COMMERCIALIZATION OF NON-TIMBER FOREST PRODUCTS: DETERMINANTS AND SUPPLY CHAIN IN INDIA

RESEARCH PROJECT

SPONSORED BY

NATIONAL HUMAN RIGHTS COMMISSION
NEW DELHI, INDIA

PRINCIPAL INVESTIGATOR

DR. PRATAP KUMAR JENA
ASSISTANT PROFESSOR OF ECONOMICS

MAHARAJA SRIRAM CHANDRA BHANJA DEO UNIVERSITY
SRIRAM CHANDRA VIHAR, TAKATPUR, BARIPADA, ODISHA-757003, INDIA

FEBRUARY, 2025

ACKNOWLEDGEMENT

I wish to thank the National Human Rights Commission (NHRC), New Delhi for sanctioning this research project. I am thankful to all office bearers in the PRP&P Division, NHRC, New Delhi for their constant support and help in carrying out this project.

I sincerely thank to the all the Office staff of ORMAS, Mayurbhanj District of Odisha, BPM JSLPS Jharkhand, Office staff of Van Dhan Kendra, NGOs in Khunti Jharkhand and Chhattisgarh for their inputs, constant support and co-operation.

My sincere thanks to all SHG members and also equally thankful to all the stakeholders, and respondents in my study states for their participation and cooperation in data collection.

It is my honour to thank our Honourable Vice-Chancellor, HOD of Economics and other faculty members in the Department of Economics, MSCB University for their constant support and encouragement to complete this project.

Last but not least, I thank my research assistants Miss Priyanka Nayak and Miss Sanjita Pagal who helped in different stages to complete this work.

(Dr. Pratap Kumar Jena)
Principal Investigator

DISCLAIMER

This research project was sponsored under the Research Scheme of the National Human Rights Commission (NHRC), India. The researcher has prepared this report using data collected from various sources. The Commission (NHRC) has no authenticity on data, methodology and accuracy of results in the report. The Commission shall not be held responsible for findings or opinions expressed in the report. The whole responsibility rests with the researcher.

ABBREVIATIONS

FAO	- Food and Agriculture Organization
FC	- Forest Cover
FD	-Forest Department
FRI	- Forest Research Institute
GA	- Geographical Area
GOI	- Government of India
GVA	- Gross Value Added
IRS	- Indian Remote Sensing
ISFR	- Indian State Forest Report
JFM	- Joint Forest Management
JSLPS	- Jharkhand State Livelihood Promotion Society
LISS	- Linear Imaging Self-Scanning Sensor
MDF	- Moderately Dense Forest
MFP	- Minor Forest Product
MGNREGA	- Mahatma Gandhi National Rural Employment Guarantee Act
MSP	- Minimum Support Price
NTFP	- Non-Timber Forest Product
OF	- Open Forest
ORMAS	- Odisha Rural Development and Marketing Society
RFA	- Recorded Forest Area
RFA	- Recorded Forest Area
RFC	- Recorded Forest Cover
RWA	- Red Weaver Ant
SFR	- State Forest Report
SHGs	- Self-helped Groups
SPSS	- Statistical Package for Social Sciences
SWOT	- Strengths Weaknesses Opportunities Threats
TOF	- Trees Outside Forest
VDF	- Very Dense Forest

LIST OF TABLES

LIST OF FIGURES

EXECUTIVE SUMMARY

The commercialization of Non-Timber Forest Products (NTFPs) has seen rapid worldwide growth in recent years. The demand for NTFPs in both urban and rural settings has the potential to improve the subsistence and income of those who rely on these products for their continued existence (Perez et al., 2004). The International Millennium Development Goals (MDGs) acknowledge the role of NTFP commercialization in achieving both conservation and economic development objectives by enhancing forest resources. However, studies on various aspects of NTFPs suggest that commercialization has not always been successful, often due to unsustainable harvesting practices that lead to forest degradation and income instability. Consequently, further research is necessary to understand how NTFP commercialization can enhance the livelihoods through sustainable forest management for the rural poor.

The present study examines (i) the socio-economic conditions of forest dependants, (ii) economics of NTFPs collection and contribution to household'sincome, (iii) to examine effects of Covid-19 pandemic on households' collection of NTFPs and stakeholders of supply chain, (iv) determine factors influencing NTFP commercialization, and (v) analyze strategies for the success of NTFP commercialization in the study regions. The study objectives are examined using the primary data collected from Odisha, Jharkhand and Chhattisgarh.

The study found that all the sample respondents are involved in the commercialization of NTFPs in the study area. The major NTFPs that are commonly accessiblein study areas are as Kendu leaf, Mahua (seed and flower), Sal (seed and flower), Amla, Tamarind (raw and seed), Harida, Bahada, Honey, Jamun, Karanj Seed, Lac, Kusumi seed and Tassar. The highest volumes of NTFPs are harvested from February to May every year. Both men and women engaged in the commercialization of NTFPs but women's participation is very high. Women active in NTFP commercialization, primarily aged between 25-55 years. The majority of these women have attained primary education, over half of the respondents (58.05%) have 10-20 years of experience in the collection, processing of the product, sales, and marketing of NTFPs. Consequently, landless households predominantly rely on NTFPs for their livelihood in the surveyed villages across these states. NTFP collection serves as a seasonal income source, leading people to rely on other activities for the remainder of the year. The respondents who are the part of SHG members and engaged in either ORMAS or Van Dhan Kendras, earned good income then the respondents who are individually engaged in NTFP commercialization. The ORMAS or Van Dhan Kendras are helping tribal women

and SHG members by teaching them the method of collection, processing, product creation, and marketing skills. These centres also provide training to tribal women who serve as resource persons in different national and state institutions, offering them an additional income source. The non-members are in distress and earning less income due to several problems like under-pricing and value of their product, difficulty in valuation of their product, lack of knowledge, storage, marketing, transportation and sale, etc.

The Covid-19 pandemic had severe impacts on NTFP dependants, with some even benefiting from it. Households engaged in leaf collection, processing, and marketing suffered huge losses. However, medicinal NTFPs were in high demand, and those involved in these products earned good income even during Covid-19.

The study suggests to educatethe NTFP collectors on different techniques of collection and forest conservation. The Van Dhan Kendra/ ORMAS office should be set up nearer to community centers so that more women can be engaged which can increase the commercialization of NTFPs, through which poverty can be reduced. The collectors should be educated/trained on various medicinal plants, their importance, extraction techniques, uses and their market value. For the success of commercialization of NTFPs, there is a need of warehouses/storehouses near the community centres i.e. either at their gram panchayat (GP) or to appoint registered traders at their native place.

CONTENTS

1. INTRODUCTION

1.1 Background of the Study

Commercialization of Non-Timber Forest Products (NTFPs) has seen rapid worldwide growth in recent years. The demands for NTFPs in both urban and rural settings have the potential to improve the subsistence and income of those who rely on these products for their livelihoods (Perez et al., 2004). The International Millennium Development Goals (MDGs) acknowledge the role of NTFP commercialization in achieving both conservation and economic development objectives by enhancing forest resources (Angelsen and Wunder, 2003). However, studies on various aspects of NTFPs suggest that commercialization has not always been successful, often due to unsustainable harvesting practices that lead to forest degradation and income instability (Neumann and Hirsch, 2000). Consequently, further research is necessary to understand how NTFP commercialization can enhance the livelihoods of the rural poor through sustainable forest management.

Policymakers and social scientists are eager to explore the connection between forests and forest reliance to enhance livelihoods (Mamo et al., 2007). In India, approximately 275 million rural inhabitants rely on non-timber forest products (NTFPs) for their subsistence and monetary livelihoods (Malhotra & Bhattacharya, 2010; Bhattacharya & Hayat, 2009). This reliance is especially pronounced among tribal and marginalized communities living on the peripheries of forests. NTFP exports constitute 68% of the forestry sector's total exports, and the NTFP sector alone can generate about 10 million workdays annually in a country (Panigrahi, et al., 2019). Moreover, about 80% of the impoverished population in developing nations primarily depend on NTFPs for their nutritional needs (Rasul et al., 2008; Shackleton & Pullanikkatil, 2019).

Primarily tribal people living within and at the edge of forests gather Non-Timber Forest Products (NTFPs) for personal use and sale, generating monetary income (Behera et al., 2012). The India Forest Rights Act 2006 grants forest inhabitants the right to collect NTFPs. Consequently, NTFPs account for approximately 20% to 40% of the annual income for forest-dependent populations, who are often disadvantaged and landless (Planning Commission Report, 2011). NTFPs also provide food security and employment during the off-season (Jena, 2020). The economic potential of NTFPs has been overlooked by researchers and policymakers worldwide, with some even downplaying their significance in the livelihoods of forest-dependent communities (Murthy et al., 2005). However, a scarcity of

research on the impact of the COVID-19 pandemic on NTFP commercialization occurred and those involved in its collection and supply chain. Some studies indicate that the livelihoods, amenities, and physical hardships of poor and marginalized communities have been disproportionately affected. The pandemic continues to cause loss of income, workdays, and livelihoods, with effects that may persist for an extended period. The trade and value chain of NTFPs have also been disrupted by the COVID-19 pandemic. Non-Timber Forest Products (NTFPs) serve as a fundamental source of livelihood and employment for forest-dependent and tribal communities, as well as for other stakeholders including middlemen, retailers, traders, brokers, and wholesalers. However, there appears to be a lack of empirical studies examining the factors influencing NTFP commercialization, usage, and marketing chains in India. Consequently, this study poses several research questions: (i) What are the average collection, consumption, and sales figures for NTFPs in the study region? (ii) Which NTFPs are marketed, in what quantities, and at what prices? (iii) How can the supply of NTFPs be ensured in sufficient quantities to support increased commercialization? (iv) What kind of value addition occurs along the supply chain, and how much income does it generate? (v) What are the factors that influence the success of NTFP commercialization? (vi) What impact has COVID-19 had on individuals involved in NTFP collection and on stakeholders within the supply chain?

1.2 Forest, Tribes, and Livelihood Importance of NTFPs in India

Forests are expanses of land covered by trees, and their importance cannot be overstated. They provide oxygen for living organisms to breathe and purify the air by mopping up carbon dioxide and releasing oxygen during the day. Forests play a crucial role in absorbing greenhouse gases, regulating environmental temperature, and combating climate change. They protect water resources from solar radiation, anchor soil, and prevent erosion. Beyond being a natural habitat for numerous species, forests also support the livelihoods of its dependent (Davies and Brown, 2007). For rural communities, particularly those living on the edges of forests, these resources are integral to their income and employment, as they rely heavily on the forest for sustenance. Tribal communities gather wood, timber, fruits, oilseeds, food, and medicinal products from the forest, both for personal use and trade, which holds significant economic value. However, in recent decades, planners and researchers have primarily focused on timber when evaluating forest resources' worth, overlooking the diverse ways in which tribal communities rely on the forest beyond just timber. They collect and sell

a variety of forest products known as Non-timber Forest Products (NTFPs) and Timber as well. NTFPs are crucial for rural households in terms of usage and production scale (Paumgarten and Shackleton, 2009). Forest dwellers rely on these local forest products as they are readily and inexpensively available. Tribal people enjoy a high life expectancy and good health standards because the forest supplies them with nutritious food, shelter, clothing, medicine, and employment opportunities, making NTFPs vital for their livelihood in India (Verma and Paul, 2019).

India boasts extensive forest resources and featuring an extended flora and fauna. Humans have had a longstanding relationship with forests since their emergence on Earth. Forests are regarded as renewable natural resources and play a significant role in the economy (Varadharaj, 2001). In the mid-1990s, dense forests covered 17% of India's forested land, with barren land constituting about 50%, and productive forests spanning approximately 35 million hectares, which was nearly 10% of the total land area of India (Jain, et al., 2007). With India's progression on the development trajectory, the demand for forest resources has also escalated (Shivaprasad, 2016).

According to the Economic Survey of 2021-2022, India boasts a wealth of natural resources, with a forest cover totaling 713,789 square kilometers in 2021, globally ranked as the 10th largest country in terms of forest area, which represents 2% of the world's forest area. Regarding canopy density, very dense forests make up 99,779 square kilometers, accounting for 3.04% of the total forest cover, moderately dense forests span 306,890 square kilometers, representing 9.33%, and open forests cover 307,120 square kilometers, or 9.34% of the total forest cover. In India, the forest sector utilizes the second-largest land area after agriculture, as per the FAO in 2005. The total forest and tree cover in India now stands at 80.9 million hectares, which is 24.62% of the country's total geographical area. This includes 21.71% forest cover, 2.91% tree cover, and 4,992 square kilometers of mangrove cover. Asia leads with the highest net gain in forest area, and India ranks third in the world for average net gain in forest area during the decade 2010-2020, as reported by the India State of Forest Report, 2021. The National Forest Policy of 1988 recommends that the country should target covering one-third of its total geographical area with forests or trees and two-thirds of hilly and mountainous regions to prevent soil erosion, combat land degradation, and ensure environmental stability within the ecosystem (National Forest Policy, 1998).

1.3 Tribes and Forest Dweller Act in India

Tribes have a profound connection with forests, regarding them as their home from birth until death. They revere the forest for providing sustenance, employment, and income. Tribal communities are often referred to as the forest's offspring. The harmonious relationship between tribes and forests has remained intact. Tribal lifestyles differ markedly from those in civilized societies. Most tribal people, who live in or near forests, rely on forest products to make a living. There are 10.4 million tribal individuals, also known as Indigenous people, Adivasis, Janjatis, and Scheduled Tribes, residing in 15% of India's total land area, making up 8.6% of the nation's population. Traditionally, there is a strong cultural bond between forests and tribes (Tripathi, 2016). Initially, tribal communities collected non-timber forest products solely for consumption, but over time, they began selling these products for commercial gain (Verma and Paul, 2019). The 2011 Census indicates that India has 537 tribal groups, yet only 258 are officially recognized as tribes. Maharashtra and Odisha have the largest tribal populations. Approximately 55% of the Scheduled Tribes population resides in West Bengal, Bihar, Madhya Pradesh, Odisha, and parts of Andhra Pradesh and Mizoram. A significant majority, about 82%, are located in the western states, while only 11% inhabit the southern states. The 2011 census recorded the tribal population in India at 10,42,81,034, accounting for 8.6% of the total population, a slight increase from 8.2% according to the 2001 census. Although the number of tribal people has risen, their development rate has not kept pace with the broader population. Odisha is home to 9.20% of India's total tribal population, Jharkhand to 8.30%, and Chhattisgarh to 7.50%. The literacy rate among Scheduled Tribes is 59% nationwide. Jharkhand alone has 32 tribal groups, categorized by their occupational structure into hunter-gatherers, shifting agriculturists, simple artisans, and settled agriculturists (Govt of Jharkhand, 2019). Prominent tribes in Odisha include the Zuang, Sawara, Karia, Khond, and Kandh; in Jharkhand, the Santhal, Paharia, Munda, Ho, Bihor, Oraon, Kharia, Tamaria; and in Chhattisgarh, the Hill Maria, Muria, Dandami, Gond, Baiga, Parja, Bhattra, Agaria, Bhil, Saharia, Korwa, Halba, and others.

Adequate forest cover exists when tribal communities safeguard the forests. Over time, these communities were coerced into becoming forest labourers by the forest department or forest mafias, leading to the inception of deforestation and a drop in forest cover (Verma and Paul, 2019). Before independence, minor forest products (MFPs) were overlooked due to their minimal revenue contribution to the forest department. Nonetheless,

tribal people persisted in gathering and selling MFPs for their survival and livelihood. Presently, the demand for numerous MFPs has surged in both national and international markets. Consequently, state governments have begun to recognize the commercial significance and value of MFPs on a global scale (Burman, 1982).

The Scheduled Tribes and Other Traditional Forest Dwellers Act, 2006, defines forest-dwelling tribes as communities or members of scheduled tribes who primarily reside in forests and depend on them for their livelihood needs, including Scheduled Tribe pastoralist communities. Traditional forest dwellers are those community members who have depended on the forest for their livelihood for a considerable period. The Forest Rights Act of 2006 allows forest dwellers living in forest areas and deriving their livelihood from these forests to claim legal rights to the land they utilize (Verma and Paul, 2019). The aim of the Scheduled Tribes and Other Traditional Forest Dwellers Act, 2006, is to guarantee the following rights to forest dwellers on all forest lands:

a. The right to hold and live in areas of self-cultivation for livelihood by forest-dwelling Scheduled Tribes or other traditional forest dwellers.

b. Rights of the community.

c. The right of ownership, collection, and use of minor forest products gathered within and outside village boundaries.

d. Rights include fishing, grazing, and traditional seasonal resource access for communities.

Community tenure rights for the habitation of primitive tribal dwellers are as follows:

a. Conversion rights for Pattas or leases issued by local authorities or state governments on forest lands.

b. Settlement and conversion rights.

c. The right to protect, conserve, and manage community forest resources.

d. In-situ rehabilitation rights.

1.4 Livelihood Importance of NTFPs

Forest resources are crucial for the rural economy, especially for the tribal communities. Historically, forest products have been valued mainly for timber, yet the rural and tribal populations rely on more than just timber for their livelihoods. Tribal people gather various NTFPs for domestic use and to supplement their income. In India, approximately 170 million people live in or near forests, with half belonging to tribal societies that depend on NTFPs for

their livelihood, considering the forest as their home (Basu, 2009). Tropical forest products are categorized into timber and non-wood or minor forest products. Traditionally, timber products have been prioritized, leading to relatively low net revenue from forest products due to the neglect of non-wood products (Peter et al., 1989). However, the current scenario has changed as NTFPs now make a significant contribution to the country's Gross Value Added (GVA). Forest resources are essential for sustainable development and poverty reduction. NTFPs, being a key component of forest resources, support the economy by reducing poverty through the conservation and management of forests and biodiversity. NTFPs provide a safety net during food shortages in agriculture and seasonal fluctuations by offering food, nutrition, fodder, medicine, fuel, etc. With scientific management, NTFPs greatly aid in the sustainable livelihoods of rural and tribal populations and enhance biodiversity conservation (Kharmyndai, 2013). In the fiscal year 2019, NTFPs contributed approximately 268 billion Indian rupees to the Indian economy, accounting for 13 percent of the GVA from forest products in India (Statista Research Department, 2022).

NTFPs are crucial for the livelihoods of millions worldwide, both in rural and urban areas (Shackleton et al., 2015; Malhotra and Bhattacharya, 2010). Tribal communities, in particular, rely heavily on NTFPs for their livelihood and monetary income (Byron and Arnold, 1999; MOEF, 2006). Sampson (2005) noted that approximately 400 million people depend directly and 1 billion indirectly on NTFPs globally. In Chhattisgarh's Bastar district, about 75% of the population supplements their diet with tubers, flowers, and fruits throughout the year (Pandey et al., 2016). Similarly, in Odisha, 1.8 million women gather kendu leaves for 'Bidi' production (Khare and Rao, 1993). Forest-dependent communities derive a significant portion of their income (10-60% of total household income) from NTFPs (Asfaw et al., 2013; Babulo et al., 2009; Singh and Adey, 2003). NTFPs not only supplement income but also contribute significantly to the livelihoods and employment of forest-dependent populations (Areki and Cunningham, 2010; Babulo et al., 2009; Belcher et al., 2005; FAO, 2006). The collection of NTFPs is influenced by various factors such as geographical location, forests, and seasons (Mahapatra and Kant, 2005). Sustainable NTFP utilization enhances the socio-economic status and livelihoods of forest-dependent communities (Yadav and Roy, 1991; Cavendish, 2000; Sarker and Das, 2009; Saxana, 2003). NTFPs serve diverse purposes based on geographical areas, communities, and even individual households (Pandey et al., 2016). They are broadly categorized into food, fuel, medicine, etc., and are derived from leaves, fruits, stems, and roots, providing nutritional

health supplements, materials for house construction, and meeting other needs of both rural and urban populations (Shackleton et al., 2015; FAO, 1992). They are also utilized in traditional medicine systems like Ayurveda and Unani across various countries (GOI, 2000).

NTFPs also known as Non-Wood Forest products (NWFPs), encompass all biological materials other than timber harvested from forests. Defining NTFPs is challenging due to their diversity across geographical areas. Wickens (1991) described NTFPs as biological materials extracted for cultural, religious, food, medicinal, and commercial purposes to enhance income levels. Similarly, Shvidenko et al. (2005) characterized NTFPs as forest products integral to the daily lives and well-being of millions globally. Forest products are all commodities produced by a forest. These are categorized into Significant Forest Products, like timber, herbs, and firewood, and Minor Forest Products, such as grass, organic matter, leaves, animal products, and minerals (Shivaprasad, 2016). Classification into Major and Minor Forest Products is based on economic value. Historically, Minor Forest Products generated less revenue than Major ones (Prasad and Bhatnagar, 1991). However, the current scenario has changed, with Minor Products also holding significant economic value. The distinction between Major and Minor Products varies by country. In India, timber and wood are considered Major Products due to their higher economic value compared to Minor Products. Conversely, in countries where timber is less valued, these categories become less pertinent, as what is Major in one country may be Minor in another (Lalremruata, 2012). NTFPs, often termed Minor Products, have various other names such as non-wood forest products, benefits, goods and services, special forest products, and other economic forest products. Despite the different terminologies for NTFPs, their significance remains universally recognized.

Historically, the term NTFP encompassed all forest produce excluding timber. To date, no legislation, rules, policies, or administrative reports have provided a clear definition for NTFP. Although the Indian Forest Act of 1927 and its amendments remain the primary legal framework for forest administration and management, they do not reference NTFP. Resource organizations such as the Forest Research Institute (FRI) and the Food and Agriculture Organization (FAO) have attempted to define NTFP but have only managed to classify and document it without a formal definition. The FRI simplifies the term, stating that NTFP includes all forest produce apart from the major ones.

Timber is commonly recognized as a significant forest product. However, with the current ban on green felling, there is debate over whether timber should still be considered a major forest product, as the distinction between major and minor products may be based on the revenue they generate.

The 'Committee for Recommendations on Ownership Rights over Minor Forest Produce on Gram Sabha,' inspired by the MP government, categorized NTFP as forest produce excluding timber, which can be harvested sustainably. Although this definition is widely recognized, it has its shortcomings. It fails to detail what constitutes a non-destructive harvesting method and subtly ties it to ownership issues. The Orissa Forest Act of 1972 and the Orissa Forest Produce (Control of Trade) Act of 1981 do not define MFP. Prior to 1980, MFP (Minor Forest Product) was generally understood to mean any forest product apart from timber, firewood, and charcoal.

In 1980, the Odisha timber and other forest produce transit rules were established, defining MFP as forest produce excluding timber, firewood, charcoal, and bamboo. However, FD records still list bamboo as a Minor Forest Produce.

In the order related to JEM dated 30th September 1996, the government purportedly granted 100 percent usufruct rights to the Vana Sanrakshyana Samities established under JEM. Individuals have the right to collect, process, and store Non-Timber Forest Products (NTFP), but they must sell these to departmental agencies at government-fixed rates. In practice, communities lack the right to process and store NTFP. The government's recent policy, which identified 85 NTFPs for the first time distinguished between Minor Forest Produce (MFP) and NTFP, which was not previously defined. Figure 2.2 illustrates the types of non-timber forest products. NTFPs are categorized into MFP and Other NTFP. For MFP, 69 products such as tamarind, honey, hill brooms, Siali leaves, myrobolans, and tree-borne oilseeds like neem, Karanja, babul, Kusum, etc., have been identified, while the remaining 16 products fall under Other NTFP. Additionally, Other NTFPs are further divided into two subcategories: nationalized produce and lease bar produce.

***Categories*:** Forests supply a variety of products including food, fodder, fuel, medicine, building materials, and other essentials for short-term household needs. The utilization of forest products differs not only from one region to another but also among communities within the same region. This diversity in usage makes it challenging to accurately assess the

full spectrum of NTFPs, which are universally categorized into three subgroups based on their nature and applications.

a. ***Plant-Origin***: this category encompasses NTFPs harvested from plant species. It includes edible items, spices, and condiments, medicinal products, aromatic or essential oils, fatty oils, and various plant exudates such as gums, resins, gum-resins, oleo-resins, gum-oleo resins, waxes, tannins, dyes, and pigments. Also included are fibers and flosses, bamboos, canes, fodder and forage, fuelwood, charcoal and their briquettes, bio-wrapper leaves & bidis, other leaves used for platters, plates, bowls, etc., ornamental beads, and other decorative items.

b. ***Animal-Origin***: NTFPs associated with animal and insect species fall into this category. They include honey and beeswax, lac and shellac, tissues from silk-producing insects, animal hides, skins, feathers, horns, bones, shells, ivory, and musk.
c. ***Mineral origin:*** includes mica, sand, gravel, and various other minerals.

