FOREST RESOURCE COLLECTION FOOTPRINTS

Study of Khutwanda, Ghosari, Ashta, Wadala, Sonegaon, and Arjuni village

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CONSERVATION FOUNDATION

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SUPPORTED BY

TADOBA ANDHARI TIGER RESERVE

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About the pictures: *The SCF team took all the photographs in this report during field visits while accompanying villagers in the forest. The permission was obtained from the villagers before capturing images. To protect the privacy and safety of the villagers, no identifiable personal details have been disclosed, and the images are used solely for this report.*

Cover Picture: Forest resource collection around Tadoba Andhari Tiger Reserve is common. Women are seen climbing Tendu trees to collect leaves.
Back Cover Picture: Field staff assessing household fuel wood consumption, understanding the dependency on forest resources.

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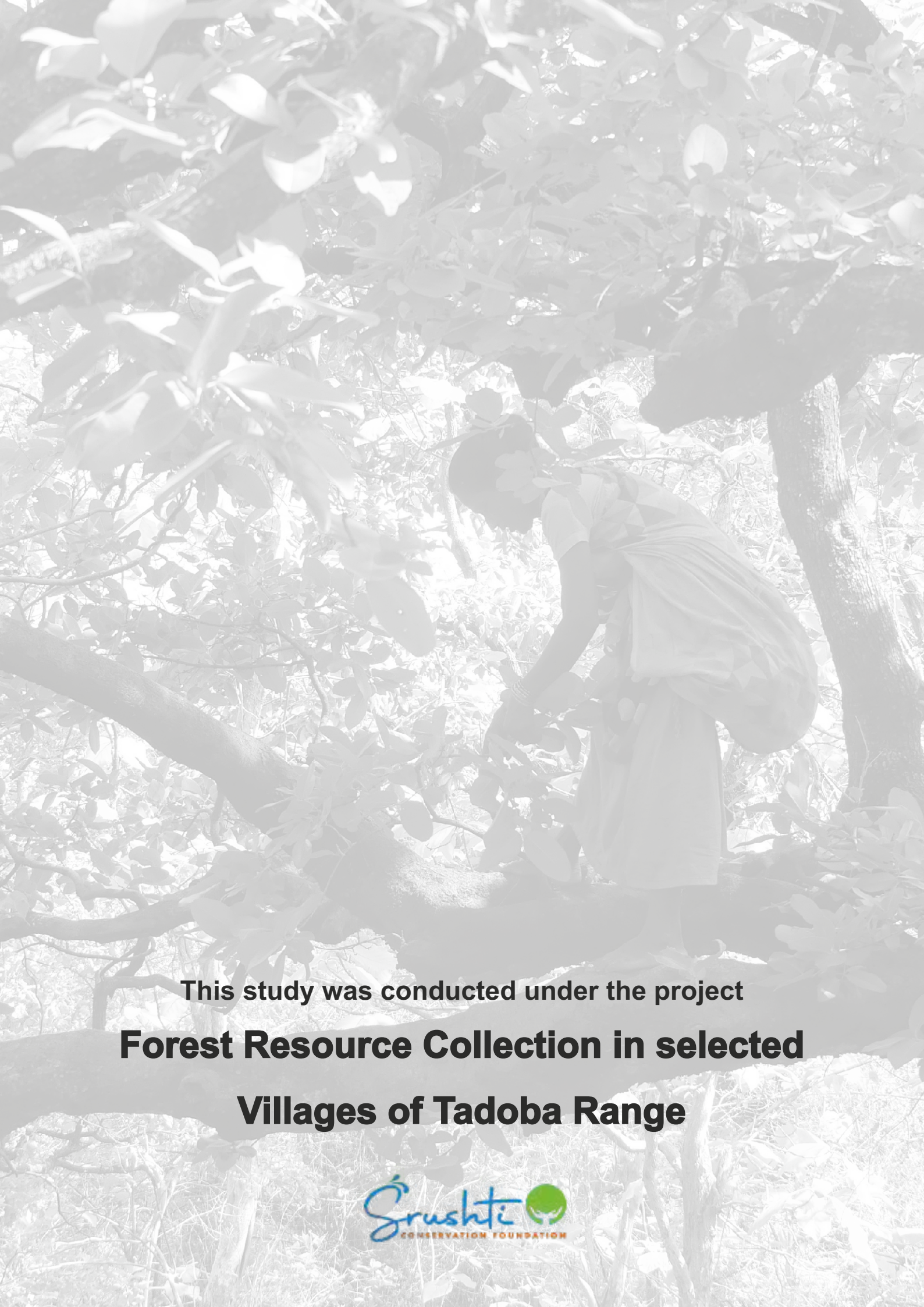

This study was conducted under the project

Forest Resource Collection in selected Villages of Tadoba Range

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EXECUTIVE SUMMARY

The project, initiated in April 2024, focuses on the collection and use of forest resources in six selected villages of the Tadoba Range of Tadoba Andhari Tiger Reserve of Chandrapur district. This study is significant due to the dependence of these villages on the core and nearby area for resources such as fuelwood, tendu patta, mahua, bamboo, and cattle grazing. Previous studies have unnoticed these critical topics, making this project essential for understanding the socio-economic and environmental impacts of forest resource collection.

Key Findings

Forest Resource Collection: It has been observed that despite having access to LPG at their doorstep, villagers continue to use traditional chulha (wood-burning stoves) regularly for daily meals. The primary reasons are the high cost of LPG refills and the availability of free fuelwood from the forest. Our study of forest resource dependency in these villages reveals that the villagers rely heavily on fuelwood and small timber for their energy needs. The tendu patta collection stands out as the most significant source of income during the lean summer months. Villagers venture deep into the forest, including core areas, to collect tendu patta, as it provides them with essential cash income during this period. On the other hand, the Mahua collection has declined in these villages. Villagers report that they do not receive enough money from this activity, and traders no longer visit the villages as frequently. Bamboo collection is less extensive compared to other forest products. Villagers primarily gather bamboo for agricultural purposes, but the reduced availability of bamboo, caused by flowering events, has diminished its role as a significant livelihood source.

During the monsoon season, cattle graze deep within the forest. However, the number of cattle, especially cows, has decreased in these villages. In contrast, the population of goats and sheep has increased, which raises concerns about the growing pressure on forest resources. The increased grazing by goats and sheep could lead to overgrazing and worsen human-wildlife conflicts. Wild vegetables are collected from the nearby forests regularly during the monsoon, as their availability is seasonal. This collection serves as a valuable source of food for the villagers during this time of the year.

Socio-economic Aspects: The study highlights the deep connection between forest resources and livelihoods. Women play a significant role in forest resource collection, balancing household responsibilities with income-generating activities. Seasonal and geographical constraints, such as the lack of proper buffer zones and distance to resource collection areas, pose challenges for these communities.

Challenges & Opportunities: The study identifies issues like overexploitation of resources, increasing human-wildlife conflict, and a lack of sustainable management practices. GPS tracking of livestock movement and tendu patta collection offers a potential tool for managing forest resource pressures. Compared to earlier studies, this research reveals that the western part of the Tadoba Andhari Tiger Reserve shows a lower dependency on forest resources than the eastern and southern parts. This reduced dependency may be attributed to geographical and socio-economic factors, including greater access to alternative livelihoods and resources, as well as the lower availability of forested areas in the western part due to its proximity to the core of the reserve. This research emphasizes the urgent need for sustainable forest resource management, community involvement, and strategic conservation planning. Addressing these challenges will be vital for the conservation of the Tadoba Andhari Tiger Reserve and the well-being of local communities.

INTRODUCTION

Tadoba Andhari Tiger Reserve (TATR), located in the Chandrapur district of Maharashtra, is one of the most important tiger habitats within the Central Indian Landscape. With a healthy tiger population and rich biodiversity, the reserve's forested areas play a crucial role not only in wildlife conservation but also in supporting the livelihoods of nearby communities. The buffer zone of TATR is home to over 90 villages, with more than 23,000 families, many of whom depend on forest resources for their daily needs, including fuelwood, bamboo, tendu patta, mahua, wild vegetables, other MFPs, and grazing land for livestock.

This study, titled `Forest Resource Collection Footprints`, focuses on understanding the extent of forest resource collection in six selected villages within the Tadoba Range of TATR. The western part of Tadoba, where these villages are located, presents unique challenges, as it is closer to the core area of the reserve and lacks a significant buffer zone. This has made the local communities highly dependent on forest resources within the core zone, often leading to potential conflicts with wildlife and unsustainable extraction practices.

Our previous studies have highlighted higher forest resource dependency in the eastern and southern parts of Tadoba, where communities are more reliant on the forest for their livelihoods. However, this study reveals that the western part of the reserve shows a relatively lower dependency on forest resources, likely due to geographical and socio-economic factors. The availability of alternative livelihoods, limited forest cover, and proximity to the core reserve may have contributed to this reduced reliance.

Despite the lower levels of dependency, the collection of forest resources in these villages is vital for sustaining livelihoods, particularly during the summer months when employment opportunities are limited. Women play a significant role in this process, especially in tendu patta collection, bamboo crafting, and gathering Fuelwood. This study aims to assess the patterns,

socio-economic impacts, and challenges of forest resource collection in these villages, as well as explore sustainable practices that can balance community needs with conservation goals.

Through field surveys, interviews with local communities, group discussion, and socio-economic assessments, the project provided valuable insights into the role of forest resources in the lives of these villagers and offered recommendations for sustainable resource management to support both tiger conservation efforts and community development.

The western part of Tadoba, where these six villages are located, presents unique challenges, as it is closer to the core area of the tiger reserve and lacks a significant buffer zone. This has made the local communities highly dependent on forest resources within the core zone.

PROJECT OBJECTIVES

a. Evaluate the types and quantities of forest resources collected in the 6 villages of Tadoba range of the Tadoba Andhari tiger reserve.

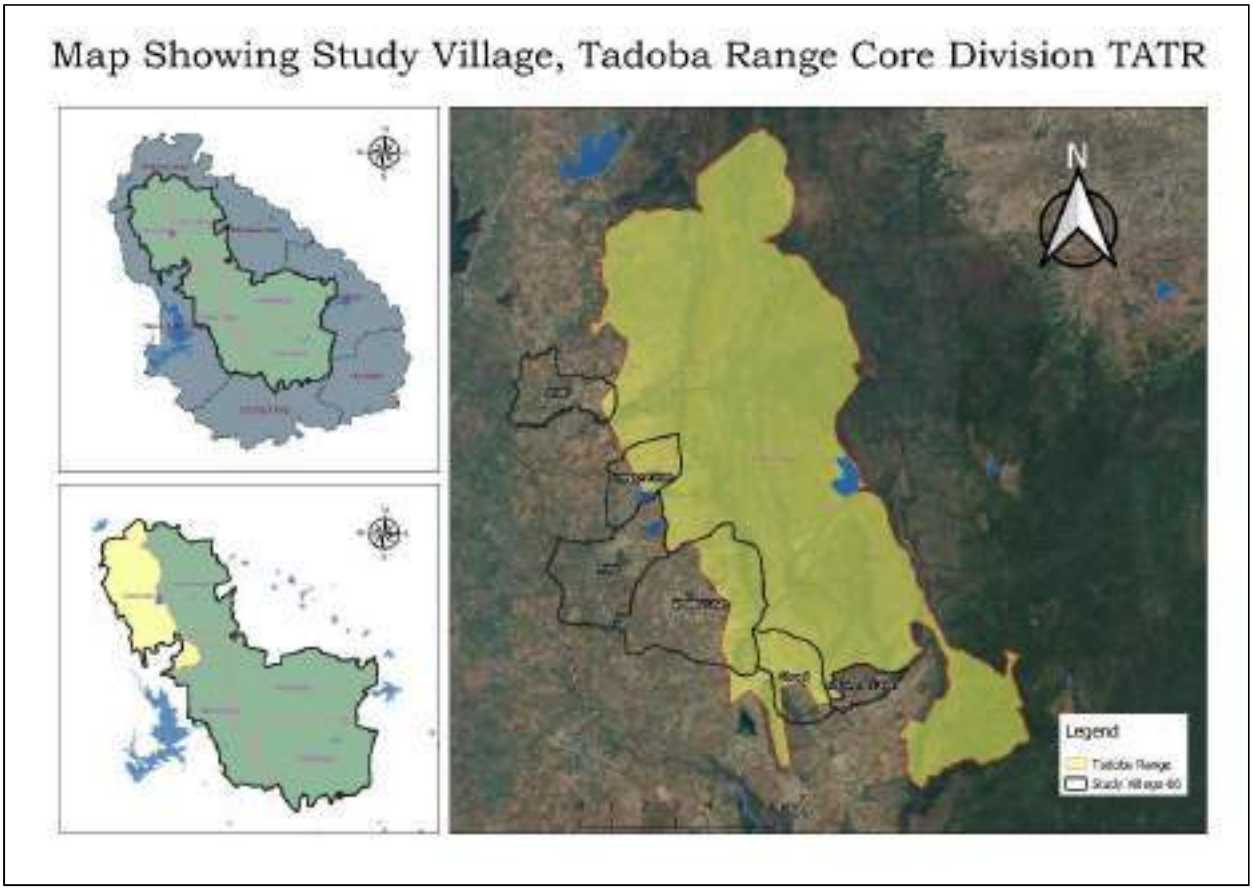
b. Investigate the socio-economic aspects of forest resource collection, including livelihood dependence and income generation.

e. Identify the challenges and opportunities for sustainable forest resource management.

f. Develop recommendations for sustainable practices and community involvement in conservation efforts for tiger conservation plan.

STUDY AREA

The study area comprises six villages situated near the Tadoba Andhari Tiger Reserve and the fringe is forested regions, each exhibiting unique socio-economic and environmental characteristics while sharing common challenges related to resource collection and human-wildlife interface. The villages are Khutwanda, Ghosari, Ashta, Wadala, Sonegaon, and Arjuni. All these villages are in the Tadoba Range of TATR.



Source: TATR

VILLAGE PROFILE

KHUTWANDA

Khutwanda village is in Bhadravati tehsil, situated near the western core zone of Tadoba Andhari Tiger Reserve, and plays a vital role in the human-wildlife interface due to its proximity to the protected area. This is one of the old gates of Tadoba having daily entry of 6 Gypsy vehicles. The total area of the village is 300 Ha. The village has a population of 688 and comprises 367 families, with 215 belonging to Scheduled Tribes (ST), highlighting its predominantly tribal character. Additionally, there are 23 Scheduled Caste (SC) families, 8 Nomadic Tribe (NT) families, 5 Other Backward Classes (OBC), and a small number from other castes, indicating a mix of social groups. Despite the presence of job cards across all households, 89 families are listed as Below Poverty Line (BPL), reflecting the economic vulnerability of a section of the population. The village's economy primarily revolves around agriculture, with marginal farming being the most common livelihood. Paddy is the dominant crop, while cotton, wheat, and chickpeas also form part of the cropping pattern.

Educational facilities within the village are limited to a Zilla Parishad (ZP) primary school, with students traveling to nearby Mudholi for high school education. Employment opportunities linked to tourism in the Tadoba Tiger Project are a significant aspect of the local economy. A total of 25 families are directly involved in tiger reserve-related tourism activities, with 15 serving as guides or gypsy drivers. Few youths engaged in resorts nearby area. Additionally, a few families run a small canteen, Pan Tapari further supporting their livelihoods. Health services are accessible at the primary health center in Mudholi, located 5 kilometers from the village. 12 families have no toilets in their house.

In terms of livestock, the village has a small population, with the animal husbandry department reporting 269 cattle and 170 sheep. However, the village’s proximity to the reserve boundary presents significant challenges, including cattle kills and crop raids by wildlife. Paddy, wheat, chickpeas, and cotton are the primary crops targeted, and wild ungulates such as Wild boars, spotted deer, Nilgai, and Langur are the main culprits. Crop raiding is particularly intense during the winter season, which coincides with harvest times, making it a critical issue for the farming community.

In response to these threats, villagers have adopted several measures to safeguard their crops. These include solar-powered fencing, barbed wire barriers, and traditional bamboo or sari fencing. Additionally, night patrolling, locally referred to as "Jagali," is a common practice of guarding their fields to deter wild animals.

Overall, Khutwanda Village presents a dynamic interplay between traditional agrarian practices, dependence on forest resources, and challenges posed by its proximity to a thriving tiger reserve. The socio-economic structure of the village, with its strong tribal base and involvement in tourism, coupled with ongoing wildlife-related conflicts, makes it a key area for understanding the complexities of forest resource use and conservation challenges.

ARJUNI

Arjuni Village, situated in Warora Tehsil of Chandrapur district, is home to 1,238 individuals across 321 families. The village has a predominantly tribal population, with 229 families belonging to Scheduled Tribes (ST). In addition, there are 53 Other Backward Classes (OBC) families, 8 Scheduled Caste (SC) families, 33 Nomadic Tribe (NT) families, and a few others from various social groups. Socio-economically, the village faces challenges, with 234 families holding Below the Poverty Line (BPL), while 87 families are classified as Above the Poverty Line (APL). Open defecation remains an issue for 60 families, despite growing awareness of sanitation.

Livestock farming is a significant activity in Arjuni. According to the animal husbandry department, the village has 490 cattle, 60 buffaloes, and 250 goats, forming an essential part of their agrarian economy. Educational facilities in the village include primary, secondary, and high schools, providing basic to mid-level education to the local children. However, for healthcare, residents must travel 15 kilometers to the nearest Primary Health Center (PHC) in Shegaon, posing a challenge during emergencies.

Agriculture serves as the main livelihood for the majority of the villagers, with rain-fed farming being the primary mode of cultivation. The main crops include paddy, soybean, and cotton during the Kharif season, while wheat and chickpeas are grown as second crops. In addition to farming, many villagers are engaged in agricultural labor, forest labor, small businesses, and daily wage jobs, contributing to a diverse income structure.

Despite the reliance on agriculture, the village frequently faces challenges from wildlife, particularly crop raiding by wild ungulates. Wild boar, spotted deer, langur, and Nilgai are the primary species responsible for damaging crops such as paddy, wheat, cotton, and chickpeas. These raids are especially severe during harvest seasons, significantly impacting the villagers' agricultural output. To combat this, villagers have adopted several crop protection techniques, including solar fencing, wire fencing, and traditional barriers made from bamboo and saris. Additionally, the practice of "Jagli," or night patrolling, is commonly undertaken by villagers to safeguard their fields.

The village is located near a forest area that forms part of the habitat for large predators like tigers, leopards, and sloth bears, which are frequently sighted in the surrounding landscape. Human-wildlife conflict is a major concern, with a history of tiger attacks on humans creating a tense environment. In response to this, the local forest department has set up a protection hut nearby, and a round officer from the tiger reserve resides in the village with accommodation facilities. This presence helps in monitoring wildlife movement and mitigating conflicts, although the situation remains delicate.

WADALA

Wadala (B) Village, located on the main road to Mudholi in Bhadravati Tehsil, is a small yet vibrant community with a population of 814 people living in 296 families. Among these families, 274 belong to Scheduled Tribes (ST), highlighting the village's strong tribal representation. Additionally, 40 families are from Other Backward Classes (OBC), 36 from Nomadic Tribes (NT), and 2 from Scheduled Castes (SC). A significant number, 74 families, are classified as Below the Poverty Line (BPL). The total area of the village is 1334 Ha. One notable development in Wadala is that all families have access to household toilets, marking a positive step towards better hygiene and sanitation practices. The literacy rate in the village is around 70%, reflecting a moderate level of education among its residents.

Livestock farming plays a central role in the village economy, with a large number of cattle (634) and a substantial population of goats and sheep, estimated to be around 1,000. This contributes to the livelihood of many families. The village has a primary school, but for secondary education, students travel 8 kilometers to the nearest high school in Mudholi.

Agriculture remains the primary livelihood for most households. The villagers practice rain-fed farming, with paddy being the dominant crop. Other important crops include soybean, cotton, tur (pigeon pea), wheat, and chickpeas. Some families also grow vegetables, providing them with an additional source of income. However, due to the seasonal nature of agriculture, many families engage in farming activities primarily until the summer months, after which opportunities become limited. One high-end resort is near this village, few youths are attached to this business.

The village depends on a combination of local water sources, including a village tank, for livestock and agricultural irrigation. While Wadala farmers take several precautions to protect their crops, crop depredation is a persistent issue. Wild boars and spotted deer are the primary animals responsible for raiding crops, particularly during the monsoon and winter seasons. These wildlife encounters can cause substantial damage to crops such as paddy, soybean, and cotton.

