorly documented, feature species such as *Nannorrhops ritchiana*, and *Ephedra nebrodensis*. Opportunities for enterprises in Pakistan include access to export markets generating millions in foreign exchange, domestication and cultivation, and value addition through processing—which can enhance rural incomes by 10-50% while supporting biodiversity conservation. However, the challenges of unsustainable harvesting leading to 60-70% product losses (Latif and Shinwari 2005), market monopolies dominated by middlemen, lack of infrastructure, overexploitation, and climate-induced vulnerabilities like floods and shifting plant phenology—pose serious threats to resource sustainability and community welfare. For sustainable development, this review emphasizes community training, regulated harvesting, market linkages, policy reforms, and gender-inclusive approaches that balance economic benefits with ecological preservation. By addressing these priorities, NTFP enterprises can foster inclusive growth, reduce poverty, and promote forest conservation in Pakistan. This review provides a comprehensive framework for future policy and research emphasizing integrated management for long-term sustainability. Its significance lies in providing actionable insights for

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stakeholders to harness NTFPs for poverty alleviation and biodiversity conservation in alignment with national sustainable development goals. Ultimately, this review serves as a foundational guide for policymakers and researchers seeking to promote resilient rural economies while safeguarding forest ecosystems.

**Keywords:** sustainable development, rural livelihoods, forest conservation, enterprise development  
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## INTRODUCTION

Pakistan's diverse forest ecosystems—ranging from the Himalayan highlands to coastal mangroves—harbor a rich variety of Non-Timber Forest Products (NTFPs) that have historically sustained rural communities while supporting vital ecosystem functions. NTFPs play a crucial role in meeting household food requirements, providing specific medicinal resources, and supplying raw material inputs for rural livelihood. They also serve as a safety net during periods of agrarian distress. In both low- and high-income countries with abundant biological resources, NTFP value chains have become increasingly important for generating income, enhancing livelihoods, and reducing poverty in forest dependent communities (Magry et al. 2024). With approximately 4.8 million hectares of forest cover representing about 6% of the country's total land area, Pakistan's forests support millions of rural households through NTFP collection, processing, and trade.

NTFPs are essential for rural livelihoods across both temperate and tropical regions, as evidenced by recent studies using systematic review approaches to investigate the socio-

economic factors shaping community management of these resources (Vila et al. 2025). The significance of NTFPs extends beyond subsistence, encompassing substantial economic opportunities for sustainable development, poverty alleviation, and forest conservation. However, despite this potential, NTFP enterprises in Pakistan face numerous challenges that limit their contribution to national economic development and community welfare.

Global recognition of NTFPs has evolved significantly since the 1992 Rio Summit, with increasing emphasis on their role in sustainable forest management and rural development. NTFP research and development expanded significantly following the Rio de Janeiro summit, with most published research originating from the United States, accounting for 24% of total publications, followed by Brazil and India each contributing 10% (Magry et al. 2024). This evolution reflects a growing understanding of the complex interconnections among forest resources, community livelihoods, and sustainable development goals.

## MATERIALS AND METHODS

This review employed a systematic literature review approach to synthesize current knowledge on NTFPs enterprises in Pakistan and their roles in sustainable development. The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) methodology, incorporating explicit keywords (Magry et al. 2024) was adopted as a robust framework for structuring the review process. Alternative systematic review frameworks include the *Cochrane Handbook for Systematic Review of Interventions*, AMSTAR (A Measurement Tool to Assess Systematic Reviews), Joanna Briggs Institute (JBI) guidelines and ROSES (Reporting Standards for Systematic Evidence Synthesis), the latter being particularly suited for environmental and ecological synthesis. PRISMA was selected for its emphasis on transparent reporting of the review process, making it ideal for integrating diverse evidence on NTFP enterprises. The research was designed to integrate both quantitative and qualitative approaches to develop a comprehensive understanding of NTFP enterprises in Pakistan, following established methodological precedents successfully applied in similar contexts across South Asia.