1.5 Forest Resources Status in Odisha, Jharkhand and Chhattisgarh

Odisha ranks 8th in area and 11th in population, with the 3rd largest Scheduled Tribe population in India. Geographically, Odisha is situated between latitudes 17.47°N to 22.34°N and longitudes 81.22°E to 87.29°E. It is bordered by West Bengal and Jharkhand to the north, Chhattisgarh to the west, and Andhra Pradesh and Telangana to the south. Odisha experiences four meteorological seasons: winter (January to February), pre-monsoon (March to May), southwest monsoon (June to September), and northeast monsoon (October to December). The state boasts a wealth of natural resources, including forests, rivers, and mines. The Mahanadi, the largest river in Odisha, flows into the Bay of Bengal and spans 856 km. Chilika and Anshupa are two significant lakes in the state. Odisha is rich in minerals, offering high-grade iron ore, bauxite, chromite, manganese, and other minerals like coal, limestone, dolomite, tin, nickel, vanadium, lead, graphite, gold, gemstones, diamonds, and stones for dimension and decoration. These abundant resources pave the way for industries such as steel, ferroalloys, cement, alumina/aluminium, refractories, and thermal power. The Steel and Mines Department is a key government body in Odisha, contributing to the state's economic development by generating substantial revenue.

According to the Indian State Forest Report (ISFR) 2021, Odisha's total forest area spans 52,156 sq km, accounting for 33.50 percent of the state's geographical area. This includes

7,213 sq km of very dense forest, 4.63 percent of the total area, 20,995 sq km of moderately dense forest, 13.49 percent, and 23,948 sq km of open forest, constituting 15.38 percent. The tree cover in Odisha is 5,004 sq km, or 3.21 percent of the state's area. Combined, Odisha's total forest and tree cover is 42.82 percent, covering 15.72 percent of the state. The mangrove cover in Odisha in 2021 is reported to be 258.98 percent, an increase of approximately 8 sq km from the ISFR 2019 assessment. Odisha ranks fourth in India for total forest cover. From 2019 to 2021, the forest cover grew by 537 sq km, the third-largest increase among Indian states. Sal, Madhu, Cuddapah almond, Kusum, and Ballataka are the primary non-timber forest products harvested in the state. Odisha is home to four major types of forests: moist deciduous, dry deciduous, semi-evergreen, and mangrove, as identified by Reddy et al. in 2013.

Jharkhand encompasses a total geographical area of 79,716 sq km, with a forest cover of 23,721 sq km, making up 29.76% of the state's total area. Additionally, tree cover spans 2,867 sq km, which is 3.60% of the state's geographical expanse. Combined, forests and trees cover 53.81% of the land, equating to 17.95% of Jharkhand's total area. In rural regions, the five predominant tree species outside forests (TOF) are Shorea robusta, Butea monosperma, Acacia auriculiformis, Mangifera indica, and Phoenix. In contrast, urban areas are characterized by Mangifera indica, Azadirachta indica, Moringa spp., Cassia siamea, and Artocarpus heterophyllus as the dominant TOF species. The major non-timber forest products (NTFP) species harvested in Jharkhand include the Sal tree, Cuddapah almond, Mahua, Tendu, and Palasa.

According to the Indian State Forest Report (ISFR) 2021, Chhattisgarh encompasses a total geographical area of 135,192 sq km, of which 55,719 sq km is forest cover, representing 41.21% of the state's total area. This ranks it third in forest cover nationally. Forests are categorized by canopy density into very dense, moderately dense, and open forests. In Chhattisgarh, very dense forests cover 7,068 sq km, or 5.23% of the total area, with 5,358 sq km within and 1,710 sq km outside recorded forest areas. Moderately dense forests span 32,279 sq km, or 23.87% of the total area, with 10,631 sq km within and 5,801 sq km outside recorded forest areas. Open forests cover 16,370 sq km, or 12.11% of the total area, with 10,631 sq km within and 5,739 sq km outside recorded forest areas. The state's total tree cover is 5,355 sq km, accounting for 3.96% of its geographical area. Combined, forest and tree cover constitute 30.46% of Chhattisgarh's total area. The five major non-timber forest

products (NTFP) species are the Sal tree, Tulasi, Cuddapah almond, and Tendu. The top five tree species outside forests in rural areas are Shorea robusta, Mangifera indica, Butea monosperma, Acacia Arabica, and Madhuca latifolia, while in urban areas, they are Mangifera indica, Moringa spp, Azadirachta indica, Tectona grandis, and Psidium guajava.

Odisha's forests are abundantly rich in forest products and mineral resources, characterized by their well-stocked, diverse, multi-tiered, and dense nature. According to the Champion & Seth Classification of Forest Types (1968), Odisha is home to four main forest groups, which are subdivided into 19 types. Recognizing the importance of community involvement in forest conservation, the Government of Odisha has been a frontrunner in implementing the Joint Forest Management Programme. The state has a recorded forest area (RFA) of 61,204 sq. km, comprising 36,049 sq. km of reserve forest, 25,133 sq. km of protected forest, and 22 sq. km of unclassed forest (ISFR, 2019). Interpretation of IRS Resource at-2 LISS III satellite data from Nov 2017 to Feb 2018 indicates that Odisha's forest cover spans 51,618.51 sq. km, accounting for 33.15 percent of the state's geographical area. The state's forest canopy is classified into 6,969.71 sq. km of Very Dense Forest (VDF), 21,551.93 sq. km of Moderately Dense Forest (MDF), and 23,096.87 sq. km of Open Forest (OF). The Forest Survey of India (FSI), under the Ministry of Environment, Forest & Climate Change (2023), defines these categories clearly: Very Dense Forest includes all lands with tree cover, including mangroves, with a canopy density of 70 percent and above; Moderately Dense Forest has a canopy density ranging from 40-70 percent; and Open Forest includes lands with tree cover, including mangroves, with a canopy density of 10-40 percent.

The potential of Non-Timber Forest Products (NTFPs) in Odisha, Jharkhand, and Chhattisgarh can be assessed using five parameters as identified by Pandey et al. (2016): ecological status of species, social accessibility of NTFPs, technical knowledge, economic returns from NTFPs, and the policy and legal framework promoting NTFP use. These states are exceptionally rich in natural resources and forested areas compared to other Indian states. The forests are classified into three types: dense, open, and mangrove. Odisha has a larger dense forest area than the other types. According to the State Forest Report of Odisha (2017), the total forest cover is 51,345 sq km, which is 32.98% of the state's geographical area. The dense forest area is approximately 6,967 sq km, the moderately dense forest area is 21,370 sqkm, and the open forest area is about 23,008 sq km. Over the last year, the dense forest area decreased from 6,985 sq km in 2015 to 6,967 sq km in 2016. The moderately dense forest

area also saw a reduction of 100 sq km, from 21,470 sq km to 21,370 sq km. However, the open forest cover increased from 22,005 sq km to 23,008 sq km. Mangrove forests are typically found in the coastal districts of Odisha. There was an increase in dense forest cover by 7 sq km, from 190 sq km to 197 sq km, in the Kendrapara district. Additionally, the mangrove forests were expanded by 5 sq km in the Balasore and Bhadrak districts. However, no changes were observed in the forests of the Jagatsinghpur and Puri districts.

In Odisha, the forest area can be derived from two sources: the state government's 'Recorded Forest Area' (RFA) and the 'Forest Cover' (FC) from the state forest report. According to the RFA for 2016-17 and the SFR for 2015, 37.4% and 34.9% of Odisha's total geographical area are classified as 'Forest Area' and 'Forest Cover,' respectively. These details are outlined in Table 1.1, which reveals that the geographical extents of RFA and FC are identical in square kilometers. The combined government and private forest areas total 58135.47 sq. km and 12.29 sq. km, respectively. Regarding forest cover, open forests and tree cover span 21861 sq. km and 3986 sq. km. As of 2015, Odisha's total forest cover stands at 54340 sq. km. Coastal districts like Balasore, Bhadrak, Jagatsinghpur, Kendrapara, and Puri have less than 10% forest area, while districts such as Kandhamal, Sundargarh, Mayurbhanj, Ganjam, and Keonjhar account for 35.6% of the state's forest area, as reported in the Odisha Economic Survey of 2017-18. The land use patterns in Odisha, Jharkhand, and Chhattisgarh, show that Odisha has the largest geographical area per thousand hectares, followed by Chhattisgarh and Jharkhand. Forest land comprises about 46% of Chhattisgarh, 37.46% of Odisha, and 28% of Jharkhand. In terms of the net sown area, Chhattisgarh leads with 33.94%, while Jharkhand has the smallest at 17.37%.

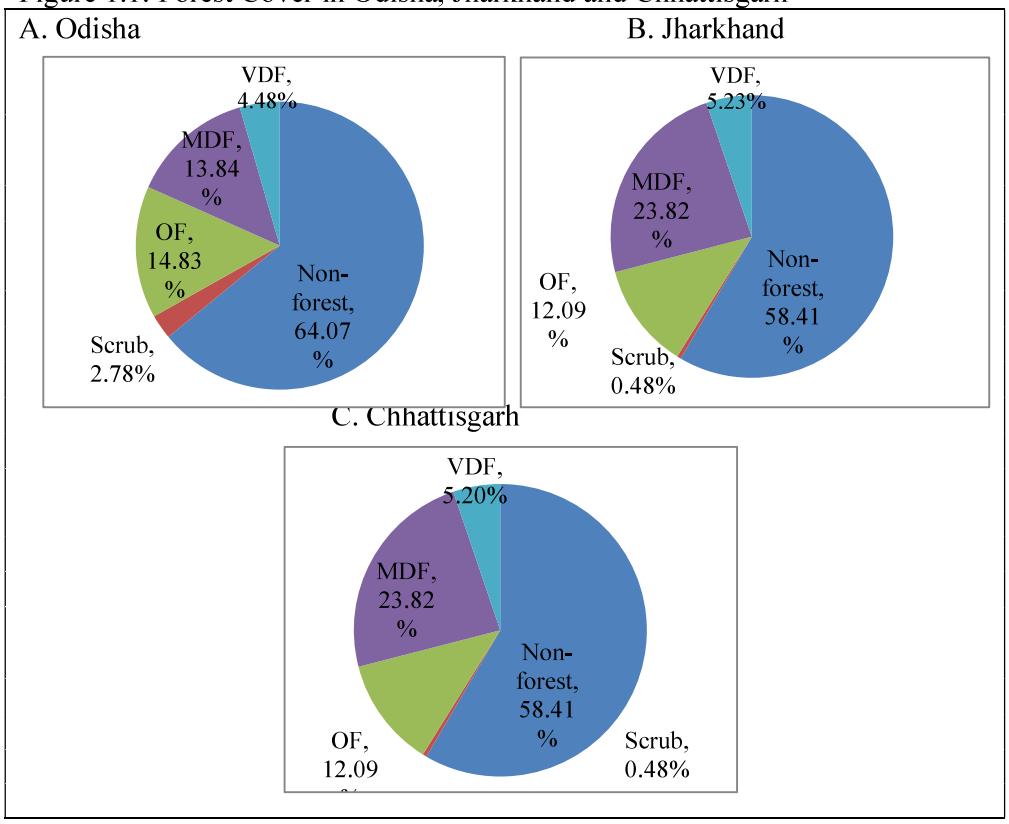
Figure 1.1 illustrates the forest cover in selected Indian states for the study. According to Figures A, B, and C, Odisha boasts the largest forest cover when compared to Chhattisgarh and Jharkhand. In terms of land categories, Odisha is abundant in non-forest land (64.07%), very dense forest (VDF) land (4.48%), moderately dense forest (MDF) (13.84%), and open forest (OF) (14.83%). Conversely, Jharkhand and Chhattisgarh exhibit comparable levels of forest cover.

Table 1.1: Land Use Pattern in Odisha, Jharkhand and Chhattisgarh

Land Use Type	Odisha		Jharkhand		Chhattisgarh	
	Area (in 000' ha)	%	Area (in 000' ha)	%	Area (in 000' ha)	%
Geographical Area	15,571		7972		13519	
Reporting area for Land utilization	15,518	100	7970	100	13790	100
Forest	5,814	37.46	2239	28.1	6316	45.8
Not available for land cultivation	2,396	15.44	1274	15.98	1029	7.47
Permanent pastures and other grazing lands	524	3.38	113	1.43	887	6.43
Land under misc. tree crops and groves	211	1.36	98	1.23	1	0.01
Culturable wasteland	550	3.54	353	4.43	351	2.54
Fallow land other than current fallows	631	4.07	1122	14.08	258	1.87
Current fallows	918	5.92	1386	17.38	267	1.94
Net area sown	4,474	28.83	1385	17.37	4681	33.94

Source: Land Use Statistics, Ministry of Agriculture, GOI (2020-21).

Figure 1.1: Forest Cover in Odisha, Jharkhand and Chhattisgarh



Source: India State Forest Report, 2019

Table 1.2 presents the district-wise forest cover in Odisha according to the 2019 assessment, detailing data on Geographical Area (GA), percentage of GA, Very Dense Forest (VDF), Moderate Dense Forest (MDF), Open Forest (OF), total forest area, change since the 2017 assessment, and scrub forest (areas with low vegetation and dense bushes). The table indicates that Odisha's total geographical area is 156,707 sq. km, which is 33.15 percent of the state's area, with 6,969.71 sq. km of VDF, 21,551.93 sq. km of MDF, and 23,096.87 sq. km of Open Forest. The aggregate forest cover amounts to 51,618.51 sq. km, comprising VDF, MDF, and OF. Sundargarh has the largest forest cover at 4,273.37 sq. km, while Bhadrak has the smallest at 78 sq. km. Mayurbhanj has a significant forest cover of 4,094.17 sq. km, including the largest VDF area at 1,334.95 sq. km, 1,717.24 sq. km of MDF, and 1,041.98 sq. km of Open Forest. The total forest area in Mayurbhanj is thus 4,094.17 sq. km. The table also notes an increase in Odisha's forest cover by 273.51 sq. km since the ISFR 2017 report. Additionally, it records 4,326.91 sq. km of Scrub Forest.

Table 1.3 reports the district-wise forest cover in Jharkhand state according to the 2021 assessment. It indicates that among the 24 districts, West Singhbhum has the largest geographical area at 7224 sq. km, followed by Gumla at 5360 sq. km, and Ranchi at 5097 sq. km. West Singhbhum also has the highest total forest area in the state at 3368.44 sq. km, while Jamtara has the smallest at 106.02 sq. km. Latehar boasts the largest area of dense forest (VDF) at 480.36 sq. km, with West Singhbhum close behind at 461.53 sq. km. Khunti district has 72.97 sq. km of Very Dense Forest (VDF), 344.59 sq. km of Moderate Dense Forest (MDF), and 496.18 sq. km of Open Forest (OF), totaling 913.74 sq. km. Jharkhand's total geographical area is 79716 sq. km, which is 29.76 percent forested, including 2601.05 sq. km of very dense forest, 9688.91 sq. km of moderately dense forest, and 11431.2 sq. km of open forest, summing up to a total forest cover of 23721.1 sq. km.

Table 1.2: District Wise Forest Cover of Odisha State (as per 2019 Assessment)

Area in sq. km.

Sl. No.	District	Geo-graphical Area	Very Dense Forest	Moderate Dense Forest	Open Forest	Total	Percent of GA	Change wrt 2017 Assessment	Scrub
1	Anugul	6375	371.01	1380	1031.62	2782.63	43.65	27.63	84.18
2	Balangir	6575	70	224	841.26	1135.26	36.64	4.26	143.16
3	Balasore	3806	23	133.38	226.18	382.56	5.82	2.56	46.59
4	Bargarh	5837	175.01	374.14	501.31	1050.46	27.6	19.46	40.57
5	Baudh	3098	262.91	562.04	465.99	1290.94	51.53	1.94	57.39
6	Bhadrak	2505	0	8.7	69.3	78	1.34	3	0
7	Cuttack	3932	53	226	525.38	804.38	20.46	8.38	67.8
8	Debagarh	2940	191	667.41	618.75	1477.16	50.23	5.16	14.08
9	Dhenkanal	4452	173.99	420.38	851.24	1445.61	32.47	28.61	83.88
10	Gajapati	4325	84.16	1490.09	947.12	2521.37	58.3	1.37	262.88
11	Ganjam	8206	164.39	1074.32	866.69	2105.4	25.66	2.4	655
12	Jagatsinghapur	1668	0	4.64	131.64	136.28	8.17	0.28	0
13	Jajapur	2899	6	71.99	228.09	306.08	10.56	3.08	49.78
14	Jharsuguda	2114	3	173.82	155.82	332.64	15.74	10.64	29.21
15	Kalahandi	7920	361.64	734.19	1323.97	2419.8	30.55	1.8	371.69
16	Kandhamal	8021	660.95	2593.23	2143.53	5397.71	65.01	5.71	385.51
17	Kendrapara	2644	83.4	88.54	139.36	311.3	3.88	6.3	1.99
18	Kendujhar	8303	288.78	1420.07	1513.31	3222.16	121.87	10.16	53.24
19	Khordha	2813	21	186	260.09	467.09	16.6	10.09	90.47
20	Koraput	8807	94.48	740.41	1263.38	2098.27	23.83	9.27	947.86
21	Malkangiri	5791	158	712.76	1465.41	2336.17	40.34	-5.83	45.9
22	Mayurbhanj	10418	1334.95	1717.24	1041.98	4094.17	39.3	14.17	37.57
23	Nabarangapur	5291	172.63	447.04	527.08	1146.75	29.48	43.75	48.62
24	Nayagarh	3890	189	965	559.75	1713.75	44.49	3.75	171.36
25	Nuapada	3852	86.01	481.69	706.76	1274.46	24.09	1.46	108.82
26	Puri	3479	0	59.73	165.36	225.09	6.47	11.09	10.79
27	Rayagada	7073	419.54	853.42	1873.55	3146.51	44.49	20.51	359.91
28	Sambalpur	6624	498.99	1696.32	1096.98	3292.29	49.7	12.29	40.55
29	Subarnapur	2337	2	187	161.85	350.85	15.01	0.85	29.22
30	Sundargarh	9712	1020.87	1858.38	1394.12	4273.37	44	9.37	88.89
	Grand Total	**155707**	**6969.71**	**21551.9**	**23096.9**	**51618.5**	**33.15**	**273.51**	**4326.91**

Source: India State of Forest Report (ISFR), 2019, Vol.(II), Odisha.

Table 1.3: District Wise Forest Cover of Jharkhand State (as per 2021 Assessment)

Area in sq. km.

Sl. No.	District	Geo-graphical Area	Very Dense Forest	Moderate Dense Forest	Open Forest	Total	Percent of GA	Change wrt 2019 assessment	Scrub
1	Bokaro	2883	60.99	231.94	283.07	576	19.98	2.45	37.95
2	Chatra	3718	244.28	871.73	666.08	1,782.09	47.93	4.74	23.57
3	Deoghar	2477	0	14.3	191.5	205.8	8.31	2.09	14.04
4	Dhanbad	2040	0	44	174.18	218.18	10.7	4.67	16.05
5	Dumka	3761	0	259.4	318.23	577.63	15.36	0.32	44.55
6	East Singhbhum	3562	54.81	591.69	434.19	1080.69	30.34	1.31	20.91
7	Garhwa	4093	125.14	415.6	890.98	1431.72	34.98	40.13	44.32
8	Giridih	4962	77.16	338.56	490.19	905.91	18.26	4.67	28.92
9	Godda	2266	12.81	271.88	138.66	423.35	18.68	0	14.27
10	Gumla	5360	304.69	585.81	552.65	1443.15	26.92	0.89	8.25
11	Hazaribagh	3555	230.11	348.54	784.54	1363.19	38.35	10.42	15.99
12	Jamtara	1811	0	20.84	85.18	106.02	5.85	5.38	5.32
13	Khunti	2535	72.97	344.59	496.18	913.74	36.04	8.25	3.11
14	Koderma	2540	80.8	494.43	447.82	1023.05	40.28	-0.42	6.37
15	Latehar	4291	480.36	1308.93	613.75	2403.04	56	-3.3	9.3
16	Lohardaga	1502	174.03	218.4	111.99	504.42	33.58	-0.2	7.66
17	Pakur	1811	2.96	172.4	111.64	287	15.85	-0.13	20.06
18	Palamu	4393	62.82	512.73	640.18	1215.73	27.67	14.95	84.23
19	Ramgarh	1341	30.96	109.32	190.98	331.26	24.7	2.26	14.49
20	Ranchi	5097	62.89	363.91	741.98	1168.78	22.93	4.29	27.98
21	Sahibganj	2063	17.74	258.73	297.48	573.95	27.82	1.6	47.53
22	Saraikela-Kharsawan	2657	22.03	213.84	338.73	574.6	21.63	0.56	21.87
23	Simdega	3,774	21.97	343.54	877.89	1243.4	32.95	2.48	20.28
24	West Singhbhum	7,224	461.53	1353.8	1553.11	3,368.44	46.63	2.32	47.18
Grand Total		**79716**	**2601.05**	**9688.91**	**11431.2**	**23721.1**	**29.76**	**109.73**	**584.2**

Source: India State of Forest Report (ISFR), 2021, Jharkhand.

Table 1.4: District Wise Forest Cover of Chhattisgarh State (as per 2019 Assessment)

Area in sq. km.

Sl. No.	District	Geo-graphical Area	Very Dense Forest	Moderate Dense Forest	Open Forest	Total	Percent of GA	Change wrt 2017 Assessment	Scrub
1	Bastar	10,470	954.84	2,117.50	1,160.52	4,232.86	40.43	8.86	34.87
2	Bijapur	8,530	2,048.29	2,926.49	1,537.37	6,512.15	76.34	5.15	1.98
3	Bilaspur	8,272	395	1,539.19	522.7	2,456.89	29.7	0.89	48.3
4	Dakshin Bastar/ Dantewada	8,298	250.63	2,305.07	1,907.45	4,463.15	53.79	7.15	26.34
5	Dhamtari	4,084	49	1,385.52	424.6	1,859.12	45.52	2.12	8.91
6	Durg	8,535	44	512.04	220.35	776.39	9.1	5.39	20.48
7	Janjgir-Champa	3,853	2	22.13	125.76	149.89	3.89	0.89	13.98
8	Jashpur	5,838	225.36	1,316.71	573.7	2,115.77	36.24	-15.23	21
9	Kabeerdham	4,235	79.09	1,083.84	385.79	1,548.72	36.57	2.72	12.75
10	Korba	6,598	203	2,313.62	877.08	3,393.70	51.44	3.7	92.03
11	Koriya	6,604	78.53	2,579.90	1,438.18	4,096.61	62.03	3.61	66.69
12	Mahasamund	4,790	4	515.22	425.75	944.97	19.73	1.97	27.38
13	Narayanpur	4,653	1,127.55	1,690.63	978.12	3,796.30	81.59	-5.7	19.22
14	Raigarh	7,086	237.96	1,591.03	791.34	2,620.33	36.98	9.33	25.18
15	Raipur	12,383	141.83	2,413.04	1,075.05	3,629.92	29.31	10.92	54.43
16	Rajnanadgaon	8,070	31	1,749.51	754.67	2,535.18	31.41	8.18	50.13
17	Surguja	15,732	706.72	3,930.64	2,445.25	7,082.61	45.02	10.61	77.86
18	Uttar Bastar Kanker	7,161	488.92	2,205.48	701.61	3,396.01	47.42	3.01	7.99
	Grand Total	**1,35,192**	**7,067.72**	**32,197.56**	**16,345.29**	**55,610.57**	**41.14**	**63.57**	**609.52**

Source: India State of Forest Report (ISFR), 2019, Vol.(II), Chhattisgarh.

Table 1.4 presents the district-wise forest cover in Chhattisgarh, highlighting that Surguja district encompasses the largest geographical area at 15,732 sq. km, followed by Raipur and Bastar with 12,383 sq. km and 10,470 sq. km, respectively. Surguja also boasts the highest total forest area in the state at 7,082.61 sq. km, while Janjgir-Champa has the smallest at 149.89 sq. km. Additionally, the table indicates an increase in Odisha's forest cover by 63.57 sq. km since the last assessment in ISFR 2017. It further details that Chhattisgarh's total geographical area is 135,192 sq. km, which is 41.14 percent forested, including 7,067.72 sq.

km of very dense forest, 32,197.56 sq. km of moderately dense forest, and 16,345.29 sq. km of open forest, culminating in a total forest cover of 55,610.57 sq. km.

NTFPs are crucial, providing a significant livelihood for millions living in forested regions by offering subsistence and cash income (Pandey et al., 2016). The availability and use of NTFPs are noted to vary by location, economic, and cultural contexts. Table 1.5 lists the major NTFPs commonly found, parts used, and their uses in the study states of Odisha, Jharkhand and Chhattisgarh. It is found that the NTFPS uses are different in the study states. Some NTFP leaves are only used, some NTFP seeds are used only, some NTFP pulps are only used and a few NTFP whole parts are used. The NTFPs are used as food items, medicines, body massages, animal fodder, etc.