Apart from agriculture, villagers depend on forest resources for fuelwood, fodder, and minor forest produce. Collecting these resources is a traditional practice, but it has gradually reduced as more villagers have shifted their focus toward agriculture. Additionally, many families supplement their income by participating in employment schemes such as the Mahatma Gandhi National Rural Employment Guarantee Scheme (MREGS), which provides wage labor opportunities, especially during off-season periods.

The Tadoba range office is on the fringe of this village along with staff quarters. The village is also located near forested areas that are home to wildlife, including large predators like tigers and leopards. Though human-wildlife conflict is not as prominent as in some nearby areas, the village still experiences occasional encounters with these animals, increasing the need for vigilance and protection measures.

GHOSARI

Ghosari is a small village in Bhadravati Tehsil, with a population of 485 people living in 147 families. The village has a dominant Scheduled Tribe (ST) community, comprising 82 families. Other social groups include 33 families from Other Backward Classes (OBC) and 25 families from Nomadic Tribes (NT). Of the total families, 61 are categorized as Below the Poverty Line (BPL), reflecting the economic challenges faced by a portion of the community. The total area of the village is 438 Ha.

The village is primarily composed of marginal farmers, with paddy being the main crop cultivated. In addition to paddy, other crops such as soybean, cotton, and pigeon peas are grown during the Kharif season, while wheat and chickpeas (chana) are cultivated as Rabi crops. Some families also grow vegetables, adding diversity to the village's agricultural output. The main water source for irrigation is a village tank, along with a few newly constructed tanks that further support farming activities. About 40 families are actively engaged in agriculture, while a larger number of families earn their livelihoods through agricultural labor. Local Bamboo craft and forest labor are also occupations among the villagers, highlighting the village's dependence on nearby forest resources.

Ghosari has basic infrastructure facilities, including a primary school and roads that connect it to neighboring areas. For secondary education and healthcare, villagers travel to Mudholi, which is located 5 kilometers away. The village benefits from its proximity to Khutwanda, a core gate village of Tadoba Andhari Tiger Reserve, which has led to the establishment of a few private resorts in Ghosari. As a result, tourism-related jobs have emerged, with some women working as guides and a few men as gypsy drivers, contributing to the local economy.

Despite being a small village, Ghosari has a considerable livestock population, with 365 cattle, 150 goats, and 22 sheep. Livestock farming is a critical component of the villagers' livelihoods, providing additional income and sustenance.

However, the village faces significant challenges due to crop depredation by wild ungulates, a common issue in forest-adjacent communities. According to the villagers, wild boars are the primary culprits, frequently raiding crops just before harvest. This issue is particularly severe during the final stages of crop growth, leading to significant economic losses for the farmers. To protect their crops, villagers rely on a mix of traditional practices and modern methods, such as solar-powered fencing, to deter wildlife from damaging their fields. Despite these efforts, crop raids remain a persistent problem.

Ghosari also houses a forest guard quarter, emphasizing its strategic location near forested areas. The presence of forest officials helps monitor wildlife movement and manage forest resource extraction, though the human-wildlife conflict continues to be a challenge for the community.

SONEGAON

Sonegaon is the smallest of the six villages included in the study and is located near the tiger reserve boundary. The village is surrounded by forest on three sides, making it heavily reliant on forest resources. With a population of 308 individuals living in 116 families, Sonegaon has a diverse social structure. Out of the total families, 62 belong to Scheduled Tribes (ST), 37 are from Other Backward Classes (OBC), 15 from Nomadic Tribes (NT), and 2 families are Scheduled Castes (SC). Among these, 66 families hold Below Poverty Line (BPL) ration cards, highlighting the economic challenges faced by a significant portion of the community.

The village has a considerable livestock population, with 205 cattle, 140 goats, and 35 sheep as per official records. Livestock farming, along with agriculture, is a key component of the village economy. Around 100 families are actively involved in agriculture, while many others engage in farm labor to supplement their income.

Sonegaon's cropping pattern is typical of the region, with paddy, soybean, cotton, and chickpea being the main monsoon crops. These are followed by Rabi crops, which depend heavily on water availability. Wheat and chickpeas are the primary Rabi crops, and a few families also grow vegetables for additional income. Water for agriculture comes from a variety of sources, including lakes, wells, and bore wells. In addition, 12 families have been allotted land through the Van Hakka (Forest Rights) scheme, totaling around 50 acres.

Compared to the other five villages studied, Sonegaon shows a higher dependence on forest resources. Villagers collect fuelwood, Tendu patta, Mahua, fodder, and minor forest produce to meet their daily needs. The village’s proximity to the forest also exposes it to frequent wildlife interactions, especially regarding crop depredation. Wild boar is a particularly troublesome species, causing extensive damage to crops during both the monsoon and winter seasons. Crop raids are a common occurrence, and the impact on agricultural productivity is significant. To address these challenges, villagers have implemented various methods to protect their crops. In addition to traditional practices, they employ local gadgets and innovations to mitigate the damage caused by wildlife. However, despite these efforts, the raids continue to be a major concern for the farming community.

In terms of infrastructure, Sonegaon has a primary school, but for higher education, students travel to the nearby town of Ashta. The village benefits from its close-knit community, with forest and agriculture being the backbone of its livelihood. However, the continuous struggle with wildlife conflict, particularly crop raids by wild boars, poses a significant challenge to the sustainability of agriculture in the region.

ASHTA

Ashta is a large village located in Bhadravati Tehsil, strategically situated on the main road, making it a hub for local trade and commerce in this region after Shegaon. The village hosts a weekly market, along with several hotels and a small canteen that cater to both locals and travelers. Ashta is home to 662 families, with a total population of 1,867. The predominant community in the village is from the Scheduled Tribes (ST), with 397 families. Additionally, 150 families belong to the Other Backward Classes (OBC), 76 to the Nomadic Tribes (NT), and 37 to the Scheduled Castes (SC), with the rest belonging to other social groups.

Agriculture is the primary occupation in Ashta, as it is in many surrounding villages. The cropping pattern is similar to that of neighboring areas, with paddy being the main crop. In addition to paddy, farmers grow soybean, cotton, chickpeas, and other crops depending on the season. Most villagers are engaged in farming, either as landowners or agricultural laborers. Despite being relatively far from the forest, Ashta also faces the issue of crop raids by wild animals, a problem common in the region. According to the villagers, winter is the peak season for crop depredation, with wild boars and other animals causing significant damage to agricultural fields.

To address this issue, the tiger reserve authorities have distributed solar-powered fencing to several villagers to help protect their crops from wildlife. However, many families are still awaiting their allocation of fencing, leaving them vulnerable to crop raids. Encounters with wildlife in the vicinity of the village are not uncommon, heightening the sense of urgency for crop protection measures.

Ashta is relatively well-developed in terms of infrastructure. The village has primary, secondary, and private high schools, ensuring access to education for the local population. In addition, Ashta houses a primary health center (PHC), providing essential healthcare services to the community. The village is also home to an animal hospital, which serves the needs of livestock farmers, an important aspect of the local economy.

Livestock farming is a significant livelihood activity in Ashta, with a substantial cattle population of 980. In addition, the village has 76 buffalo, 400 sheep, and 640 goats, contributing to the villagers' income and sustenance. The combination of agriculture and livestock farming forms the backbone of the village economy.

The village also has a round office quarter, which houses forest department staff responsible for overseeing forest-related activities and managing human-wildlife interactions in the area.

In conclusion, Ashta is a large and economically active village with a strong agricultural base. Despite its distance from the forest, crop raids by wildlife present a significant challenge to the farmers. The village's infrastructure, including schools, healthcare facilities, and animal services, supports the well-being of its residents. However, the ongoing need for effective crop protection remains a critical issue for the farming community in Ashta.

Pics from six villages…Women busy in day-to-day activities

FUELWOOD COLLECTION

INTRODUCTION

In the Tadoba range, particularly across the six studied villages situated near the core zone of the Tadoba Andhari Tiger Reserve (TATR), fuelwood continues to play a central role in the daily lives of the communities. Primarily used in traditional *Chulhas* for cooking and heating water, fuelwood collection is deeply embedded in rural routines. Nationally, 64% of rural households rely on wood for cooking, but this percentage rises sharply in forested areas where access to the forest is easier and wood is more abundant. In fact, in these forest-adjacent villages, the use of fuelwood is nearly double that of other rural areas.

The amount of fuelwood used by each household depends largely on the village's proximity to forested areas. The closer a village is to the forest, the higher the likelihood that its residents will use fuelwood more frequently. Seasonal variations also impact fuelwood collection; for instance, during the monsoon when access to the forest is challenging, villagers tend to stockpile wood in advance. After crop harvesting, it is a common sight in the buffer villages of TATR to see women carrying head loads of fuelwood, especially from the fringes of protected forest areas.

Recognizing the impact of fuelwood collection on forest ecosystems and the associated risk of human-wildlife conflict, particularly with tigers, the Forest Department has been proactive in introducing alternative solutions. In 2015, under the Shyama Prasad Mukherjee Jan-Van Vikas Yojana, LPG cylinders were distributed to buffer villages located near protected areas. This scheme aimed to reduce the dependency on forest resources by providing subsidized LPG cylinders, particularly to conflict-prone villages. Many of the fringe villages in the Tadoba range benefited from this program, with agencies making it easier to distribute cylinders directly to villagers' doorsteps. Despite these efforts, interactions with women during sensitization programs conducted by our team reveal that fuelwood remains the preferred choice for cooking in these fringe villages.

To gain clearer insights into fuelwood consumption patterns and women's attitudes towards using LPG versus traditional *chulhas,* our team conducted a detailed survey in the six villages surrounding the Tadoba range. The survey aimed to quantify fuelwood usage and explore the socio-cultural reasons behind the continued preference for wood, even in the presence of LPG alternatives. The findings highlighted that while LPG adoption has increased, there are still barriers—economic, cultural, and practical—that prevent a complete shift away from Fuelwood.

Under the Shyama Prasad Mukherjee Jan-Van Vikas Yojana, LPG cylinders were distributed to villages located near protected areas. This scheme aimed to reduce the dependency on forest resources by providing subsidized LPG cylinders, particularly to conflict-prone villages.

METHODOLOGY

The SCF team conducted a fuelwood survey in three phases. Here are these phases.

Phase 1 (June 2024)

To gain a deeper understanding of fuelwood usage patterns and perceptions regarding energy consumption in the six villages of the Tadoba range, a comprehensive quantitative and perception-based questionnaire was developed. This tool aimed to capture various aspects of household life and energy consumption, including family size, occupation, resources used for meal preparation and water heating, LPG schemes, and the dimensions of fuelwood collection. The quantitative data collection was carried out using the KoBo Toolbox application, followed by data processing for detailed analysis. Sampling was done by selecting 25% to 30 % of the total households from each village based on family size, land, and occupation resulting in a total sample of 515 families across the six villages in the Tadoba range.

Phase 2 (June)

When collecting quantitative data, our team precisely estimated fuelwood usage, and a pilot study was conducted in all six villages. The SCF team selected 10 households from each village based on family size, and land ensuring most of the sampled households had LPG connections. The aim was to understand how much fuelwood is being used in conjunction with LPG. The methodology was executed over two phases, in different seasons, to account for seasonal variations in fuelwood usage.

In this initial summer phase, fuelwood was weighed and provided to 5 to 8 kg per day, depending on family size and need to 10 selected households for three consecutive days. If leftover fuelwood from the previous day remained, additional wood was provided to ensure a consistent supply for the next day. The difference between the allotted quantity and the remaining quantity was calculated, yielding an estimate of the daily fuelwood consumption. The average usage over the three days was then calculated for each household. The team also collected information about the tree species preferably used for cooking. As per our observation, the villagers do not use hot water for bathing in summer. So our team did not calculate fuelwood consumption for bathing in this exercise.

Phase 3 (August-September 2024)

The same fuelwood count process was repeated in the monsoon season for two days to account for potential changes in fuelwood consumption. Our team calculated the use of fuelwood for hot water also in this monsoon survey. For some households, where a single chulha is used for both cooking and hot water, our team meticulously maintained separate records.

CALCULATION OF DAILY FUELWOOD USE

Our team based the calculation of fuelwood consumption on the assumption that fuelwood is used for cooking on 330 days of the year. This accounts for the fact that families may spend approximately 35 days attending marriages, family functions, or being away for livelihood-related activities, during which they do not require fuelwood. For heating water, we considered fuelwood usage for 275 days a year, factoring in the three months of extreme summer in this landscape when heating water is typically not necessary. Here our team considered the family size of 4 to 5 people in a house.

Considering these assumptions, the team developed a formula to estimate the total yearly fuelwood consumption for the entire village, covering both cooking and water heating needs. This approach provides a more accurate estimate of the village's fuelwood usage based on local seasonal practices and family activities.

Fuelwood was weighed and provided to each of the 10 selected households for three consecutive days. The amount of wood distributed ranged from 5 to 8 kg per day, depending on family size and need.

FUELWOOD CONSUMPTION IN KHUTWANDA VILLAGE

Based on our phase two and phase three data collection and analysis, the average Fuelwood consumption per family in Khutwanda village during the summer months is estimated at 3.65 kg per day for cooking purposes. This calculation was made by conducting surveys and monitoring fuel use during this period. During the monsoon season, the team repeated the exercise over two days. Fuelwood consumption in this season tends to increase, particularly for night-time cooking, as the dampness of the environment requires more fuel for effective cooking. The average daily fuelwood consumption rises to about 4.9 kg per family in the monsoon months. As per our assumptions and previous studies, winter also sees a higher rate of wood consumption, ranging between 5 to 6 kg per family per day. This is likely due to the need for additional warmth and heating, along with cooking.

Taking all seasons into account, the average daily fuelwood consumption in Khutwanda village is approximately 4.5 kg per family. With 367 families residing in the village, each using the chulha for about 330 days a year, the total daily fuelwood consumption across all households is estimated to be between 1,600 and 1,650 kg. On an annual basis (for 330 days), the total fuelwood consumption for cooking alone in Khutwanda village is calculated to be around 5,40,000 kg.

In addition to cooking, Fuelwood is also used for heating water. Our data shows that the average Fuelwood consumption for heating water per family is between 3 to 4 kg per day. This amounts to a total of 1,500 kg of wood used daily for water heating purposes in the village. Since water heating typically occurs for 275 days a year (excluding the 3 summer months), the annual consumption for this purpose is around 4,00,000 kg.

Thus, the total annual fuelwood consumption in Khutwanda village, for both cooking and water heating, amounts to more than 9,00,000 kg, sourced mostly from the core and adjacent forest of the Tadoba range. In Khutwanda, our team recorded 23 plant species used for fuel, with sag, kukadi, bhera, and kalam being the most frequently used.

FUELWOOD CONSUMPTION IN GHOSARI VILLAGE

Ghosari is a small village located in Bhadravati Tehsil, with a population of 485 people spread across 147 families. The village is predominantly inhabited by members of the Scheduled Tribe community. Like many rural areas, the villagers rely heavily on traditional methods for cooking and heating water, primarily using the chulha, an earthen stove that burns firewood.

Our survey of Ghosari village revealed that the average fuelwood consumption varies across seasons. During the summer months, each family consumes an average of 2.67 kg of wood per day for cooking. However, during the monsoon, this consumption increases significantly to about 5 kg per day, as more fuel is needed for cooking during the wet season. In winter, fuelwood consumption rises further, reaching up to 6 kg per family per day. Over a year, we estimate that the average fuelwood requirement for cooking is approximately 5 kg per family per day. With 147 families in the village, the total daily fuelwood consumption for cooking is around 750 kg. When multiplied by 330 days (the estimated number of days villagers use chulhas for cooking, accounting for days when families may be away for weddings, functions, or livelihood reasons), the total annual Fuelwood consumption for cooking in Ghosari village is approximately 250,000 kg.

In addition to cooking, villagers in Ghosari also use the chulha to heat water regularly. The average daily consumption of fuelwood for this purpose is about 4 kg per family. This means that the entire village uses roughly 580 kg of fuelwood. Considering that heating water is typically done for around 275 days a year (excluding the summer months), the total annual fuelwood consumption for water heating in the village amounts to approximately 150,000 kg.

In total, the villagers of Ghosari consume around 400,000 kg of fuelwood annually, with 250,000 kg used for cooking and 150,000 kg for heating water. This significant reliance on fuelwood underscores the village's dependence on nearby forests for their daily energy needs. 21 plant species were documented, with the priority ones being sag, garadi, bhera, chichwa, and kuda.

FUELWOOD CONSUMPTION IN WADALA VILLAGE

Wadala is a village located in Bhadravati Tehsil, with a predominantly scheduled tribe community. The village comprises 296 families, all of whom rely on the traditional chulha for cooking and heating water, which necessitates a significant amount of fuelwood throughout the year. In Wadala, the consumption of fuelwood for cooking varies across seasons. During the summer months, the average daily fuelwood consumption per family is around 3 kg. However, during the monsoon season, this figure decreases to 2.7 kg per family per day, as some families use the chulha only to prepare chapati, reducing their overall wood usage. In the winter months, the demand for fuelwood increases again, reaching 4 to 5 kg per family per day due to colder weather and additional cooking and heating needs. Over the year, the average fuelwood consumption for cooking purposes is estimated to be approximately 4 kg per family per day. With 296 families in the village, the total daily fuelwood consumption for cooking is estimated at around 1,184 kg. Assuming that chulhas are used for cooking for 330 days a year, the total annual consumption of fuelwood for cooking in Wadala village is approximately 4,00,000 kg.

In addition to cooking, the villagers of Wadala use fuelwood to heat water. The average daily fuelwood consumption for this purpose is about 4 kg per family, which amounts to a total of 1,100 kg of fuelwood used each day for heating water across the entire village. Considering that water heating typically occurs for around 275 days, the total annual fuelwood consumption for heating water is approximately 3,50,000 kg.

In total, the residents of Wadala village consume approximately 7,50,000 kg of fuelwood annually. This includes 4,00,000 kg used for cooking and 3,50,000 kg for heating waterThis village showed 22 plant species used for the chulha, including sag, bhera, kuda, tendu, and kalam.

FUELWOOD CONSUMPTION IN ARJUNI VILLGE

Arjuni village, located in Warora Tehsil, is home to 321 families, making it the second-largest village our team studied after Ashta. The village is heavily dependent on fuelwood for its daily cooking and water heating needs, with fuel being sourced primarily from nearby forest areas, including the core and buffer zones of Tadoba Andhari Tiger Reserve. In Arjuni village, the average fuelwood consumption for cooking fluctuates across seasons. During the summer months, the average daily consumption per family is about 4 kg. This figure rises to 5 kg per family per day. In the winter, fuelwood consumption remains elevated, averaging 5 kg per family.

On average, for the year, fuelwood consumption for cooking purposes is estimated to be around 5 kg per family per day. With 321 families in the village, this results in a total daily consumption of approx. 1600 kg of fuelwood. When calculated over 330 days per year, the total annual fuelwood consumption for cooking in Arjuni village reaches approximately 5,28,000 kg. In addition to cooking, the villagers also use chulha to heat water. This practice is carried out throughout the year, except for the extreme summer months. On average, each family uses 5 kg of fuelwood daily for water heating, especially during the monsoon and winter seasons. This translates to a total daily consumption of another 1600 kg of wood across the village. Over 275 days (excluding the summer months), the total annual consumption of fuelwood for water heating amounts to approximately 4, 40,000 kg.

In total, the annual fuelwood consumption in Arjuni village is estimated to be around 10, 00,000 kg. The high levels of fuelwood consumption in Arjuni underscore the challenges faced by the community in terms of energy access. With limited alternatives to traditional chulhas, the villagers continue to depend on large quantities of wood. In Arjuni, 16 plants were recorded, with sag, garadi, rohan, bharati, and bhera being the most frequently used in Chulha for fuel.

FUELWOOD CONSUMPTION IN SONEGAON VILLAGE

Sonegaon, the smallest of the six villages included in this study, is located near the boundary of a tiger reserve and is surrounded by forest on three sides. With a population of 308 individuals living in 116 families, the village has a diverse social structure and is heavily reliant on forest resources for fuelwood, which is used primarily for cooking and heating water.