The literature search strategy was designed to capture the multidimensional aspects of NTFP enterprises in Pakistan, including their economic, social, environmental, and policy dimensions. This study investigates the socio-economic factors influencing communities managing these resources for meta-analysis (Vila et al. 2025), demonstrating the comprehensive scope required for such reviews. The search was conducted across multiple academic databases including Web of Science, Scopus, Google Scholar, PubMed, and specialized forestry

databases, ensuring comprehensive coverage of relevant literature. Primary search terms included combinations of “Non-Timber Forest Products,” “NTFP,” “Pakistan,” “sustainable development,” “rural livelihoods,” and “forest enterprises,” along with specific product categories such as medicinal plants, wild fruits, mushrooms, nuts (e.g., walnuts, pine nuts), honey, fibers (e.g., Mazri leaves), gums, resins, and other plant/animal-based materials prevalent in Pakistan’s forest ecosystems.

Literature selection criteria included inclusion of peer-reviewed articles and reports published in English between 2000 and 2025, with a focus on studies directly relevant to NTFP enterprises in Pakistan or comparable South Asian contexts. Exclusion criteria encompassed non-empirical opinion pieces, studies lacking methodological details, and those unrelated to economic, social or environmental aspects of NTFPs. Duplicates were removed and abstracts were screened for relevance, followed by full-text assessment for quality based on criteria such as methodological rigor, sample size adequacy and contribution to understanding of NTFP enterprise themes.

Further analysis highlighted that NTFP consumption, utilization, and sales occur at the household level, making comprehensive assessment challenging, underscoring the need for approaches that include value chain analysis. This methodological challenge was addressed in the review by focusing on studies that employed comprehensive household surveys, participatory rural appraisal techniques, and value chain analysis approaches. The synthesis process involved careful consideration of the heterogeneity of methodological approaches across studies, with findings being interpreted within the context of the methodological limitations and strengths of each study.

The review methodology also incorporated systematic assessment of policy and institutional frameworks affecting NTFP enterprises in Pakistan. Studies addressing regulatory environments, market systems, and institutional arrangements were analyzed using established policy analysis frameworks. Data synthesis procedures involved development of thematic categories, identification of knowledge gaps, and critical assessment of evidence quality across different dimensions of NTFP enterprise development. This methodology ensured comprehensive coverage of the scope and limitations of NTFP enterprises in Pakistan while maintaining scientific rigor in the analysis and synthesis of available evidence (Magry et al. 2024, Vila et al. 2025, Akomaning et al. 2023).

## CONCEPTUAL FRAMEWORK AND DEFINITIONS

### Defining Non-Timber Forest Products

NTFPs have been defined as “*all biological materials, excluding timber, which are extracted from forests for human use*” (Zaman et al. 2023). This broad definition encompasses a diverse range of forest-derived products including medicinal plants, wild fruits, nuts, mushrooms, gums, resins, fibers, and other plant- and animal-based materials. In tropical forest systems, multiple-use plants provide an array of ecosystem services, including food for wildlife, in addition to NTFPs and commercial timber (Cummings et al. 2016).

The scope of NTFPs in Pakistan is particularly extensive given the country’s diverse ecological zones. Research findings reveal that 82% of households depend on fuelwood, 45% collect medicinal herbs,

and 28% harvest wild fruits and nuts, with an average annual income of PKR 34,000 derived from NTFPs. These products contribute between 10% and 25% of total household income (Shafi et al. 2025). This diversity reflects the complex interplay between ecological conditions, cultural practices, and economic necessities that characterize NTFP utilization in Pakistan.

### Theoretical Framework for NTFP Enterprise Development

The development of NTFP enterprises operates within a complex socio-ecological system where multiple factors influence success and sustainability. Research examines the relationship between NTFP dependence and variables such as gender, age, household size, education, income, forest conservation practices, public policies, social organization, and market access. Among these, gender, age, public policies, social organization, income, and forest conservation emerged as significantly influencing determinants (Vila et al. 2025).

Enterprise development in the NTFP sector requires understanding of value chain dynamics, market mechanisms, and institutional frameworks. Unlike timber, NTFP markets are unstable which limits their potential as tools for economic advancement and forest conservation. Addressing this gap is critical as the forest sector adjusts to fast-changing market conditions, where flexibility and strategic marketing are essential for competitiveness (Santos 2025).