Table 1.5: NTFPs Produced in Odisha, Jharkhand and Chhattisgarh

Sl. No.	Name of NTFPs	Scientific Name	Sl. No.	Name of NTFPs	Scientific Name
1	Sal	Shorea robusta	12	Red weaver ants	Oecophyllasmaragdina
2	Mahua	Madhuca longifolia	13	Lac	Kerria lacca
3	Neem	Azadirachta indica A. Juss	14	Wild Honey	Apis mellifera
4	Amla	Phylanthusembalica	15	Mushrooms	Agaricus bisporus
5	Broom grass	Thysanolaena maxima	16	Bel	Aegle marmoelos
6	Bahada	Terminalia bellirica	17	Tendu	Diospyros melanoxylon roxb
7	Harida	Terminalia chebula	18	Jamun	Syzygiumcumini
8	Tamarind	Tamarindus indica	19	Jhuna	Ziziphus jujube
9	Karanj	Pongamia pinnata	20	Siali leaves	Bauhinia Vahlii
10	Kusumi	Schleichera oleosa	21	Cotton tree	Ceiba pentandra
11	Siali	Boswellia serrata	22	Cocoon	Chrysalis, Pupae

Table 1.6 presents the forestry output values of Non-Timber Forest Products (NTFPs) in the study states from 2012 to 2019, showing an overall increase over the years. In Odisha, the forestry output of NTFPs rose from 17,841.30 in 2012 to 22,563 in 2019. In Chhattisgarh, it increased from 13,002.96 in 2012 to 27,871.06 in 2019. Jharkhand also saw growth, with

forestry output of NTFPs going from 4,816.59 in 2012 to 5,905.59 in 2019. Comparatively, Chhattisgarh has the highest forestry output value of NTFPs, followed by Odisha, with Jharkhand having the least.

Table 1.6: Forestry Output Value of NTFPs in Odisha, Jharkhand & Chhattisgarh in million rupees.

Year\ States	Odisha	Chhattisgarh	Jharkhand
2012	17841.302	13002.957	4816.591
2013	18012.499	18627.566	6991.739
2014	19124.819	17716.816	8179.978
2015	22112.281	17904.700	9095.470
2016	24167.381	16333.883	9415.885
2017	26783.607	21969.517	12520.856
2018	24035.544	28045.100	7861.066
2019	22545.449	27871.058	5910.854
2020	23315.400	24166.200	8153.000
2021	23522.100	22815.200	7833.800

Source: MOSPI, Govt. of India, 2021.

1.6 Constraints of NTFP Development

There are several constraints for NTFPs development in India. The specific constraints are explained in the below.

Collection Constraints: NTFPs are a vital source of income for many tribal communities in the study area, leading to restrictions on their collection. In Odisha's Mayurbhanj district, the Similipal forest, India's largest biodiversity forest, is off-limits for deep forest NTFP collection due to government restrictions aimed at wildlife and biodiversity conservation. Even forest officers and guards are prohibited from venturing deep into the forest. Additionally, the risk posed by wildlife such as bears, elephants, and snakes, particularly during the winter collection season, deters collectors from entering deep forest areas.

Marketing Constraints: Tribal individuals, who are the primary NTFP collectors and often live in poverty within the forest, lack of literacy and education. This results in a lack of market knowledge, product demand awareness, and NTFP pricing information. While some sell their products in local markets, most sell to traders at low prices. Despite the state setting a minimum support price (MSP) for major NTFPs, it seldom benefits the collectors, especially when they harvest certain NTFPs illegally. Their limited collection knowledge and unawareness of product quality and storage requirements often lead to damage and devaluation of the NTFPs. Consequently, some tribal members report being compelled to sell

their products at reduced prices to nearby traders, who frequently deceive them about the product quality.

Resource Management Constraints: Non-Timber Forest Products (NTFPs) are in high demand both within and outside the district. However, their availability is limited due to the seasonal nature of their production and collection. A significant number of NTFPs are accessible during the winter compared to other seasons. Collectors often gather these products hastily and without regard for sustainable management practices, contributing to the decline in NTFP availability. Some collectors have observed a decrease in the quantities of Kokum seeds, Sal seeds, among others, without understanding the underlying causes. They do not engage in replanting or forest conservation post-harvest. Additionally, restricted access to the forest's core areas by forestry officials, coupled with a lack of financial incentives, diminishes their motivation to maintain the forest.

Institutional Constraints: The majority of NTFP collectors report product losses due to institutional barriers, such as the absence of factories to process their goods. They harvest large amounts of leaves, which are fashioned into plates, cups, and other items, yet there is no direct market to sell these products at fair prices. Consequently, they often wait extended periods for traders to purchase the leaves. The number of traders has decreased over time, and without adequate storage facilities, many collectors suffer losses. Some collectors focus on medicinal products, which typically command better prices than leaves, but they too have seen a decline in both collection and sales. Previously, an Ayurvedic hospital in Baripada provided a steady demand for these products, but since its closure, the market demand has significantly diminished, with alternative Ayurvedic products now available.

2. REVIEW OF LITERATURE

Non-timber forest products (NTFPs) are crucial for the livelihoods of millions worldwide, as noted by Shackleton et al. (2015). The swift spread of COVID-19 and subsequent mobility restrictions have led to a global socio-economic standstill and an unprecedented crisis (Lindsey et al., 2020). The United Nations Forum on Forests (2021) assessed the pandemic's effects on sustainable forest management, forest-dependent communities, Indigenous peoples, and international cooperation in forest financing. The pandemic has negatively impacted all regions, with varying severity and extent. The report emphasized the need for further studies to understand the pandemic's short-, medium-, and long-term effects on forest management and industries. Laudari et al. (2021) focused on the Gandaki province of Nepal, using semi-structured interviews, literature reviews, and media analysis to investigate the lockdown's impact on forestry. They reported that the pandemic halted forestry and ecotourism, research, capacity development, forest works, and led to increased illegal activities, costing Gandaki province 9.6 million USD and 3.2 million man-days of employment. McNamara et al. (2020) explored the link between macroeconomic shocks and the wild meat trade, including the potential consequences of COVID-19 on wildlife and dependent livelihoods.

Research on factors affecting the success of NTFP commercialization by Marshall et al. (2003) identified 45 factors that impede this success, highlighting the need for proper business planning, market development, and analysis. Shackleton and Shackleton (2004) noted the growing trade of NTFPs and its benefits for rural communities. Ros-Tonen and Wiersum (2005) documented the diverse uses of NTFPs in livelihoods, including food, materials, and medicine. Delang (2006) evaluated the impact of wild food plants on poverty reduction and rural livelihoods. Belcher and Schreckenberg (2007) pointed out that NTFP commercialization faces challenges that require a multidisciplinary approach, supporting both technical and social aspects of natural resource management at all levels. Asamoah, et al. (2023) observed that the respondents were not doing any value addition in collected NTFPS. They have different perceptions on commercialization as well as understanding about value addition to their NTFPS.

Paumgarten and Shackleton (2009) observed that NTFPs significantly contribute to rural households, suggesting that poverty alleviation and NTFP conservation could be achieved through effective socio-economic strategies. Ahenkan and Boon (2010) argued that regular commercialization of NTFPs could create employment, generate income, and enhance the

livelihoods of forest-dependent communities. Mukul (2011) recommended government support for the NTFP industry to adapt to the global market's changes, suggesting improvements in production, supply chains, and worker skills. Gauli (2011) found that managing NTFPs effectively and fostering a supportive policy environment could alleviate rural poverty. Ahenkan and Boon (2011), and Adam et al. (2013) concluded that NTFPs could improve livelihoods and reduce poverty through gradual domestication.

Ahenkan and Boon (2011) posited that commercializing non-timber forest products (NTFPs) could greatly enhance sustainable development and women's empowerment. Khosravi et al. (2017) discovered that lower-income groups derive a larger share of their income from NTFPs compared to higher and middle-income groups, with NTFP income constituting 10% to 21% of their total income. Matias et al. (2018) concluded that commercializing traditional indigenous practices could increase both gross margins and ecological sustainability. Demie (2019) found that NTFPs account for 29.34% of total household income and that socio-economic factors such as gender, family size, and wealth status influence NTFP collection. Kamwi et al. (2020) indicated no significant link between demographic factors like age, gender, marital status, and household size with NTFP dependency, but found a significant correlation between NTFP reliance and factors such as occupation, years in the village, number of employed household members, highest qualification, and employment status.

Meinhold and Darr (2019) suggested that NTFP success requires a comprehensive approach considering socioeconomic, environmental contexts, and the value chain process. Nguyen & Lv (2021) identified a significant correlation between farmers' willingness to engage in the value chain and sustainable poverty reduction policies, noting that this willingness markedly influences financial participation in the NTFP value chain. Mahonya et al. (2019) observed that NTFP value chains are small and dominated by traders and intermediaries. Rahman et al. (2021) reported that collectors and farmers earn more from NTFP collection than from other occupations. Shen et al. (2022) found that socio-ecological factors impact both participation in and income derived from NTFP collection.

***National and Regional Studies*:** Chatterjee (2020) examined the effects of the Covid-19 lockdown on selected communities and the accessibility and efficacy of government relief in eight Indian states. The findings indicated villagers were unable to collect NTFPs. Even when some households collected NTFPs, they couldn't sell them due to supply chain disruptions and local market closures during Covid-19 period. Singh et al. (2021) assessed the

pandemic's impacts on rangers and their daily tasks through a global survey, including case studies from Pakistan and India. The online survey with closed-ended questions aimed to gauge the pandemic's effects on the ranger workforce. They discovered that various aspects of ranger duties were adversely affected by the pandemic, actions by authorities, and illegal activities. The study also highlighted varying regional perceptions of the pandemic's impact on protected areas and ranger operations. Dinda, et al. (2020) NTFPs examined the commercialisation of NTFPs as well as the sustainable management strategies in Paschim Medinapur district of India. Their study found that the forest dwellers sold their NTFPs in local market or intermediaries due to lack of knowledge of value additionality, storage and accessibility of market.

Prasad and Chauhan (2020) investigated the livelihood contributions of NTFPs from three Jharkhand villages using quantitative and qualitative data. Their research indicated that most households gather NTFPs, contributing significantly to their income, ranging from 33% to 55%. Islam and Quli (2017) evaluated the role of NTFPs in the tribal economy of Bundu block in Ranchi district, Jharkhand. Utilizing a multi-stage random sampling method, they collected data from nine villages and 164 households, employing basic statistical tools for analysis. Their findings showed the average household income from NTFPs was Rs. 4,791.16 annually, with the cottage industry generating the most income and ethno-medicine the least. The sustainable exploitation, utilization, and commercialization of Non-Timber Forest Products (NTFPs) are key to socio-economic development, poverty alleviation, and livelihood security for tribal communities in the region. A study by Nayak et al. (2014) revealed that approximately 40 to 60 percent of income for households living in and around forests is derived from the sale of NTFPs. Verma and Paul (2019) investigated the range of rural livelihood contributions of NTFPs in Jharkhand's Gumla district, aiming to pinpoint factors influencing household engagement levels. Their research indicated that all households in the study area collect NTFPs regardless of the income they contribute.

In Chhattisgarh's Bastar district, about 75% of the population supplements their diet with tubers, flowers, and fruits throughout the year (Pandey et al., 2016). For tribal communities, NTFPs contribute to half of their income (10-60% of total household income) (Asfaw et al., 2013). NTFP also serves as the sole means of income generation for millions (Areki and Cunningham, 2010; Babulo et al., 2009). Household size determines the dependence on forest products. More family members, earning more income from off-farm jobs depend less on forest products and vice versa (Biland, et al., 2021). Larger families tend to collect more

forest products, utilizing them more for self-consumption and to sustain labourers, in contrast to smaller families (Adhikari et al., 2004).

Ghosal (2011) noted that effective management of NTFPs could lead to income and employment generation, thus their economic value warrants attention from both government and non-governmental organizations. Saha and Sundriyal (2012) proposed that strategic management and policy initiatives could address NTFP-related issues. Shit and Pati (2012) argued that due to unsustainable practices, poor management, and limited market access, the potential of NTFPs to support livelihoods and conservation is not fully realized. Douli et al. (2014) found that firewood and Sal leaves, as key NTFPs, substantially contribute to the income of tribal communities, suggesting that their conservation through strategic management could enhance income and employment. Kumar (2015) recommended that elevating the education level of tribal forest dwellers, along with effective NTFP management and policy reforms, could improve their socio-economic status. Jha (2016) advised that enhanced market information systems, value addition, and a shift from informal to formal market structures are necessary for better NTFP returns. Pandey et al. (2016) observed that sustainability and utilization of NTFPs require appropriate strategies. Singh and Chatterjee (2022) discovered that in Uttarakhand's Himalayan region, the value chain significantly impacts the livelihoods and employment of local communities.

Dash and Behera (2016) observed that households derive a significant portion of their income from collecting non-timber forest products (NTFPs), with socio-economic and demographic factors influencing the intensity of collection. Prasad and Chauhan (2020) noted that most households gather NTFPs, which constitutes a substantial part of their income relative to other sources. Singh, P. et al. (2022) discovered that the collection and sale of NTFPs significantly impact both rural and tribal economies. Islam and Quli (2017) identified sustainable exploitation, utilization, and commercialization of NTFPs as key contributors to socio-economic growth, poverty alleviation, and the livelihood security of local tribes. Verma and Paul (2016) proposed that the government address certain challenges related to NTFPs to enhance the earnings of those involved in their collection.

3. RATIONAL OF THE STUDY

NTFPs contribute significantly to rural development and poverty alleviation in tropical forest areas. While existing studies have primarily focused on the livelihood aspects of NTFPs, a few studies have analyzed their commercialization. The existing studies reveal that approaches to NTFP commercialization contrast due to income fluctuations and unsustainable harvesting methods, leading to forest degradation (Talukdar, et al., 2021). Therefore, further research is necessary to identify circumstances where NTFP commercialization can improve forest dependants' livelihoods while ensuring sustainable forest resources. The NTFP trade in national and international markets requires a complex supply chain with multiple stages, skills, and value addition (Wynberg and Niekerk, 2014). However, farmers, processors, middlemen, and traders face obstacles in securing a reliable and fair market for their products. This study aims to identify factors for successful NTFP commercialization, improving the livelihood of dependants, and the income of stakeholders in the supply chain. In these directions, the present study is carried out in Odisha, Jharkhand, and Chhattisgarh states in India, where tribes such as Santhal, Kolha, Bhumija, Bhuyan, Bhatudi, Mahalis, Sounti, and Saharas are mainly engaged in NTFP collection and marketing. The Covid-19 lockdowns severely impacted the livelihood of forest dependants, restricting their ability to collect and sell NTFPs. As a result, both forest dependants and stakeholders in the supply chain were negatively affected by the pandemic.

4. OBJECTIVES OF THE STUDY

The primary objective of the present study is to identify the factors influencing NTFP commercialization and what are strategies followed/required for the success of commercialisation in India. Therefore, the specific objectives of the study are as follows:

- To analyze the socio-economic conditions of forest dependants in the study area.
- To analyze the economics of NTFPs collection and contribution to income and employment in the study area.
- To examine the effects of the Covid-19 pandemic on households and other stakeholders of the supply chain.
- To determine factors influencing NTFP commercialization in the study area. And
- To analyze strategies for the success of NTFP commercialization in the study area.

5. METHODOLOGY

5.1 Universe of the study

The present study focuses on three Indian states Odisha, Jharkhand and Chhattisgarh, and from each state, one was picked namely Mayurbhanj in Odisha, Khunti in Jharkhand, and Gariyaband in Chhattisgarh. These districts were chosen because of a high concentration of tribal people and high forest dependency. The Mayurbhanj district in northern Odisha stretches from 85˚40' to 87˚11' East Longitude and 21˚16' to 22˚34' North Latitude. The total area of the Mayurbhanj district is 10,418 square kilometers and the border district is West Bengal's Medinipur, Jharkhand's Singhbhum, Odisha's Balasore and Kendujhar. The district is covered with over 39% forests and hills. Among Odisha's nine tribal districts, Mayurbhanj ranks second in the Scheduled Tribes (STs) population with 58.58% (Mohanty, B., 2017).

Likewise, the state Jharkhand is located in the northeastern part of the country, renowned for its wealth of NTFPs and climatic conditions (Prasad, S. and Chauhan, D.S., 2020). The boarder states are Bihar in the north, West Bengal in the east, Odisha in the south, Chhattisgarh in the west, and Uttar Pradesh (UP) in the northwest. The state spans from 21˚57' to 25˚14' north latitude and from 83˚20' to 87˚58' east longitude and known for its abundant forest resources. The district has a high tribal population, predominantly the Munda tribes, who rely on collecting minor forest products to support their economy and livelihood. Due to historical exclusion from the educational system, Khunti is one of the most educationally backward districts with a low literacy rate. It is also famous for its significant contribution to lac production, accounting for a substantial portion of India's total lac production. Khunti District lies in the southwestern part of Jharkhand, covering 2535 sq. km, and is bordered by the Ranchi district in the north, Ranchi and Saraikela districts in the east, West Singhbhum district in the south, and Gumla and Simdega districts in the west.

Similarly, Chhattisgarh located in central India is renowned for its dense forests. The state has nearly 44% forest cover, which is one of India's most biodiverse regions. The state's forested area is recorded at 56,772 square kilometers, constituting 44.21% of its total geographical area (Shrey, R. 2017). As a landlocked region, Chhattisgarh is bordered by UP to the north, Jharkhand to the northeast, Odisha to the southeast, Madhya Pradesh (MP) to the northwest, Maharashtra to the southwest, and Andhra Pradesh to the south. It spans from 17˚ 46' N to 24˚ 5' N latitude and from 80˚ 15' E to 84˚ 20' E longitude, occupying a central position in India with an area of 135,194 square kilometers. The Gariyaband District,

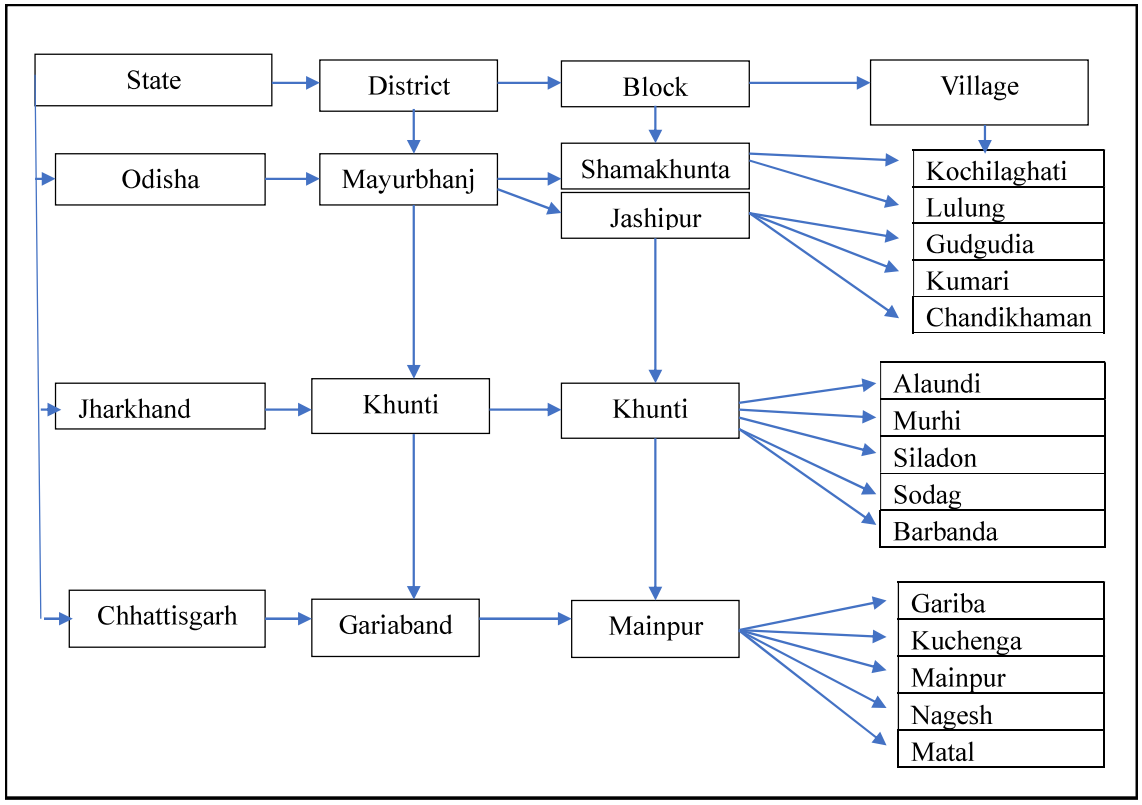
established in 2012 from the Raipur district, serves as the study area within the state. It is encircled by the Nabarangapur district of Odisha to the south, the Kalahandi and Nuapada districts to the east, the Mahasamund and Raipur districts to the north, and the Dhamtari district to the west. The district spans 5,822.861 square kilometers, with forests covering 2,935 square kilometers, including the Udanti Sitanadi Tiger Reserve. It has a population of 597,653, with 17.97% belonging to Scheduled Castes and 36.14% to Scheduled Tribes (Census 2011, Government of India).

The study uses primary data collected from different respondents such as NTFP collectors, processors, traders, retailers, and wholesalers using semi-structured questionnaires. The analysis incorporates NTFPs that are frequently gathered and sold in these states. The study variables include the costs associated with various operations, the labour and time required for collection, marketing, processing at different levels of farm operations, etc. The research employs a mixed-methods approach to achieve its objectives, which includes a quantitative household survey, focus group discussions with villagers and traders, interviews with traders and millers, and a value chain analysis within the supply chain. It utilizes a range of statistical tools, such as percentages, ratios, cross-tabulations, and multiple regression technique.

5.2 Study Design

The study objectives are examined through the analysis of primary data gathered through questionnaires and personal interviews. At the beginning of the research, the researcher has focused on the states with a higher tribal population by looking at Census Data 2011. Then the study decided Odisha, Jharkhand and Chhattisgarh states specific for interest. Then the specific districts are selected in each state based on their reliance on forest resources for sustenance. Consequently, the study selects the Mayurbhanj district from Odisha, Khunti district from Jharkhand and Gariaband district from Chhattisgarh. Following the selection process, particular blocks within these districts are chosen namely- Shamakhunta and Jashipur blocks from Mayurbhanj district, Khunti block from Khunti district and Mainpur block from Gariaband district. Subsequently, five villages were selected from districts within the respective states. These details are shown in Figure 5.1.

Figure 5.1: Flow chart of Study Area



5.3 Sampling and Sample Size

The study uses the simple random sampling method to select samples from the study areas in each state. This approach is utilized to prevent biasedness representation of the sample by ensuring each has an equal opportunity to be chosen. The study has collected a total of 1000 samples from the selected study area. However, due to some missing data/ data errors, and to make study sample uniformity across the study states, the total sample size is restricted to 900 and from each state 300 samples have been used in the data analysis. The primary data was collected from the tribes involved in the collection, processing and marketing of NTFPs. Hence, the sample respondents were mainly tribal women, SHG members.

Additionally, the study uses secondary data to analyze production, consumption, government revenue, and the demographic profiles of the study villages and other aspects, from various sources including district statistical reports, state budget papers, and the Directorate of Economics and Statistics in respective state.

5.4 Sample Selection

The primary data are collected from three states: Odisha, Chhattisgarh, and Jharkhand. In each state, one district is selected- Mayurbhanj from Odisha, Khunti from Jharkhand, and Gariyaband from Chhattisgarh. These districts were chosen due to their significant tribal populations and high forest dependency. Further, from each district five villages have been selected as shown in Table-5.2.

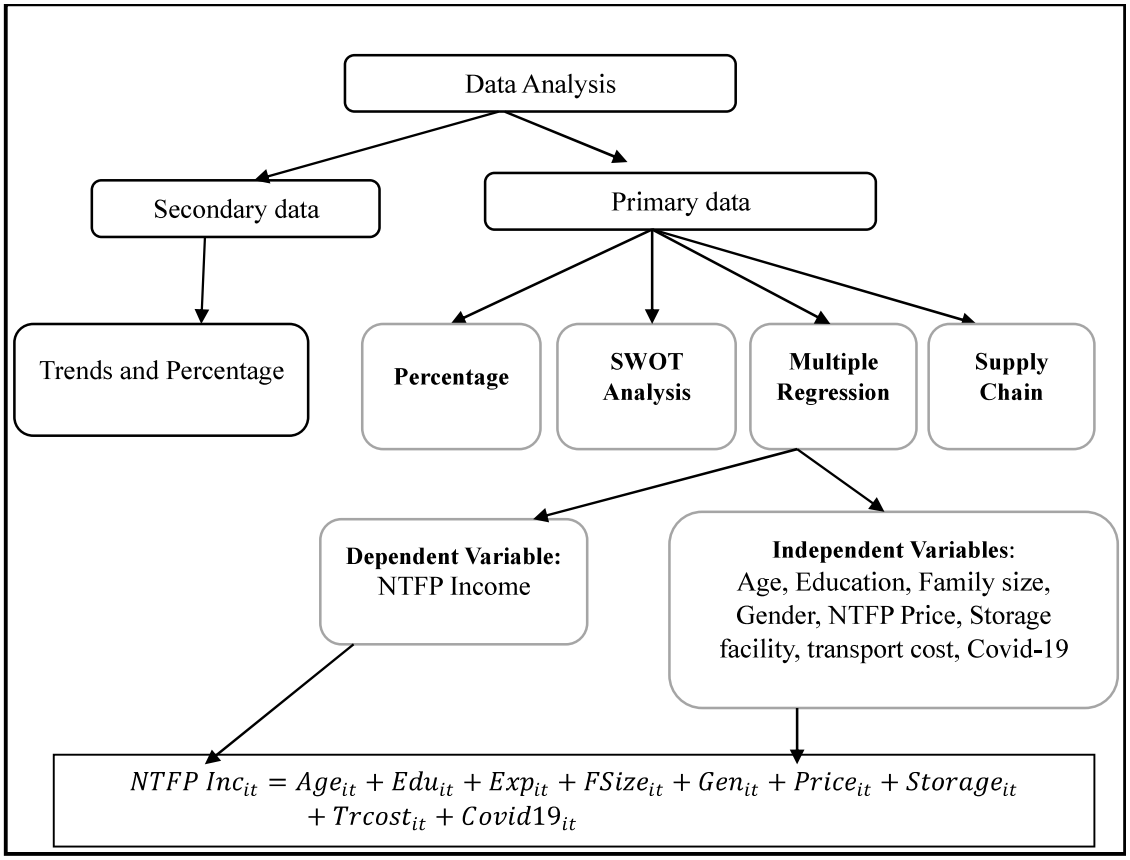
Table 5.1: Sample Selection

Odisha					
District	Block	Village	Total Houses	Total Population	Total Sample
Mayurbhanj	Shamakhunta	Kochilaghati	108	505	300
		Lulung	15	57	
	Jasipur	Gudgudia	144	701	
		Kumari	80	321	
		Chandikhaman	240	1166	
Jharkhand					
Khunti	Khunti	Alaundi	93	487	300
		Murhi	237	1213	
		Siladon	211	975	
		Sodag	95	442	
		Barbanda	160	836	
Chhatisgarh					
Gariaband	Mainpur	Gariba	114	526	300
		Kuchenga	96	390	
		Mainpur	216	862	
		Nagesh	124	400	
		Matal	32	119	

5.5 Tools & Techniques

The study objectives were examined using both secondary and primary data to analyse study objectives. The study analyses trends and percentage from the secondary data. The primary data was through estimation of percentage, SWOT analysis, multiple regression technique and supply chain method. The tools and techniques of data analysis are shown in Figure 5.2.