In Sonegaon, the consumption of fuelwood for cooking varies seasonally. During the summer, the average fuelwood usage per family is about 3.5 kg per day. However, this increases to 4.5 kg during the monsoon season. In winter, fuelwood consumption ranges from 4 to 5 kg per family per day due to the colder temperatures, which necessitate more frequent cooking and heating.

Over the year, the average fuelwood consumption for cooking purposes is estimated to be around 4 kg per family per day. With 116 families in the village, the total daily consumption of fuelwood for cooking amounts to approximately 460 kg. When calculated over 330 days, the annual fuelwood consumption for cooking in Sonegaon is approximately 1,50,000 kg.

In addition to cooking, the villagers of Sonegaon use fuelwood to heat water, particularly during the monsoon and winter seasons. On average, each family consumes about 4.5 kg of fuelwood daily for heating water. Across the entire village, this amounts to approximately 520 kg of fuelwood required each day for water heating. Over 275 days, the total annual fuelwood consumption for heating water is estimated to be around 1,40,000 kg.

The total fuelwood consumption in Sonegaon for both cooking and heating water is approximately 3,00,000 kg annually. During our study, 22 different plant species were identified as being used for fuelwood in Sonegaon. The most commonly used species include chincha, kawatha, bhera, sag and tendu. These species are favored due to their availability and caloric value, making them ideal for sustaining cooking and heating fires.

FUELWOOD CONSUMPTION IN ASHTA VILLAGE

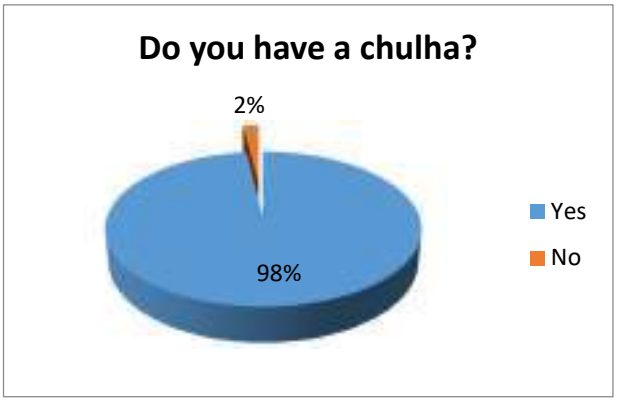
Ashta is a large village situated in Bhadravati Tehsil, strategically located along the main road, which makes it a key hub for local trade and commerce in the region, second only to Shegaon. The village is home to 662 families, predominantly from the Scheduled Tribes community. The villagers rely heavily on nearby forest resources for their fuelwood needs, though some farmers also collect wood from their agricultural fields.

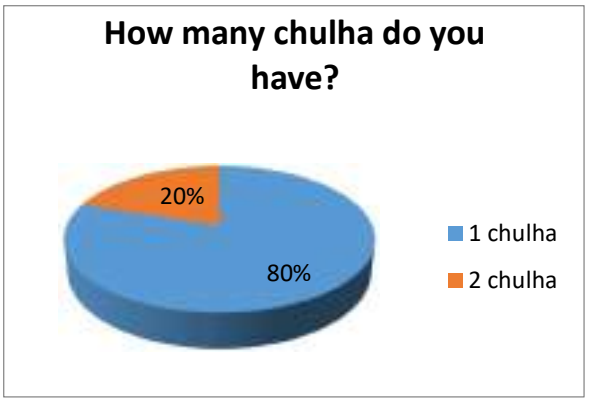
Fuelwood consumption in Ashta varies across the seasons, but it remains a vital resource for the community's daily cooking needs. During the summer months, the average family in the village uses approximately 3.3 kg of fuelwood per day. However, in the monsoon and winter, the demand for fuelwood increases, with families using around 4 kg of wood daily. On an annual basis, the average fuelwood consumption for cooking in Ashta is estimated at around 4 kg per day per family. With 662 families in the village, the total daily consumption for cooking purposes is over 2,600 kg. Assuming the use of chulhas for cooking for 330 days a year (accounting for days when families might be away for social or livelihood reasons), the total annual fuelwood consumption for cooking in Ashta is more than 8,70,000 kg. This significant volume of fuelwood usage places considerable pressure on the local forest resources, particularly those within the Tadoba Andhari Tiger Reserve.

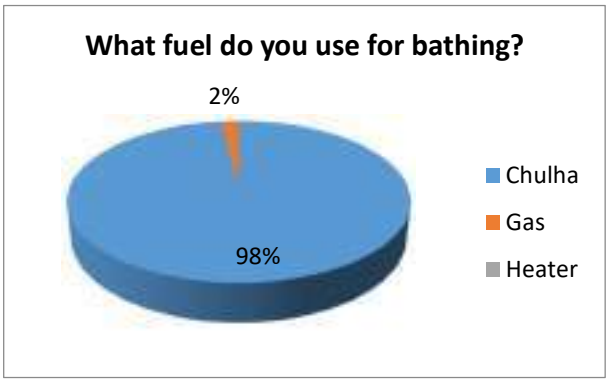
In addition to cooking, villagers in Ashta heavily depend on fuelwood to heat water, especially during the monsoon and winter seasons. The average fuelwood consumption for heating water during these periods is around 5 kg per family per day. Across the village's 662 families, this results in a daily consumption of approximately 3,300 kg of fuelwood for water heating. Over 275 days per year (excluding the extreme summer months), the total annual fuelwood consumption for water heating in Ashta reaches around 9,10,000 kg.

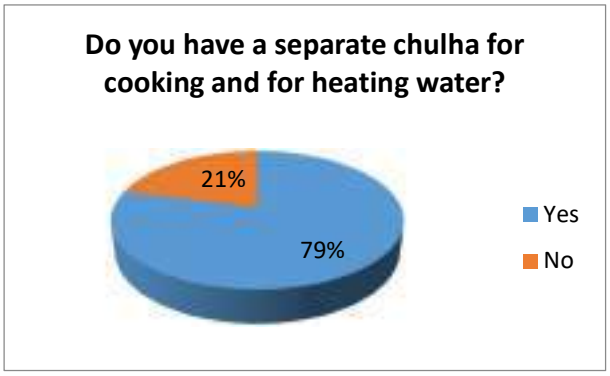
In total, the villagers of Ashta consume more than 1.7 million kg (17,00,000 kg) of fuelwood annually for both cooking and water heating. This massive quantity highlights the tremendous pressure on the surrounding forest areas, particularly in the nearby Tadoba Andhari Tiger Reserve, from which most of the wood is sourced. During the study, our team recorded 17 different plant species that are commonly used by the villagers for Fuelwood. Among the most frequently collected and burned species are sag, kukadi, subabhul, bhera, and bhubhul.

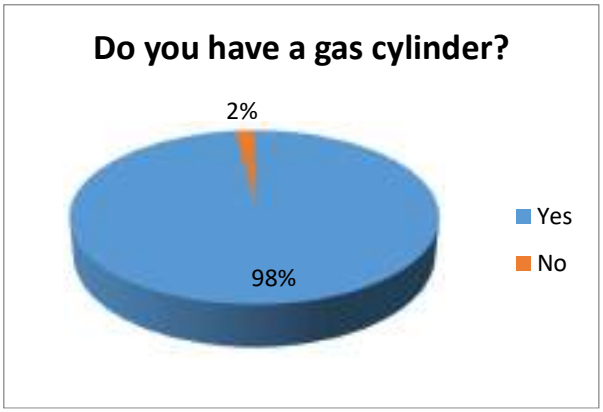
The dependence on fuelwood in such a large volume not only depletes local forest resources but also threatens the sustainability of the ecosystem, which is crucial for both the villagers and the wildlife in the area.

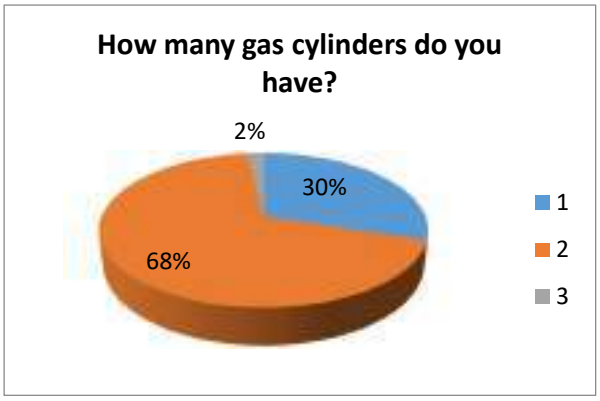

Do you have a chulha?
2%
98%
Yes
No

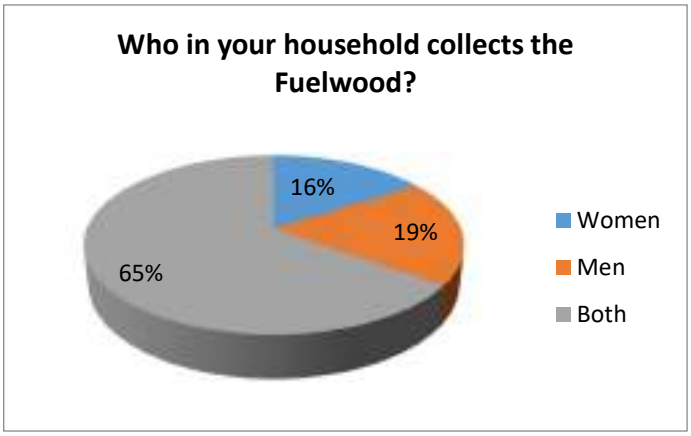

How many chulha do you have?
20%
80%
1 chulha
2 chulha

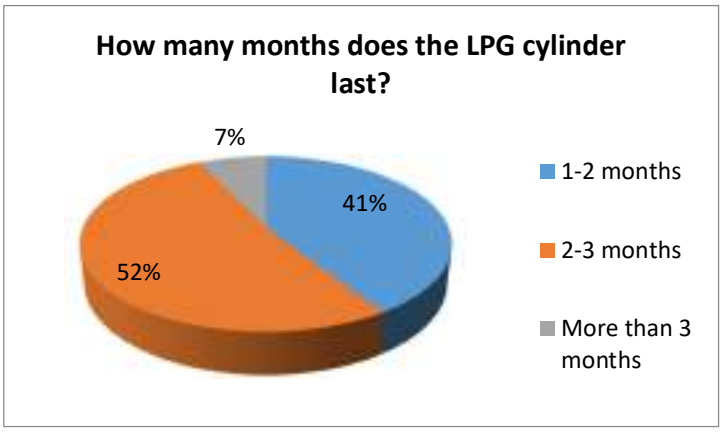

What fuel do you use for bathing?
2%
98%
Chulha
Gas
Heater

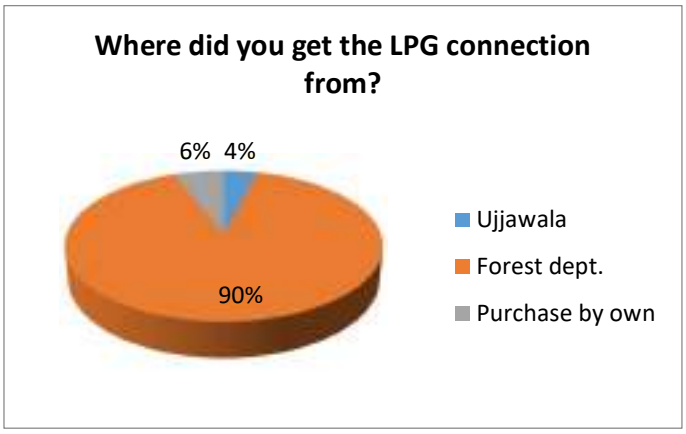

Do you have a separate chulha for cooking and for heating water?
21%
79%
Yes
No

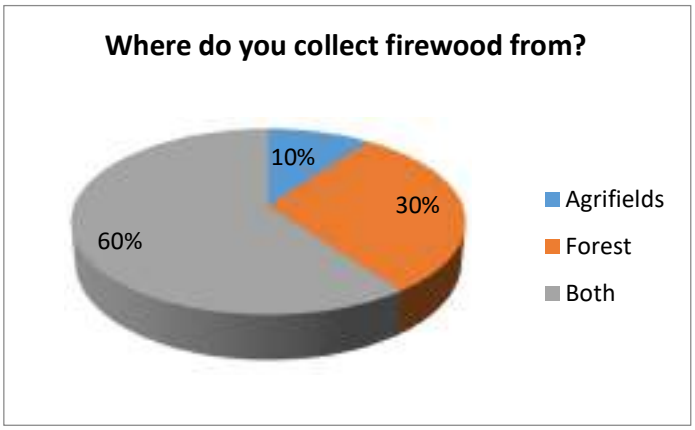

Do you have a gas cylinder?
2%
98%
Yes
No

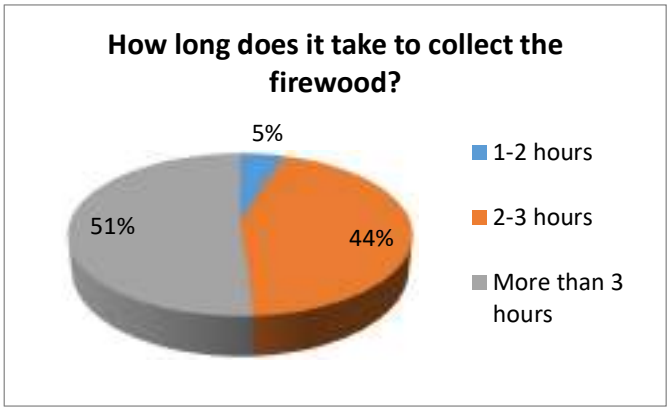

How many gas cylinders do you have?
2%
30%
68%
1
2
3

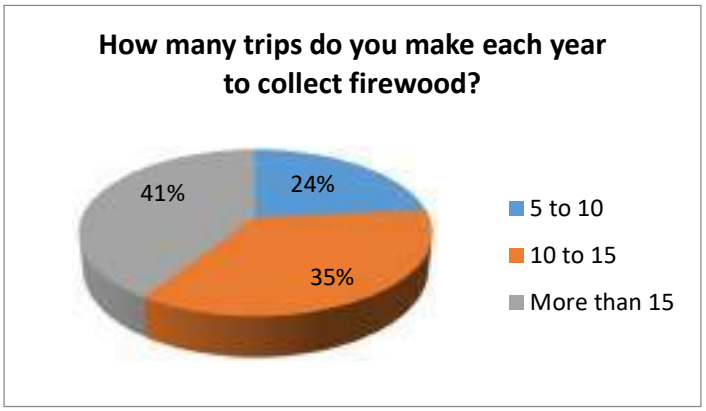

Who in your household collects the Fuelwood?
16%
19%
65%
Women
Men
Both

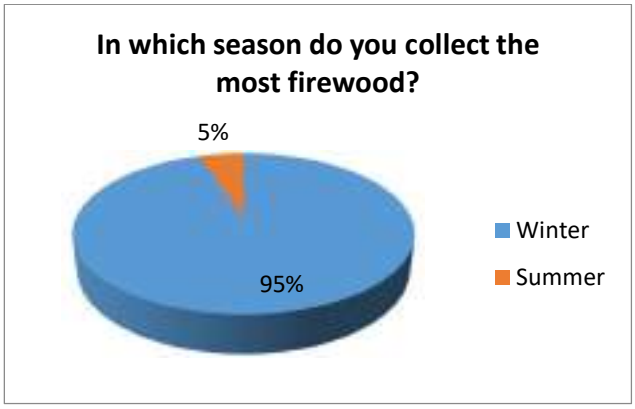

How many months does the LPG cylinder last?
7%
41%
52%
1-2 months
2-3 months
More than 3 months

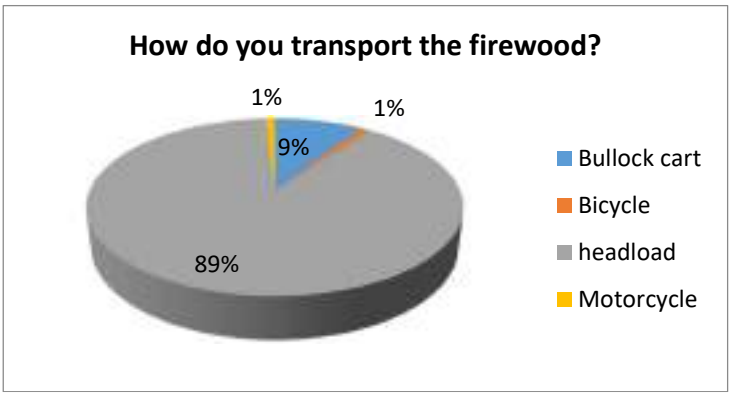

Where did you get the LPG connection from?
6%
4%
90%
Ujjawala
Forest dept.
Purchase by own

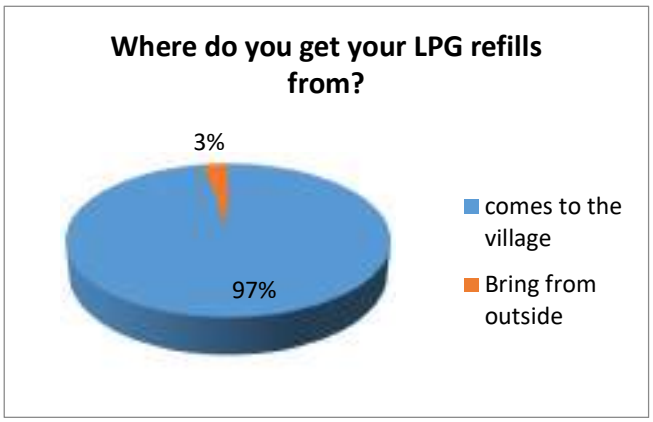

Where do you collect firewood from?
10%
30%
60%
Agrifields
Forest
Both

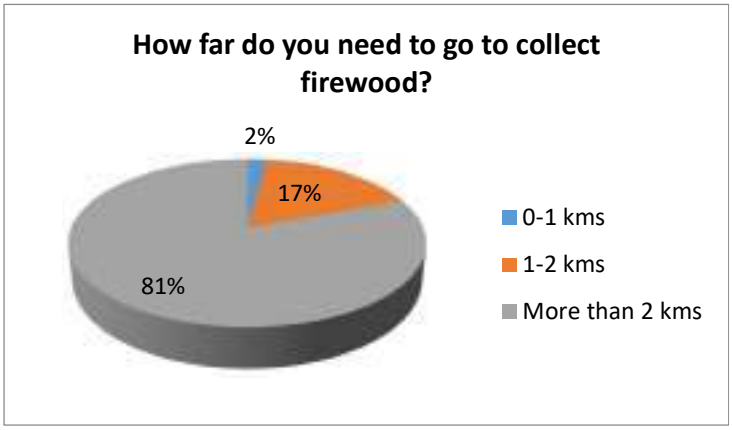

How long does it take to collect the firewood?
5%
51%
44%
1-2 hours
2-3 hours
More than 3 hours

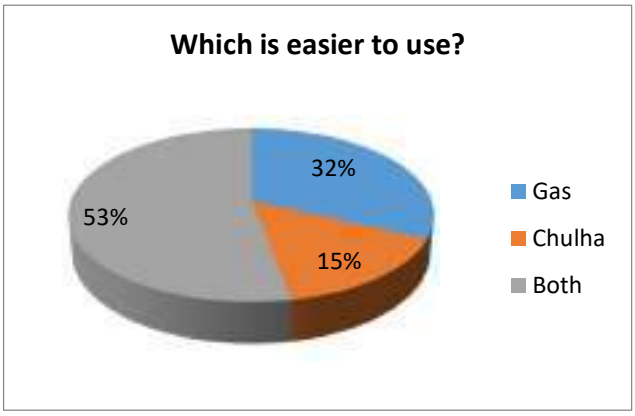

How many trips do you make each year to collect firewood?
41%
24%
35%
5 to 10
10 to 15
More than 15