### Current status and opportunities of NTFP enterprises in Pakistan

In Pakistan, NTFPs are vital for sustaining rural livelihoods, with over 131 species supporting about 80% of forest dwellers who depend on them due to poverty

and limited livelihood options (Masoodi and Sundriyal 2020). This review examines NTFP enterprises across regions including Northeastern Pakistan, Sharan Valley, Ayubia National Park, Swat, Chitral, and the Indus Basin, exploring how they support poverty reduction and biodiversity conservation while facing the challenges of overharvesting, market issues, and climate change (Ahmad et al. 2021). Northern mountainous regions, especially Khyber Pakhtunkhwa and Gilgit-Baltistan, are key NTFP areas. Data from 300 households in three villages show that 82% depend on fuelwood, 45% collect medicinal herbs, and 28% harvest wild fruits (Shafi et al. 2025). Factors including adult male participation and market access significantly increase NTFP-derived earnings in the area of Swat (Ibrar-ul-Haq and Shafi 2022).

Pakistan's diverse climate supports various NTFPs including food items such as morels, honey, walnuts, and pine nuts, as well as medicinal plants, fibers, and industrially useful products (Latif and Shinwari 2005). The temperate forests of Khyber Pakhtunkhwa, Azad Jammu and Kashmir, and Northern Areas at altitudes of 1,000 to 3,000 meters, serve as primary production zones (Latif and Shinwari 2005). In Himalayan areas, 811 NTFP species have been cataloged, with herbs (64.6%) and medicinal plants (61%) being most common, particularly between 1,001 and 1,800 meters elevation (Masoodi and Sundriyal 2020). Annual production includes 55-65 tons of dried morels, 4,647 tons of honey, and 41,000 tons of nuts (Sher et al. 2004). Some species, like *Podophyllum hexandrum* regenerate well while others like *Trillium govanianum* are facing depletion in Sharan Valley (UNDP 2012). About 34% of the local population depends on NTFPs for income, with 80% of forest communities applying traditional

knowledge in their collection practices (Zubair et al. 2019).

To summarize key species and regions without redundancy, Table 1 provides an overview of prominent NTFPs, their primary regions, and associated enterprise opportunities.

NTFPs provide an average annual income of PKR 34,000 to rural households in Pakistan, contributing 10-25% of total household income, with factors including household size, forest proximity, and market access significantly influencing earnings (Shafi et al. 2025). Studies from neighboring regions show NTFPs contributed 29% to household income compared to 16% from farming and 55% from off-farm work, with NTFP availability, agricultural occupation, collection experience, and farm income positively affecting NTFP earnings (Bagal et al. 2023). The growing global market for natural products offers substantial opportunities for Pakistani NTFP enterprises. For instance, in the Philippines, products such as rattan and abaca are used in the furniture and textiles industries, demonstrating that investing in NTFP marketing can drive sustainable economic growth (Santos 2025). Processing and product development can significantly increase NTFP profits and promote bio-economy development, though improved assessment methods, including value chain analysis are needed since most NTFP activities happen at household level (Magry et al. 2024).

NTFP businesses offer substantial income opportunities in Pakistan, with exports of morels, chalghoza, and walnuts earning Rs. 1,384.72 million in 1999–2000 (Latif and Shinwari 2005). In Swat and Mansehra, 69% of households earn over Rs. 60,458 per season from NTFPs as supplementary income (Khan et al. 2020). Mushrooms have high market

**Table 1. Summary of NTFP diversity, utilization status, and enterprise opportunities across major regions of Pakistan.**