Figure 5.2: Tools &Techniques of Data Analysis in the Study



To determine the factors influencing the commercialization of NTFPs in the study area, the study has used a multiple regression technique as presented in Table 3.15 below.

NTFP Income = C(1)*Age + C(2)*Education + C(3)*Experience + C(4)*Family size + C(5)*Gender + C(6)*Price + C(7)*Storage facility + C(8)*Transport Cost + C(9)*Covid-19 + C(10) + [Ar(1)=C(11)] +u

The net income from NTFPs is used as a proxy for commercialization of NTFPs, 'u' represents the disturbance or error term. It is presumed that a low price adversely impacts NTFP income, and likewise, Covid-19 has a detrimental effect on the commercialization of NTFPs, as well as the income from NTFPs for the households surveyed.

5.6 Study Variables and Sources

The study uses both secondary data and primary data. The variables such as NTFPs production, consumption, government revenue, forest covers, land use pattern and forestry output values were collected from different secondary sources. Whereas, the variable like respondents age, educational qualification, family members, year of experience on collection of NTFPs, income from NTFPs, incurred costs, marketed values and supply chain data were

collected from primary source includes women involved in the collection and sale of Non-Timber Forest Products (NTFPs), as well as various stakeholders like retailers, distributors, wholesalers, transporters, processors, and others, as relevant.

6. RESULTS & DISCUSSIONS

6.1 Analysis of Commercialisation of NTFPs in Study Area

Price is very important for the success of commercialization of NTFPs. The minimum support price (MSP) of major NTFPs in the study states are reported in Table 6.1. The Ministry of Tribal Affairs, Government of India (2020) updated the MSP of NTFPs time to time under the centrally sponsored scheme "Mechanism for Marketing of Minor Forest Produce (MFP) through Minimum Support Price and Development of Value Chain for MFP". The MSP for MFPs is subject to review every three years by the Pricing Cell established by this ministry. After the COVID-19 pandemic, there was introduction of a scheme to support tribal MFP gatherers, relaxations were made to the existing scheme guidelines. Consequently, the revised MSP have increased for all NTFP items.

Table 6.2 reports the total volume and value of major NTFPs in the study states for 2020-21. It indicates that the total volume and value of major NTFPs in the study states was68938.351metric tonnes and 16770.21lakhs. In State-wise, Chhattisgarh leads with the highest volume and value of NTFPs as compared to Odisha and Jharkandhs, because the it produces highest volume of NTFPs than other study states. Next Odisha is producing the highest volume and value of NTFPs, whereas, the state Jharkhand has the least volume and value of NTFPS.

Table 6.1: Major NTFPs Commodity wise MSP of MFP items and the Price Change

Sl. No.	NTFP Item	2019	2021	Price Change (in Rs)
		Existing MSP Rates (Rs./Kg.)	Revised MSP Rates (Rs /Kg)	
1	Tamarind (with seeds) - *Tamarindus indica*	31	36	5
2	Wild Honey	195	225	30
4	Karanj seeds - *Pongamia pinnata*	19	22	3
5	Sal seed - *Shorea robusta*	20	20	0
6	Mahua seed - *Madhuca longifolia*	25	29	4
7	Sal leaves - *Shorea robusta*	30	35	5
8	Chironji pods with seeds - *Buchananialanzan*	109	126	17
10 (A)	Rangeeni Lac	130	200	70
10 (B)	Kusumi Lac	203	275	72
11	Kusum seeds - (*Schleichera oleosa*)	20	23	3
12	Neem seeds - (*Azadirachta indica*)	23	27	4
14	Baheda - (*Terminalia bellirica*)	17	17	0
15	Hill Broom Grass - (*Thysanolaena maxima*)	30	50	20
17	Bael pulp (Dried) - (*Aegle marmelos*)	27	30	3
18	Nagarmotha - (*Cyperus rotundas*)	27	30	3
19	Shatavari Roots (Dried) - (*Asparagus racemosus*)	92	107	15
22	Tamarind (De-seeded) - (*Tamarindus indica*)	54	63	9
23	Guggul (*Sterculia urens*)* -	700	812	112
24	Mahua Flowers (dried) - (*Madhuca longifolia*)	17	30	13
26	Jamun dried seeds - (*Syzgiumcumini*)	36	42	6
27	Dried Amla Pulp (deseeded) - (*Phyllanthus emblica*)	45	52	7
33	Giloe - (*Tinospora cordifolia*)	21	40	19
34	Kaunch Seed - (*Macuna pruriens*)	18	21	3
35	Chirata - (*Swertia chirata*)	29	34	5

Source: Ministry of Tribal Affairs, Govt. of India, 2021

Note: States have been given freedom for fixing MSP 10% above or below the MSP rate decided by Ministry of Tribal Affairs.

Table 6.2: Volume and Value of NTFPs in Study States in FY 2020-21

Sl No.	State and NTFP	Volume (MTs)	Value (Rs. Lakhs)
1	Odisha		
	Chironjee Pod with Seeds	3.08	3.88
	Mahua Seed	64.11	18.59
	Myrobalan	1.12	0.17
	Sal Seed	10015.44	2003.09
	Seeded Tamarind	686.92	247.29
	De-seeded Tamarind	0.02	0.01
	Wild Honey	0.525	1.02
	Hill Broom Grass	1.41	0.7
	Baheda	0.06	0.01
	Sub-Total(1)	10772.69	2274.77
2	Jharkhand		
	Rangeeni Lac	9.48	15.69
	Seed Lac Kusumi	60.41	386.62
	Seeded Tamarind	9.911	3.56796
	De-seeded Tamarind	5.84	3.67
	Karanj seed	1.523	0.33
	Charita	1	0.34
	Sub-Total(2)	88.16	410.22
3	Chhattisgarh		
	Chironjee Pod with Seeds	62.422	73.34
	Kusumi Lac	1.219	3.66
	Rangeeni Lac	13.831	30.43
	Mahua Seed	44.994	12.79
	Sal Seed	35071.998	7014.4
	Seeded Tamarind	13388.106	4511.87
	De-seeded Tamarind	125.777	70.88
	Baheda	4550.75	773.63
	Mahua Flower Dry	2824.774	847.43
	Giloy	1206.853	482.74
	Mahul Patta	223.476	33.52
	Hill Broom Grass/ Phool Jaharu	122.824	59.02
	Tamarind Seed	118.021	15.34
	BahedaKachariya	80.043	16.01
	Harra Kachariya	33.622	8.41
	Bael Pulp	65.372	18.81
	Karanj Seed	51.47	9.79
	Wild Honey	32.325	72.73
	Satavar	18.257	19.53
	Kusum Seed	16.646	3.83
	Jamun Seed Dry	12.694	5.18
	Neem Seed	10.662	1.17

	Aonla (Without Seed)	1.365	0.71
	Sub-Total(3)	58077.501	14085.22
4	**Grand Total(1+2+3)**	**68938.351**	**16770.21**

Source: TRIFED Annual Report 2020-21.

6.2 Demographic Profile

The demographic profile of the study is reported in Table 6.1. It reveals that among the study villages, the total population in the Murhi village is highest followed by Chandikhaman and Siladon. The Lulung village reports the lowest total population. The nine study villages namely Lulung, Kumari, Chandikhaman, Gudgudia, Barbanda, Siladon, Mainpur, Gariba and Nagesh show more than 50 percent female population. Over half of the total population in the study villages in the three states are from the Scheduled Tribe (ST) community. Notably, Lulung and Matal villages in Odisha and Chhattisgarh have 100% ST population. Matal leads in workforce participation with 75.60%, followed by Sodag in Jharkhand at 71.70% and Kumari in Odisha at 66.40%. The highest child population aged 0-6 is in Chandikhaman village, whereas, in Murhi and Barbanda villages in Jharkhand trailing the child population respectively.

Table 6.3: Village Profile

Village Name	Total No of Houses	Total Population	Total Literacy rate (%)	ST Population (%)	Working Population (%)	Child (0-6) Population by 2011
Mayurbhanj District, Odisha						
Kochilaghati	108	505	41.4% (209)	90.7% (458)	52.50%	75
Lulung	15	57	48.0% (27)	100% (57)	61.40%	7
Gudgudia	144	701	47.08% (330)	80.60%(565)	49.64%	89
Kumari	80	321	40.2% (129)	92.5% (297)	66.40%	36
Chandikhaman	240	1166	40.6% (473)	97.7% (1139)	51.80%	211
Khunti District, Jharkhand						
Murhi	237	1213	53.8% (652)	65.1% (790)	36.60%	206
Barbanda	160	836	38.5% (322)	90.3% (755)	42.60%	169
Siladon	211	975	59.0% (575)	55.6% (542)	47.90%	121
Sodag	95	442	40.7% (180)	90.5% (400)	71.70%	74
Alaundi	93	487	68.8% (335)	83.6% (407)	33.10%	57
Gariaband District, Chhattisgarh						
Mainpur	216	862	63.7% (549)	58.1% (501)	59.60%	106
Gariba	114	526	37.1% (195)	91.1% (479)	60.50%	82
Nagesh	124	400	57.5% (230)	91.8% (367)	64.30%	60
Matal	32	119	05.0% (6)	100.0% (119)	75.60%	23
Kuchenga	96	390	35.9% (140)	62.1% (242)	53.10%	92

Source: Census 2011, Government of India.

Table 6.4 provides an overview of the characteristics of the participants, in the research conducted in states in India. It indicates that individuals engaged in the commercialization of NTFPs in these states primarily fall within the age range of 25 to 55 with a representation from those under 25. While both men and women are involved in NTFP commercialization there is a level of participation from women compared to men. The data reveals that over 90% of those engaged in NTFP commercialization are married. 30% of participants had no education around half had received primary education and the remaining 20% had completed upper primary education. On average each family consisted of seven members within the study states.

Table 6.4: Demographic Profile of Respondents in the Study Area

			Odisha		Jharkhand		Chhattisgarh	
Sl. No.	Variable	Category	Frequency	%	Frequency	%	Frequency	%
1	Age							
		below 25	64.08	21.36 %	52.92	17.64	56.43	18.81
		25-55	186.81	62.27 %	209.22	69.74	194.31	64.77
		56 above	49.11	16.37 %	37.86	12.62	49.26	16.42
2	Sex							
		Male	117	39%	99.78	33.26	99.78	31.79
		Female	183	61%	200.22	66.74	200.22	68.21
3	Marital Status	Unmarried	22.41	7.47	12.96	4.32	11.28	3.76
		Married	271.29	90.43	277.14	92.38	286.83	95.61
		Widow	6.3	2.1	9.9	3.3	1.89	0.63
4	Educational Status							
		Illiterate	86.58	28.86 %	95.46	31.82 %	92.19	30.73 %
		Primary	132.42	44.14 %	143.73	47.91 %	151.80	50.60 %
		UP	81.00	27.00 %	60.81	20.27 %	56.01	18.67 %
5	Family Size (Average)	Total	6.91		7.87		7.62	
		Men	2.16		3		3	
		Women	2.34		2		2	
		Children	2.41		2.87		2.62	

Regarding the years of experience in NTFP commercialization, Table-3.8 indicates that a majority of respondents (58.05%) have 10-20 years of experience in the collection, processing, sale, and marketing of NTFPs in Odisha. Additionally, 28.78% have over 20 years of experience, while only 13.17% have less than 10 years. In Jharkhand, 15.36% of respondents have under 10 years of experience, 63.48% have 10-20 years, and 21.16% have over 20 years. In Chhattisgarh, the figures are 10.85% for less than 10 years, 64.98% for 10-20 years, and 24.17% for more than 20 years. It can be concluded that in the study villages across the selected states, over half of the respondents possess 10-20 years of experience in the collection, processing, sale, and marketing of NTFPs.

Table 6.5: Experience on Collection, Processing and Sale of NTFPs in the Study Area

Experience	Years	Odisha Respondents (%)	Jharkhand Respondents (%)	Chhattisgarh Respondents (%)
Collection, processing, sale & marketing of NTFPs	<10 years	13.17%	15.36%	10.85%
	10-20 years	58.05%	63.48%	64.98%
	20 years above	28.78%	21.16%	24.17%

Table-6.6 presents the average landholdings of respondents in study villages across selected Indian states, revealing variations in landholding sizes. For instance, in Mayurbhanj district of Odisha, 63% of households surveyed have an average landholding size of less than 2 acres, approximately 19% do not own land, 16% possess 2-4 acres, and a mere 2% hold more than 4 acres. In Khunti district of Jharkhand, the findings show 58% of households with less than 2 acres, 13% landless, 26% with 2-4 acres, and only 3% exceeding 4 acres. In Chhattisgarh's study villages, the majority (72%) own less than 2 acres, followed by 12.14% with 2-4 acres, and 14.05% without any land. Consequently, landless households largely rely on non-timber forest products (NTFPs) for their livelihood in these states.

Table 6.6: Average Land Holding of Respondents in the study area (in Acres)

Land holding	Odisha		Jharkhand		Chhattisgarh	
	Households	%	Households	%	Households	%
No land	74.44	18.61	38.94	12.98	42.15	14.05
less than 2 acres	252.72	63.18	173.22	57.74	216.06	72.02
2 to 4 acres	64.72	16.18	78.36	26.12	36.42	12.14
4 acres above	8.12	2.03	9.48	3.16	5.37	1.79

Table-6.7 outlines the livelihood sources in the study villages of the selected states. Livelihoods vary and include NTFP collection and sales, agricultural cultivation, agricultural wage labour, daily wage labour, animal husbandry, and private jobs. Given the seasonal nature of NTFP collection, residents depend on other activities for the remainder of the year.

Table 6.7: Sources of Family's Livelihood in the Study States in India

States	Sources of Livelihood
Odisha	NTFP collection and sale, Agriculture, Agri-wage labour, Daily wage labour, Animal husbandry
Jharkhand	NTFP collection and sale, Agriculture, Private Job, Agri-wage labour, Daily wage labour
Chhattisgarh	NTFP collection and sale, Agriculture, Daily wage labour, Animal husbandry

Figure 6.1 illustrates the household income sources in the study area, identifying five major categories: NTFP collection and sales, agricultural crop production, wage labour, livestock, and other sources such as part-time jobs and shops. The data reveals that 63% of households consider NTFP collection as their primary source of income, followed by 21% who rely mainly on agricultural crop production. Additionally, 11% of households cite daily wage labour as a significant income source, and 2% derive income from livestock.

Figure 6.1: Sources of Households Income in the Study Area

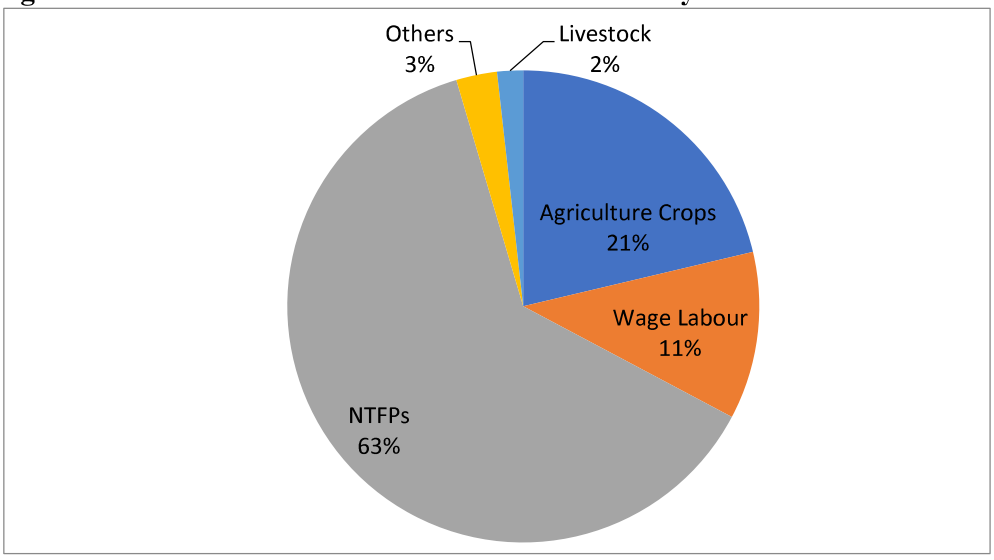


Table-6.8 presents the average annual household income in the study area, showing that a typical household in the Mayurbhanj district of Odisha earns between Rs. 50-70 thousand annually from the commercialization of NTFPs. In contrast, households in the Khunti district

of Jharkhand have an average annual income of Rs. 70-80 thousand from NTFPs. Meanwhile, in the study villages of Chhattisgarh, households earn approximately 40-50 thousand from NTFP commercialization. A comparison of districts and states reveals that households in Jharkhand's Khunti district have the highest earnings from NTFP commercialization, followed by those in Odisha and Chhattisgarh. This is attributed to the support from Van Dhan Kendras/Centres in Jharkhand, which significantly aid tribal women participants and SHG members. These centres instruct them in collection, processing, product creation, and marketing, particularly during various festivals. Some tribal women have also been trained as resource persons for national and state institutions, providing training and lectures, which supplements their income. Field surveys and interactions with different SHG women members revealed that they all have bank accounts where their NTFP income is directly credited by Van Dhan centres in Jharkhand and Chhattisgarh, and by ORMAS in Odisha. After covering their monthly expenses, they manage to save money in their bank accounts.

Table 6.8: Annual Income of Households from NTFPs in the Study Area (Rs.)

District	State	Annual Income from NTFP (Rs)	Remarks
Mayurbhanj	Odisha	30,000 - 50,000	Mostly seasonal collection of NTFPs. Among the NTFPs Tendu leaves & fruits, Sal leaves, seeds &Jhuna, mushrooms, honey, kusum seeds, charkoal, jamun, harida, bahada, sabai grass, karanj seed highest collected.
Khunti	Jharkhand	50,000 - 70,000	Mostly seasonal collection of NTFPs. Among the NTFPs, Tamarind, Lac, Tendu leaves, Mahua, Karanj seed are highest collected.
Gariaband	Chhatisgarh	50,000 - 70,000	Mostly seasonal collection of NTFPs. Among the NTFPs, Tamarind, Lac, Tendu leaves and Mahua are highest collected

Note: (i) the above annual income earned by the households who are a member of SHG and involved in processing, making product and marketing that product.

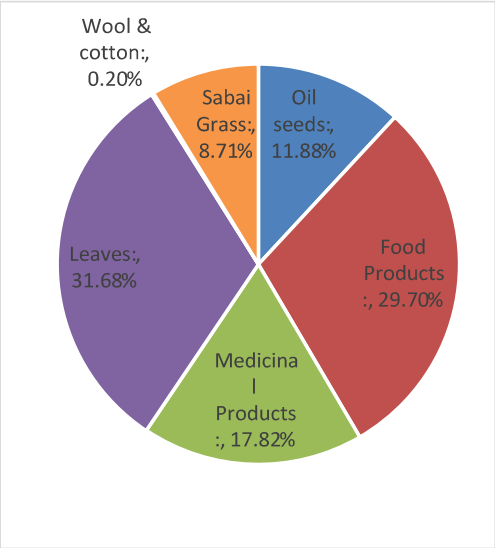
(ii) The non-members of SHG earned about 30000-35000 annually as they sold to middleman/local traders or nearby markets.

Figure 6.2A to C presents the various sources of NTFP income within the study area. It revealed that in Odisha, the largest share of NTFP income comes from various leaves (31%), followed by food products (30%). Medicinal products account for approximately 18% of households' total income, oil seeds for about 12%, and sabai grass for 9%. Likewise, in

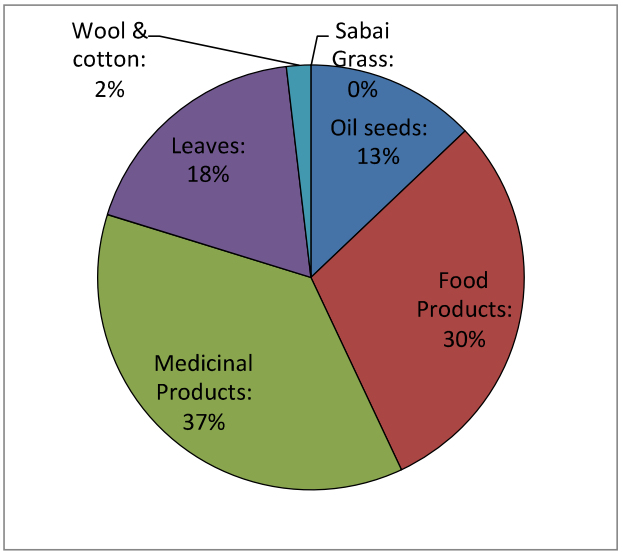
Jharkhand, the medicinal products has the highest 37% NTFP income share, followed by food products (30%). Leaves and oil seeds contribute 18% and 13% to the total NTFP incomerespectively. Similarly, in Chhattisgarh, the leaves are the predominant source (40%) of NTFP income that followed by food products (28%). Medicinal products and oil seeds contribute 17% and 14% to household income respectively. A comparison within the states shows that both Odisha and Chhattisgarh's highest NTFP income earned from selling of different leaves, followed by medicinal products, while in Jharkhand, the highest income earned from medicinal products, particularly lac, and then food products.

Figure 6.2: Source of NTFPs Income of Households in the Study Area

A. Odisha



B. Jharkhand



C. Chhattisgarh

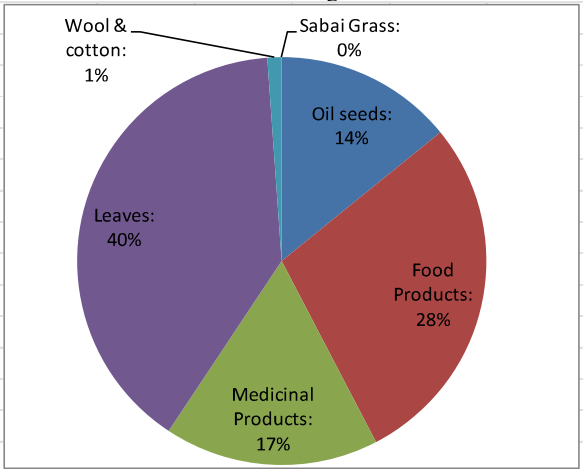


Table-6.9 illustrates the percentage of family income derived from NTFP in the study states. It is found that both in Odisha and Jharkhand households received about 40-60% of annual income from NTFPs. However, in Chhattisgarh, the income percentage ranges between 50-70 percent. Comparatively, Chhattisgarh households earned the highest percentage of family income from NTFPs than Odisha and Jharkhand.

Table 6.9: Households Income from NTFPs in percentage

State	Income from NTFPs (%)
Odisha	40-60%
Jharkhand	40-60%
Chhattisgarh	50-70%

Figure-6.3 outlines the seasonal availability of Non-Timber Forest Products (NTFPs) in the study area, revealing that the majority of NTFPs are accessible during winter, especially from February to May. Sal seed and honey are available in both winter and summer. The Red Weaver Ants (RWA) are available throughout the year, but their production volume peaks in winter. Lac, produced by insects, is found naturally and is also cultivated by local households in nearby forests due to its high commercial value among NTFPs.