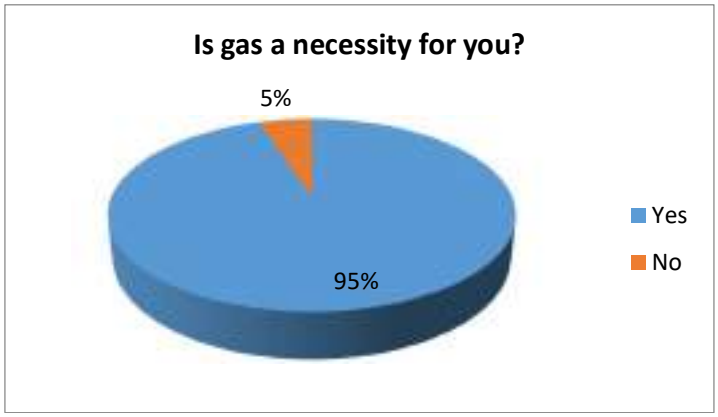

In which season do you collect the most firewood?
5%
95%
Winter
Summer

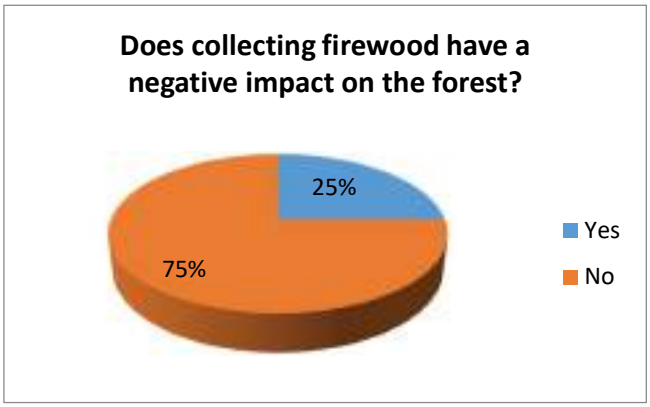

How do you transport the firewood?
1%
1%
9%
89%
Bullock cart
Bicycle
headload
Motorcycle

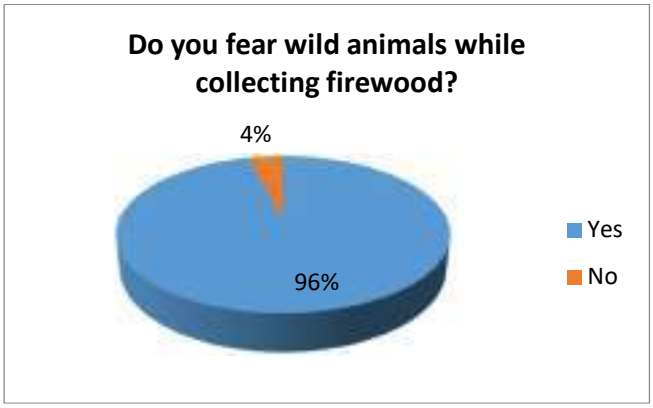

Where do you get your LPG refills from?
3%
97%
comes to the village
Bring from outside

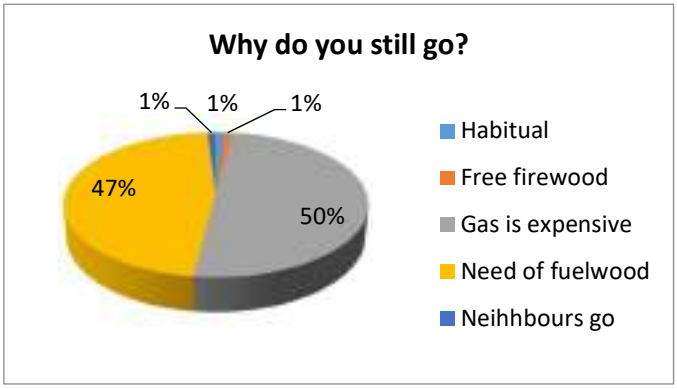

How far do you need to go to collect firewood?
2%
17%
81%
0-1 kms
1-2 kms
More than 2 kms

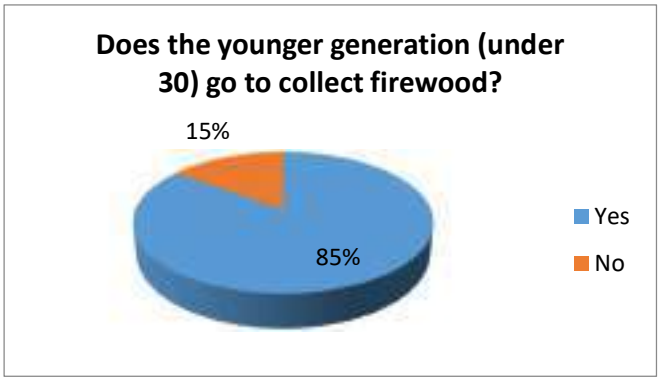

Which is easier to use?
32%
53%
15%
Gas
Chulha
Both

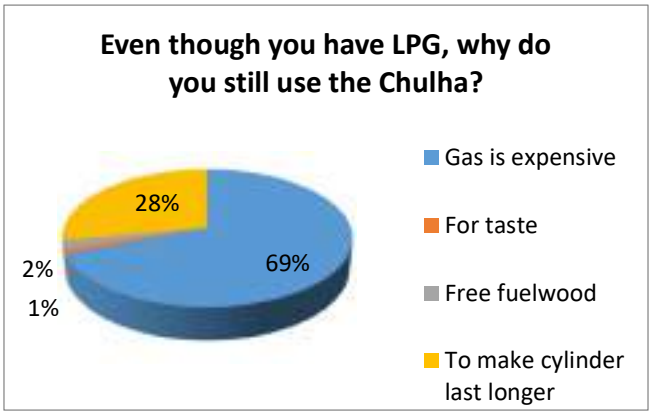

Is gas a necessity for you?
5%
95%
Yes
No

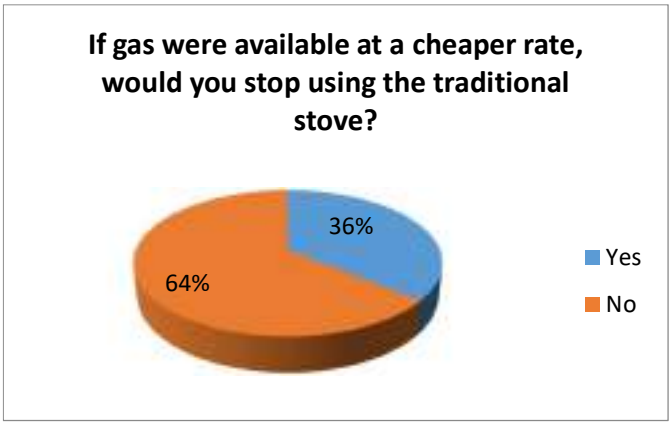

Does collecting firewood have a negative impact on the forest?
25%
75%
Yes
No


Do you fear wild animals while collecting firewood?
4%
96%
Yes
No


Why do you still go?
1%
1%
1%
47%
50%
Habitual
Free firewood
Gas is expensive
Need of fuelwood
Neihhbours go


Does the younger generation (under 30) go to collect firewood?
15%
85%
Yes
No


Even though you have LPG, why do you still use the Chulha?
28%
2%
1%
69%
Gas is expensive
For taste
Free fuelwood
To make cylinder last longer


If gas were available at a cheaper rate, would you stop using the traditional stove?
36%
64%
Yes
No

Our extensive survey, covering 515 families across six villages, provides a comprehensive and detailed understanding of fuelwood consumption patterns within these communities. The survey was conducted as part of a larger effort to assess the reliance on forest resources for household energy needs, focusing primarily on the use of fuelwood for cooking and heating water. The villages included in the survey were Khutwanda, Ghosari, Wadala, Arjuni, Sonegaon, and Ashta, each varying in population size, proximity to forested areas, and dependency on natural resources.

Key Insights

1. **Prevalence of Chulhas**

- Despite access to LPG, 98% of households still use a traditional chulha for cooking. Among these, 80% have one chulha, and 20% have two.

- The chulha is not only used for cooking but also for heating water, with 98% of households relying on it for this purpose as well. Moreover, 79% of households maintain separate chulha for cooking and heating water, which demonstrates the significant role of the chulha in daily life.

2. **LPG Availability**

- Of the total households, 98% of households have access to LPG, with most families owning two cylinders 68% to avoid interruptions in supply.

- 96% of the households have had gas connections for over four years, with 90% obtaining them through the Forest Department and 97% receiving refills directly in their village.

3. Fuelwood Collection

- 10% of households collect firewood from fields 30% from forests and 60% from both. It is a time-consuming and physically demanding task, with 81% of respondents traveling more than 2 kilometers to collect firewood. 51% spend more than 3 hours per trip, and 45% make over 15 trips annually.

- The burden of collecting firewood is shared in most households, with 65% reporting that both men and women participate. However, the laborious nature of firewood collection is compounded by safety concerns, as 96% of respondents fear wild animals when gathering firewood in the forest of Tiger Reserve.

4. Reasons for Continued Chulha Use

- The primary reason for continuing to use the chulha is the cost of LPG, with 69% stating that gas is too expensive. Only 1% cited reasons like taste or free firewood.

- Even if gas were made more affordable, 64% of respondents would still use the chulha, reflecting the deep-rooted cultural habits and preferences associated with it.

5. Perception of Impact on Forests and Safety

- 75% of respondents believe that firewood collection does not harm the forest, although 96% express concern about encountering wild animals. Despite these fears, 85% of young people (under 30) continue to engage in firewood collection, highlighting the enduring role of traditional practices even among the younger generation.

6. Fuel Preferences

- While 95% of respondents recognize gas as a necessity, 53% find both gas and chulha equally easy to use. However, 50% still resort to collecting firewood due to the prohibitive cost of LPG, even though they view it as a necessary fuel.

Conclusion

Even if LPG were made more affordable, the cultural attachment to the chulha and longstanding traditions would likely maintain its presence in these communities. For LPG adoption to fully replace traditional stoves, stronger financial support or subsidies for gas cylinders, as well as increased awareness of the environmental and health benefits of LPG, may be necessary to shift these deeply ingrained practices.

The laborious nature of fuelwood collection is compounded by safety concerns, as 96% of respondents fear wild animals when gathering wood in the forest of Tiger Reserve.

DISCUSSION

In the summer months, meals are often prepared outside the house, either on the shaded side or at the front. A traditional summer activity that takes place during this time is the making of special dishes like "dhapoday" (or pappadum), which is in full swing in some houses. For cooking, villagers typically use the chulha at night, while LPG gas is preferred during the day. This is primarily because of the intense heat during the day, making it more comfortable to cook indoors using gas. While in summer months roti and dal are commonly prepared on the chulha, other meals are often cooked using LPG.

When asked why the chulha is still widely used, many women explained that the high cost of LPG cylinders encourages them to save gas by using the chulha.

Finally, among all the trees, villagers reported that bhera is the most durable and provides the highest caloric value, making it an ideal fuel. Other valuable species include kuda, garadi, and kalamb. While sag is considered a costly wood, it is prized for its quick ignition and long-lasting burn in the chulha. During our survey, some villagers were reluctant to participate in a second round of wood-counting exercises, so the team ensured they did not repeat the survey in the same households.

RECOMMENDATIONS

The qualitative and quantitative study on fuelwood consumption offers valuable insights into the relationship between rural communities and forest resources, particularly highlighting the continued reliance on traditional chulhas despite access to LPG. Here are some recommendations based on your findings:

1. Promote Subsidies for LPG Cylinders

Given that the high cost of LPG is a significant barrier to its full adoption, advocating for increased subsidies or financial support for gas cylinders would encourage a shift towards cleaner energy use. Government or NGO-led programs could focus on ensuring affordability, particularly for low-income families.

2. Behavioural Change Campaigns

Cultural attachment to the chulha remains strong. Education and awareness programs should highlight the health benefits (reduced indoor air pollution) and environmental advantages (less forest degradation) of using LPG over firewood. Targeted campaigns could address myths and provide information on how LPG improves quality of life.

3. Increase Safety Measures for Fuelwood Collection

Since firewood collection poses risks due to the fear of wild animals, a safety program could be developed, including scheduled or community-led firewood collection times, and potential collaboration with forest departments to ensure safer zones for gathering wood.

4. Involve Young Adults in Conservation

Since younger generations especially girls (under 30) continue to participate in firewood collection, incorporating them into community-led conservation programs might encourage a more sustainable approach to firewood usage. Young ambassadors could lead awareness campaigns on alternative energy sources and conservation practices.

5. Species-Specific Wood Conservation

Specific species like bhera and kuda are considered valuable for their high calorific value. Conservation efforts could focus on these species to ensure they aren't over-harvested. Training in sustainable harvesting techniques, or developing woodlots within villages, could help alleviate pressure on forests.

6. Seasonal Cooking Adjustments

Since the use of LPG is more common during the day in summer and monsoon months, promoting similar strategies for cooking during other seasons (i.e., staggered or mixed usage of LPG and chulha) could be encouraged to reduce overall fuelwood dependency.

7. Incorporate Findings in Forest Management Policies

Partner with forest departments to use this data in developing local forest management policies that balance community fuelwood needs with sustainable resource extraction. Conservation education linked with forest safety, reforestation efforts, and sustainable harvesting techniques should be included.

8. Ongoing Monitoring and Evaluation

Continue the survey process, but address survey fatigue by rotating households or introducing community feedback mechanisms. This could improve participation and provide fresh data for policy advocacy.

9. Promotion of Fuel efficient stove

In Chandrapur landscape, Wildlife Conservation Trust (WCT) provided fuel-efficient stoves for hot water. This stove requires very basic raw material to ignite. This stove is user friendly and many families adopted and are using these stoves (bamb) daily.

SMALL TIMBER COLLECTION

INTRODUCTION

Small timber plays a vital role in the daily lives of rural communities, particularly in the villages adjacent to the Tadoba Andhari Tiger Reserve. Beyond serving as a source of firewood, small timber is used for a wide range of practical purposes, making it an indispensable resource in these areas. Small timber typically refers to the wood obtained from trees and shrubs with slender trunks or branches, which are easy to harvest, transport, and work with. Due to its accessibility and versatility, small timber is heavily used to build essential structures, agricultural tools, fencing, and other daily utilities in rural settings.

The species of small timber commonly found and utilized in these regions include Sag (*Tectona grandis*), Babul (*Acacia*), Tendu (*Diospyros melanoxylon*), Kavath (*Limonia acidissima*), Garadi (*Cleistanthus collinus*) Khair (*Acacia catechu*), Bherra (*Chloroxylon swietenia*), Dhawada (*Anogeissus latifolia*), Ain (*Terminalia tomentosa*), Bamboo and some other shrubs used for this work. These species are well-suited to the local environment and have various properties that make them useful for specific purposes. For instance, Teak is known for its durability, Acacia and Bherra for their strength, and Bamboo for its flexibility and rapid growth, which makes it a sustainable choice for temporary constructions.

Small timber plays a critical role in the construction of rural infrastructure, including cow shelters (Gotha), agricultural fencing, watchtowers (locally known as Maara), and temporary shade structures (Maandav). Additionally, it is used to craft various agricultural tools and implements such as plow handles, yokes, and sickles. In many villages, homes are also built using small timber, with wooden beams supporting roofs and walls. One key aspect of small timber usage is the regular replacement cycle, which varies depending on the specific application. For example, agricultural fencing typically needs to be replaced annually, while cow shelters and other structures made from small timber are replaced every 4 to 10 years, depending on wear and environmental factors.

In the Tadoba range, a study conducted by our team across six villages examined the patterns of small timber consumption. The results revealed that the villagers heavily rely on this resource for their daily needs, often harvesting it from the surrounding forests. The continuous extraction of small timber, while crucial for village life, poses challenges to the local ecosystem, especially in areas close to protected forests like Tadoba.

METHODOLOGY

Our team conducted a comprehensive survey to understand the usage patterns, priorities, and dependence on small timber among rural families in villages surrounding the Tadoba Andhari Tiger Reserve. The primary objective was to gather data on the types of timber used, the frequency of use, and the specific purposes for which small timber is engaged.

In each village, our team randomly selected 20 families for the survey. The sample size was chosen to represent the diversity of households in the area, ensuring that the data reflected a broad spectrum of socioeconomic backgrounds and landholding patterns. By surveying 20 families per village, we gathered insights from a total of 120 families across all six villages. The respondents were chosen based on their direct involvement in activities that require small timber, ensuring that their responses would accurately represent timber usage patterns. The participants included: Small Farmers, Laborers, and Agricultural Farmers. This selection ensured that the survey captured different levels of dependence on small timber, from subsistence to larger-scale usage. The primary tool for data collection was a structured data sheet designed to capture the various components of this wood collection.

The main purposes for which small timber is used, such as cow shelters, farm fencing, watchtowers, agricultural tools, and household items. Respondents were asked to prioritize these uses based on their importance in daily life. Data on how often the small timber structures, such as fences, shelters, and tools, are replaced or repaired. Whether the timber is collected from forested areas of buffer or core or, farmlands, or purchased from local markets. The survey was designed to be both quantitative (recording the number of items made from small timber) and qualitative (understanding the perceptions of timber use and dependency).

SMALL TIMBER STRUCTURES

Here's an elaborate look at how small timber is utilized for different items in these six villages.

1. Cow Shelters (Gotha)

Material: In villages like small timber is a primary building material for cow shelters. The timber is typically harvested from the core area of the tiger reserve. The timber forms the basic framework for the walls and roofs of cow shelters, providing a cost-effective, sturdy structure to protect livestock from weather conditions and carnivores. Wood species such as Teak, Khair, Ain, Garadi, Tendu, and Bamboo are mainly used in all six villages. The wood is harvested in the summer and villagers travelled 5 to 8 km to collect this wood. As per the villagers, around 30 to 40 % of small timber is used for this shelter.

Durability: These structures need to be relatively robust, as they are meant to protect valuable cattle from wildlife, and other weather conditions. This wood often replaced every 2 to 5 years due to wear and decay, is chosen for its availability and ease of replacement. Villagers regularly maintain these shelters to ensure their longevity.

2. House Construction

- Material: In these villages, small timber plays a significant role in the construction of raw houses. These homes often have wooden frameworks that support mud or thatch walls, along with timber roofs covered with tiles or thatch. Wooden beams and rafters are used for roofing, providing a lightweight yet sturdy solution for rural dwellings. The species used in cow shelters are also used in these houses. Now, due to PM Aavas Yojana the villagers constructed cement and brick houses replacing wood supporting hosues.

- Durability: The use of small timber in house construction is a reflection of its affordability and renewability. Although these houses are not as durable as concrete structures, they are well-suited to the rural environment, where timber is plentiful and easily replaced every decade or so. Timber roofs and frames are regularly maintained and repaired to prolong the lifespan of the homes.

3. Agricultural Tools

- Material: Small timber is mainly used to craft a variety of agricultural tools such as wooden plows, yokes for oxen, and handles for hand-held implements like sickles, hoes, and spades. The local names of these tools such as *Vakhar, Nangar, Tiphan, Phan, Chota Nangar, Parani Nangar,* etc. The Bullock cart is an important transport tool for the local transport of various agricultural goods and materials made from teak wood. The use of wood in tool making has been a tradition for centuries, as it is solid and heavy, easy to work with, and readily available in rural settings. The Teak wood is mainly used for these tools and collected from the core area of the TATR.

- Durability: These tools are often made by local craftsmen or farmers themselves, who customize the design based on their specific agricultural needs. For instance, wooden plows are commonly used for tilling small plots of land, especially where mechanized plowing is not feasible. The above wood was replaced more than 5 years as teak is rock solid.

4. Farm Fencing

- Material: Small timber is commonly used for farm fencing. Farmers create simple barriers around their agricultural fields by driving sharpened timber poles into the ground, sometimes tying them with rope or wire. These fences serve to mark the boundaries of farms and keep livestock, wild animals especially wild boar from wandering into fields, especially during the crop-growing season. Bamboo fence along with Khair, Ain, and Garadi is used to erect the poles of the fence.

- Durability: Since rural farmers often lack the financial resources for concrete or metal, Chainlink, or barbed wire fencing, small timber provides a more affordable alternative. It is readily

available in nearby forest areas and is renewable as fast-growing tree species are replanted after harvesting. Farm fencing made from small timber needs to be replaced approximately every year, as constant exposure to the elements causes the wood to weaken and decay over time.

5. Maara (Watchtowers) and Maandav (Temporary Shade)


- Material: Small timber is essential for building watchtowers, known locally as "Maara." Farmers construct these elevated platforms in their fields to keep an eye on crops and protect them from wild animals. The watchtowers are usually about 10 to 15 feet tall and consist of a simple framework of wooden poles, with a wooden or bamboo platform on top where a person can sit or stand. In most of the fields in the six villages, one can see many maara structures in the field in harvesting season. The farmers sit or sleep in this maara at night for crop protection. The maandav is in front of the house especially constructed in the summer months. Small timber is often employed in the construction of Maandav, temporary structures that provide shade and shelter during community gatherings, festivals, or agricultural activities. For both structures lesser known species of trees and branches are used.