Region/Area	Key species/Products	Current status (Diversity and Utilization)	Enterprise opportunities
Swat and Manshra (KP)	<i>Morchella esculenta</i> (morels), <i>Valeriana jatamansi</i> , wild fruits, nuts	69% of households earn > Rs. 60,458/season; tertiary income source after agriculture/livestock (Khan et al. 2020)	Export markets (e.g., morels at Rs. 4,000-5,500/kg locally, \$271/kg internationally); added value through processing; market access within 10 km increases income by 12.5% (Ibrar-ul-Haq and Shafi 2022)
Sharan Valley (KP)	<i>Podophyllum hexandrum</i> , <i>Bistorta amplexicaulis</i> , <i>Trillium govianianum</i> , <i>Artemisia</i> spp.	High regeneration potential for some species; depletion risks from unscientific extraction (UNDP 2012)	Commercialization via processing centers; global herbal demand; funding for infrastructure (UNDP 2012)
Himalayan Communities (KP, AJK, Northern Areas)	<i>Paeonia emodi</i> , <i>Bergenia ciliata</i> , <i>Viola canescens</i> , <i>Taxus wallichiana</i>	811 species documented; highest abundance at 1,001-1,800 m; 125 species threatened (Masoodi and Sundriyal 2020)	Domestication and cultivation to reduce pressure on wild populations; certification for premium markets; 16- to 6-fold increase in valuable species via reforestation (Adnan et al. 2010)
Ayubia National Park (KP)	<i>Dryopteris stewartii</i> , <i>Nepeta laevigata</i> , <i>Bergenia ligulata</i> , <i>Skimmia laureola</i> , mushrooms	Collected primarily by women; contributes to biodiversity in reserved forests (Zaman et al. 2023, Zubair et al. 2024)	Value addition and marketing of high-value items; training for women/children (24%/54% of collectors); eco-tourism integration (Zubair et al. 2019)
Chitral District (KP)	<i>Artemisia brevifolia</i> , <i>Ephedra gerardiana</i> , wild honey, Jungli thome	Supports >50% of household income in remote valleys (Shafi et al. 2023)	Eco-tourism branding; income increase of 20-30% via international markets; joint forest management (Shafi et al. 2023)
Indus Basin (Flood- Proximate Areas, Punjab/ Sindh)	<i>Saccharum munja</i> , <i>Typha latifolia</i> , <i>Eucalyptus camaldulensis</i>	Used for Construction/cottage industries; Rs. 25,000-45,000 annual income for 44% of households (Zubair et al. 2022)	Safety net during floods; cultivation in Punjab for mushrooms; coastal mangroves for fibers/medicinals (Zubair et al. 2022)
Baluchistan (Arid Zones)	Mazri plant ( <i>Nannorrhops ritchiana</i> ), <i>Ephedra nebrodensis</i>	Limited documented diversity; 70% production decline due to regulations (Khan et al. 2020)	Domestication programs; value chains for fibers

potential, with prices reaching Rs. 4,000-5,500/kg locally and \$271/kg internationally (Sher et al. 2004). Cultivation of species such as seabuckthorn and Mazri palm can reduce pressure on wild populations and create value chains. Commercializing medicinal plants through processing centers can further support infrastructure, with Pakistan ranking among the world's top herbal exporters (UNDP 2012). Training can empower women and children who make up 24% and 54% of NTFP collectors, respectively (Zubair et al. 2019). In Swat, households with more adult males and market access within 10 km report significantly higher NTFP income (Ibrarul-Haq and Shafi 2022). High-value species near Ayubia offer revenue through better processing and marketing (Zaman et al. 2023), while in flood areas, NTFPs provide Rs. 25,000-45,000 annually for 44% of households as a financial safety net (Zubair et al. 2022). Overall, NTFPs show strong business potential through sustainable practices, market connections, and cooperatives (Tehseen 2024).

### **Biodiversity and resource potential, sustainable management, community-based enterprise development**

Pakistan's plant diversity offers opportunities for NTFP businesses, particularly for medicinal plants, although northwest forests face severe threats (Adnan et al. 2010). Restoration initiatives show promise, with valuable NTFP species increasing 16-, 8-, and 6-fold in reforested areas where density, species diversity, and biomass are 7, 5, and 2 times higher (Adnan et al. 2010). Medicinal plant exports grew from USD 27.49 million in 2005 to 60.09 million in 2014, showing strong economic potential (Ghimire et al. 2016). NTFP income positively influences forest conservation, by creating economic

incentives for sustainable management (Ozukum et al. 2024), with sustainable practices and certification offering premium market access.