Figure 6.3 : Seasonal availability of NTFPs in Study States in India

NTFP	**Botanical Name**	**Harvesting Period**				
		Feb	Mar	Apr	May	Jun
Amla	Embelica Officinalis	■	■			
Atundi Lai	Combretum Decandron		■	■	■	
Bel	Aegelmarmelos			■	■	■
Atundi Fruit	Combretum Decandron			■	■	
Kamala Gundi Fruit	Melltusphilippenensi		■	■	■	
Kendu leaf	Diospyros Melanoxylon			■	■	
Tamarind	Tamarindusindica	■	■	■		
Mahua flower	Madhu Indica	■	■	■		
Mahua seeds	Madhu Indica			■	■	
Char seeds	Buchanananialanzan			■	■	■
Karanj	Pongamiapinnata		■	■	■	
Neem	Azadiractaindica			■	■	■
Siali leaves & seed	Bauhinia Vahili	■	■	■	■	■
Sal leaves & Seeds	Shorearobusta	■	■	■	■	■
Thorn Broom	Astidasetacea	■	■			
Kusum seeds	Schleicheraoleosa	■	■	■		
Honey	Bee spp.	■	■	■	■	■
Arrowroot	Curcuma augustifolia	■	■			
Satabari	Asparagus Racemosus	■	■			

The NTFPs body parts and uses area reported in Table-6.10. It indicates that the various body parts of NTFP are used for different purposes. Among the body parts of NTFPs, leaves, fruits, roots, flowers, seeds, stems and pulp have been used for both human and animals. That body parts are used for different purpose like as food and food supplements, and medicinal use for different purposes, etc.

Table 6.10: Uses of NTFPs in the Study States in India

Sl. No.	Name of NTFPs	Scientific Name	Body Parts used	Used for
1	Sal	Shorea robusta	Leaves	making leaf plates and cups
			Seeds	used as oil in Ayurvedic medicines
2	Mahua	Madhuca longifolia	Flower	in making cakes and alcoholic drinks
			seeds	seeds oil used in massage to relive joint pain
3	Neem	Azadirachta indica A. Juss	seeds	used as oil in Ayurvedic medicines
4	Amla	Phylanthusembalica	Fruits	used as food and also for medicinal purpose
5	Broom grass	Thysanolaena maxima	Leaves, Roots, stem	to feed livestock, soil conservation, staking in vegetable growing fields
6	Bahada	Terminalia bellirica	Fruits	used as food and medicine for stomach problem
7	Harida	Terminalia chebula	Fruits	used as food and medicine for stomach problem
8	Tamarind	Tamarindus indica	Leaves, pulp and seeds	leaves and pulp are used in making various dishes and chocolates, and seeds has various medicinal uses.
9	Karanj	Pongamia pinnata	Fruits	Used as herbal medicines
10	Kusumi	Schleichera oleosa	Seeds	used as Oil seed and medicines
11	Siali	Boswellia serrata	Fruits	used as medicines
12	Red weaver ants	Oecophyllasmaragdina	Whole	consumed as food and good for overall immune system
13	Lac	Kerria lacca	Resin	secretes a resin material onto trees that can be used as shellac which is an important ingredient in various inks, paints, sealants and varnishes

14	Wild Honey	Apis mellifera	Honey	used as food and medicine for stomach problem
15	Meshrooms	Agaricus bisporus	whole	eatable mushrooms are used in various food dishes and wood mushrooms are used in leather industries in making various products
16	Bel	Aegle marmoelos	pulp	used as food drinks and also has various medicinal uses.
17	Tendu	Diospyros melanoxylon (roxb)	leaves, fruits and seeds	leaves are used to make bidi. Fruits pulp are consumed and seeds oil are used in massage.
18	Jamun	Syzygiumcumini	Fruits	used as food and medicine for stomach problems and diabetes
19	Jhuna	Ziziphus jujuba	whole	used during worship and used in making agarwati
20	Siali leaves	Bauhinia Vahlii	leaves	used in making leaf plates and also used as ayurvedic medicine
21	Cotton tree	Ceiba pentandra	silk and roots	silk are used in making pillow and matresses. Roots are used in treating various disseses
22	Cocoon	Chrysalis, Pupae	silk	used in making garments.

Table-6.11 categorizes the NTFPs utilized by humans, as classified by Singh, P. et al. (2022), into Edible Plant Products, Non-edible Plant Products, Edible Animal Products, Non-edible Animal Products, and Medicinal Products. Edible Plant Products include foods, edible oils, spices, fodder, and other edible plants. Non-edible Plant Products encompass bamboo, sustainably harvested wood, ornamental plants, and other non-edible plant items. Edible Animal Products cover terrestrial animals, animal products, fish, aquatic invertebrates, and other edible animal items, while Non-edible Animal Products consist of insect products, wildlife products, live animals, and other non-edible animal items. Lastly, Medicinal Products comprise all medicinal forest products.

Table 6.11: Categories of NTFPs in study states in India

Categories	Name of the Products
Edible Plant Products:	
Food	Amla, Honey, Jammun,Mahua, Wood mushroom, Rutuka mushroom, Dingiri mushroom, Tamarind, Bel
Edible oils	Karanj seed, Kusum seed, Char seed, Mahua seed, Sal seed, Neem seed
Spices	Wild turmeric
Fodder	Broom grass, sal leaves
Non-edible plant products	Sabai grass, Simili wool, Cucon, Charcoal
Edible Animal Products:	Red weaver ant
Non-edible Animal Products:	
Insect Products	Lac
Other non-edible animal products	Wool, Fur, Tasar
Medicinal Products:	
All medicinal products	Harida, Bahada, Palas flower/ stem bark, Siali bark, Genduli, Dhataki, Amla & Lac

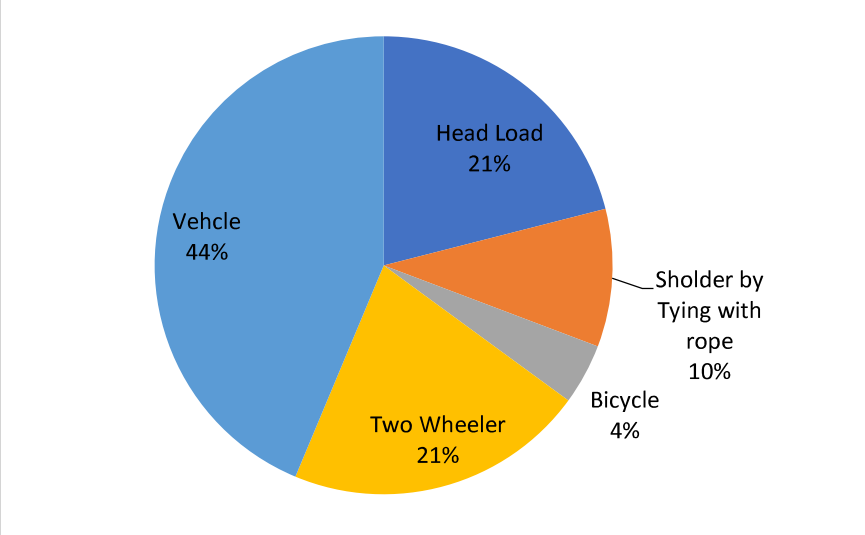
Table-6.12 illustrates the monthly household income from Non-Timber Forest Products (NTFPs) in the study region. It is found that household earned income of Rs. 15750/- per month (pm) in Odisha, followed by Jharkhand Rs. 22250/-pm and Chhattisgarh Rs. 22500/-pm respectively. From the different categories of NTFPs, the households in Mayurbhanj district of Odisha earned the largest share about 35% of income from food products. The second highest income come from leaves is about 32%, then followed by medicinal products (15.87%). The Wool and cotton contribute the least income to households only 0.32%. Likewise, the households in Jharkhand and Chhattisgarh earned highest income from the medicinal products 35.96% and 37.78% respectively, followed by food products 29.21% and 26.67%. The households in both the states earned the least income from Hill grass 1.12% and 1.33% respectively. Overall, the households in the study states earned a significant income from the NTFPs food products, medicinal products and leaves.

Table 6.12: Households Income from NTFPs in the Study Area (Per Month)

Category of NTFPs	Odisha		Jharkhand		Chhatisgarh	
	Income (Rs.)	(%)	Income (Rs.)	(%)	Income (Rs.)	(%)
Oil seeds:	1500	9.52	2000	8.99	2500	11.11
Food Products:	5500	34.92	6500	29.21	6000	26.67
Medicinal Products:	2500	15.87	8000	35.96	8500	37.78
Leaves:	5000	31.75	5000	22.47	5000	22.22
Wool & cotton:	50	0.32	500	2.25	200	0.89
Hill Grass:	1200	7.62	250	1.12	300	1.33
Total	15750	100	22250	100	22500	100

In the study area, respondents utilize various transportation methods at different stages of NTFP handling, from collection to sale. The field survey revealed that transportation modes include head load, shoulder carrying with ropes, bicycles, two-wheelers, and vehicles. Figure-6.4 depicts the transportation methods for NTFPs by households in the study villages across the selected states. It is evident that vehicles are predominantly used for NTFP commercialization (44%), followed by personal bikes/two-wheelers (21%). A significant number of respondents (21%) transport their NTFPs from collection to market by head load. A smaller group of collectors use bicycles and shoulder carrying with ropes for the collection and marketing of their NTFPs in the study area.

Figure 6.4: Mode of Transportation NTFPs in the Study States in India



The study has estimated the determinants of NTFP commercialization. The utilized the net income from household NTFPs for commercialization purposes. Several variables influence NTFP commercialization, as reported in Table-3.15, which presents the multiple regression

results for the study area. Examining the estimated variables, the found significant coefficients for family size, low price, transport cost, and Covid-19 among the nine determinants. A positive and significant family size coefficient suggests that larger families earn more from NTFPs. Conversely, lower NTFP prices decrease household income. The negative Covid-19 coefficient indicates that the pandemic has adversely impacted NTFP commercialization in the study area.

Table 6.13: Multiple Regression Results of NTFP Income

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Age	0.062	0.007	0.86	0.39
Education	0.021	0.007	0.303	0.76
Experience	-0.019	0.014	-1.408	0.16
Family size	0.021	0.006	3.719***	0.00
Gender	0.077	0.008	-0.922	0.36
Price	-0.016	0.009	-2.080*	0.06
Storage facility	-0.008	0.01	-0.748	0.46
Transport_Cost	0.011	0.012	1.960**	0.05
Covid_19	-0.047	0.025	-1.925*	0.06
C	4.535	0.059	77.443***	0.00
AR(1)	0.396	0.111	3.555***	0.00
R-squared	0.25	F-statistic	2.74	
Adjusted R-squared	0.24	Prob(F-statistic)	0.01	
Durbin-Watson stat	1.80			

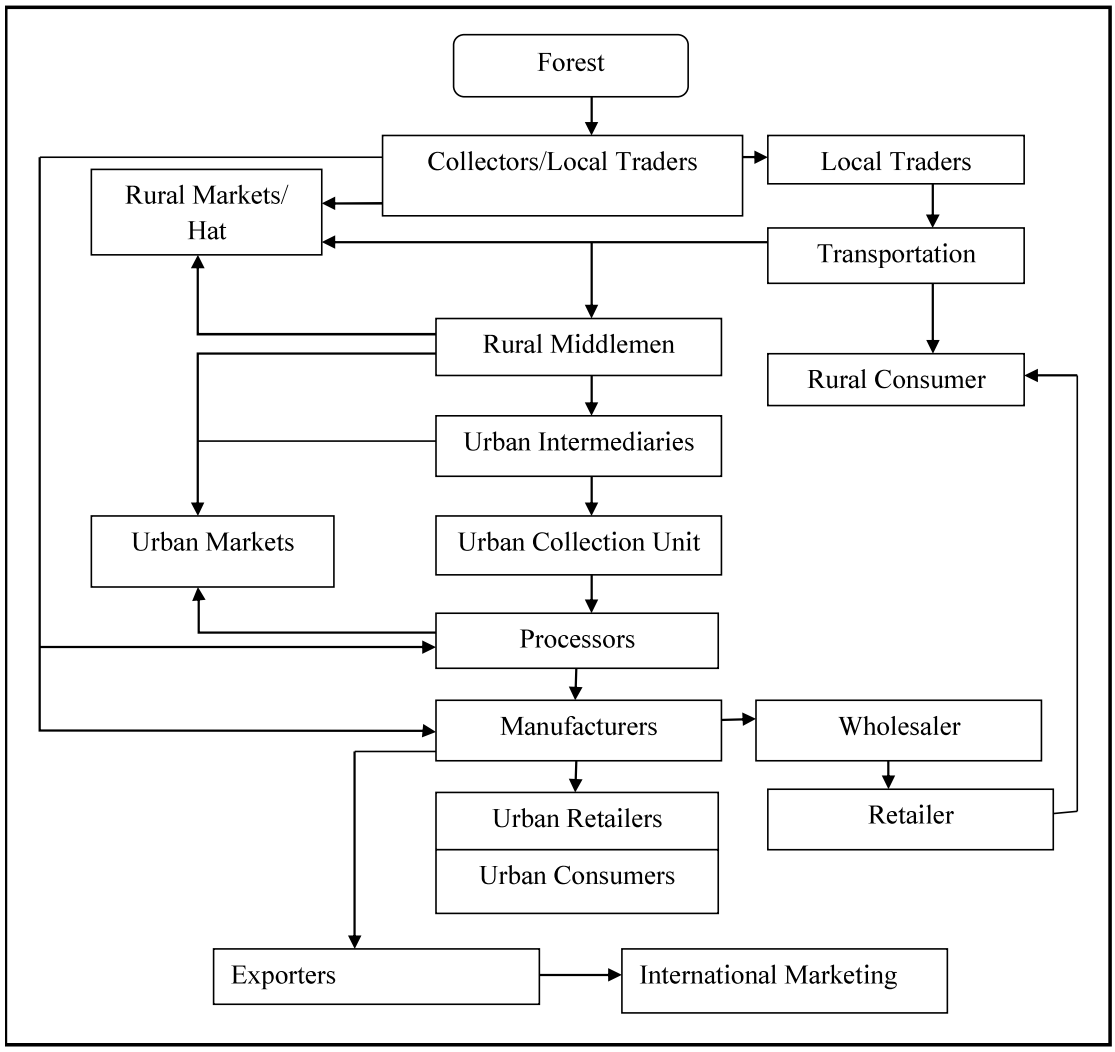
Source: estimated from field data.

6.2 Analysis of Supply Chain of NTFPs in the Study Area

In the study region, tribals are mainly depending on the collection of NTFPs, they keep minimal quantities for their personal use, while the majority are sold either to local traders or in local markets. These households collect NTFPs primarily for commercial purposes, generating income. Local retailers and traders often buy NTFPs directly from the collectors, as well as from local markets and smaller traders. Larger enterprises and wholesalers purchase NTFPs from these local entities, process them, and then produce goods that are sold to retailers or exported to international markets. The supply chain of selected NTFPs, which are commonly commercialised in the study states in India are discussed in the below. In the NTFPs supply chain, the study identified multiple stakeholders collaborating in the commercialization process. While the supply chain varies by product, commonly, women in the study villages gather NTFPs with family assistance. Subsequently, either male family members aid or the women themselves carry the products to their homes. They initiate processing by sun-drying and other methods, and within a short period, sell the goods either

directly to local traders at their homes or at the local 'haat'. Women in Self-Help Groups (SHGs) collaborate and sell to Van Dhan Centres, where they also partake in further processing and final product creation. They assist in marketing these products at local 'haats', fairs, or public events. Traders who purchase NTFPs at the doorstep or from the 'haat' sell to larger traders, who in turn sell to Van Dhan Centres for processing and final product creation. Van Dhan or ORMAS centres then market their products in the retail sector through their members and also export abroad. Throughout this process, from collection to sales, value is added at each stage, culminating in the final product ready for sale.

Figure-6.5: Supply Chain of NTFPs in the Study Area.



***Mahua (Madhuca indica) Flower*:** The Mahua, scientifically known as Madhuca indica, is known by various local names across India. In Odisha, it's called 'Mahula,' while in Jharkhand and Chhattisgarh, it's referred to simply as Mahua. This tree is widespread throughout India, from the eastern states of Odisha, Jharkhand, Chhattisgarh, and Bihar, to the southern states of Andhra Pradesh and Maharashtra, as well as central regions like Uttar Pradesh and Madhya Pradesh, the Western Ghats, and the Himalayas. Typically, Mahua trees are medium to large in size and found in forested areas. Known as the "Tree of the Poor," the Mahua is an imperative source of income and sustenance for tribals. Its uses are varied: the flowers are consumed as food, fermented to produce 'Desi liquor,' and its seeds are processed to extract oil for soap, biofuel, and oil cakes. Additionally, Mahua leaves serve as nutritious fodder for livestock, especially cows. Households in the study collect Mahua flowers during April-May and seeds in May-June, dedicating about 30-40 days annually to this task. The flowers are gathered in the morning hours when they fall. After collection, the flowers are sun-dried for at least two days to prevent fungus growth and bitterness. They are not stored long-term; instead, they are sold within a week to local traders or at the local 'Haat'. Some local traders buy Mahua flowers and seeds from the 'Haat' and put up for sale them to larger traders i.e. district-level traders. These major traders further dry the flowers to ensure quality and reduce waste. It is estimated that 10-20% of the Mahua flower quantity is lost during processing. While collectors sell Mahua flowers at Rs 20-22 per kg, after processing, large traders sell them to retailers at Rs 35-40 per kg. Additionally, some individuals produce Desi liquor from the flowers, retailing it locally for Rs 60-70 per liter.

***Mahua Seed (Madhuca indica)*:** Mahua seeds, derived from the frequently gathered Mahua flowers in the study area (Figure-4.3), are processed to extract oil. The seeds are crushed, steam-cooked, and pressed. Tribal members use the oil for cooking and topical applications, while the residual oilcake is sold to traders and solvent plants for deoxidation and use in animal feed. During cash shortages, seeds are sold as a small surplus to local traders. In Jharkhand and Chhattisgarh, Mahua seeds are plentiful, but there is cheating in weighing by traders. Oil is a staple products for the tribes, and nearly all extract oil from the seeds. Solvent plants process the oilcake further to produce deoxidized cakes (DOC), which are then marketed as fish feed, and the oil is used for making Vanaspati oil. Collection of Mahua seeds occurs over 15-20 days from June to July. Villagers remove the seed coats to obtain de-coated seeds. Those who gather Mahua flowers also collect the seeds. On average, during the

peak season, Mahua seeds are sold for Rs. 7 to Rs. 8 per kg, although prices vary between states and depend on the number of traders and consumers.

***Tamarind (Tamarindus indica)*:** Tamarind, locally known as 'Imli' in India and 'Tentuli' in Odisha, is predominantly produced in states like Odisha, Andhra Pradesh, Telangana, Tamil Nadu, Uttar Pradesh, Karnataka, and Madhya Pradesh. The fruit is mainly utilized in the domestic market, with a small portion being exported internationally. Southern states, including Andhra Pradesh, Telangana, and Tamil Nadu, are the highest consumers of Tamarind compared to other regions in India. Owing to its unique sweet, sour, and spicy flavor, tamarind is versatile in its uses. The pulp of the tamarind fruit is widely used to flavor foods, in preservation, and in the preparation of pickles, juices, and chocolates, among others. Additionally, tamarind seeds are processed into powder to produce starch, which is utilized in the gum and plywood industries, as well as in paint and cattle feed.

In the fields, it is observed that households collect tamarind from February to April annually. They either use long sticks or have a male individual climb the tree to shake or beat the branches, causing the pods to fall, which are then collected from the ground by others. It takes households approximately 2-3 days to harvest tamarind from a single tree. The processing involves sun-drying the tamarind pods, de-shelling the skin, and removing the pulp by beating with a stick. Households remove the pulp and sometimes the seeds from tamarind. They retain small quantities (about 1-2 kg) for their use, selling the remainder in local markets or to traders. Tamarind processing is primarily done by women in these households, while marketing involves men, women, or both. Tamarind prices, for both fruit and seeds, fluctuate with production and market trends and are largely set by major traders. The price of tamarind often changes in tandem with tomato prices, as it is a common substitute in states like Odisha and West Bengal. Households sell tamarind fruit for Rs. 25-30 per kg, and consumers purchase it from retailers at Rs. 40-45 per kg. Figure-4.4 illustrates the tamarind value chain in the study area.

***Lac (Kerria lacca)*:** Lac is a natural resin produced by specific trees such as Palas, Dhak (Butea monosperma), Ber (Zizyphusmauritiana), Kusum (Schleichera oleosa), and Semialata (Flemingiasemialata) in the study area. An insect secretes a type of resin known as Kerria lacca (Kerr.), and due to its high market value, its cultivation is widespread across various states like Odisha, Jharkhand, Chhattisgarh, West Bengal, Madhya Pradesh, Maharashtra, and parts of Uttar Pradesh, Andhra Pradesh, and Gujarat. India is reported to produce the largest

quantity of lac globally i.e. about 50-60% of total world production accordingly. Jharkhand and Chhattisgarh are the leading lac-producing states in India. Lac typically comes in three forms: resin, dye, and wax. It is harvested as stick lac by scraping the lac encrustation from the shoots of host trees. In India, there are two types of lac insects, each with distinct strains: 'Kusumi' and 'Rangeeni'. The 'Kusumi' strain is cultivated on Kusum trees, with crops of kusmibroodlac harvested in June/July (Jethwi) and January/February (Aghani). The 'Rangeeni' strain, on the other hand, thrives on plants like Palas, Ber, and Semialata, with crops in October/November (Katki) and June/July (Baisakhi). Of these, the Kusmi strain is more valuable but less cultivated due to the scarcity of Kusum trees in the study areas.

Regarding its applications, lac, being naturally cultivated and harvested, is biodegradable and non-toxic, making it widely utilized in the food, textile, and pharmaceutical industries also in various forms. Moreover, lac finds usage in other sectors including paint, electrical, automotive, cosmetics, adhesives, leather, and wood furnishing. Historically, nearly half of India's lac production was consumed by the gramophone industry. In recent years, new applications have emerged in dyes, bangles, varnishes, polishes, jewellery, toys, and handicrafts. Field observations reveal that the lac production cycle begins with pruning on host trees, followed by lac inoculation, typically done with lac sticks, which are removed after 20-25 days. The harvested lac, known as Phunky lac, commands the highest market price. Pesticide application varies based on the host plants and environment, occurring 40-50 days post-inoculation. In Jharkhand, Vana Vikash Kendra (VANDHAN), under the Jharkhand State Livelihood Promotion Society (JSLPS), oversees the processing, production, and marketing of lac products. In Khunti district, an NGO named PRADHAN promotes lac cultivation, involving tribal women through Self-Help Groups (SHGs) in the entire chain from collection to marketing. Similarly, in Odisha, tribal women, through various NGOs, participate in the process under the Odisha Rural Development and Marketing Society (ORMAS), selling their products. In Chhattisgarh, women are involved in Vana Dhan Kendra for the sale and marketing of their products. The price of lac is approximately one lakh per quintal in the study area. Producers indicate that out of one quintal of lac, 40 kg is lost to processing activities like cleaning and drying, with the final value estimated from the remaining 60 kg. Consequently, the price increases for the final lac products. Some collectors harvest lac prematurely due to immediate financial needs.

Sal Leaf (Shorea robusta): Sal leaves are a crucial resource for the survival of tribal communities in the study regions, available for 8-9 months annually and in high demand for

various occasions in both rural and urban areas. Over 70% of the population in these areas depend on Sal trees for their income, harvesting leaves, seeds, and gums, locally known as Jhuna. Collectors often travel 3-5 km to reach the forest and an additional 5-10 km into it to gather Sal leaves early in the morning. They use their hands, ropes, and small sticks for plucking. Once collected, the leaves are carefully dried and stitched together before being sold in local markets or directly to traders. Sal leaves are fashioned into plates and cups used during festivals, functions, and weddings across India. Despite the low probability of finding Sal leaves, collectors are keen to install machines at the village level for making Sal leaf plates and cups, thereby increasing their earnings from both collection and processing. The study states exhibit a significant demand for these machine-stitched products like cups, plates, glass, etc.

***Chironji Seed/Char Seed (Buchananialanzan)*:** Chironji, also known as Char, is a food product highly prized for its kernel, which is extensively used as a flavouring agent in sweets, milk products, halwa, kheer, and other consumables. The taste of Char seed is a blend of pistachio and almond flavours. It is particularly popular in the Muslim community for use in various sweet dishes during festivals. Char seeds are harvested in April and May, and often collected before they mature, leading to lower earnings. The lack of awareness about the higher prices of matured Char fruit results in not maximizing profits. The price of Char is determined by the kernel content in the seeds, with larger kernels fetching higher prices. Traders have a ranking system for pricing Char, which is unique and not used for other non-timber forest products (NTFPs). The price also varies between fresh and dried Char. During cash transactions, collectors receive Rs. 15-20 per kg based on the fruit's quality. Additionally, Chironji is traded for rice (90%) and salt (10%) with local traders at the market (Figure 4.10).