- Durability: Maara watchtowers allow farmers to keep vigil over their crops, especially at night or during critical growing seasons. Both structures last for one or two years only. Every year new structures or repairs have to be necessary to maintain the structures.

COLLECTION PATTERN

Small Timber collection follows a similar pattern throughout the village. Summer is the season for collections. In certain cases, the timber is also collected in winter and monsoon. They collect timber from the forest solely or in small groups. In the above six villages, this timber is harvested from the core area of the TATR. Most of the small timber harvesting is transported on headloads. These villagers travelled 5 to 10 km to collect the wood. Villagers go to the forest 4-5 times a year on average. For the households and cow shelter construction, they mostly prefer “Y” shape

timber to be used as the main pillars of the structure. The decayed and old small timber is used as fuelwood in chulha and bonfires. Small timber harvesting falls under the category of non-commercial collection. The collection does not provide any direct benefit. However, the harvest is carried out to meet their construction requirements.

RECOMMENDATIONS

Based on the data collected and the observed patterns of small timber usage, the following recommendations are suggested to ensure the sustainable management of small timber resources while supporting the livelihoods of the local communities:

1. Promote sustainable harvesting practices

- Selective Cutting: Encourage villagers to adopt selective cutting practices, targeting only mature trees for timber collection, rather than indiscriminately cutting young trees or saplings. This will ensure the regeneration of tree species and long-term forest health.

- Rotation of Collection Areas: Introduce a rotation system where villagers collect timber from different areas each year, allowing over-harvested areas to regenerate before being harvested again.

- Community-Led Forest Management: Form community forest management groups in each village to oversee timber collection activities, monitor usage, and ensure compliance with sustainable practices.

2. Introduce agroforestry and timber plantation programs

- Agroforestry Integration: Encourage farmers to integrate fast-growing timber species such as bamboo, Acacia, and other fast-growing species into their agricultural systems. This would provide an alternative source of small timber, reducing the pressure on nearby forested areas.

- Village-Level Plantations: Establish small timber plantations in common lands or degraded forest areas, where fast-growing species can be planted and harvested sustainably by the community. This will provide a reliable source of timber without impacting natural forests.

- Government or NGO Support: Collaborate with local governments and NGOs to provide technical support, seeds, and training for planting appropriate small timber species in the village periphery.

Villagers heavily rely on this resource for their daily needs, often harvesting it from the surrounding forests. The continuous extraction of small timber, while crucial for village life, poses challenges to the local ecosystem, especially in areas close to protected forests like Tadoba.

3. Enhance awareness and education programs

- Training in Sustainable Forestry: Provide regular training programs for villagers on sustainable timber collection techniques, forest conservation, and the ecological importance of maintaining forest cover. Special focus should be given to educating herdsmen and farmers on the consequences of overharvesting small timber.

- Community Workshops: Organize community workshops on the importance of sustainable timber use, involving village leaders, youth, and women, to build a collective understanding of the need to protect forest resources.

4. Promote the Use of alternatives to Small Timber

- Alternative Materials for Fencing and Shelters: Promote the use of alternative materials such as bamboo, metal, cement, or synthetic materials for fencing and shelter construction. Bamboo, in particular, is a fast-growing species and can be an excellent substitute for timber in many cases.

- Encourage Recycling and Reuse: Advocate for the repair and reuse of small timber items rather than replacing them frequently. Villagers could be trained in maintenance techniques that extend the lifespan of fences, shelters, and agricultural tools made from timber.

- Subsidies for Alternative Materials: Introduce government or NGO-led subsidy programs to make alternative materials like bamboo or metal more affordable for villagers, reducing their dependence on small timber from forests.

BAMBOO COLLECTION

INTRODUCTION

The state of Maharashtra has a total forest area of 61,939 sq. km. The bamboo forest comprises 8,400 sq. km or about 13% of the total forest area. This distinctive grass predominates in Gadchiroli, Chandrapur, Amravati, Bhandara, and Gondia districts. Only the districts of Gadchiroli and Chandrapur produce 90 percent of the state's bamboo. Bamboo is a versatile forest product with the title "green gold" due to its economic importance. Bamboo has numerous applications and can give economic empowerment, particularly in rural areas. The bamboo market is worth approximately Rs 26,000 crore in India. Bamboo furniture, bamboo pulp, bamboo mat board, cottage industries, and plyboard are just a few examples. As a result, bamboo is seen as a source of economic and social development. With all these considerations in mind, the government has established a National Bamboo Mission to cultivate bamboo and fully exploit its potential for the economic and social development of the underprivileged. As part of the comprehensive implementation of this policy, a Bamboo Research and Training Center (BRTC) was set up by the Maharashtra government at Chichpalli in the Chandrapur district. Also, the Maharashtra Bamboo Development Board (MBDB) has been established as per Government Resolution 2016. Maharashtra is the first state in the country to release TP-free bamboo transportation in 2017. Subsequently, the Central Government revoked the bamboo felling license in the entire country by changing the bamboo from tree to grass species included in the Indian Forest Act, 1927 in 2018. In the last few years, several initiatives have been taken in the Chandrapur district to promote the bamboo sector, in which more than 3,000 women have been trained in bamboo handicrafts at Chichpalli and Chandrapur. The Bamboo Diploma Course has been started at Chandrapur. Every year, 20 students are trained in this center. Five sub-centers have been set up at Chandrapur for making bamboo handicrafts and furniture.

TADOBA BUFFER SCENARIO

Bamboo collection and product-making are among the most important livelihoods for families in the buffer villages of the Tadoba Andhari Tiger Reserve (TATR). In the buffer zone, which consists of 92 villages, there are approximately 23,000 families. Of these, 2,081 families from 45 villages are actively involved in the bamboo business (Source: TATR). However, according to our estimates, an additional 1,000 to 1,200 families are illegally harvesting bamboo from these villages.

Among the six buffer ranges in Tadoba, the Shivani range stands out as the leading region for bamboo-related activities. In this range alone, 923 families are engaged in collecting bamboo from both the core and buffer areas of TATR. Due to the high demand for raw bamboo, illegal harvesting is common in nearby forests. The excessive harvesting of bamboo from both the buffer and core areas led the Tadoba management to ban the production of *Tatwa* (bamboo fencing) in 2018, which requires large quantities of bamboo, posing a threat to the pristine habitat of the Tiger Reserve.

Bamboo flowering, a rare event in the Chandrapur landscape, last occurred in 1982-84, and it reoccurred in 2022-23. This natural phenomenon, which leads to the death of bamboo plants after flowering, had a significant impact on the bamboo population in the region. By the summer of 2024, most of the bamboo in both the core and buffer zones had died due to this incident. To understand the scenario our team explored the villages in Tadoba range.

The mass flowering of bamboo has directly affected the livelihoods of the bamboo-working communities, whose dependence on this resource is now severely challenged.

METHODOLOGY

In Tadoba range, three villages are known for engaging in bamboo-related activities, particularly bamboo collection and craft production. As part of a study on bamboo usage and its impact, a thorough investigation was carried out by visiting bamboo-working families in three key villages: Khutwanda, Ghosari, and Wadala. A team visited these villages to directly interact with the families involved in bamboo-related activities. During these visits, the team gathered detailed information about the bamboo collection process, the types of products made, and the challenges faced by the families. The data was systematically recorded on a datasheet, ensuring accurate documentation of their practices, work routines, and the socio-economic aspects tied to bamboo crafts. Through this approach, the study aimed to capture a comprehensive understanding of how bamboo is collected, utilized, and managed within these villages, providing insights into the livelihoods of the craftsmen and the broader impact of bamboo-related activities in the region.

VILLAGE WADALA

In Wadala Village, there are only six to seven families directly engaged in the traditional craft of converting bamboo into various products. The main items they produce include Dala (baskets), Kada (small bamboo containers), Bendawa (for poultry), Tatawa (woven mats), Varli (decorative items), Dholi (bamboo drums), and Zap (bamboo sieves). These craftsmen personally collect bamboo from the core area of the Tadoba Andhari Tiger Reserve (TATR). Bamboo harvesting is an activity they undertake year-round, except during the monsoon season. During the monsoons, bamboo collection becomes difficult due to the heavy rains, swollen streams, and flooded forest areas, making it tedious to access bamboo. During this period, most of the craftsmen are also preoccupied with agricultural activities, particularly harvesting. As per the craftsmen, they usually travel 10 to 15 kilometers into the forest to gather bamboo, spending approximately five hours for each collection trip. This task is traditionally done by men.

Once the bamboo is harvested and converted into finished products, the craftsmen either sell them directly to buyers or take them to the marketplace in Mudholi to sell. In some cases, local farmers place direct orders for bamboo products, which are used for various agricultural purposes. This small-scale business, however, has been facing challenges in recent times. Bamboo flowering, a natural process that leads to

the death of bamboo plants, has significantly reduced the availability of bamboo. Additionally, the forest department fears, which has further affected the livelihood of these families. Despite these challenges, some families continue this craft. Apart from selling products in the market, bamboo is also essential for agricultural use, such as for making fencing, building cattle sheds, and meeting other household needs. However, due to the dwindling bamboo supply and increasing restrictions, the future of this traditional craft is uncertain.

VILLAGE GHOSARI AND KHUTWANDA

In the villages of Ghosari and Khutwanda, only a small number of families are involved in the bamboo business. In Ghosari, four to five families engage in crafting bamboo products, while in Khutwanda, just two families are involved in this trade. The main items they produce include Dala, Kada, Warla, Bendawa, Zinka, and Tatwa. These products are made either based on direct orders from local villagers or for sale in nearby markets. However, this business comes to a halt during the monsoon season, as bamboo collection becomes difficult.

The men in these families are responsible for collecting bamboo, typically venturing 3 to 5 kilometers into the core forest to gather the raw material. In Ghosari, for example, one family, led by Shankar Wagh, only prepares bamboo products when they receive an order from farmers. A similar practice is followed by Ramaji Madavi in Khutwanda, who also works on an order-based system, producing bamboo products when required by local customers.

During the visits, our team observed that the bamboo business in these villages is on the verge of extinction. The recent bamboo flowering phenomenon, which led to the death of a large portion of the bamboo in the region, has further hampered the livelihoods of bamboo workers. While many farmers collect bamboo individually from the forest for personal use—such as for fencing, agricultural purposes, and shelter—there is no large-scale or extensive bamboo

harvesting taking place in these six villages. The combination of reduced demand, difficult access to resources, and the effects of bamboo flowering has left the bamboo trade in a fragile state, threatening its survival in the region.

ECONOMY

In the survey, it is noticed that a single family from these village earns Rs. 2000–3200 weekly according to the family members involved in bamboo craft making. Approximately they earn Rs. 8000–12000 per month. Only men collect bamboo from forests as it is a labor-intensive activity in bamboo cutting, and transporting it by bicycle or on the shoulders. The basic cost of the raw material (bamboo) to make the product is availed free of cost to them.

DISCUSSION

Despite the importance of bamboo in these communities, this traditional craft is facing significant challenges. A major issue is the recent bamboo flowering event, which caused a large-scale die-off of bamboo in both the core and buffer zones of TATR. This natural phenomenon has greatly reduced the availability of bamboo, affecting both the supply of raw materials and the income of bamboo workers. Bamboo collection and crafting are largely seasonal activities, with families halting bamboo-related work during the monsoon season when the forests are difficult to access. During this time, many craftsmen shift their focus to agricultural work. The seasonal nature of this livelihood adds to the instability faced by these communities, making them highly dependent on the availability of bamboo and the timing of their harvests.

RECOMMENDATIONS

The depletion of bamboo resources due to flowering and illegal harvesting calls for an urgent need for sustainable bamboo management practices. The Forest Department, in collaboration with local communities, should implement a sustainable bamboo harvesting plan that includes:

- Regulated bamboo harvesting periods to prevent over-exploitation.

- Promotion of bamboo regeneration programs to encourage the replanting of bamboo in areas affected by flowering and overharvesting.

- Introducing skill development programs for women and youth in alternative crafts or small businesses to create additional income streams.

- Encouraging eco-tourism initiatives that could involve bamboo craftsmen, allowing them to showcase their traditional skills while attracting income from tourism. Helping craftsmen connect with larger markets outside the local area to sell their bamboo products, ensuring better prices and demand for their goods.

WILD VEGETABLE COLLECTION

INTRODUCTION

In many rural regions, especially among the villages situated on the fringes of forests, wild edible plants form a crucial part of the traditional diet. These communities have long relied on wild vegetables, not only for their distinct flavors but also for their nutritional benefits. These greens, often rich in vitamins, and minerals, and low in calories, are cherished for their taste and health benefits. In Central India, particularly within tribal communities living in and around protected areas, the practice of harvesting wild greens has been a deeply ingrained tradition. Many local communities residing near forests heavily depend on these wild vegetables for their daily sustenance. Due to their local availability and ease of access, these plants are often inexpensive for low-income households. Wild edible plants thus serve as an essential source of food for marginalized communities, offering both nutritional support and a cost-effective supplement to their diet. During periods of food scarcity, they act as a vital resource, helping prevent starvation and contributing to survival throughout much of the year.

This study aims to document the variety and importance of wild vegetables in six villages located in the Tadoba range of Tadoba Andhari Tiger Reserve. By exploring the role these wild plants play in the daily lives of villagers, the research seeks to understand their significance in terms of nutrition, culture, and motivation for venturing into the forest for foraging. The findings will contribute to a broader understanding of how wild vegetables impact food security, nutritional health, and the preservation of traditional dietary practices in rural and tribal communities.

Herders often forage for wild vegetables while grazing their cattle and gather them either for personal consumption or to share with their friends

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METHODOLOGY

To conduct a comprehensive study on wild vegetables in the Tadoba range, a qualitative research approach was employed. The study focused on six villages within the Tadoba range of TATR, where wild vegetables are commonly harvested by the local community. The methodology consisted of site selection, data collection through interviews and field visits, and interaction with key informants knowledgeable about wild vegetable harvesting practices. To understand the scenario in detail, the team prepared a questionnaire to discuss with the villagers. The primary data collection focused on interviewing local women, as they are the main foragers responsible for collecting wild vegetables. These women have a deep understanding of the areas where these vegetables grow, a knowledge passed down through generations. The data collection team of SCF visited households in the selected villages to engage with women, gathering insights about their search practices. Open-ended discussions were held to collect qualitative information about the types of vegetables harvested, the time of collection, and the methods used. Many women were also interviewed in the fields where they worked. These interactions provided additional insights into how farming and wild vegetable foraging coexist in their daily routines. Herders were also interviewed as they frequently venture into the forest and possess substantial knowledge about wild vegetables. They often forage for wild vegetables while grazing their cattle and gather them either for personal consumption or to share with their neighbors. The team accompanied the herders into the forest, observing their collection practices and gaining firsthand information about the plants' growth patterns, locations, and harvesting techniques.

DISCUSSION

The data collected from the six buffer villages of the Tadoba Andhari Tiger Reserve revealed that the local villagers consume more than 50 species of different types of wild vegetables. These vegetables typically grow in specific niches such as forest clearings, agricultural bunds, and near water bodies. They have a brief growing season, mostly during the monsoon from June to September, making the collection opportunistic. However, a few exceptions like Bahava and Kuda flowers are harvested from April to June.

Women are the primary harvesters of wild vegetables, a practice deeply rooted in tradition. After the first monsoon showers, women get occupied with agricultural work, so they collect wild vegetables in the months aligned with their growth cycles. Once the agricultural tasks are completed by September, the focus shifts back to harvesting wild greens. Women often cover distances of 2 to 5 kilometers to gather these vegetables, being highly familiar with the specific locations where they grow, both in regular forests and in protected areas of the tiger reserve. This knowledge is passed down through generations, allowing them to identify the best spots for foraging.

In addition to the women, herdsmen also collect wild vegetables while grazing their cattle in the forests. While women tend to harvest from accessible areas, men typically venture deeper into the forest to collect not only wild vegetables but also timber, bamboo shoots, and mushrooms. These forest resources are mostly harvested for personal consumption, though some villagers sell surplus vegetables and mushrooms in nearby markets. Mushrooms, in particular, are in high demand and are gathered fresh from the ground to be sold. The fruits of the Tendu tree (Tembhru) available during the summer, are another seasonal forest product that finds its way into local markets.

However, due to continuous over-extraction, many wild vegetables have become rare in recent years. Despite this, the villagers continue to collect these vegetables primarily for their taste and seasonal availability. While some are aware of the medicinal value of certain wild vegetables, taste, and ease of access remain the main reasons for their collection. The women possess a deep knowledge of various wild vegetables, legumes, and tubers, and they typically prepare them by boiling or roasting. The most common method of consumption involves making curries with leaves, although stems, petals, and pods are also used in some cases.

In the past, villagers often faced shortages of regular vegetables and relied heavily on staples like potatoes and eggplants. However, in recent years, the availability of vegetables has improved. Vendors now regularly bring a variety of vegetables to the villages by tempo, and motorbikes which were previously only accessible at taluka markets. This shift has reduced the villagers' dependence on wild vegetables, although they remain an integral part of the local diet due to their flavor and tradition.

RECOMMENDATIONS

Based on the findings from the study of wild vegetables in the six villages the following recommendations are proposed to enhance the sustainability, availability, and benefits of wild vegetables in the region:

1. Promote Sustainable Harvesting Practices

It is essential to educate the local communities about sustainable harvesting techniques. Training programs and workshops should be organized to:

- Encourage selective harvesting methods that allow plants to regenerate.

- Raise awareness about the importance of conserving rare species of wild vegetables.

- Promote rotational foraging to prevent depletion in certain areas.

2. Documentation and Preservation of Traditional Knowledge

The women and herdsmen of these villages possess deep traditional knowledge about wild vegetables, including their medicinal uses and seasonal availability. To preserve this knowledge for future generations and scientific study:

- Develop community-led initiatives to document local names, uses, and harvesting techniques.

- Collaborate with local educational institutions or NGOs to create a knowledge repository that includes both the traditional uses and potential modern applications of wild vegetables.

3. Enhance Food Security and Nutrition Programs

Wild vegetables play a vital role in local diets, providing essential vitamins and minerals. To enhance food security and nutritional outcomes:

- Integrate wild vegetables into local nutrition and food security programs, especially targeting low-income households.

- Provide nutritional education to the villagers highlighting the health benefits of wild vegetables, and encouraging their continued use alongside regular market vegetables.

4. Foster Market Opportunities for Wild Vegetables

-While most wild vegetables are harvested for personal consumption, there is potential to create a sustainable market for surplus vegetables and other forest products like mushrooms and fruits. To support local economies:

- Establish community-based cooperatives or farmer's groups to sell wild vegetables in local markets or nearby towns.

5. Encourage Conservation of Wild Vegetable Habitats

- Partner with forest departments to implement community-based forest management programs, which can help protect areas where wild vegetables grow.

- Encourage agroforestry practices, where villagers can grow wild vegetables in controlled environments near their homes or farms, reducing the need to forage in sensitive forest areas.

The agricultural department organizes an exhibition on the district and taluka level of wild vegetables as “Ranbhajya Mahotsav”. The SHG women or villagers sell wild vegetables in this exhibition. It was noticed that there is no agenda seen to sustain and conserve these vegetables in this initiative. The conservation of these wild vegetables was not promoted by the agriculture or forest department. In due course, these wild vegetables will become extinct or be on the red list.