Community-based NTFP enterprises provide valuable opportunities for reducing poverty and promoting inclusive growth in rural areas. Non-timber forest products contribute significantly to addressing food security, income generation, and livelihood needs of rural populations worldwide, supporting economic development through employment creation and direct tax revenues (Akomaning et al. 2023). When communities actively participate in forest conservation through groups like Supervisory Community Groups and combine this with strong NTFP product development strategies, they create favorable conditions that leverage existing strengths and opportunities for success (Sribudiani et al. 2024).

### **Key challenges and limitations**

NTFP businesses in Pakistan suffer from over 60% product losses due to poor harvesting practices (Latif and Shinwari 2005), with 42% of children missing school for hazardous collection work (Zubair et al. 2019). Middlemen exploitation, weak infrastructure, and price fluctuations limit incomes (Khan et al. 2020). Over-collection threatens 125 species with 80% lacking management data (Masoodi and Sundriyal 2020). Poor processing reduces quality and poverty drives unsustainable extraction risking extinction of valuable species (UNDP 2012). Government neglect and unreliable data compound these issues (Sher et al. 2004). Overgrazing, deforestation, and climate change contribute to environmental degradation in Swat, where educated collectors earn 58% less (Ibrar-ul-Haq and Shafi 2022). Poverty-driven collection

threatens biodiversity near Ayubia (Zubair et al. 2024), women face collection barriers (Zaman et al. 2023), and flood areas lack facilities and market awareness (Zubair et al. 2022), with overall limited policy support hindering growth of the NTFP sector (Tehseen 2024).

Climate change threatens NTFP businesses by altering plant growth and reducing projected yields of morels and medicinal plants by up to 30% by 2050 in Himalayan regions (Ahmad et al. 2021), while remote locations and border conflicts in Chitral worsen market access and aggravate overharvesting (Shafi et al. 2023). NTFP marketing remains unstable compared to timber, with remoteness, poor roads, and limited market information blocking business development. Despite generating income, NTFPs provide insufficient earnings for survival, and connecting to regional or global markets without fixing underlying systemic problems doesn't improve livelihoods (Nakanyete et al. 2023). Rising temperatures have already cut lac (*Kerria lacca*) production by 31.60 tonnes yearly, resulting in degraded quality and dropping prices, which directly harms livelihoods dependent on NTFPs (Magry et al. 2022).

Unsustainable harvesting practices represent a critical challenge to the long-term viability of NTFP enterprises. Non-timber forest products derived from trees are often collected through unsustainable practices, which contributes to species decline and undermines the livelihoods and well-being of the most forest-dependent communities, with unsustainable collection practices such as cutting branches to collect fruits being somewhat more common among women than men (Jalonen et al. 2022). The challenge of balancing conservation and utilization objectives requires careful management

approaches. Rural ethnic minority groups have long relied heavily on non-timber forest products (NTFPs) and threatened natural forest environments. Studies indicate high or relatively high dependence on NTFPs accompanied by a shift from subsistence use to income oriented extraction (Dinh et al. 2023).

Weak policy frameworks and poor institutional support limit NTFP business growth in Pakistan and similar countries. In Ghana, governments have not focused enough on laws and regulations for NTFPs, with forest policies still naming them “minor forest products.” The lack of clear NTFP policies impedes promotion, commercialization, and supply chain development (Akomaning et al. 2023). Environmental policies, socio-cultural backgrounds, and economic conditions significantly affect NTFP collection, as rural communities still depend on forests for fuelwood and fodder but lack the knowledge and education to understand forest policies and NTFP-related schemes (Thapa et al. 2023).

Gender disparities and social constraints hinder fair participation in NTFP enterprises, with men dominating physically demanding collection work, while youth show little interest, increasingly choosing alternative employment over NTFP activities (Abhishek and Parayil 2024). Women are less likely to suggest partnerships with outside organizations than men, and their ability to identify opportunities for change is constrained by social and gender norms and poor relationships with forestry authorities (Jalonen et al. 2022).

### **Implications for sustainable development**

NTFPs can advance sustainable development in Pakistan by integrating economic, social, and environmental dimensions.