6.3 Impact of COVID-19 Pandemic on Commercialization of NTFPs

The study revealed that through direct interaction with NTFP collectors, traders, retailers and wholesalers in the study regions; it was found that the COVID-19 pandemic had a mixed kind of impact. The COVID-19 pandemic severely negatively affected some stakeholders in all aspects. They faced significant challenges, such as difficulties in collecting and gathering products due to movement restrictions during the COVID-19 shutdowns and lockdowns. Although movement was restricted, local Haats were closed, and external traders could not enter the villages, households still collected NTFPs. However, without storage facilities, some collectors suffered substantial losses due to product wastage. Others managed to store

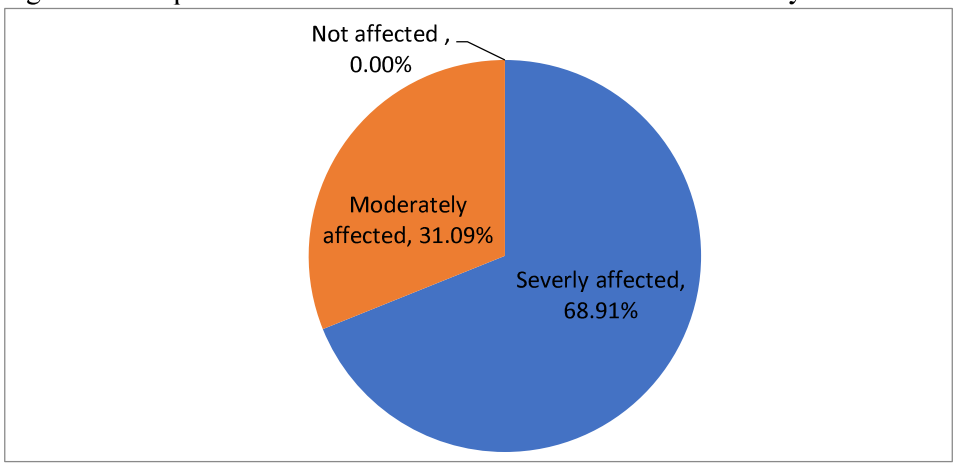
the NTFPs at home but were forced into distress sales due to the inability to sell in time, leading to considerable income loss.

Respondents indicated that the peak NTFP collection period from February to May offers a wide variety of NTFPs from nearby forests. These are typically gathered and sold to various members within the village, at Haats, procurement centers, or directly at their doorstep, contributing to their livelihood and financial income. However, the COVID-19 significantly affected the commercialization of NTFPs, is discussed in the below.

Impact on Collection of NTFPs

The restrictions on work and movement during the initial stages of the shutdown and lockdown periods have impacted the collection of NTFP during the peak season. The optimal time for NTFP collection is from February to May, but the shutdown began in the third week of March 2020 across India, followed by various periods of lockdown and shutdown until mid-2022. Figure 6.6 illustrates the impact of Covid-19 on the collection of NTFPs in the study area. It was found that 100% of NTFP collectors were affected by the pandemic. Among them, approximately 69% experienced severe disruptions in their collection activities, while 31% were moderately affected. Those moderately affected reported that they had collected some NTFPs before the mid-March 2020 shutdown, with some sold in local markets and some remaining unsold. However, most forest products were left on the trees and plants, eventually drying up, falling to the ground, and going to waste. Even those who managed to collect some NTFPs were unable to put them on the market due to a lack of storage amenities, leading to damage and quality loss, resulting in distressed sales after the lockdown was lifted. Among those impacted, leaf collectors, especially those collecting Sal leaves, siali leaves, and brooms, were severely affected.

Figure 6.6: Impact of COVID-19 on Collection of NTFPs in Study Area



Impact on Marketing of NTFPs

Field data revealed that nearly all respondents have been impacted in the marketing of their products. With the escalation of the Covid-19 pandemic, movement restrictions intensified, leading to the closure of local markets. Local traders were unable to purchase from collectors, and external traders faced transport issues. Consequently, there were no sales in the local markets, and traders did not visit the study villages to buy the collected products. Some respondents even reported distressed sales of medicinal products. During the COVID-19 period, leaf collectors (Sal, Siali, and Tendu) and wholesalers in the leaf industry encountered numerous challenges. The lockdown, across India, halted demand for Sal leaf products due to the closure of temples, restrictions on marriages, and the prohibition of gatherings for parties and functions, which were the primary sources of demand for these products. The collected leaves spoiled without buyers or storage, leading to significant losses due to insect damage. Those involved in the Sal leaf industry struggled with their livelihoods as their main income source ceased. Subsequently, these collectors turned to agricultural labour for daily wages, facing difficulties in transportation, buying, selling, securing loans, and more.

Table 6.14 outlines various factors that influenced the marketing of NTFPs during COVID-19 in the study villages. It identifies ten factors impacting NTFP marketing, with varying responses from the participants. All respondents indicated that movement restrictions during various phases of lockdown and shutdown due to COVID-19 posed challenges in marketing their collected products. Regarding transportation costs, approximately 98% of respondents reported severe disruptions to transportation services due to Covid-19. Initially, transportation was completely halted in the study area during the first phase of the pandemic, followed by limited services with restrictions. Consequently, NTFP collectors incurred higher transportation costs due to restricted services and fewer trips. A minority of respondents were unaffected by transportation costs and disruptions as they transported their products on their bikes. Despite movement restrictions, some faced fines and punishment by local authorities.

Approximately 98% of respondents reported that during the Covid-19 period, with community centers and local markets closed, traders offered them very low prices. Conversely, only 2% of respondents were not affected by the low prices as they sold to Van Vikash Kendras and were not overly concerned about the profit or immediate monetary value of their products. On average, 72% of respondents indicated that the quality of their products declined, with some items being damaged due to lack of availability or poor storage facilities, insects, animals, etc. On the other side of this issue, the decrease in demand for leaf products led to a drop in business profits for both retailers and wholesalers during the COVID-19

period. Some sellers, including retailers and wholesalers, reduced their purchases of leaves and lowered employment levels. Throughout the pandemic, stakeholders such as collectors, traders, retailers, and wholesalers of leaf products were severely impacted by COVID-19.

Table 6.14: Factors influenced NTFPs Marketing during Covid-19 in Study Area

Sl No.	Factors Influencing Marketing of NTFPs	Response(%)		
		Yes (%)	No (%)	No Response/ silent (%)
1	Restriction on movement to outside	100	Nil	Nil
2	Lack of transportation facilities	98.36	1.64	Nil
3	Transportation cost	93.07	6.07	0.86
4	Low price	97.6	2.4	Nil
5	Quality lost	71.48	26.47	2.05
6	product damaged (due to unavailability/ bad storage, insects, animals, etc.)	73.31	26.69	Nil
7	closed off local haat	100	Nil	Nil
8	Lack of traders	98.19	1.81	Nil
9	Distant market place	94.02	5.98	Nil

Interactions with Self-Help Group (SHG) members in study villages and at Van Vikash/Van Dhan Kendras revealed that women working at these centers benefited during COVID-19. At the Van Dhan Kendras in Khunti and Gariyaband districts of Jharkhand and Chhattisgarh, they not only earned profits but also continued processing Non-Timber Forest Products (NTFPs) within these centers during the lockdown. Although occasionally intercepted by local police, they resumed their activities, such as processing lac, separating tamarind pods, pulps, and seeds, after the authorities left. In Odisha, SHG members reported creating decorative items from Sabai grass for homes, hotels, restaurants, and offices. Additionally, women crafted various types of lac bangles. However, the market for NTFP products like Sal and Siali leaf plates suffered greatly as the lockdown led to the closure of hotels, shops, and the cancellation of ceremonial functions.

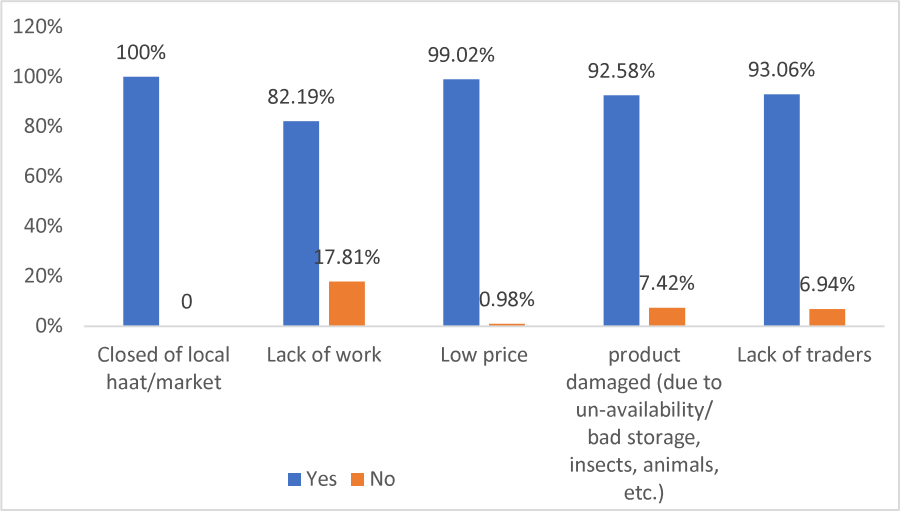
Impact on Income

In the previous chapter, we discussed that collections of Non-Timber Forest Products (NTFPs) are the primary income source for household respondents in the study area. However, the collection of NTFPs is highly seasonal, typically available and gathered for only 3-4 months each year. The collectors withdraw a considerable portion of their income from NTFPs collection. Yet, the Covid-19 pandemic led to a financial crisis as it impacted

nearly all their income sources, including agriculture and wage labour. Marginal rural households faced severe hardships, with large farmers ceasing to hire wage labourers and MGNREGA work coming to a standstill. Moreover, NTFP sales were hindered by the closure of local markets/hats, traders' disinterest in purchasing forest products due to falling prices, and other factors. Some respondents reported receiving dry rations from their panchayat office to sustain their households.

Figure-6.7 illustrates the factors that influenced NTFP income among respondents in the study area. It reveals that 100% of respondents experienced a decrease in income due to the closure of local markets/hats. Additionally, 82% reported a lack of work in forms such as daily labour, MGNREGA work, or other income sources during the Covid-19 period, while 18% managed to find some work in their villages or neighbouring areas. When questioned if NTFP pricing contributed to income decline, approximately 99% confirmed that lower prices had reduced their earnings. Similarly, 93% indicated that their income suffered due to product damage from various causes, including inadequate storage, insects, rats, and other animals, leading to reduced quality and quantity. Moreover, 93% reported that due to Covid-19 restrictions, traders either did not visit their locations or offered very low prices, further diminishing their income. The study found that Covid-19 significantly impacted the collection, marketing, trading, and income of all stakeholders. However, it was observed that those involved in medicinal products managed to maintain a better income compared to others during the pandemic.

Figure 6.7: Factors affected NTFP Income during Covid-19 period



Impact on Work Days

According to respondents from the study areas, the Covid-19 pandemic severely affected workdays due to lockdowns and shutdowns. People were strictly prohibited from leaving their homes and entering the forests. However, sometimes the tribal communities entered the forests illegally (likely once or twice a week, but not regularly) to gather forest products for their livelihood.

Impact on Red Weaver Ant (Consumption, Marketing and Income)

Tribal communities across India consume various insects, which are rich in protein. Not only tribal people, but others also include insects in their diet for protein intake and medicinal benefits. The protein content in insects is comparable to that in fish, meat, and even the human body. However, not all forest insects are edible, and consuming certain insects can be hazardous, leading to allergic reactions and poisoning. Tribals primarily eat ants, termites, caterpillars, water bugs, rats, beetle larvae, flies, cicadas, and dragonfly nymphs, among others (Srivastava et al., 2009). Additionally, while various types of ants exist, not all are consumable. The red weaver ant, scientifically known as Oecophyllasmaragdina, is eaten by tribes and others in different regions of India. In the Mayurbhanj district of Odisha, this ant, locally known as 'Kaii' or 'Kurkuti,' is made into a chutney mixed with green chili, mint, onion, ginger, cumin, mustard oil, and salt. This chutney can be stored for 2-3 days and is enjoyed with rice due to its pleasant taste (Jena et al., 2020; Mitra et al., 2020). Typically, the red weaver ant is consumed at the larval stage, either roasted, fried, raw, or smoked (Narzari & Sarmah, 2015).

Beyond being a food item, RWA has various uses: it serves as a remedy for myopia (Padmanabhan & Sujana, 2008), a paste of RWA provides relief from colds and stomach aches (Posey, 1986), and the entire nest of the red weaver ant, when fried in Karanj oil, is used for massages that benefit those with gout and joint pain. Additionally, RWA eggs, larvae, and pupae are fried with onions and consumed regularly to recover from weakness caused by prolonged fevers from diseases such as typhoid, gastritis, and bronchitis. To prevent gastritis, live ants are eaten with salt, red chilies, and mustard oil (Kumari & Kumar, 2009). RWA is found throughout the Mayurbhanj district of Odisha and is a dietary staple. It is harvested from trees and sold in weekly markets. Tribals from various parts, including Rairangpur, Baripada, Jashipur, Udala, and Betnoti, collect RWA for both personal consumption and commercial purposes. They sell it at nearby ‘hat’ for Rs. 10 per plate, which

contains approximately 50 grams. Interactions with collectors revealed that they typically sold RWA/Kaii for Rs. 250-300 on each market day. However, during the Covid-19 pandemic, demand for RWA surged not only locally but also from larger cities like Cuttack and Bhubaneswar in Odisha, and some was even sent to Kolkata and Hyderabad where relatives reside. Despite the increased demand, collectors profited by raising the price from Rs. 10 per plate to Rs. 30-40 per plate, boosting their usual sales from Rs. 250-300 to Rs. 500-600. The pandemic inadvertently benefited RWA collectors by enabling them to raise their prices.

6.4 Strategies for Success of NTFPs Commercialisation

The NTFP commercialization plays a crucial role in livelihood of tribal people and also for economic growth and development in the study states in India. The success of NTFPs commercialization depends on certain strategies to overcome challenges and get maximum benefits. The key strategies for the success of NTFP commercialisation are discussed in the below.

- ***Improving Collection, Processing and Marketing Skills*:** The success of NTFPs commercialization depends on proper collection, processing of the product and well-mechanized marketing facilities of NTFPs. In the study area, it is observed that the collectors have no prior knowledge on the collection, marketing, valuation of NTFPs. Sometimes, the forest officers are denied entry into the forest and collect forest products. Therefore, many times their collected NTFPs are damaged and mostly undervalued. Therefore, there should be capacity/skill development among the NTFP producers/collectors on efficient and sustainable methods of collection. In addition to that, the processing units should be supplied to collectors group, which will increase employment, income generation and also good quality of their products to improve the commercialization of NTFPs.
- ***Storage Facilities***: It has been observed that the NTFPs collectors/producers have no separate storage facilities. They stored their products in the living home, without any proper care. Therefore, some of their products are damaged due to insects, with rain and humidity, rats and animals. There is a need of village/community storage facilities for the success of commercialization.
- ***Improvement of Local Hat/Market:*** In the study region, it is revealed that most of the NTFP collectors/gatherers sold their products in the local market 'Hat'. They face several problems like bad road connectivity, no/limited transportation facilities with

high costs, no proper pricing in the Hat/local market. Therefore, there is a need for development of local market 'Hat', and price list should be provided by local authority, which will help better commercialization of NTFPs.

- ***Domestication of NTFPs:*** In the study area domestication of NTFPs should be promoted. Maximum forest products (which have medicinal values) are unsold in the local market due to a lack of domestication. Secondly, many forest products have been over-exploited without proper sustainability measures. Most respondents said that the availability of many NTFPs have been drastically reduced. Therefore, government and forest should encourage for the domestication of NTFPs and its sustainability to counter the shortfalls in supply.
- ***Prevention of Deforestation:*** It is observed that there has been a wide deforestation in the study area which led to ecological and biodiversity deterioration. Every year the study area experiences wildfire, illegal hunting and reckless farming. As a result, there has been a continuous shortfall of the collection of NTFPs in the study area. Therefore, local awareness must be created to safeguard the forest and wild animals to protect the biodiversity and ecology, which will enhance commercialisation of NTFPs.
- ***Research and Development (R&D) on NTFPs***: For the commercialisation of NTFPs, there is a need for the development of R&D on NTFPs. Government should encourage different academic and non-academic institutions to carry out individual or collaborative research on different NTFPs and their usefulness. Although, in recent years there has been an increased in the usability of forest products in domestic and international countries, further development is needed for the wider use of NTFPs.

7. CONCLUSION

7.1 Summary of the Findings

Over the years, the commercialization of NTFPs has amplified globally. The demand for NTFPs in both urban and rural settings has improved the livelihoods and income of tribal communities (Perez et al., 2004). However, studies have shown that commercialization has not been consistently successful, as unsustainable harvesting practices have led to forest degradation and income instability (Neumann and Hirsch, 2000; Peters, 1996; Wollenberg and Ingles, 1998). Against this background, the current study aims to investigate the commercialization of NTFPs and their supply chain in Odisha, Jharkhand, and Chhattisgarh. The study objectives are examined using primary data collected from Odisha, Jharkhand, and Chhattisgarh. In each state, a district with a predominant tribal population was chosen, as NTFPs are a key source of income and employment for the tribes in these areas.

The study revealed that all respondents are engaged in the commercialization of NTFPs within the study area. The primary NTFPs commonly found in the study districts and states include Kendu leaves, Mahua (seeds and flowers), Sal (seeds and flowers), Amla, Tamarind (raw and seeds), Harida, Bahada, Honey, Jamun, Karanj Seeds, Lac, Kusumi seeds, and Tassar. The majority of NTFPs are harvested from February to May annually. However, certain products like Sal leaves and seeds, Honey, and Karanj seeds are collected over a longer period, from February to July each year. Both men and women are involved in the commercialization of NTFPs, with women's participation notably higher in all surveyed villages. Women active in NTFP commercialization primarily aged between 25-55 years. The majority of these women have attained primary education; over half of the respondents (58.05%) have 10-20 years of experience in the collection, processing, sales, and marketing of NTFPs. Consequently, landless households predominantly rely on NTFPs for their livelihood in the surveyed villages across these states.

NTFP collection serves as a seasonal income source, leading people to rely on other activities for the remainder of the year. It was reported that 63% of households consider NTFP their primary monetary income, 11% of households supplement their income with daily wage labour, and a small percentage (2%) also gain income from livestock. The respondents who are part of SHG members and engaged in either ORMAS or Van Dhan Kendras, have earned good income then the respondents who are individually engaged in NTFP commercialization. The ORMAS or Van Dhan Kendras are helping tribal women and

SHG members by teaching them the method of collection, processing, product creation, and marketing skills. These centres also provide training to tribal women who serve as resource persons in different national and state institutions, offering them an additional income source. Women working with Van Dhan Kendras and ORMAS receive their NTFP income directly into their bank accounts from these centres, allowing them to save after monthly expenses. The non-members are in distress and earning less income due to several problems like under-pricing and value of their product, difficulty in valuation of their product, lack of knowledge, storage, marketing, transportation and sale, etc.

The study also revealed that the Covid-19 pandemic had a severe impact on NTFP dependents, with some even benefiting from it. Collectors experienced a negative impact on their livelihoods, facing major challenges such as difficulties in collecting and gathering products due to movement restrictions during the Covid-19 shutdown and lockdown periods. Although there was a restriction on people's movement, local Hats were closed, and outside traders were not permitted to enter the villages. With no storage facilities for their collected NTFPs, some collectors suffered significant losses due to product wastage. Some managed to store the collected NTFPs at home but were unable to sell them in time, leading to distress sales and substantial income loss. Respondents engaged in leaf collection, processing, and marketing suffered huge losses. However, medicinal NTFPs were in high demand, and those involved in this sector earned better incomes even during Covid-19. Additionally, respondents in the Mayurbhanj district of Odisha, who were involved in the commercialization of RWA, earned substantial incomes during the Covid-19 period, as RWA, commonly used for coughs, colds, fever, and joint pains, saw increased demand and price.

7.2 Way Forward

The present study found that there has been growing up commercialisation of NTFPs in the study states in India. The commercialisation of NTFPs is helping stakeholders to get employment and income-generate during off season. Therefore, this study should be further extended to analyses the cost-benefits of commercialisation of NTFPs. Secondly, there should be a study on the sustainability of commercialization of NTFPs in changing climate.

8. RECOMMENDATIONS

The discussions and conclusions indicate that the commercialization of Non-Timber Forest Products (NTFPs) plays a significant role in the livelihoods of rural tribal communities and the Indian economy. The Covid-19 pandemic has severely impacted human life and livelihoods. Consequently, policy interventions are necessary to foster the growth and success of NTFP commercialization in the study area. The study recommends the following policy measures that need immediate government focus/intervention to solve the problems arising on the commercialization of NTFPs in the study areas.

i. ***Educating & Skill Development on Collection of NTFPs for Sustainability***: the commercialization of NTFPs primarily depends on the quality of NTFPS, which is influenced by the techniques of collection, processing and product types. However, the NTFP gatherers lack of proper knowledge of NTFPs collection, processing and how to make quality products, which lead to low offered prices and some products could not commercialize at all. Therefore, it is suggested that the NTFP collectors/gatherers should educate on the extraction techniques, processing methods and product development to facilitate commercialization. This education will not only enhance the commercialization of NTFPs but will support sustainability.

ii. ***Inclusiveness***: government institutions such as Van Dhan Kendra (VDK) in Jharkhand, Van Dhan Vikas Kendra (VDVK) in Chhattisgarh, and Odisha Rural Development and Marketing Society (ORMAS) in Odisha are playing crucial role in NTFP commercialization. These Kendras (VDK/VDVK) and Society (ORMAS) do more than just purchase NTFPs from collectors/gatherers. These institutions provide training on collection techniques, processing methods, products development and cultivation of these resources. Additionally, they train individuals to educate others about NTFPs and how to generate profit from the commercialization of NTFPs. Currently, only a small number of tribal women are connected with VDK/VDVK and ORMAS, many more are outside of these organisations. As a result, they often sold their NTFPs to local traders/middlemen or in the local market ("Hat") at significantly low prices. Therefore, this study suggests that there should be a mechanism to establish tribal cooperative societies or federations at the block level, which will strengthen the NTFPs collectors/gatherers' bargaining power.

iii. **Fair Market Access**: In recent years, there has been a significant global increase in demand for natural and Ayurvedic products. In the study area, Households harvest a significant amount of medicinal forest products, but are often unaware of their true market value. Local traders typically buy these NTFPs at low prices and making substantial profits, while the collectors receive minimal income. Therefore, the study recommends that the information about product prices and values should be extended to remote/ rural tribal women, helping them to earn higher revenues from their products. Moreover, the government should promote direct market linkages with buyers and also support e-commerce platforms for these products.

iv. **Storage, Infrastructure and Marketing Facilities**: The lack of adequate storage, marketing, and transportation facilities hinders the NTFP collectors from effectively commercializing their products, resulting in quality degradation, product damage, and high transportation costs, which result in distressed sales. Therefore, to facilitate the successful NTFP commercialization, it is essential to establish warehouses or storehouses near community centres, such as at the gram panchayat level, or to appoint registered traders within the collectors' localities.

v. ***Sustainable Resource Management***: Excessive commercialization of NTFPs without sustainable resource management poses serious threat to the community, society as well as to the environment. The NTFPs are collected as leaves, fruits, roots, gums and more- are directly and indirectly linked to forest trees. Over-extraction of NTFPs to pursuit of higher income can lead to biodiversity loss. Field observations indicate that many respondents have noticed a decline in the availability of forest products compared to previous years but they are often unclear about the reasons. Some respondents attribute to climate change, while others don't know the cause. Officials at different Kendras and Societies have noted that climate change as well as forest fires are significantly damaging the forest trees and negatively impacts the NTFP collection. Therefore, this study recommends raising social awareness among local or tribal communities in the forest areas about preventing forest fires. Additionally, there should be encouragement to plant large trees such as Kusum trees, Karanj Trees and Neem Trees where they can cultivate 'Lac' for greater profit from commercialization.

vi. ***Financial Support and Incentives***: In the study area, it is observed that many tribal women are interested in setting up machines either individually or in groups to produce various products from their collected NTFPs and earn substantial income. However, due to a lack of funds, they often sold their NTFPs to local traders or firms

at a lower prices. Some women even sell NTFPs to nearby firms and also working as a daily labourer there. The firm owners utilize NTFPs and chief labour to create different products and profit significantly from those sales. Therefore, it is suggested that micro-credit facilities should be provided through tribal cooperatives or community banks at a lower interest rate to tribal women/ those women who are interested in NTFP entrepreneurs. In addition to that, subsidies should be offered in different capital assets if these are procured by these women.

vii. ***Product Certification and Safety Standard***: It is observed that one of the main reasons for the low offered price of NTFPs in the study area is the lack of /failure to maintain quality of products. The traditional collection methods for NTFPs don't involve any techniques for collection, processing, making products and marketing. Moreover, the consumers of commercialized NTFPs are mostly non-tribals, and there is a high demand for hygiene products and also a need for safety standards for processing and packaging. Therefore, to address this issue, it is recommended that the government should provide training to NTFP collectors or gatherers on product hygiene and safety standards for processing and packaging. In addition to that, there should be product certification for organic or Fairtrade labelling, etc.