List of Wild Vegetables recorded in six villages

Sr. No.	Local Name	Scientific Name	Part consumed
1	फेटरा / kala phetra	*Tamilnadia uliginosa*	Flower and fruit
2	उंदीरकान / कोचई	*Typhonium* sp.	Leaves
3	अंबाडी	*Hibiscus sabdariffa*	Leaves
4	चिउर		Leaves
5	वाशीन		Leaves
6	पातुर	*Launaea procumbens*	Leaves
7	तांदूळका		Leaves
8	माठ		Leaves
9	धान भाजी	*Allmania nodiflora*	Leaves
10	अळू / अरवी/धोपा	*Colocasia esculenta*	Leaves
11	अरतफरी / हळदुली	*Olax scandens*	Leaves
12	ढेमानी	*Cissus vitiginia*	Leaves
13	आंबाडा		Leaves
14	गुळवेल		Leaves
15	मसाले पान		Leaves
16	उतरणचे झाड		Leaves
17	तिकनवेल		Leaves
18	चितूर	*Corchorus trilocularis*	Leaves
19	कडू भाजी	*Gilnus oppositifolius*	Leaves
20	मालकामोनी		Leaves
21	भराटी		*Flowers, fruits*
22	काटेकरोटा	*Alternanthera philoxeroids*	*Leaves*

23	नागरकेन / विंचू *केन*	*Commelina diffusa*	*Leaves*
24	इकदोडा		*Fruits*
25	कुडा / पांढरा कुडा	*Holarrhena pubescens*	*Flowers, fruits*
26	बायवा	*Casia fistula*	*Flowers, fruits*
27	बांबू वाष्टे	Bamboo shoots	*Young stems*
28	कडू तोंडरी	*Coccinia grandis*	*Fruits*
29	काटवल	*Momorcica dioica*	*Fruits*
30	टेकोडे	Olmis mushroom	*Fresh mushroom*
31	गोपीन		*Leaves*
32	खापरखुटी	*Boerhaavia diffusa*	*Leaves*
33	शेंबडी		*Flowers*
34	रानभेंडी	*Abelmoschus ficulneus*	*Leaves*
35	राई	*Brassica juncea*	*Leaves*
36	वाघाटी / गोविंदफळ	*Capparis zeylanica*	*Fruits*
37	राजगिरा	*Amaranthus cruentus*	*Leaves*
38	तरोटा / टाकळा	*Cassia tora*	*Leaves*
39	कोंबडा/कुक्कुडा		*Leaves*
40	सुरंद		*Fruits*
41	घोळ	*Portulaca oleracea*	*Leaves*
42	रानहेटी		*Flowers*
43	कुंद्रू		*Fruits*
44	आघाडा	*Achyranthes aspera*	*Leavesmor*
45	चिवळ	*Portulaca quadrifida*	*Leaves*
46	चोपळा माट/ काटे माट	*Amaranthus viridis/ Amaranthus spinosus*	*Leaves*
47	जिवती	*Telosma pallida*	*Leaves*
48	रानमेथी	*Indigofera* spp.	*Leaves*
49	गोबी /पंढरी	*Achyranthes aspera*	*Leaves*
50	शेरडीरे	*Smilax ovalifolia*	Leaves
51	ब्रम्हराक्षस (काळी कोचई)	*Colocasia esculenta*	*Leaves*

TENDU PATTA COLLECTION

INTRODUCTION

Tendu (*Diospyros melanoxylon*), a species native to India and Sri Lanka, belongs to the family Ebenaceae. The collection of Tendu leaves, a significant non-timber forest product (NTFP), is a vital economic activity, particularly in Central India. These leaves are primarily used in the production of bidis, a traditional hand-rolled cigarette, making Tendu collection an important livelihood for local communities and a substantial source of revenue for state forest departments.

India produces approximately 3.5 lakh tons of Tendu leaves annually, valued at around $200 million (Kaur, 1991). The states of Madhya Pradesh, Chhattisgarh, Odisha, and Maharashtra are the largest contributors, with Madhya Pradesh accounting for 25%, Chhattisgarh 20%, Odisha 15-20%, and Maharashtra 10%. Bidi production in India has also shown a significant increase over the decades, with 740 billion bidis sold in 1970, 990 billion in 1993, and 1.2 trillion annually by 2005-06. The Tendu leaf industry employs about 7.5 million people, particularly during the agricultural off-season. Additionally, approximately 4.4 million women and children are employed in bidi rolling, contributing to 600 billion to 1 trillion bidis production annually (Ministry of Labour, 2000). The World Bank (2006) estimates that Tendu leaf collection employs around 106 million people, with another 675 million involved in secondary processing activities.

In the Vidarbha region, the Tendu leaf collection is one of the most important forest-based economic activities for local villagers. This collection process typically begins in the month of May across all forest divisions of Vidarbha. Thousands of villagers ventured into the forests during this period to collect leaves, which have high economic value due to their wide-scale use in the bidi industry. Tendu leaves are favored for their agreeable flavor, flexibility, resistance to decay, and ability to sustain a slow burn, making them ideal for wrapping bidis.

As per forest department data in Chandrapur district alone, 52,703 families participated in the Tendu leaf collection in 2019, coming from villages in the Central Chanda, Chandrapur, Bramhapuri, and Tadoba buffer divisions. The collection period lasts for 15 to 25 days during the peak summer month of May, with villagers spending 6 to 8 hours daily in the forests, often traveling 5 to 10 kilometers each day.

However, the proximity of these activities to tiger habitats poses significant risks. Chandrapur district, home to over 200 tigers, has witnessed instances of human-wildlife conflict during Tendu leaf collection. Between 2013 and 2022, 11 human deaths were reported in the district due to tiger encounters during this period of increased forest activity. This situation highlights the delicate balance between livelihood activities and wildlife conservation, calling for the development of strategies to mitigate human-wildlife conflict while sustaining local economies dependent on Tendu leaf collection.

METHODOLOGY

To better understand the patterns and dynamics of the Tendu patta collection, including the distances traveled by collectors, associated risks, the impact on forest ecosystems, and the economic significance of this activity, the SCF team conducted a pilot study in six villages. The objective was to gather in-depth insights into the collection process, identify potential threats, and quantify the environmental and economic impacts. For this study, the SCF team joined local villagers engaged in patta collection for two consecutive days in all six villages. This immersive fieldwork allowed the team to observe firsthand the timing of the collection, the specific patterns of collection, the distances traveled by the villagers, and the risks they encountered during the process. Additionally, to obtain a precise understanding of the geographical area affected by this activity, the team tracked the routes taken by the collectors using GPS technology.

In parallel with the on-ground observation, the team also conducted a quantitative survey in these six villages to gather detailed information. A total of 170 families, all of whom had participated in the Tendu leaf collection during the year, were selected for the survey. This provided critical data on household participation in the collection, economic benefits, and challenges faced by the villagers.

To assess the environmental impact of the patta collection, the SCF team used the Google Earth measurement tool to calculate the area affected by this activity. The activity zone, defined as the area in which leaf collection occurs, was determined by analyzing the GPS data collected during the field visits. This approach allowed for a detailed calculation of the area affected by patta collection, measured in hectares (Ha), providing a clear and accurate representation of the land impacted by this practice.

PATTA COLLECTION IN SIX VILLAGES

In the buffer landscape of Tadoba Andhari Tiger Reserve, the Tendu tree is a common sight in the forest. The collection of Tendu leaves, or patta, is an important economic activity for the local communities. This process is managed by the Tiger Reserve authorities in selected villages within the buffer zone. In the buffer area of Tadoba, there are 92 villages, with approximately 23,000 families residing in these communities. Out of these, the Tendu patta collection is managed in 53 selected villages under the supervision of the reserve's management.

There are eight Tendu collection units, specifically Palasgaon, Shivani, Maroda, Ghantachauki, Varvat, Aagarzari, Nimdhela, and Tekepar, according to the data provided by the buffer division of TATR. In the Aagarzari unit of the Moharli buffer, there are two main collection centers or "phadi" where villagers deposit their harvested Tendu leaves these are Tekadi and Kinhala. The villagers from Khutwanda and Ghosari deposit their collected Tendu leaves in Tekadi phadi, while villagers from Ashta, Wadala, Sonegaon, and Arjuni deposit their collections in Kinhala phadi.

This year, the rate for Tendu patta was set at Rs. 2.85 per bundle (puda), equivalent to Rs. 285 for 100 bundles. The collection started on 9th May and lasted up to 2nd June 2024. According to data from the Moharli buffer office, a total of 18 lakh bundles of Tendu leaves were collected this year, achieving 98% of the targeted collection. The breakdown of deposited bundles by villagers in the Moharli Range of various collection centers is as follows:

- Kokewada: 2,87,620 bundles, - Adegaon: 3,26,040 bundles, - Agarzari: 1,79,940 bundles

- Wadholi: 2,08,340 bundles, and Kinhala: 3,14,080 bundles

In total, 18 lakh bundles of Tendu patta were collected, nearly meeting the full collection target. Last year, the total collection was significantly lower at 11, 98,420 bundles, representing just 66% of the target. This marked improvement highlights the increased engagement and success of this year’s Tendu leaf collection season.

Regarding the financial aspect, the contractor of Patta distributed moderate labor charges to the villagers involved in the collection. Through Tekadi phadi, Rs. 12, 80,277 were paid to the villagers as labor wages, while Rs. 8, 95,128 were paid through Kinhala phadi. Tekadi phadi collected 17, 65,240 bundles this year, generating Rs. 50, 30,934 for the villagers.

On a more localized scale, specific six villages demonstrated significant contributions to the overall collection: (Source: Frontline staff of tiger project)

Arjuni Village: 15 families participated in the collection, gathering 15,070 bundles of Tendu leaves. They received Rs. 42,949 for their efforts.

Ashta Village: 98 families were involved in the collection, assuming 1, 33,500 bundles and earning Rs. 3, 80,000 in labor wages.

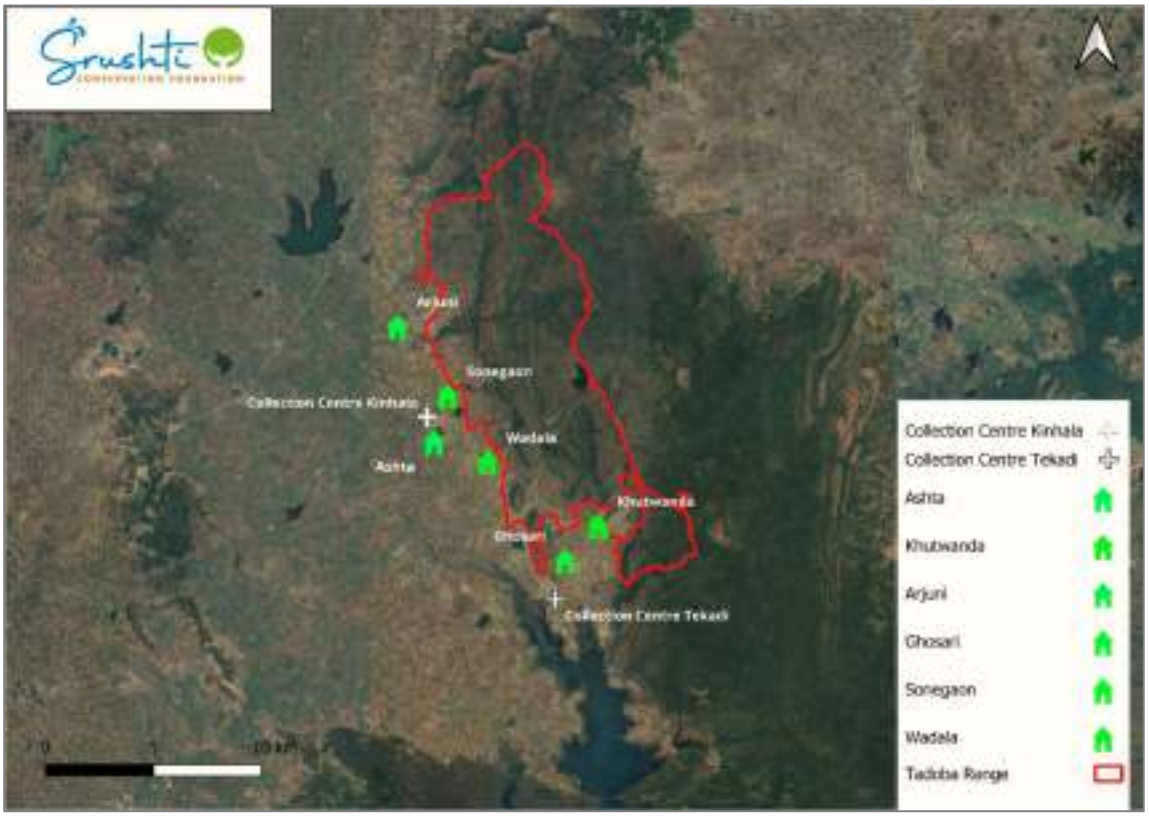
Ghosari village: 53 families were involved in the collection, collecting 77,350 bundles and earning around Rs. 2,20,447 as a lobar wage.

Khutwanda Village: Only 11 villagers were involved in the collection, collected 18,450 bundles, and got Rs 52,582 as a lobour charge.

Sonegaon Village: 54 families collected 96,500 bundles of Tendu leaves, earning Rs. 2, 75,025 for their labor.

Wadala Village: 19 families contributed to the collection, gathering 23,900 bundles and receiving Rs. 68,115 as labor wages.

These figures illustrate the Tendu patta collection's significant role in supporting the livelihoods of the local communities within the Tadoba zone. The income generated through this activity, particularly during the agricultural off-season, is crucial for many families. At the same time, the collection is tightly integrated with the forest management practices of the tiger reserve, balancing local economic needs with the broader goal of conservation.



Collection centre and six villages

COLLECTION IN KHUTWANDA: FIELD OBSERVATIONS

The SCF team joined villagers to collect tendu patta from forests. The team consists of three members, all of whom are local to the Tadoba landscape. Their familiarity with the region and Project In charge connections with the local communities and support of PRT members played a crucial role in securing permission to accompany the villagers during the patta collection process. The SCF team began by meeting with local villagers actively involved in the patta collection this season. Once granted permission, the team joined the patta collectors in the forest, equipped with a camera to document the process and a GPS device to accurately track the collection routes. This collaboration between the SCF team and the locals not only provided valuable data for conservation efforts but also helped foster stronger connections with the community, enhancing mutual understanding and cooperation for future projects.

Here are details about the collection village-wise.

Day 1: 12th May 2024

The tendu patta collection activity commenced early in the morning on the 12th of May. The Khutwanda villagers, consisting of four men, eight women, and a young boy in the 9th grade, began their journey from Khutwanda village at 6:10 AM. By 6:40 AM, they reached the forest area known as Gahubodi, located to the northeast of the village. The collection continued until 10:55 AM, after which the group stopped plucking and began their return journey, arriving back at the village by 11:35 AM. In total, the group covered a distance of 7.05 kilometers. The group composition was diverse: two of the women were over 50 years old, while the remaining members, both men and women, were between the ages of 35 and 50. During the collection process, the group encountered a Gaur, which briefly interrupted their work. Each villager was equipped with water bottles and gunny bags, used to carry the collected tendu patta. There are two recognized methods for tendu patta collection: the selective method, where medium-sized leaves are carefully chosen for plucking, and the crude method, where leaves are scratched and gathered randomly without much attention to their quality. The villagers on this day used the selective method, focusing on plucking medium-sized leaves.

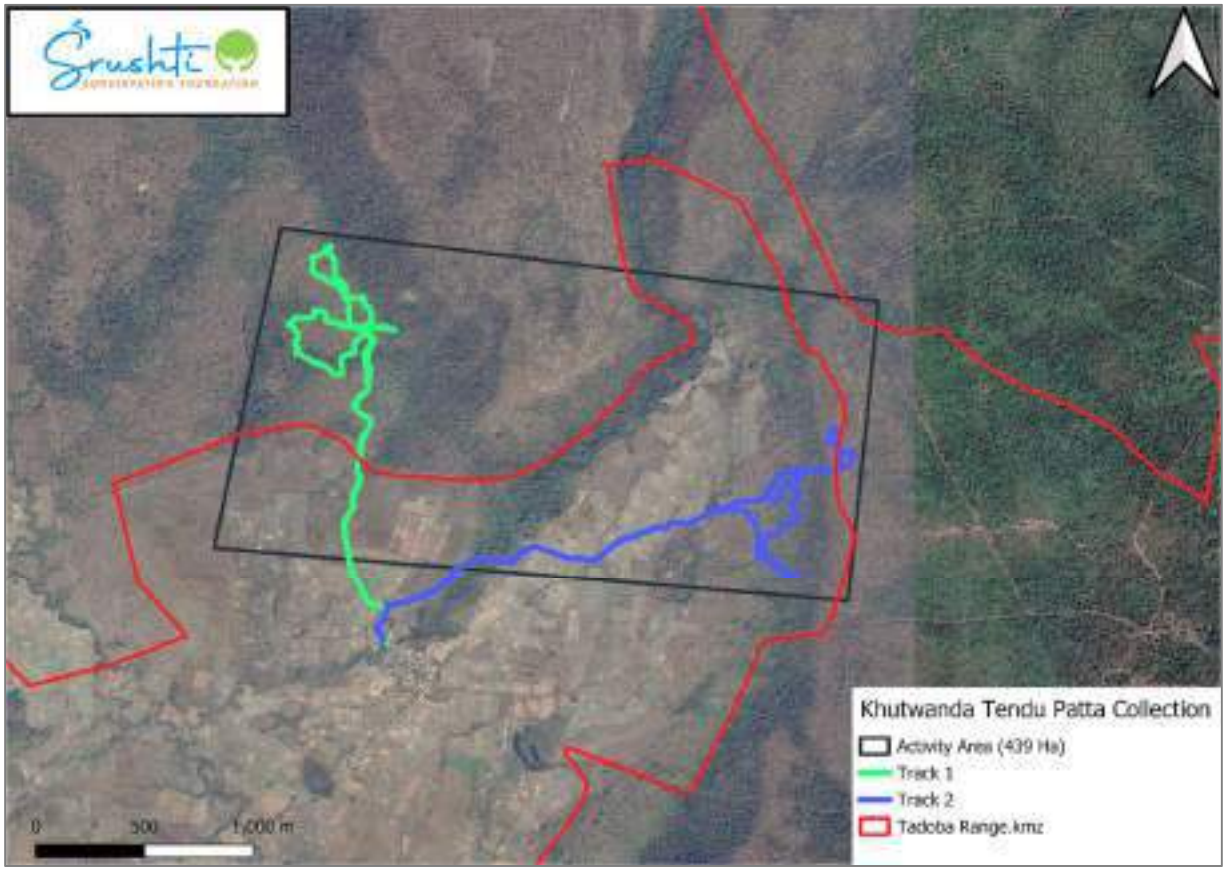
While collecting, the pluckers maintained communication with each other by calling out at intervals of 5 to 10 minutes, ensuring everyone was safe and accounted for. To maximize efficiency, the group spread out in different directions within the forest, each focusing on their areas to collect the tendu leaves. The women had a unique way of carrying the leaves. They tied their saris around their waists to form makeshift bags or carried a sari bag, while the men used traditional gunny bags. Once enough leaves were collected, they emptied their small bags into a

larger gunny bag, and the process continued with the group dispersing again in different directions.

Day 2: 13th May 2024

On the second day, the villagers started their collection at 6:20 AM, heading to the Chichghat forest area. They reached the forest by 6:57 AM. This time, the group consisted of four men and seven women. As they proceeded with the collection, they encountered several signs of wildlife in the core forest. During their work, they sighted a Sambar and noticed tiger scat and sloth bear droppings, clear indirect signs of the presence of these animals in the area. Interestingly, another group of tendu patta collectors was spotted in the same forest. Upon noticing our team, this second group quickly ran away, likely to avoid interaction or attention.

Despite these wildlife encounters and the sighting of the other group, the team that our observers accompanied continued their collection process. They wrapped up their work by 11:35 AM, returning to the village. The distance covered on the second day was slightly longer, with the group traveling a total of 8.3 kilometers. The activity impact area is about 439 Ha.



GPS track of patta collection from Khutwanda village

PATTA COLLECTION….Khutwanda

COLLECTION IN ASHTA VILLAGE: FIELD OBSERVATIONS

Day 1: 16th May 2024

Starting Time from Village: 6:05 AM, Arrival at Forest: 6:40 AM, Total Participants: 7 individuals (6 women, 1 man)

On the first day, the group of patta pluckers from Ashta village ventured to the Mahalgaon Maruti area, located within the core zone of the Tadoba range. The participants, consisting of six women and one man, began collecting tendu leaves upon reaching the forest. It was observed that the pluckers avoided entering too deep into the forest, likely due to safety concerns, as the core area is known for frequent wildlife activity, including tigers. Both men and women tied saris around their waists to form makeshift pouches, which they used to collect the plucked leaves. Once the leaves were plucked, they were carefully stored in these sari pouches. While the women were primarily engaged in the plucking process, one man accompanied the group, assisting the women by bending branches to make it easier for them to access the leaves. It is worth noting that he did not actively participate in the collection but instead played a supporting role. Additionally, one of the women climbed a tree to access branches from which she plucked tendu leaves directly. The tendu leaves being collected were predominantly from small bushes. There was an artificial waterhole in the vicinity, and the collectors exercised caution while working near it, likely due to the potential presence of wildlife.