Community-based management, including rotational harvesting and cultivation, can conserve forest resources while boosting incomes by 10-50% (Masoodi and Sundriyal 2020). Policies should formalize NTFP markets, promote training in sustainable collection techniques, and integrate NTFP education into curricula to reduce child labor and enhance technical skills (Zubair et al. 2019). Establishing local collection depots, processing centers, and certification programs in areas like Sharan Valley would minimize losses and ensure fair trade (UNDP 2012). Prioritizing high-demand species for domestication and developing product conservation plans can help balance market demand with resource sustainability, while preserving indigenous knowledge and ecosystems (Latif and Shinwari 2005). Gender-inclusive approaches, ensuring women benefit equally, alongside infrastructure improvements, can promote resilient livelihoods and biodiversity (Sher et al. 2004). In Swat, financial and technical support, capacity building, and education in sustainable management are recommended to mitigate resource depletion (Ibrar-ul-Haq and Shafi 2022). For Ayubia, promoting sustainable harvesting, value addition, and marketing, with park management to inhibit over-collection, can improve both incomes and conservation outcomes (Zaman et al. 2023, Zubair et al. 2024). In the Indus Basin, increasing market demand (38%), expanding facilities (62%), and controlled harvesting can enhance long-term sustainability (Zubair et al. 2022). Awareness campaigns, policy advocacy for fair pricing, and collaborations with NGOs can strengthen NTFP enterprises (Tehseen 2024). Adapting to climate change through diversified cropping and resilient species selection is essential for long-term viability (Ahmad et al. 2021). In Chitral, joint

forest management initiatives, integrating NTFPs with tourism for holistic development could empower local communities (Shafi et al. 2023). Ultimately, collaborative stakeholder efforts, including government and NGOs, are essential for NTFP enterprises to effectively contribute to Pakistan's sustainable development goals.

### **Policy recommendations and strategic interventions**

The development of comprehensive policy frameworks specifically addressing NTFP enterprises is essential for sustainable development. Policy recommendations include supporting NTFP-based livelihoods to enhance community engagement in forest conservation efforts through collaboration with local conservation bodies and traditional institutions, including the state forest department (Ozukum et al. 2024). To ensure sustainable development, strategies should focus on increasing social awareness, mechanizing resource extraction, providing financial incentives for research and training, ensuring stable market conditions, and implementing conservation-focused public policies (Vila et al. 2025). Systematic capacity building programs are also essential for enhancing NTFP enterprise development, with studies suggesting providing education and other skill development training in the areas of sustainable collection, proper storage, and scientific grading of NTFPs to local communities (Bagal et al. 2023).

This review highlights the urgent need for integration of traditional knowledge with modern conservation practices, sustainable harvesting, improved market infrastructure, and women's empowerment through training and access to high-value products (Abhishek and Parayil 2024). Key strategies include enhancing species variety, promoting business

diversification, strengthening government support, improving information exchange, market expansion, and strengthening community institutions (Hardjanto et al. 2024). Sustainable harvesting practices, community empowerment, and education programs are essential but rare in study areas (Akomaning et al. 2023), while household participation in forest conservation would support both livelihoods and sustainable management (Mpayayei et al. 2024). Building on these insights from the literature, the current review synthesizes evidence from Pakistan's diverse NTFP contexts and recommends a comprehensive framework that prioritizes: (1) Establishing regional collection depots and processing centers to reduce the current 60–70% product losses; (2) implementing certification programs and fair-trade mechanisms to mitigate middleman exploitation; (3) developing climate-resilient NTFP systems through species diversification and adaptation strategies; (4) creating gender-inclusive training programs that ensure equitable access to high-value products and decision-making roles; and (5) strengthening institutional support through policy reforms that formalize NTFP markets and integrate NTFP education into formal curricula. These recommendations emerge from gaps identified across Pakistan's NTFP regions and aim to address the systemic challenges limiting enterprise development while maximizing opportunities for sustainable livelihoods and biodiversity conservation.