9. BIBLIOGRAPHY

1. Adam, Y. O., Pretzsch, J., and Pettenella, D. (2013). Contribution of Non-Timber Forest Products Livelihood Strategies to Rural Development in Dry Lands of Sudan: Potentials and failures. *Agricultural Systems*, 117, 90-97
2. Adhikari, B., S. di Falco, and J.C. Lovett. (2004). Household Characteristics and Forest Dependency: Evidence from Common Property Forest Management in Nepal. *Ecological Economics,* 48(2), 245-257.
3. Ahenkan, A., and Boon, E. (2010). Commercialization of Non-timber Forest Products in Ghana: Processing, Packaging and Marketing. *Journal of Food, Agriculture and Environment*, 8(2), 962-969.
4. Ahenkan, A., and Boon, E. (2011). Non-timber Forest Products (NTFPs): Clearing the Confusion in Semantics. *Journal of Human Ecology*, 33(1), 1-9.
5. Angelsen, A. and Wunder, S. (2003). Exploring the Forest - Poverty Link: Key Concepts, Issues and Research Implications. CIFOR Occasional Paper. 40. Centre for International Forestry Research.
6. Areki, F. and Cunningham A.B. (2010). Fiji: Commerce, Carving and Customary Tenure. In: Wild Product Governance: Finding Policies that Work for Non-Timber Forest Products, Laird, S.A., R.J. McLain and R.P. Wynberg (Eds.). Earthscan, London, UK., pp: 229-242.
7. Asamoah, O., Danquah, J.A., Bamwesigye, D. (2023). Perceptions of Commercialisation and Value-addition of Non-timber Forest Products in Forest Adjacent Communities in Ghana. *Discover Sustain,* 4, 30. https://doi.org/10.1007/s43621-023-00146-6.
8. Asfaw, A., M. Lemenih, H. K. and Ewnetu, Z. (2013). Importance, Determinants and Gender Dimensions of Forest Income in Eastern Highlands of Ethiopia: The Case of Communities around Jelo Afromontane Forest. *Forest Policy and Economics,* 28: 1-7.
9. Babulo, B., B. Muys, F. Nega, E. Tollens, J. Nyssen, J. Deckers and Mathijs E. (2009). The Economic Contribution of Forest Resource Use to Rural Livelihoods in Tigray, Northern Ethiopia. *Forest Policy and Economics,* 11: 109-117.
10. Basu, J. P. (2009). Adaptation, Non-timber Forest Products and Rural Livelihood: An Empirical Study in West Bengal, India. In *IOP Conference Series. Earth and Environmental Science*, 6 (38).

11. Behera, M. and Nath, M. (2012). Financial Valuation of Non-timber Forest Products Flow from Tropical Dry Deciduous Forests in Boudh District, Orissa.
12. Belcher, B., & Schreckenberg, K. (2007). Commercialisation of Non-timber Forest Products: A Reality Check. *Development Policy Review*, *25*(3), 355-377. https://doi.org/10.1111/j.1467-7679.2007.00374.x.
13. Belcher, B., M. Ruiz-Perez and Achdiawan R. (2005). Global Patterns and Trends in the Use and Management of Commercial NTFPs: Implications for Livelihoods and Conservation. *World Development,* 33: 1435-1452.
14. Bhattacharya, P. and Hayat, S. F. (2009). Sustainable NTFP Management for Livelihood and Income Generation of Tribal Communities: A Case from M.P. India in: (Uma S.R., Hiremath A.J., Joseph G.C. and Rai N.D. (ed.) Non timber Forest Products: Conservation Management and Policy in the Tropics. ATTREE & University of Agriculture Science, Bangalore: 21-34.
15. Biland, M., Zeb, A., Ullah, A. and Kaechele, H. (2021) Why Do Households Depend on the Forest for Income? Analysis of Factors Influencing Households' Decision-Making Behaviors, *Sustainability*, 13 (16), 9419; https://doi.org/10.3390/su13169419.
16. Byron R.N. and Arnold J.E.M. (1999). What Future for the People of the Tropical Forests? *World Development,* 27(5), 789-805.
17. Cavendish, W. (2000). Empirical Regularities in the Poverty-Environment Relationship of Rural Households: Evidence from Zimbabwe. *World Development*, *28*(11), 1979-2003. https://doi.org/10.1016/S0305-750X(00)00066-8.
18. Census of India, 2011.
19. Champion, H.G. & Seth S.K. (1968). A Revised Survey of the Forest Types of India. *Government of India Publication, New Delhi, India*.
20. Chatterjee, S. (2020). Impact of COVID-19 on People Engaged in NTFP Collection, Indo-Global Social Service Society. Impact-of-COVID-19-on-Non-Timber-Forest-Products-Collectors-1.pdf (igsss.org).
21. Dash, M., & Behera, B. (2016). Determinants of Hhousehold Collection of Non-Timber Forest Products (NTFPs) and Alternative Livelihood Activities in Similipal Tiger Reserve, India. *Forest Policy and Economics*, *73*, 215-228.
22. Davies, G. and Brown, D. (2007). Bushmeat and Livelihoods: Wildlife Management and Poverty Reduction, *Blackwell Publishing Ltd., Australia.* DOI:10.1002/9780470692592.

23. Delang, C. O. (2006). The Role of Wild Food Plants in Poverty Alleviation and Biodiversity Conservation in Tropical Countries. *Progress in Development Studies*, *6*(4), 275-286.
24. Demie, G. (2019). Contribution of Non-Timber Forest Products in Rural Communities' Livelihoods around Chilimo Forest, West Shewa, Ethiopia. *Journal of Natural Sciences Research*, *9*(22), 25-37.
25. Dinda, S., Ghosh, S. & Chatterjee, N.D. (2020). Understanding the Commercialization Patterns of Non-timber Forest Products and Their Contribution to the Enhancement of Tribal Livelihoods: An Empirical Study from Paschim Medinipur District, India. *Small-scale Forestry,* 19, 371–397. https://doi.org/10.1007/s11842-020-09444-7.
26. Dolui, G., Chatterjee, S., & Chatterjee, N. D. (2014). The Importance of Non-Timber Forest Products in Tribal Livelihood: A Case Study of Santal Community in Purulia District, West Bengal, Indian Journal of Geography and Environment, 13, 110-120.
27. FAO. (1992). Forests, Trees and Food. Food and Agriculture Organization, Rome, Italy. http://www.fao.org/docrep/006/ u5620e/U5620E00.HTM
28. FAO. (2006). Can Non-Wood Forest Products Help Contribute to Achieving the Millennium Development Goals? Food and Agriculture Organization, Rome, Italy, pp: 2-14.
29. Gauli, K. (2011). Commercialization of Non-timber Forest Products: Contribution to poverty reduction in Dolakha district, Nepal, BOKU Ph.D. Dissertation, XI, 86 BI.
30. Ghosal, Somnath. (2011). Importance of Non-Timber Forest Products in Native Household Economy. *Journal of Geography and Regional Planning*. 4.
31. India State of Forest Report (ISFR) 2019 and 2021.
32. Islam, M. A., & Quli, S. M. S. (2017). The Role of Non-Timber Forest Products (NTFPs) in Tribal Economy of Jharkhand, India. *International Journal of Current Microbiology and Applied Sciences*, *6*(10), 2184-2195.
33. Jain, S.K., Agrawal, P.K. and Singh, V.P. (2007). Hydrology and Water Resources of India, *Water Science and Technology Library (WSTL),* 57, Springer.
34. Jena, P.K. (2020). Factor Productivity and Marketed Surplus of Non-Timber Forest Products in Similipal Forest of Odisha. *Journal of Public Affairs*, 21 (1), https://doi.org/10.1002/pa.2116.

35. Jha, K. K. (2016). Some Marketing Aspects of Important Non-Timber Forest Products in a Proposed UNESCO Heritage Site of Arunanchal Pradesh, India. *Journal of Plant Chemestry and Ecophysiology*, 1 (1), 1007-1012.
36. Kamwi, J. M., Endjala, J., & Siyambango, N. (2020). Dependency of Rural Communities on Non-Timber Forest Products in the Dry Lands of Ssouthern Africa: A Case of Mukwe Constituency, Kavango East Region, Namibia. *Trees, Forests and People*, *2*, 100022.
37. Khare, A. and Rao, A.V.R. (1993). Products of Social Forestry: Issues, Strategies and Priorities', *Wastelands News*, 6 (4): 7–17.
38. Kharmyndai, N. M. (2013). Contribution of Non-Timber Forest Products on Rural Livelihood Around Pynursla Meghalaya, shodhganga.inflibnet.ac.in.
39. Khosravi, S., Maleknia, R., & Khedrizadeh, M. (2017). Understanding the Contribution of Non-Timber Forest Products to the Livelihoods of Forest Dwellers in the Northern Zagros in Iran. *Small-scale Forestry*, 16(2), 235-248.
40. Kumar, V. (2015). Impact of Non-Timber Forest Produces (NTFPs) on Food and Livelihood Security: An Economic Study of Tribal Economy in Dang's District of Gujarat, India. *International Journal of Agriculture, Environment and Biotechnology*, *8*(2), 387.
41. Lalremruata, J. (2012). Studies on Non-Timber Forest Products (NTFPs) of Plant Origin and Livelihood Strategies in Northern Mizoram, India, http://hdl.handle.net/10603/238343.
42. Laudari, H. K., Pariyar, S., & Maraseni, T. (2021). COVID-19 Lockdown and the Forestry Sector: Insight from Gandaki Province of Nepal. *Forest Policy and Economics*, 131, 102556.
43. Mahapatra, K. & Kant, S. (2005). Tropical Deforestation: A Multinomial Logistic Model and some Country-specific Policy Prescriptions. *Forest Policy and Economics*, 7. 1-24. 10.1016/S1389-9341(03)00064-9.
44. Mahonya, S., Shackleton, C. M., & Schreckenberg, K. (2019). Non-timber Forest Product Use and Market Chains Along a Deforestation Gradient in Southwest Malawi. *Frontiers in Forests and Global Change*, *2*, 71.
45. Malhotra, K.C. and Bhattacharya P. (2010). Forest and Livelihood. *CESS Publisher, Hyderabad, India,* Pages: 246.

46. Mamo, G., Sjaastad, E., & Vedeld, P. (2007). Economic Dependence on Forest Resources: A Case from Dendi District, Ethiopia. *Forest Policy and Economics*, *9*(8), 916-927. https://doi.org/10.1016/j.forpol.2006.08.001.
47. Marshall, E., Newton, A. C., & Schreckenberg, K. (2003). Commercialisation of Non-Timber Forest Products: First Steps in Analysing the Factors Influencing Success. *International Forestry Review*, *5*(2), 128-137.
48. Matias, D. M. S., Tambo, J. A., Stellmacher, T., Borgemeister, C., & Von, W. H. (2018). Commercializing Traditional Non-Timber Forest Products: An Integrated Value Chain Analysis of Honey from Giant Honey Bees in Palawan, Philippines. *Forest Policy and Economics*, *97*, 223-231.
49. McNamara, J., Robinson, E. J., Abernethy, K., MidokoIponga, D., Sackey, H. N., Wright, J. H., & Milner-Gulland, E. J. (2020). COVID-19, Systemic Crisis, and Possible Implications for the Wild Meat Trade in Sub-Saharan Africa. *Environmental and Resource Economics*, *76*(4), 1045-1066.
50. Meinhold, K., &Darr, D. (2019). The Processing of Non-Timber Forest Products Through Small and Medium Enterprises—A Review of Enabling and Constraining Factors. *Forests*, *10*(11), 1026.
51. Ministry of Tribal Affairs, Government of India, 2020
52. MOEF (2006). Annual Report 2005-06. Ministry of Environment and Forests, Government of India, New Delhi, India.
53. Mohanty, B. (2017). Tribal Population of Mayurbhanj, IOSR Journal of Humanities and Social Science, 22(1),5, 57-60.
54. MOSPI, Govt. of India, 2021
55. Mukul, S. A. (2011). Changing Consumption and Marketing Pattern of Non-Timber Forest Products in a Competitive World: Case Study from an Urban Area of North-Eastern Bangladesh. *Small-Scale Forestry*, *10*(3), 273-286.
56. Murthy, I. K., Bhat, P. R., Ravindranath, N. H., & Sukumar, R. (2005). Financial Valuation of Non-Timber Forest Product Flows in Uttara Kannada District, Western Ghats, Karnataka. *Current Science*, 1573-1579.
57. Narzari, S. and Sarmah, J. (2015). A Study on the Prevalence of Entomophagy Among the Bodos of Assam. *Journal of entomology and zoological studies,* 3(2), 315-320.
58. National Forest Policy, 1988. Ministry of Environmental, Forest and Climate Change, Government of India.

59. National Forest Policy, 1998. Food and Agriculture Organization of the United Nations, Tanzania Forestry Action Plan, Government of Tanzania.
60. Nayak, B.P., Kohli, P. and Sharma, J.V. (2014). Livelihood of Local Communities and Forest Degradation in India: Issues for REDD. Tata Energy and Resources Institute (TERI), New Delhi, India.
61. Neumann, Roderick & Hirsch, Eric. (2000). Commercialization of Non-Timber Forest Products: Review and Analysis of Research. 10.17528/cifor/000723.
62. Padmanabham, P. and Sujana, KA (2008). Animal Products in Traditional Medicine from Attappady Hills of Western Ghats. *Indian Journal of Traditional Knowledge,* 7(2), 326-329.
63. Pandey, A. K., Tripathi, Y. C., & Kumar, A. (2016). Non-Timber Forest Products (NTFPs) for Sustained Livelihood: Challenges and Strategies. *Research Journal of Forestry*, *10*(1), 1-7.
64. Panigrahi, S., Meher, D., and Siri, P. (2019). Reliance and Livelihood Significance of Non-Timber Forest Products Available in Odisha: A Review. *Journal of Pharmacognosy and Phytochemistry,* 8(1): 2428-2432.
65. Paumgarten, F., & Shackleton, C. M. (2009). Wealth Differentiation in Household Use and Trade in Non-Timber Forest Products in South Africa. *Ecological Economics*, *68*(12), 2950-2959.
66. Peters, C. M. (1996). The Ecology and Management of Non-Timber Forest Resources (p. 322). Washington DC: World Bank Technical Paper. https://doi.org/10.1596/0-8213-3619-3.
67. Peters, C. M., Gentry, A. H., & Mendelsohn, R. O. (1989). Valuation of an Amazonian rainforest. *Nature*, *339*(6227), 655-656.
68. Planning Commission Report (2011). Annual Report 2011-12, Govt. of India.
69. Prasad, R., &Bhatnagar, P. (1991). Socio-economic Potential of Minor Forest Produces in Madhya Pradesh. *SFRI, Jabalpur*.
70. Prasad, S. and Chauhan, D.S. (2020). Appraising Forest-based Livelihoods Through Assessment of Major NTFPs: A case Study from Jharkhand, India. *International Journal of Economic Plant,*.07(02):053-059.Retrieved from https://ojs.pphouse.org/index.php/IJEP/article/view/4626.
71. Rahman, M. H., Roy, B., & Islam, M. S. (2021). Contribution of Non-timber Forest Products to the Livelihoods of the Forest-dependent Communities around the

Khadimnagar National Park in Northeastern Bangladesh. *Regional Sustainability*, *2*(3), 280-295.

72. Rasul, G., Karki, M., & Sah, R. P. (2008). The Role of Non-Timber Forest Products in Poverty Reduction in India: prospects and problems. *Development in Practice*, *18*(6), 779–788. https://doi.org/10.1080/09614520802386876.
73. Reddy, C. S., Sreelekshmi, S., Jha, C., &Dadhwal, V. (2013). National Assessment of Forest Fragmentation in India: Landscape Indices as Measures of the Effects of Fragmentation and Forest Cover Change. *Ecological Engineering*, *60*, 453-464. https://doi.org/10.1016/j.ecoleng.2013.09.064
74. Ros-Tonen, M. A., &Wiersum, K. F. (2005). The Scope for Improving Rural Livelihoods Through Non-Timber Forest Products: An Evolving Research Agenda. *Forests, Trees and Livelihoods*, *15*(2), 129-148.
75. Saha, D., & Sundriyal, R. C. (2012). Utilization of Non-Timber Forest Products in Humid Tropics: Implications for Management and Livelihood. *Forest Policy and Economics*, *14*(1), 28-40.
76. Sampson, R. N. (2005). Timber, Fuel, and Fibre Ecosystem Services (Current State and Trends Assessment). Millennium Ecosystem Assessment, World Resources Institute: Washington, USA. Available at: http://www.maweb.org/documents/document.278.aspx.pdf (Accessed 17th May 2008).
77. Sarker, D. & Das, N. (2009). Efficiency of Market Behavior of NTFPs for Households under JFMP: A Case Study in West Bengal. Munich Personal RePEc Archive, Available at: http://mpra.ub.uni-muenchen.de/14887/1/MPRA_paper_14887.pdf (Accessed 7th June 2009).
78. Saxena, N.C. (2003). Livelihood Diversification and Non-Timber Forest Products in Orissa: Wider Lessons on the Scope for Policy Change? ODI Working Paper No. 223, Overseas Development Institute, London, UK.
79. Shackleton, C. M., & Pullanikkatil, D. (2019). Considering the Links Between Non-Timber Forest Products and Poverty Alleviation. *Poverty Reduction Through Non-Timber Forest Products: Personal Stories*, 15-28.
80. Shackleton, C., & Shackleton, S. (2004). The Importance of Non-Timber Forest Products in Rural Livelihood Security and as Safety Nets: A Review of Evidence from South Africa. *South African Journal of Science*, *100*(11), 658-664.

81. Shackleton, C.M., Pandey A.K. and Ticktin, T. (2015). Ecological Sustainability for Non-timber Forest Products: Dynamics and Case Studies of Harvesting. *Routledge, New York, USA.*, Pages: 280.
82. Shen, J., Zhang, Y., Zhou, W., Song, Z., & Duan, W. (2022). Dynamics and Determinants of Household's Non-Timber Forest Products Collection in the Giant Panda Nature Reserves of China. *Forest Policy and Economics*, *137*, 102705.
83. Shit, P. K., &Pati, C. K. (2012). Non-timber Forest Products for Livelihood Security of Tribal Communities: A Case Study in Paschim Medinipur District, West Bengal. *Journal of Human Ecology*, *40*(2), 149-156.
84. Shivaprasad, T. M. (2016). Emerging Trends in Collection and Marketing of Minor Forest Produce in Karnataka A Study of Large Sized Adivasi Multi-Purpose Co-operative Societies LAMPS in Mysore and Chamarajanagara Districts.
85. Shvidenko, A., Barber, C. V. & Persson, R. (2005). Forest and Woodland Systems (Current State and Trends Assessment). Millennium Ecosystem Assessment, World Resources Institute: Washington, USA. Available at: http://www.maweb.org/documents/document.290.aspx.pdf (Accessed 20th May 2008).
86. Singh, M. K. & Ardey, J. (2003). Study of the Extraction, Processing and Local Trade of Non-Timber Forest Products in Relation to the Socio-economic Uplift of the Local Communities Under the Joint Forest Management System - A Case Study of Village Jabalpur in Dewas and Chandermuli in Jhabua District in India. IN ROY, S. B. (Ed.) Contemporary Studies in Natural Resource Management in India. Inter-India Publications, New Delhi.
87. Singh, P., Dhuria, S.S., Saudagar, I.A. and Chauhan, K. (2022). Role of NTFPs on Livelihood of Tribals of Chhattisgarh: A Review. *Indian Journal of Tropical Biodiversity,* 30(1&2):10-17.
88. Singh, R., Galliers, C., Moreto, W., Slade, J., Long, B., Aisha, H., & Ghosh18, S. (2021). Impact of the COVID-19 Pandemic on Rangers and the Role of Rangers as a Planetary Health Service. *Parks*, *27*, 119-134.
89. Singh, S., &Chatterjee, S. (2022). Value Chain Analysis of Rhododendron Arboreum Squash 'Buransh' as a Non-Timber Forest Product (NTFP) in Western Himalayas: Case Study of Chamoli District, Uttarakhand in India. *Trees, Forests and People*, *7*, 100200.

90. Srivastava, SK., Babu, N., and Pandey, H. (2009). Traditional Insect Bioprospecting-As Human Food and Medicine. *Indian Journal of Traditional Knowledge,* 8(4), 485-494.
91. State Forest Report of Odisha 2017
92. Statista Research Department, August, 31,2022, www. Statista.com.
93. Talukdar, N. R., Choudhury, P., Barbhuiya, R. A., & Singh, B. (2021). Importance of Non-Timber Forest Products (NTFPs) in Rural Livelihood: A Study in Patharia Hills Reserve Forest, Northeast India. *Trees, Forests and People*, *3*, 100042.
94. The Forest Survey of India (FSI), 2023. Ministry of Environment, Forest and Climate Change.
95. The Indian Forest Act 1927, 2006 and 1972.
96. The Orissa Forest Produce (Control of Trade) Act 1981
97. The Scheduled Tribes and Other Traditional Forest Dwellers Act 2006
98. The United Nations Forum on Forest 2021.
99. TRIFED Annual Report 2020-21, Ministry of Tribal Affairs, Government of India.
100. Tripathi, P. (2016). Tribes and Forest: A Critical Appraisal of the Tribal Forest Right in India. *Research Journal of Social Science and Management*, *6*(6), 1-8.
101. Van Nguyen, T., & Lv, J. H. (2021). Factors Determining Upland Farmers' Participation in Non-Timber Forest Product Value Chains for Sustainable Poverty Reduction in Vietnam. *Forest Policy and Economics*, *126*, 102424.
102. Varadharaj, S. (2001). Role of Non-Timber Forest Products (Ntfps) in Tribal Economy: An Economic Analysis (Doctoral dissertation, Tamil Nadu Agricultural University (India).
103. Verma, S. K. and Paul, S. K. (2019). Sustaining the Non-Timber Forest Products (NTFPs) Based Rural Livelihoods of Tribals in Jharkhand: Issues and Challenges. https://www.researchgate.net/publication/33 4319641.
104. Verma, S. K., & Paul, S. K. (2016). Sustaining the Non-Timber Forest Products (NTFPs) based Rural Livelihoods of Tribals in Jharkhand: Issues and Challenges. *Jharkhand Journal of Development and Management Studies*, 14(1), 6865-6883.
105. Wickens, G. E. (1991). Management Issues for Development of Non-Timber Forest Products. *Unasylva*, 42 (165), p. 3-8.

106. Wollenberg, Eva and Ingles, A.W. (1998). Incomes from the Forest: Methods for Development and Conservation of Forest Products for Local Communities. *Centre for International Forestry Research (CIFOR), ID,* Xi, 227p. ISBN: 979-8764-19-6.

107. Wynberg, Rachel & Niekerk, Jaci. (2014). Chapter 14. Governance, Equity and Sustainability in Non-Timber Forest Product Value Chains. 10.4324/9780203120880-14.

108. Yadav G, and Roy S.B. (1991). Significance of Non-Timber Forest Produces (NTFPs): Availability and its Utilisation Pattern in Rural Community of Midnapur, West Bengal. Technical paper. IBRAD, Kolkata.

10. APPENDICES

Appendix I

Maharaja Sriram Chandra Bhanja Deo University
Sriram Chandra Vihar, Takatpur, Baripada, Odisha-757003

Questionnaires for NTFPs Collectors

Please tick the responses wherever applicable

State: Village:

District: House No.

Block:

I. General Information

1. Name of the respondent: _____
2. Age: _____
3. Gender: Male ☐ Female ☐
4. Religion: Hindu ☐ Muslim ☐ Christian ☐ Other: ☐
5. Caste: General ☐ OBC ☐ SC ☐ ST ☐
6. Marital Status: Unmarried ☐ Married ☐ Divorce ☐ Widow ☐
7. Family Type: Joint Family ☐ Nuclear Family ☐
8. No. of members in the family: _____ Male _____ Female _____ Children _____
9. Education:

Illiterate ☐ Read and write ☐ HSC ☐ 10+2 ☐ Graduation ☐ Post Graduation ☐

10. No. of family members engaged in NTFP collection: _____

    Male _____ Female _____

11. What is your Source of income (tick all that apply):

Agri. production ☐ NTFP ☐ Livestock prod. ☐ Business ☐ Job ☐ Wages ☐

12. Is NTFPs collection is your primary source of income? Yes ☐ No ☐

If no, what is your primary source of income? Specify_____

13. How many years of experience you have on collection of NTFPs?

14. Are you a member of any SHG? Yes ☐ No ☐

If yes, what is your strategy to increase sells and women involvement in NTFPs collection

_____

15. How much land you own? _____

16. What is the type of your house? Kacha/Bamboo made with grass thatching ☐

Kacha/Bamboo made with ☐ Metal Made ☐ ck-built other

_____

17. Average Annual Family income:

<50000 ☐ < 1 lakh ☐ 1-2 lakh ☐ 2 - 3 lakh ☐ 3-4lakh ☐ 4-5 lakh ☐ >5lakh ☐

18. What are assets you own and their total current market value?

Sl. No.	Asset (Name)	Current Market Value (Rs.)