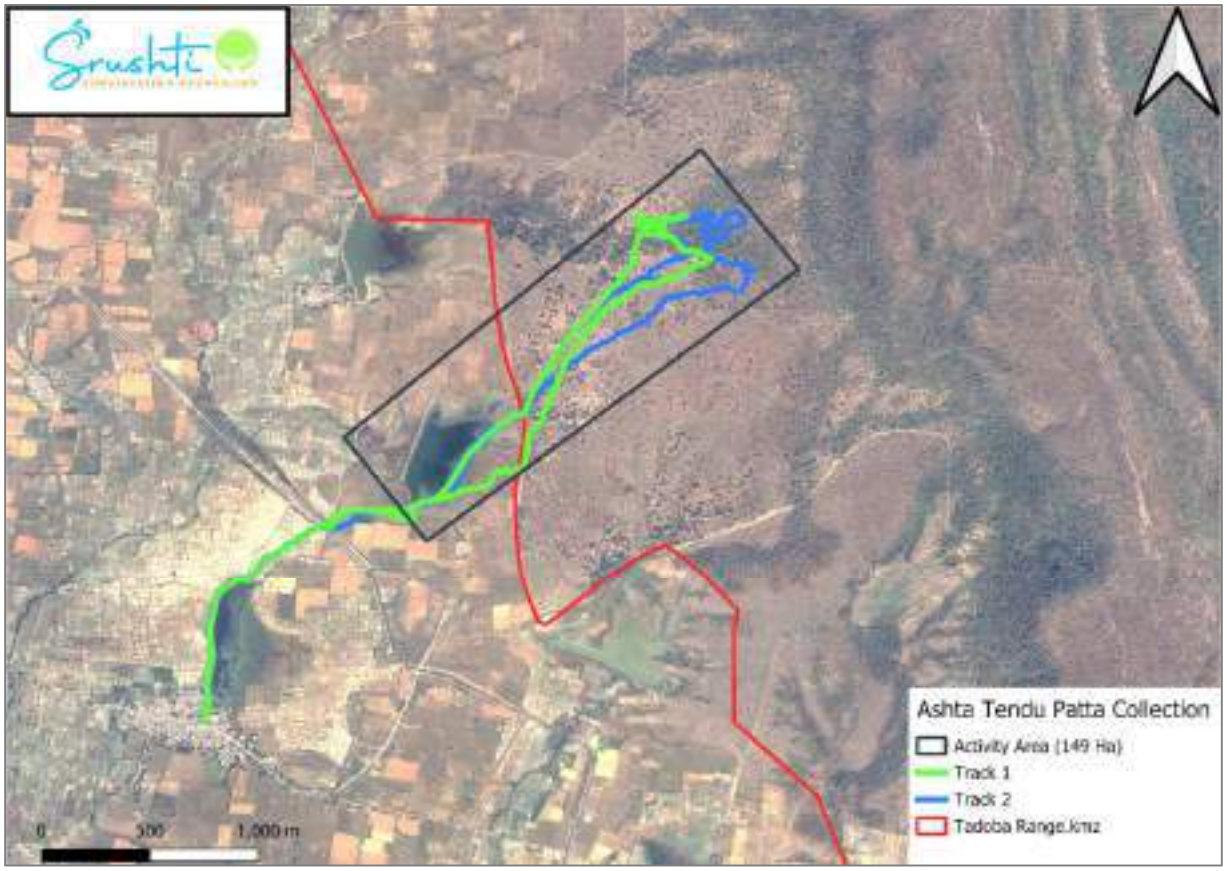
In addition to collecting tendu leaves, one of the women gathered fuelwood for the household, bundling the sticks using her dupatta for easy transport. The group made two short rest stops on their way back to the village. During the day's collection, the group spotted various animals, including spotted deer, langurs, and peacocks. On the first day, the group traveled approximately 9.5 kilometers to and from the forest.

Day 2: 17th May 2024

Starting Time from Village: 5:50 AM, Arrival at Forest: 6:25 AM, Total Participants: 8 individuals (6 women, 2 different men)

The second day followed a similar routine, with the same six women accompanied by two new men for the collection of tendu patta. The group returned to the same area within the forest for their collection efforts. The men and women worked together for about an hour and a half, plucking leaves. During this time, one man and a woman stopped collecting and returned to the village early after noticing that our survey team had taken photographs of them. It appeared that they were uncomfortable with the documentation, possibly due to concerns about exposure or other reasons related to their involvement in tendu patta collection.

On the second day, the group observed spotted deer and langurs once again. Additionally, they discovered tiger pugmarks in the area, further highlighting the potential risks of human-wildlife interactions during tendu patta collection in the core of Tiger Reserve. The group left the forest around 9:20 AM and returned to the village at approximately 10:15 AM, having traveled a total distance of 9.7 kilometers. The activity impact area was around 150 Ha.



GPS track of patta collection from Ashta village

COLLECTION IN SONEGAON VILLAGE: FIELD OBSERVATIONS

Day 1. 18th May 2024

Start Time: 5:30 AM, Participants: 9 (3 women and 6 men), Age Group: 25 to 50 years.

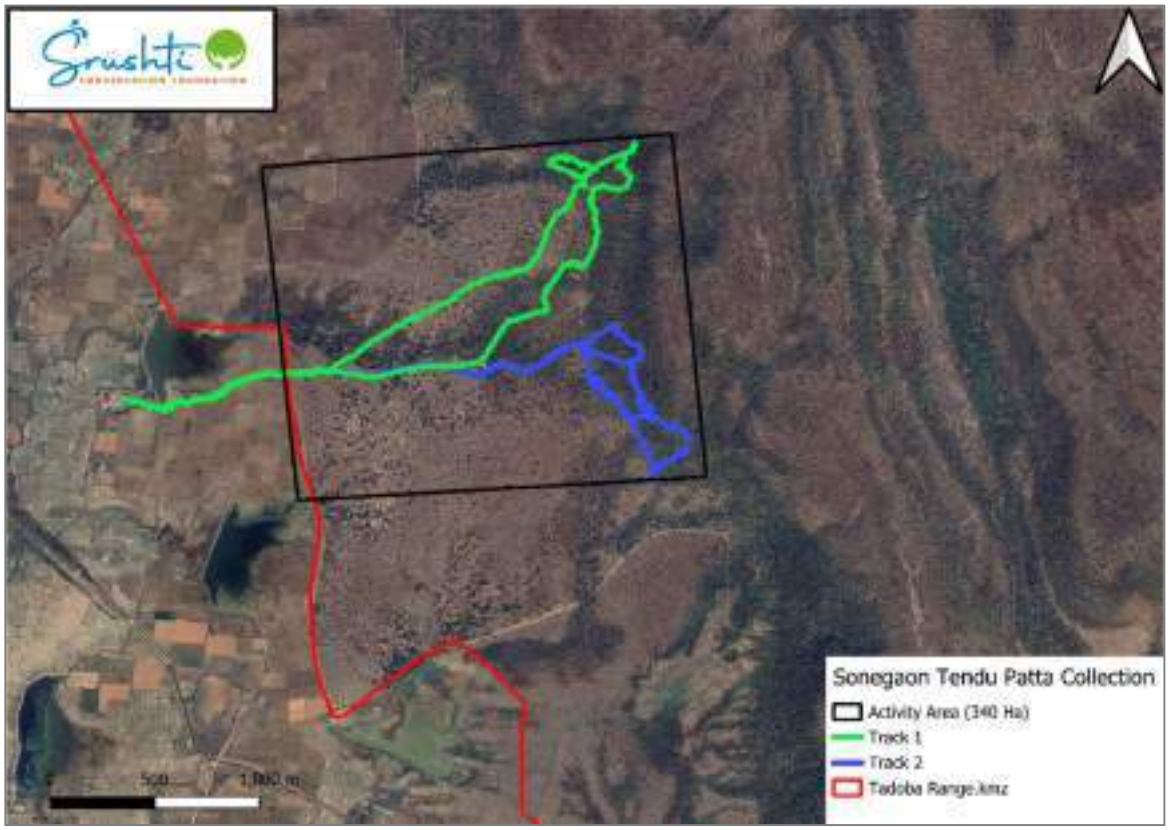
The group started their journey early in the morning and headed towards `Dhavadaban`, a hill area known for its abundance of Dhawada trees, the main source of patta. They also traversed the regions of `Dhorghat` and `Garadicha Ghat` covering a total distance of 8 kilometers. Speed and urgency were noticeable during the collection process, as the collectors aimed to gather as much as possible in a short time. A senior member of the group, though experienced, avoided the more challenging hilly terrain and opted for safer ground. This might indicate limitations due to age or physical capability. During the collection, the group's communication method was speaking from different locations to maintain contact while spread across the area. Wood apples were consumed by the collectors when they got hungry. During the collection, another group of 4 women and 2 men joined the original group, making the task more collaborative. The group returned to the village by 11:25 AM, after covering a total distance of 7.5 kilometers.

Day 2: 19th May 2024

Start Time: 5:35 AM, Participants: 8 (3 women and 5 men)

On the second day, the group ventured to Ashtaban and Zendyacha Par for patta collection, covering a distance of around 8 kilometers in total. The collection pattern mirrored the previous day, with the leaves being plucked quickly and with urgency to maximize collection in a short period. Once again, the senior person did not climb the hillock and instead stayed on flatter terrain. However, this time, he was accompanied by a woman who walked alongside him, perhaps to assist or maintain company. The rest of the group energetically climbed the hillock, swiftly moving to collect patta from higher ground. As they progressed, two additional groups joined the patta collectors – one from Sonegaon and another from Ashta. This made the patta collection more communal and collaborative. Most of the collection took place on hillocks, showing that despite the challenging terrain, it was the preferred area for gathering patta, likely because of better leaf availability.

The group returned to the village at 11:35 AM, after having traveled approximately 8 kilometers. In two days the Sonegaon villagers moved around 340 Ha of area.



GPS track of patta collection from Sonegaon village

Speed and urgency were noticeable during the patta collection process, as the collectors aimed to gather as much as possible in a short time.

COLLECTION IN ARJUNI VILLAGE: FIELD OBSERVATIONS

Day 1: 20th May 2024

Start Time: 6:15 AM, Villagers: 24 (4 men, 18 women, 2 boys)

The villagers left Arjuni and headed toward the Bhanuskhindi core area, a forested region known for abundant patta (leaves). The route spanned 10 kilometers round-trip. Although they took different roads to enter the forest, once inside, all the villagers gathered together at a common point. This meeting place likely facilitated group coordination and planning for the collection. The group then split into three smaller groups for more efficient collection, scattering themselves across different parts of the forest. This division allowed them to cover more ground. Women dominated the groups, indicating their primary role in patta collection in all villages.

Cutting trees and branches for leaves was a common practice observed during the collection. This method, though productive, suggests potential over-harvesting and impacts on tree health. The women's ability to climb trees stood out. It seemed to be a habitual practice for them, reflecting not only skill but perhaps the necessity of reaching higher branches for quality leaves. The cutting of Bahunia tree branches, which the collectors used as a natural thread to tie leaf bundles. This demonstrates how local knowledge of forest species is integrated into their collection practices. While collecting, the group also had incidental encounters with Spotted Deer, Wild Boar, and Common Hare. After completing their collection, the three groups reconvened and walked back to the village together, strengthening their sense of community and safety during travel. They arrived back at 11:25 AM, having completed a total track of 10 kilometers.

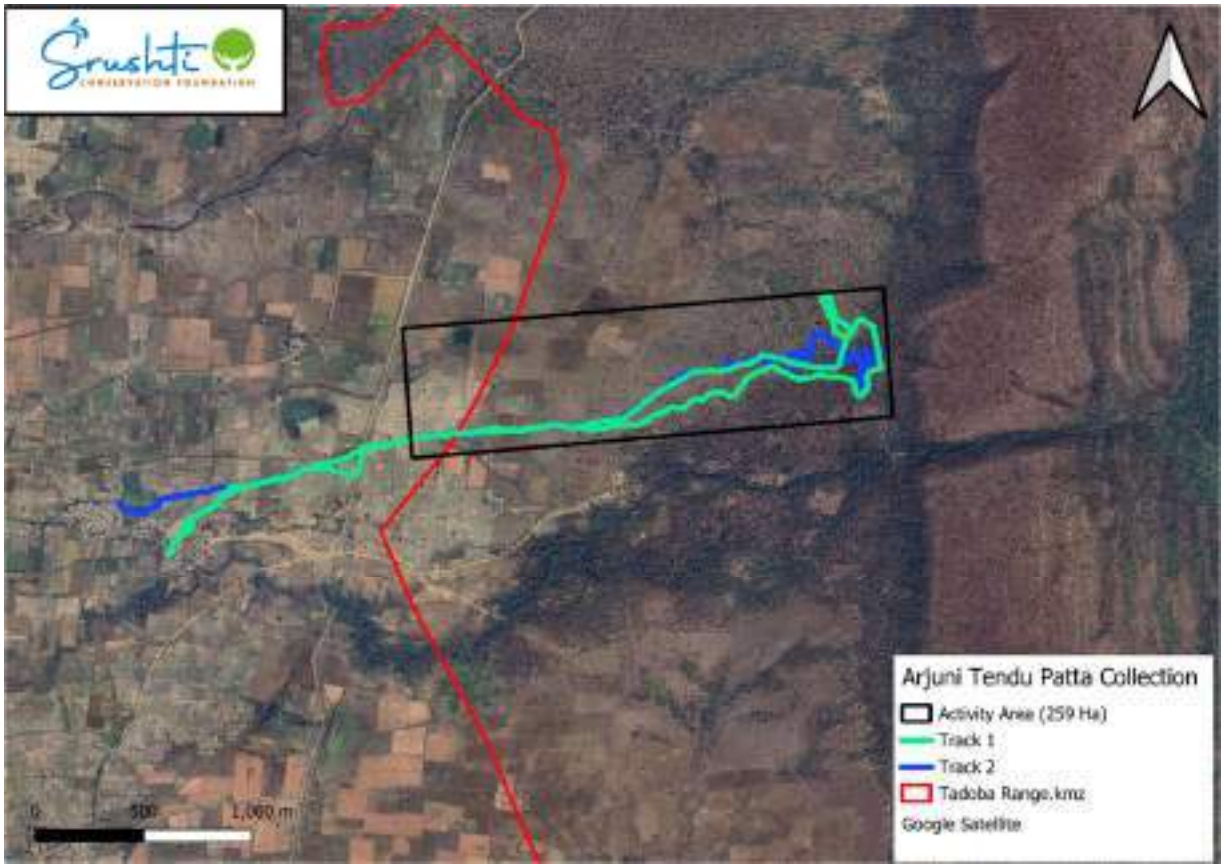
Day 2: 21st May 2024

Start Time: 6:25 AM, Villagers: 15 (mainly women)

The group revisited the Bhanuskhindi area, retracing their steps from the previous day. The total distance covered was again 10 kilometers. On the first day, the group's collection pattern followed the same method of gathering leaves and cutting branches. The women continued to lead the effort, showcasing their familiarity and expertise in navigating the forest and collecting patta.

A notable event on this day was the sudden sound of a four-wheeler vehicle while the group was busy collecting leaves. This prompted the villagers, particularly the women, to hide in the bushes, demonstrating their awareness of possible patrolling or interference by forest officials or other entities. This behavior hints at the semi-illicit nature of resource extraction in certain areas, where forest regulations might restrict such activities or where collectors wish to avoid attention.

Similar to the previous day, the group encountered Spotted Deer and Wild Boar during their time in the forest. After completing their collection, the group returned to the village at 11:45 AM, having traveled 10 kilometers in total for the day.



GPS track of patta collection from Arjuni village

The women continued to lead the effort, showcasing their familiarity and expertise in navigating the forest and collecting patta.

COLLECTION IN GHOSARI VILLAGE: FIELD OBSERVATIONS

Day 1: 22nd May 2024

Start Time: 6:30 AM, Participants: 15 (5 men, 10 women), Age Group: 28 to 55 years.

The group set off from Ghosari village and traveled to the Ghosari PF, followed by the Wadala PF and Katezari area. These regions form part of the core area for patta collection in the village. The total distance traveled was approximately 6-7 kilometers. The collection team was divided into two smaller groups who worked together briefly after reaching the forest before spreading out to cover more ground. Women dominated the collection process, climbing trees with ease to pluck leaves and break branches, demonstrating their agility and familiarity with tree climbing. Men were involved primarily in scratching the leaves from lower branches and supporting the women by carrying tools or helping bundle the leaves. This gender-based division of labor is consistent with practices in other villages.

While making their way back through the core area, the group suddenly heard the noise of a vehicle approaching, likely signaling the presence of forest authorities or other potential disturbances. In response, the entire group quickly hid in a nala for cover. This act indicates an awareness of forest regulations and the villagers' attempts to avoid detection during their collection activities, which might be subject to legal or informal restrictions. After a short time, once the coast was clear, the group emerged from their hiding spot and continued their journey back to the village. Upon exiting the forest, the group made use of mobile phones to contact family members in the village. The collected patta was transported back by two-wheelers, an efficient method to reduce the physical burden of carrying large bundles of leaves on foot.

The group arrived back in Ghosari village by 11:00 AM, having traveled approximately 6-7 kilometers during the day.

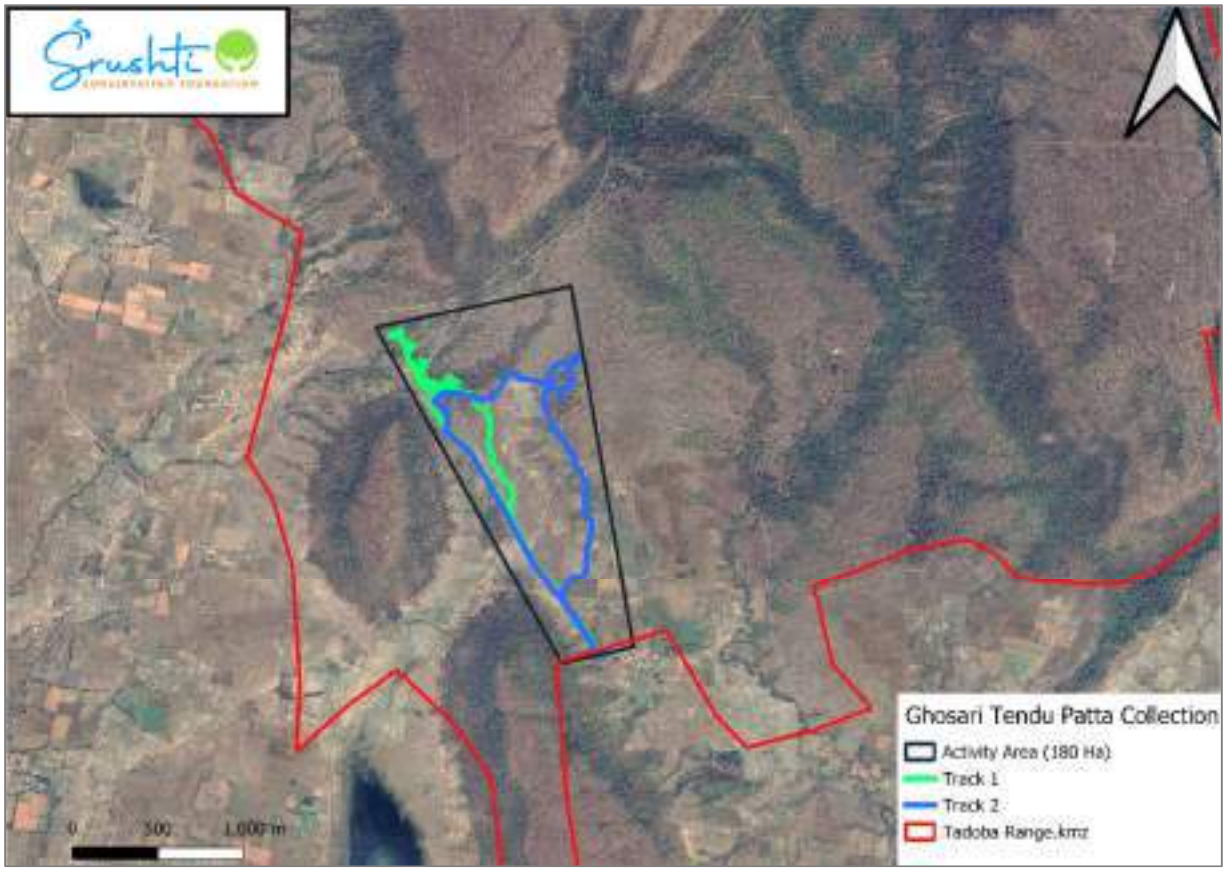
Day 2: 23rd May 2024

-Start Time: 6:35 AM, Participants: 12 (same individuals from the previous day)

The group once again headed to the Ghosari PF area, focusing their collection activities along the PF line. They repeated a similar path as the previous day, traveling around 6-7 kilometers. The majority of the participants were related to each other, reinforcing the familial ties that are common in rural labor activities. Working with family members provides a sense of security and shared responsibility in potentially risky environments like forests.