## CONCLUSIONS

NTFP enterprises in Pakistan present significant potential for sustainable development and improving rural livelihoods, particularly for marginalized communities in remote areas. However,

realizing this potential requires overcoming major challenges including market access limitations, unsustainable harvesting practices, weak institutional support, and climate change impacts. Success depends on integrated approaches that balance conservation objectives with economic goals through comprehensive policy reforms, capacity building, and community engagement. The future of Pakistan's NTFP sector relies on the collective ability of stakeholders to overcome current constraints while capitalizing on global market opportunities, thereby ultimately contributing to sustainable development while preserving forest ecosystems for future generations.

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研究報告**巴基斯坦非木材林產品企業：機會、挑戰與永續發展途徑**Muhammad Fawad Sharif<sup>1</sup>, Umer Ameer<sup>2</sup>**摘要****背景**

從喜馬拉雅高原到沿海紅樹林，巴基斯坦具有多樣森林生態系統，且蘊藏著豐富多樣的非木材林產品(Non-Timber Forest Products, NTFPs)，這些資源歷來支撐著農村社區，同時發揮重要的生態系統功能。NTFPs在滿足家庭糧食需求、提供特定藥用資源及供應農村生計的原料投入等方面扮演著關鍵角色。自1992年地球高峰會以來，全球對NTFPs的認可顯著演變，在生物資源豐富的低收入與高收入國家，NTFPs價值鏈對於創造收入、提升生計及減少森林依賴社區貧窮的重要性日益增加，並涵蓋了可持續發展、減貧及森林保育等重大經濟機會。然而，儘管具備此潛力，巴基斯坦的NTFP企業仍面臨諸多挑戰，限制其對國家經濟發展與社區福祉的貢獻。

**材料與方法**

本文採用系統性文獻回顧方法，綜合巴基斯坦NTFPs企業及其在永續發展中角色的最新知識。採用包含明確關鍵詞的系統性回顧與統合分析首選報告項目(Preferred Reporting Items for Systematic Reviews and Meta-Analyses, PRISMA)方法論作為結構化審查流程的穩健框架。文獻篩選範圍包括2000年至2025年間以英文發表的研究報告與文章，主要為直接與巴基斯坦NTFP企業或類似南亞相關研究。文獻搜尋包括經濟、社會、環境及政策等各層面，並涵蓋多個學術資料庫，包括Web of Science、Scopus、Google Scholar、PubMed及專業林業資料庫，確保相關文獻的全面覆蓋。主要搜尋詞包括「非木材林產品」、「NTFP」、「巴基斯坦」、「永續發展」、「農村生計」及「森林企業」等組合，並包含特定產品類別，如藥用植物、野生水果、蘑菇、堅果(如核桃、松子)、蜂蜜、纖維(如Mazri葉)、膠、樹脂及其他在巴基斯坦森林生態系統中普遍存在的植物/動物基材料。

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## 結果與討論

巴基斯坦多樣的生態系統支持多種NTFPs，包括藥用植物、蘑菇、水果、堅果、蜂蜜及纖維等。巴基斯坦NTFPs企業的機會包括出口市場、馴化與栽培，以及透過加工帶來的增值，約能提升農村收入10–50%，同時支持生物多樣性保育。然而，不可持續採伐亦將導致60–70%產品損失，中間商主導的市場壟斷、基礎設施不足、過度開發，以及氣候引發的如洪水和植物物候變化等脆弱性，對資源永續與社區福祉構成嚴重威脅。在永續發展方面，本回顧強調社區培訓、受管制的採集、市場連結、政策改革，以及在經濟效益與生態保護間取得平衡的方法。透過解決這些優先事項，NTFPs企業將能促進成長、減少貧窮並推動巴基斯坦的森林保育。

## 結論

巴基斯坦的NTFPs企業在永續發展和改善農村生計方面具有顯著潛力，特別是對偏遠地區的邊緣化鄉村而言。然而，要實現此潛力，必須克服包括市場准入限制、不可持續採伐做法、薄弱的制度支持及氣候變遷影響等重大挑戰。成功將依賴於透過全面的政策改革、能力建設及社區參與，取得保育目標與經濟目標的綜合性平衡。巴基斯坦NTFPs產業的未來仰賴各方共同克服當前限制，同時把握全球市場機會，最終促進永續發展，同時保護森林生態系統，惠及未來世代。

**關鍵詞：**永續發展、農村生計、森林保育、企業發展

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