19. Household Expenditure:

Items	Average Expenditure (monthly/yearly)	Items	Average Expenditure (monthly/yearly)
Food		Housing	
Education		Clothing	
Transport		Household items	
Medical Facilities		Others	
Grand Total			

II. Information on NTFPs Collection

20. What types of NTFPs are collected, seasonal available, their uses and purposes?

Sl. No	NTFPs	Seasonal availability	Period of Availability (Months)	Uses	Purpose (self consumption or commercial)

21. How much NTFPs are collected, self-consumed and sold?

NTFPs	Total collection (Quantity in Kg)	Self Consumption (Qnt in Kg/bag)	Sold in market (Qnt in Kg/bag)	Present stock (Qnt in Kg/bag)

22. If you sold NTFPs, Where you sold and whom you sold?

a. Hata (Local Market) b. Traders c. Middleman

23. Do you buy NTFPs from your neighbour and sold in the market/traders? Yes / No

24. What is the average buying and selling price of NTFPs?

Sl. No.	NTFPs	Average selling price (Kg/bag) in Rs.		Average buying price from neighbour (Kg/bag) in Rs.	
		Total Qnt	Price (per unit)	Total Qnt	Price (per unit)

25. What is the total monetary value of collected NTFPs?

NTFPs	Total value of collected NTFPs (Rs.)	Total value of self-consumption (Rs.)	Total sold value (Rs.)	Total unsold/stock value (Rs.)	Gross value of Commercialized NTFPs

III. Costs and Losses Bared by NTFPs collectors

26. How do you transport NTFPs from collection to sell?

Bicycle ☐ Shoulder by tying with rope ☐ Head load ☐ Own vehicles ☐

Private vehicles ☐ Public transport ☐

27. How much you lost NTFPs at various stages (Kg/Bundle)?

NTFPs	Losses (Kg/Bag)			
	Collection	Processing	Transportation	Marketing

28. What is the cost incurred from collection to selling of NTFPs?

NTFPs	**Cost (Rs.)**				
	Collection	Processing	Packaging	Transportation	Marketing

29. Do you pay GST or any other type of taxes or fees to the Government? Yes / No
If yes, specify the _____

30. What are the marketing constraints for NTFPs and what needs to be done?

31. Did you get information for marketing and pricing of NTFPs? Yes / No.
If yes, where did you get the information?

(a) TV (b) SHG members (c) Other collectors (d) from Block Office (e) other

32. What kind of information do you need for better pricing and marketing of NTFPs?

33. Do you/your family members plant any of the NTFPs for sustainable supply of the products?
If yes, specify:

34. Is there any organization (govt. / non-govt.) provides technical support and extension services to encourage NTFPs domestication and commercialization?
If, yes

i. Name of Organization

ii. ii. How they are supporting?

35. Is there any change in the collection/sell of NTFPs in last 5 years? Yes / No
If yes, please give details:

36. Do you want to work in a group of organized cooperative based on NTFPs?
If yes, please specify (why?):

37. What are your opinion/suggestions to make these NTFPs plant resources more available for use and conservation?

38. Is there any loss due to Covid-19 on your NTFPs? Yes / No

If yes, what problems you faced? (Tick wherever is applicable)

Problems	Tick Mark
NTFP collection was declined during short-down and lock-down	
Problem in transportation of NTFPs during short-down and lock-down	
Problem in selling of NTFPs in local Hata /market during short-down and lock-down	
Problem in selling to traders/middleman due to short-down and lock-down	
Problem in pricing of NTFPs due to the pandemic	
Any other problem, specify:	

39. Do you really want to continue collecting NTFPs? Yes / No

40. Do you wish to continue collecting NTFPs if an alternative livelihood option is provided in agriculture? Yes / No

41. How do the state government manage the impact of Covid-19 on NTFPs? Can you suggest 5 strategies?

Appendix II

Maharaja Sriram Chandra Bhanja Deo University
Sriram Chandra Vihar, Takatpur, Baripada, Odisha-757003

Questionnaires for Customers

Please tick the responses wherever applicable

State: Village:

District: House No.

Block:

Part-A

1. Name _____
2. Age_____
3. Gender:

Male ☐ Female ☐

4. Education

Illiterate ☐ Read and write ☐ SSC ☐ +2 ☐ Graduation ☐ PG ☐ ☐

☐ ☐ ☐

5. Religion: Hindu ☐ Muslim ☐ Christian ☐
6. Caste: General ☐ OBC ☐ SC ☐ ST ☐
7. Marital Status: Unmarried ☐ Married ☐ Divorce ☐ Widow ☐
8. Family Type: Joint Family ☐ Nuclear Family ☐
9. No. of members in the family:_____
10. Sources of Income: Agriculture production ☐ Business ☐ Wages ☐ Salary ☐
11. Annual Income of the Family: _____
12. What are assets you own and what is their current value?

Asset	Value (in Rs.)

13. Household Expenditure:

Items	Average Expenditure (monthly/yearly)	Items	Average Expenditure (monthly/yearly)
Food		Housing	
Education		Clothing	
Transport		Household items	
Medical Facilities		Others	
Grand Total			

14. Do you use forest product? Yes/No

If yes, specify those forest products/ NTFPs you use and for what purpose?

Forest products\ NTFPs	Purpose

15. How many years are you consuming forest product/ NTFPs? _____

16. How do you know about the product and its' benefits?

(a) TV (b) SHG members (c) Social media (d) from Government agency (e) other

17. How frequent do you purchase and spend on the following items?

NTFPs	Daily expenditures (Rs.)	Weekly expenditures (Rs)	Monthly expenditures (Rs)	Annual expenditures (Rs)

18. Where do you purchase NTFPs?

NTFPs	Purchase directly from NTFPs collectors	Purchase directly from Local Market	Purchase From Middleman / Intermediaries	Purchase From Wholesalers	Purchase From Retailers

19. Do you get your NTFPs through online shopping website?
If yes, specify the website name: _____

20. Since when, you start using purchasing NTFPs from online market place? _____

21. What is your total buying volume and price of NTFPs?

NTFPs	By volume (Kg/Bag)		By price (Kg/Bag) in Rs.		Total value of purchase in a year (Rs)
	Peak Period	Lean Period	Peak Period	Lean Period	

Part-B

22. Did you face problem of buying NTFPs during shut-down and lock-down period of Covid-19? Yes / No.

23. Is there any change on your volume of purchase of NTFP after Covid-19 as compared to before Covid-19? Yes / No.

    If yes, specify: Decreased ☐ Increased ☐ No change ☐

24. Is there any change on your purchase price of NTFP after Covid-19 as compared to before Covid-19? Yes / No

    If yes, specify: Decreased ☐ Increased ☐ No change ☐

25. What is the Impact of Covid-19 on your savings?

    Increased ☐ Decreased ☐ Same ☐

26. What is the Impact of Covid-19 on your consumption expenditure?

    Increased ☐ Decreased ☐ Same ☐

27. What is the impact of Covid-19 on your standard of living?

    Increased ☐ Decreased ☐ Same ☐

28. What kind of information do you need for purchasing NTFPs?

29. How does the state government manage the impact of Covid-19 on NTFPs? Can you suggest 5 strategies?

Appendix III

Maharaja Sriram Chandra Bhanja Deo University
Sriram Chandra Vihar, Takatpur, Baripada, Odisha-757003

Questionnaires for Retailer

Please tick the responses wherever applicable

I. GENERAL INFORMATION ON RETAILER

1. Name: _____
2. Age: _____ year
3. Name of the Shop: _____
4. Gender: Male / Female / Other
5. Education:

Illiterate☐ Read and write ☐ HSC ☐ 10+2 ☐ Graduation ☐ P.G☐

6. Religion: Hindu ☐ Muslim☐ Christian☐ Other☐
7. Caste: General ☐ OBC ☐ SC☐ ST☐
8. Marital Status: Single☐ Married☐ Divorce☐ Widow☐
9. Family Size: Joint Family ☐ Nuclear Family☐
10. No. of members in the family: _____ . Male ____ Female _____ Children _____
11. No. of family members engaged in NTFP business: _____

    Male _____ Female _____

12. Email: _____Phone No (optional): _____
13. Website URL (Optional):_____
14. Business establishment Year:_____ and years of experience_____.
15. Is NTFPs business is your primary source of income? Yes / No
16. Do you have any other business or source of income? Yes / No

If yes, please specify source _____ and income Rs._____.

17. Where do you run your business?

Own house/ rented house/ roadside/weekly Hata/local market.

18. Are you a member of any SHG? Yes ☐ No ☐

If yes, what is your strategy to increase sells and women involvement in NTFPs business:

_____

19. What is your total annual Family income: Rs._____.
20. What is the total current value of other assets (i.e. electronic goods, furniture, agriculture implements, others if you have?) in Rs _____.
21. Do you have any transport vehicle of your own? Yes / No
    If yes, specify _____
22. Is your shop licensed by the relevant regulatory authority? Yes / No

If yes, where did you get the license (authority)? _____.

23. Is your shop approved as wholesale distributor by any national/international organization? Yes / No

    If yes, please specify: _____.

24. Are you part of any association/ society for wholesaler association? Yes / No
    If yes, mention the association/group name_____.
25. Do you have insurance for your stock and shop? Yes / No
26. Do you pay any taxes to the government while buying and selling NTFPs? Yes/ No.
    If yes, specify _____ tax and annual amount Rs._____ paid.
27. What are your other sources of income?
    Agri. production ☐ NTFP collection ☐ Livestock ☐ Business ☐
    Salary ☐
28. What is your average annual income from all sources?_____.

Source	Income (Rs.)

II. INFORMATION ON INCOME, EXPENDITURE AND PROFIT OF WHOLESALER

29. What is your main activities: Collection / Harvesting / Intra-state trade / Processing / Other (specify) _____

30. What is the Nature of Business Organization: Owner ☐ Partnership ☐ Other ☐

31. What are the major NTFPs you buy, when and where you buy, and at what quantity and price?

Category	NTFPs	Season/ Month	Buy from (Collectors/ Local Market/trader)	Quantity (Kg/Bag)	Price (Kg/Bag) Rs.

32. What are the major NTFPs you sale, when and whom you sale, and at what quantity and price?

Category	NTFPs	Season/ Month	Sale to (directly Consumer/ retailer/other	Quantity (Kg/Bag)	Price (Kg/Bag) Rs.

33. What is the total money value of your NTFPs business?

Total value of purchased	Value of self consumption	Total value of sold	Total value of stock	Gross value of NTFPs

34. Where do you store NTFP? Open Go-down/ Go-down/ Cold storage.

35. How much cost incurred for storing NTFPs? Rs._____ monthly.

36. Do you have any storage loss of your NTFPs? Yes / No

If yes, please mention type of loss: _____and the loss amount: _____.

37. What is your total monthly expenditure on NTFP business?

Items	Expenditure	
	Days/Monthly/Yearly	Amount Rs.
Shop and Go-down Rent		
Labour		
Electricity		
Transport Vehicle		
Packaging/grading		
Damage/wastage		

III. INFORMATION ON FINANCE/CREDIT

38. How do you finance your business? Own/ Relatives/ Loan from banks/ others

39. How much amount of money you invested on your business last year and from what source?

Source	Amount (Rs.)
Own/ Self	
Relatives	
Banks	
Co-operative Society	
Others	

40. Do you give or receive advance payments for NTFPs? Yes / No
If yes, specify _____ and amount Rs. _____.

41. Do you get/buy the desired NTFP on/before the time? Yes / No

If yes, give details _____.

42. Do you deliver the desired NTFP on/before the time? Yes / No

    If yes, give details _____.

43. How do you transport and costs incurred from buy to sale of NTFPs?

	Transportation Costs (Rs.)		
	From collectors to shop	Middlemen/traders to shop	Shop to retailers
Own Vehicle			
Commercial vehicle			
Train			
Govt. Bus			
If others, specify			

44. Do you have insurance on your business? Yes/ No.

    If yes, what you have insured_____ and how much you paid for the insurance Rs. _____.

45. Did you ever claim your insurance? Yes/ No.

If yes, specify the amount of claim Rs. _____ and year of claim_____.

IV. INFORMATION ON IMPACT OF COVID AND OTHER

46. Did you face problem of buying NTFPs during shut-down and lock-down period of Covid-19? Yes / No
47. Did you face problem in selling of NTFPs during shut-down and lock-down period of Covid-19? Yes / No.
48. Did you face problem in transportation (buy and sale) of NTFPs during shut-down and lock-down period of Covid-19? Yes / No.
49. Did you face problem in getting loan for you NTFP business during shut-down and lock-down period of Covid-19? Yes / No.
50. Is there any change on your volume of purchase of NTFP after Covid-19 as compared to before Covid-19? Yes / No.

    If yes, specify: Decreased☐ Increased☐ No change ☐

51. Is there any change on your purchase price of NTFP after Covid-19 as compared to before Covid-19? Yes / No.

If yes, specify: Decreased☐ Increased☐ No change ☐

52. Is there any change on your volume of sales of NTFP after Covid-19 as compared to before Covid-19? Yes / No.

    If yes, specify: Decreased☐ Increased☐ No change ☐

53. Is there any change on your sales price of NTFP after Covid-19 as compared to before Covid-19? Yes / No.

    If yes, specify: Decreased☐ Increased☐ No change ☐

54. Is there any change on your NTFP income after Covid-19 as compared to before Covid-19? Yes / No.

    If yes, specify: Decreased☐ Increased☐ No change ☐

55. Is there any change on your NTFP business profit after Covid-19 as compared to before Covid-19? Yes / No.

    If yes, specify: Decreased☐ Increased☐ No change ☐

56. Is there any benefits received for your NTFP business after Covid-19 from the govt.? Yes/ No.

    If yes, specify: Decreased☐ Increased☐ No change ☐

57. Did you observed any changes in quantity purchased in last 5 years? Yes/ No.

    If yes, specify whether: Increased/ decreased. What are the reasons_____.

58. Did you observed any specific NTFPs sale increased in recent year? Yes/ No.

59. If yes, specify the NTFPs_____ and specify why there is increased of sale_____.

60. Any other information you want to share, specify_____.

Appendix IV

Maharaja Sriram Chandra Bhanja Deo University
Sriram Chandra Vihar, Takatpur, Baripada, Odisha-757003

Questionnaires for Traders

Please tick the responses wherever applicable

State: Village:

District: House No.

Block:

I. GENERAL INFORMATION ON TRADER

1. Name: _____
2. Age: _____ year
3. Name of the firm: _____
4. Gender: Male / Female / Other
5. Education:
Illiterate☐ Read and write ☐ HSC ☐ 10+2☐ Graduation ☐ P.G☐

6. Religion: Hindu ☐ Muslim☐ Christian☐ Other☐

7. Caste: General ☐ OBC ☐ SC☐ ST☐

8. Marital Status: Single☐ Married☐ Divorce☐ Widow☐

9. Family Size: Joint Family ☐ Nuclear Family☐

10. No. of members in the family: _____ . Male ____ Female _____ Children _____

11. No. of family members engaged in NTFP business: _____
Male _____ Female _____

12. Email: _____ Phone No: _____

13. What is your source of income?

Agri. production ☐ NTFP business ☐ Other Business ☐ Salary ☐

14. Is NTFP business is your primary source of income? Yes ☐ No ☐

15. What is your total annual income from different sources?

Source	Income (in Rs.)

16. What are assets you own and what is their current value?

Asset	Value (in Rs.)

17. Do you own any vehicle? Yes / No

If yes specify _____

18. Do you own any transport vehicle? Yes / No

If yes specify _____

II. INFORMATION ON TRADER BUSINESS

19. What are your total years of experience as NTFP trader/ business? _____Year.

20. Do you have license as a trader/business from any relevant authority? Yes / No

If no, do you face any problem ever? Specify_____

_____.

21. Are you part of any association/ society/union as a trader of NTFP? Yes / No.
If yes, mention the association group _____ .

22. Do you pay taxes to govt. for trading NTFP? Yes / No

Is yes, then specify the tax _____and amount Rs _____

23. What type of trading activities you do? Tick wherever is applicable.

Activity	Tick mark
Purchase from NTFPs collectors and sell to consumers	
Purchase from NTFPs collectors, sell to Wholesalers	
Purchase from NTFPs collectors, sell to Retailers	
Other	

24. Which NTFPs you are operating, from where you buy and sale, and how do you transport?

NTFPs	Place of Purchase	Place of sale	Period	Mode of Transport

25. Do you sell your NTFPs through e-commerce? Yes/ No

If yes, specify the platform _____

26. Do you give or receive advance payments for NTFPs? Yes / No
If yes, specify _____ and amount Rs. _____.

27. Do Collectors deliver to you on contract or by prior? Yes / No

If yes, give details _____

28. What is your total volume and price of buy and sale of NTFPs?

NTFP	Buy Volume (Kg/Bag)	Buy Price (Kg/Bag) in Rs.	Sale Volume (Kg/Bag)	Sale Price (Kg/Bag) in Rs.

29. What is your total money value of NTFPs business?

NTFPs	Total value of purchased (Rs.)	Total value of self-used (Rs.)	Total value of sold	Total value of stock (if any)

III. Information on Transport and Costs in NTFP Trade

30. How much is your transport and other cost incurred in NTFP business?

NTFP	Transport cost for load and unload (Rs.)	Labour cost for load and unload (Rs.)	Marketing/ delivery cost (Rs.)	Storage cost (if any) Rs.	Other cost Rs.

31. Do you store before you deliver NTFPs? Yes / No

If yes, please specify where you store _____ and storage capacity_____.

32. Do you suffer from storage loss of your NTFP? Yes / No

If yes, what is the loss _____and Loss amount_____.

33. Where do you get finance for your NTFP business? Self / Loan

If loan, please specify where you get _____ , what is the total loan amount Rs. _____ .

34. If get loan, how did you get the loan? Without security / with security.

35. Did you get the loan with hassle free? Yes / No.

If no, please specify the reasons_____.

IV. IMPACT OF COVID-19 ON NTFPs TRADE

36. Did you face problem of buying NTFPs during shut-down and lock-down period of Covid-19? Yes / No.

37. Did you face problem in selling of NTFPs during shut-down and lock-down period of Covid-19? Yes / No.

38. Did you face problem in transportation (buy and sale) of NTFPs during shut-down and lock-down period of Covid-19? Yes / No.

39. Did you face problem in getting loan for you NTFP business during shut-down and lock-down period of Covid-19? Yes / No.

40. Is there any change on your volume of purchase of NTFP after Covid-19 as compared to before Covid-19? Yes / No.

If yes, specify: Decreased ☐ Increased ☐ No change ☐

41. Is there any change on your purchase price of NTFP after Covid-19 as compared to before Covid-19? Yes / No.

If yes, specify: Decreased ☐ Increased ☐ No change ☐

42. Is there any change on your volume of sales of NTFP after Covid-19 as compared to before Covid-19? Yes / No.

If yes, specify: Decreased ☐ Increased ☐ No change ☐

43. Is there any change on your sales price of NTFP after Covid-19 as compared to before Covid-19? Yes / No.

If yes, specify: Decreased ☐ Increased ☐ No change ☐

44. Is there any change on your NTFP income after Covid-19 as compared to before Covid-19? Yes / No.

If yes, specify: Decreased ☐ Increased ☐ No change ☐

45. Is there any change on your NTFP business profit after Covid-19 as compared to before Covid-19? Yes / No.

If yes, specify: Decreased ☐ Increased ☐ No change ☐

46. Is there any benefits received for your NTFP business after Covid-19 from the govt.? Yes/ No.

If yes, specify: Decreased ☐ Increased ☐ No change ☐

Appendix V

Maharaja Sriram Chandra Bhanja Deo University
Sriram Chandra Vihar, Takatpur, Baripada, Odisha-757003

Questionnaires for Wholesaler

Please tick the responses wherever applicable

I. GENERAL INFORMATION ON WHOLESALER

1. Name: _____
2. Age: _____ year
3. Name of the Shop: _____
4. Gender: Male / Female / Other
5. Education:

Illiterate☐ Read and write ☐ HSC ☐ 10+2☐ Graduation ☐ P.G☐

6. Religion: Hindu ☐ Muslim☐ Christian☐ Other☐
7. Caste: General ☐ OBC ☐ SC☐ ST☐
8. Marital Status: Single☐ Married☐ Divorce☐ Widow☐
9. Family Size: Joint Family ☐ Nuclear Family☐
10. No. of members in the family: _____ . Male ____ Female _____ Children _____
11. No. of family members engaged in NTFP business: _____

    Male _____ Female _____

12. Email: _____Phone No (optional): _____
13. Website URL (Optional):_____
14. Business establishment Year:_____ and years of experience_____.
15. Is NTFPs business is your primary source of income? Yes / No
16. Do you have any other business or source of income? Yes / No

If yes, please specify source _____ and income Rs._____.

17. Where do you run your business? Own house/ rented house?
18. What is your total annual Family income: Rs._____.
19. What is the total current value of other assets (i.e. electronic goods, furniture, agriculture implements, others if you have?) in Rs _____.
20. Do you own any transport vehicle? Yes / No
    If yes, specify _____
21. Is your shop licensed by the relevant regulatory authority? Yes / No

If yes, where did you get the license (authority)?_____.

22. Is your shop approved as wholesale distributor by any national/international organization? Yes / No

    If yes, please specify: _____.

23. Are you part of any association/ society for wholesaler association? Yes / No

    If yes, mention the association/group name_____.

24. Do you have insurance for your stock and shop? Yes / No
25. Do you pay any taxes to the government while buying and selling NTFPs? Yes/ No.
    If yes, specify _____ tax and annual amount Rs._____ paid.

II. INFORMATION ON INCOME, EXPENDITURE AND PROFIT OF WHOLESALER

26. What is your main activities: Collection / Harvesting / Intra-state trade / Processing / International Export / Other (specify) _____
27. What is the Nature of Business Organization: Owner ☐ Partnership ☐ Other ☐
28. What are the major NTFPs you buy, when and where you buy, and at what quantity and price?

Category	NTFPs	Season/ Month	Buy from (Collectors/ Local Market/trader)	Quantity (Kg/Bag)	Price (Kg/Bag) Rs.

29. What are the major NTFPs you sale, when and whom you sale, and at what quantity and price?

Category	NTFPs	Season/ Month	Sale to (directly Consumer/ retailer/other)	Quantity (Kg/Bag)	Price (Kg/Bag) Rs.

30. Do you sell your NTFPs through e-commerce? Yes/No
If yes, specify the platform _____

31. What is the total money value of your NTFPs business?

Total value of purchased	Value of self consumption	Total value of sold	Total value of stock	Gross value of NTFPs

32. Where do you store NTFP? Open Go-down/ Go-down/ Cold storage.

33. How much cost incurred for storing NTFPs? Rs._____ monthly.

34. Do you have any storage loss of your NTFPs? Yes / No

If yes, please mention type of loss: _____and the loss amount: _____.

35. What is your total monthly expenditure on NTFP business?

Items	Expenditure	
	Days/Monthly/Yearly	Amount Rs.
Shop and Go-down Rent		
Labour		
Electricity		
Transport Vehicle		
Packaging/grading		
Damage/wastage		

III. INFORMATION ON FINANCE/CREDIT

36. How do you finance your business? Own/ Relatives/ Loan from banks/ others

37. How much amount of money you invested on your business last year and from what source?

Source	Amount (Rs.)
Own/ Self	
Relatives	
Banks	
Co-operative Society	
Others	

38. Do you give or receive advance payments for NTFPs? Yes / No
If yes, specify _____ and amount Rs. _____.

39. Do you get/buy the desired NTFP on/before the time? Yes / No

    If yes, give details _____.

40. Do you deliver the desired NTFP on/before the time? Yes / No

    If yes, give details _____.

41. How do you transport and costs incurred from buy to sale of NTFPs?

	Transportation Costs		
	From collectors to shop	Middlemen/traders to shop	Shop to retailers
Own Vehicle			
Commercial vehicle			
Train			
Govt. Bus			
If others, specify			

42. Do you have insurance on your business? Yes/ No.

    If yes, what you have insured_____ and how much you paid for the insurance Rs. _____.

43. Did you ever claim your insurance? Yes/ No.

If yes, specify the amount of claim Rs. _____ and year of claim_____

IV. INFORMATION ON THE IMPACT OF COVID AND OTHER FACTORS

44. Did you face problem of buying NTFPs during the shut-down and lockdown period of Covid-19? Yes / No
45. Did you face problem in selling of NTFPs during shut-down and lock-down period of Covid-19? Yes / No.
46. Did you face problem in transportation (buy and sale) of NTFPs during shut-down and lock-down period of Covid-19? Yes / No.
47. Did you face problem in getting loan for you NTFP business during shut-down and lock-down period of Covid-19? Yes / No.
48. Is there any change on your volume of purchase of NTFP after Covid-19 as compared to before Covid-19? Yes / No.

    If yes, specify: Decreased☐ Increased☐ No change ☐

49. Is there any change on your purchase price of NTFP after Covid-19 as compared to before Covid-19? Yes / No.

    If yes, specify: Decreased☐ Increased☐ No change ☐

50. Is there any change on your volume of sales of NTFP after Covid-19 as compared to before Covid-19? Yes / No.

    If yes, specify: Decreased☐ Increased☐ No change ☐

51. Is there any change on your sales price of NTFP after Covid-19 as compared to before Covid-19? Yes / No.

    If yes, specify: Decreased☐ Increased☐ No change ☐

52. Is there any change on your NTFP income after Covid-19 as compared to before Covid-19? Yes / No.

    If yes, specify: Decreased☐ Increased☐ No change ☐

53. Is there any change on your NTFP business profit after Covid-19 as compared to before Covid-19? Yes / No.

    If yes, specify: Decreased☐ Increased☐ No change ☐

54. Is there any benefits received for your NTFP business after Covid-19 from the govt.? Yes/ No.

    If yes, specify: Decreased☐ Increased☐ No change ☐

55. Did you observed any changes in quantity purchased in last 5 years? Yes/ No.

    If yes, specify whether: Increased/ decreased. What are the reasons_____.

56. Did you observed any specific NTFPs sale increased in recent year? Yes/ No.

    If yes, specify the NTFPs_____ and specify why there is increased of sale_____.

57. Any other information you want to share, specify_____.