The collection pattern remained the same as the first day. Women climbed trees with expertise, plucking leaves and breaking branches to gather patta. The ease with which women engage in tree climbing highlights their experience in such activities. Men assisted by gathering leaves and branches from lower areas and helping tie the bundles. During the day, ants were discovered on one of the trees by a few collectors. Those affected climbed down quickly to avoid the discomfort

and potential stings. After a productive morning, the group returned to Ghosari village by 10:25, covering the same 6-7 kilometers as the day before. The relatively early return suggests that the collection was efficient and perhaps more organized than the previous day.



GPS track of patta collection from Ghosari village

The collected patta was transported back by two-wheelers, an efficient method to reduce the physical burden of carrying large bundles of leaves on foot.

Women climbed trees with expertise, plucking leaves and breaking branches to gather patta.

WADALA: PATTA COLLECTION HAMPERED BY TIGER PRESENCE

Tendu patta collection in Wadala village had been ongoing for about a week when an unexpected event caused the activity to halt abruptly. The Mahadev Lake area, which had been a key collection site for the villagers, became a zone of concern due to the presence of a tiger.

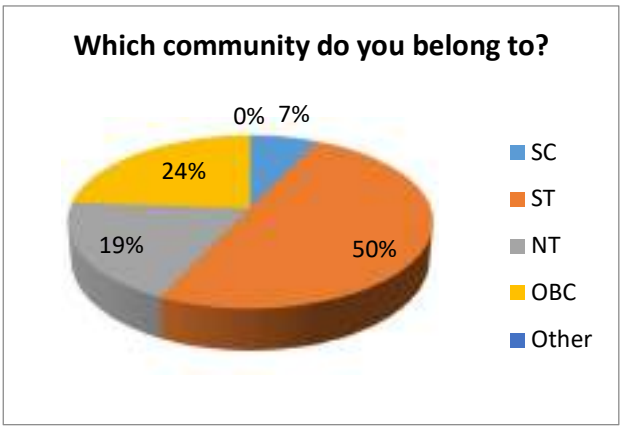
On a particular day, when our team was with Ghaosari villagers in the forest, the Wadala villagers were engaged in their routine of patta collection near Mahadev Lake, a tiger suddenly appeared and charged at the collectors. This close encounter created immediate panic and fear among the group. The collected patta was dropped and they ran back to the village. Although the tiger did not attack, the charge was alarming enough to send a clear signal of the danger posed by the predator's proximity. Following the incident, a wave of fear spread through the village, and the news of the tiger's charge prompted the villagers to halt their patta collection activities entirely.

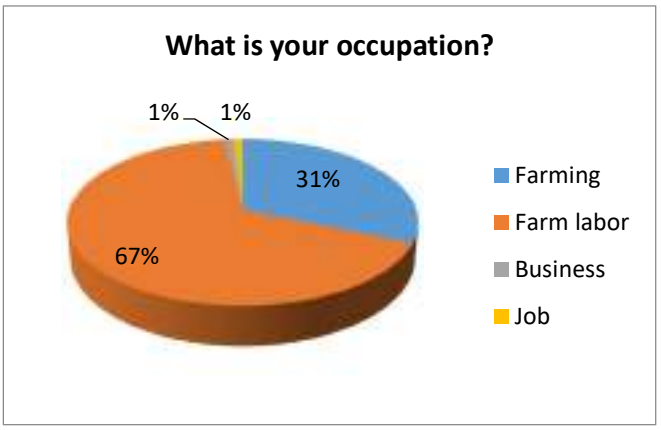
Coincidentally, around the same time, the Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS) was initiated in the village. This provided a timely alternative for the villagers, offering them wage opportunities that did not require venturing into the tiger-inhabited forest. This shift allowed them to earn a livelihood through safer means, reducing the immediate need to enter potentially dangerous areas for patta collection. Due to the villagers' decision to cease their patta collection activities and the shift toward MGNREGS work, our team did not accompany the villagers into the forest during this period.

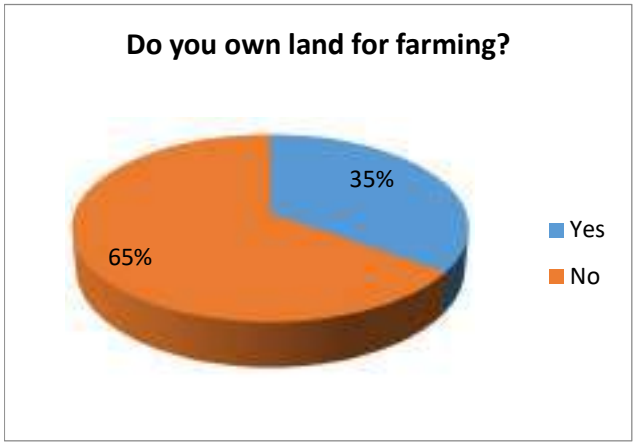
This incident highlights the complex interactions between forest-dependent communities and wildlife, illustrating how external factors like wildlife encounters can dramatically alter local livelihoods. It also underscores the importance of alternative employment schemes in providing rural communities with safer options when forest resources become inaccessible due to such risks.

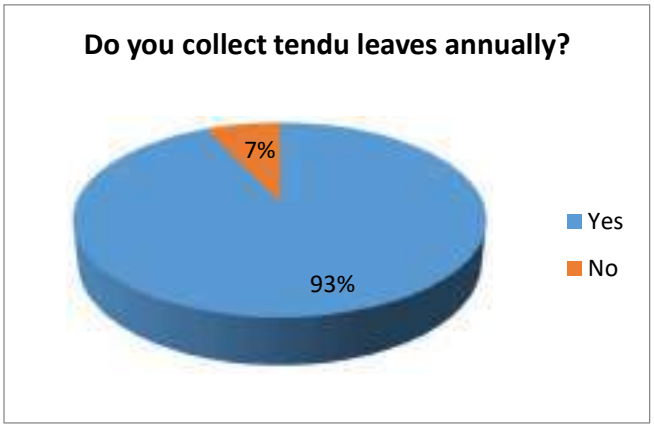
COLLECTION STUDY

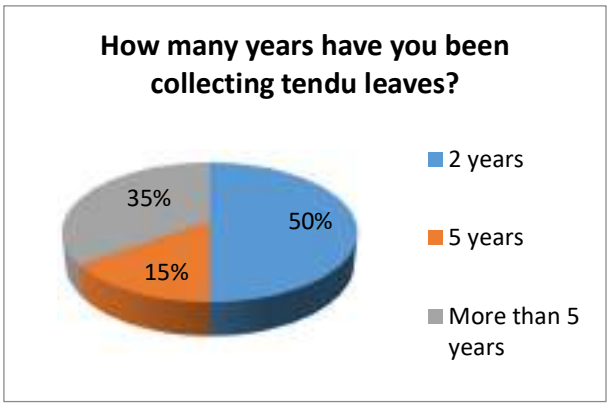
The quantitative and qualitative study investigates the practices, challenges, and patterns associated with tendu leaf collection in 170 families of six villages near the Tadoba range. The study assesses various aspects of the collection process, such as time spent, distance traveled, community participation, and the reasons for continued collection despite emerging challenges.

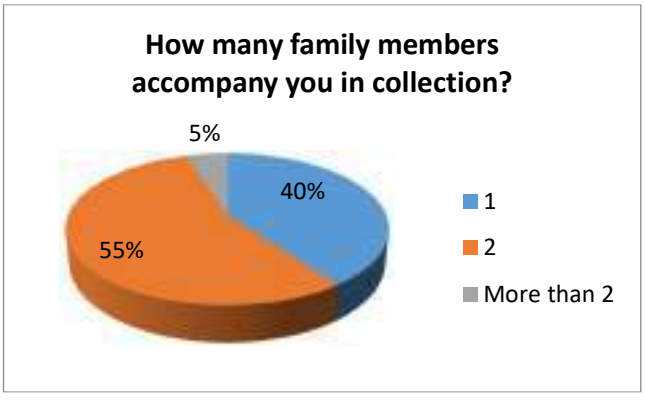


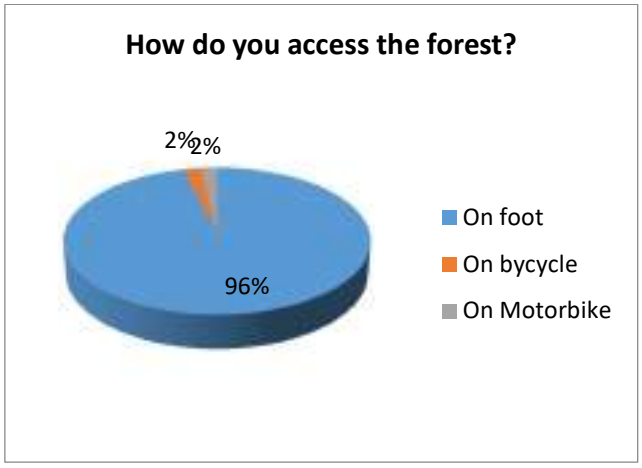


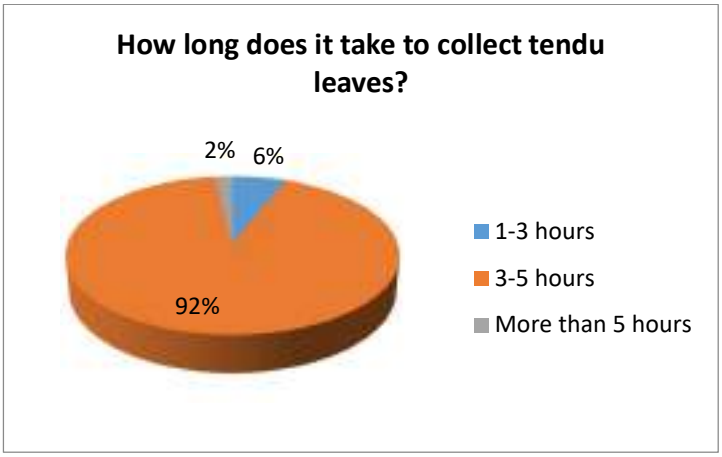


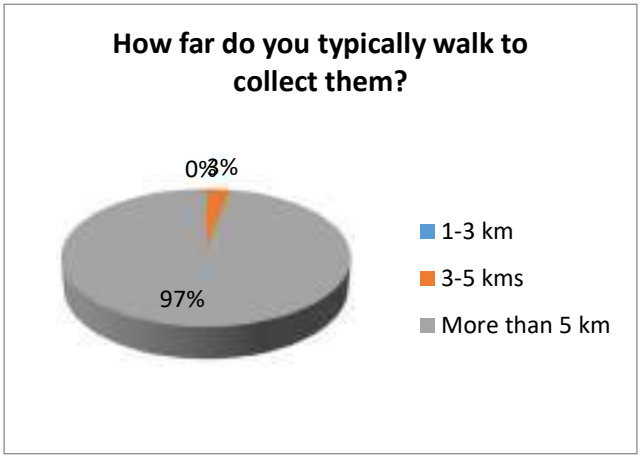


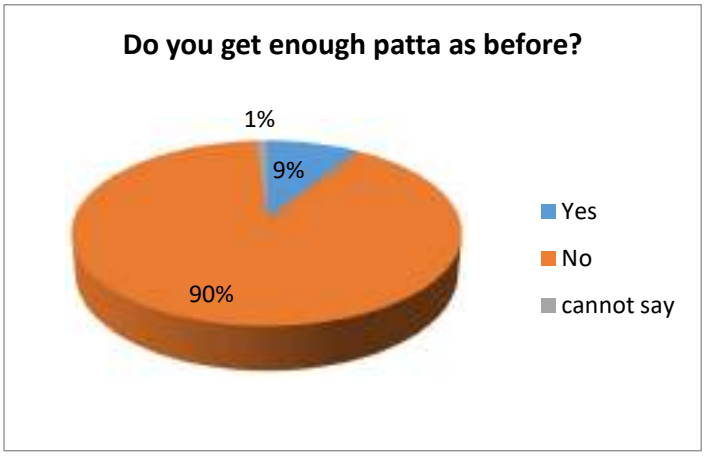


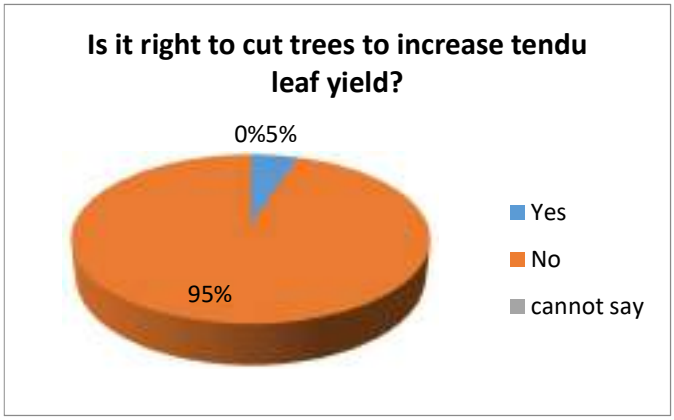


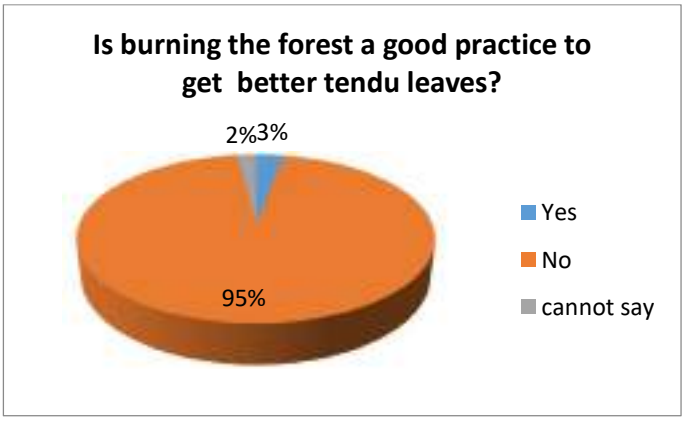

How do you access the forest?
2%
2%
96%
On foot
On bycycle
On Motorbike

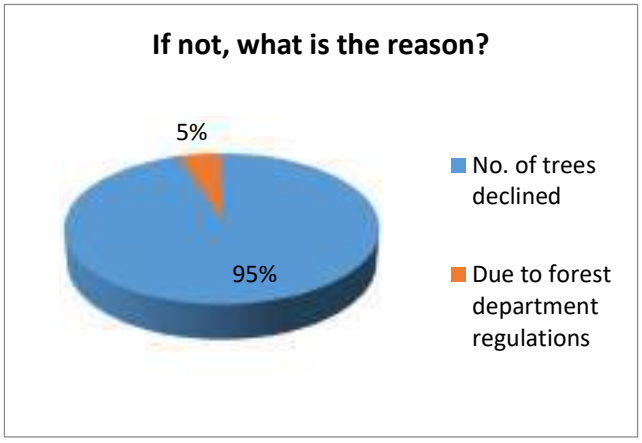

How long does it take to collect tendu leaves?
2%
6%
92%
1-3 hours
3-5 hours
More than 5 hours

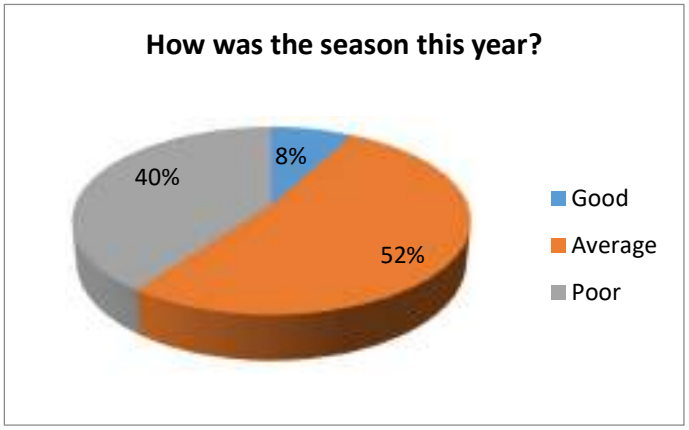

How far do you typically walk to collect them?
0%
3%
97%
1-3 km
3-5 kms
More than 5 km

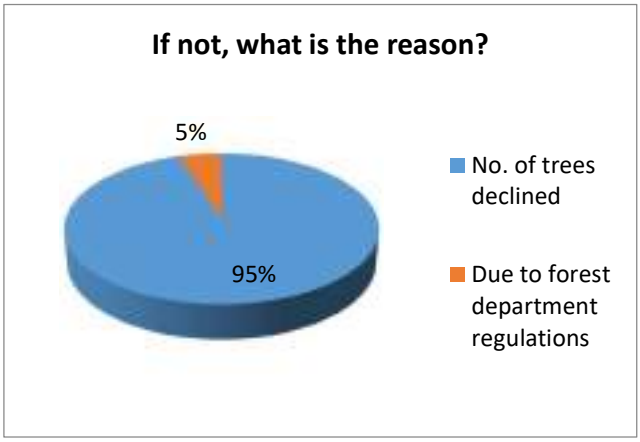

Do you get enough patta as before?
1%
9%
90%
Yes
No
cannot say

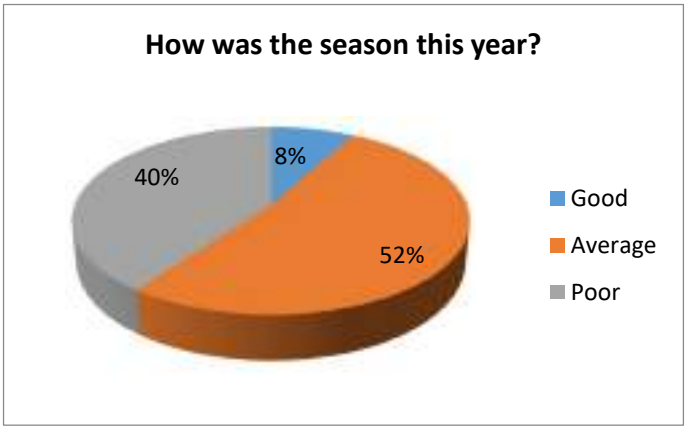

Is it right to cut trees to increase tendu leaf yield?
0%5%
95%
Yes
No
cannot say


Is burning the forest a good practice to get better tendu leaves?
2%3%
95%
Yes
No
cannot say









KEY FINDINGS

Community Composition of Tendu Leaf Collectors

The respondents of the study belong to various communities, with 50% coming from the Scheduled Tribes (ST), 24% from the Other Backward Classes (OBC), 19% from the Nomadic Tribes (NT), and 7% from the Scheduled Castes (SC). None of the respondents identified as belonging to other communities. This data highlights that the majority of tendu leaf collectors are from tribal and backward communities, who typically have a greater reliance on forest resources for their livelihoods.

Occupational Distribution

68% of respondents work as farm laborers, 32% are involved in farming, and a very small number (1% each) are engaged in business or jobs.

Land Ownership

Only 35% of respondents own land for farming, while the majority (65%) do not, indicating that most tendu leaf collectors are dependent on labor and forest resources for their livelihood.

Annual Tendu Leaf Collection

93% of respondents collect tendu leaves annually, while only 7% do not. This highlights the importance of tendu leaf collection as a regular and necessary and important livelihood for these communities.

Years in Tendu Leaf Collection

50% have been involved in tendu leaf collection for 2 years, 15% for 5 years, and 35% for more than 5 years. This suggests that a significant portion of the community has long-standing experience in this activity.

Family Participation

40% of respondents are accompanied by one family member when collecting tendu leaves, 55% by two family members, and 5% by more than two family members. Family involvement is common and crucial in the collection process.

Forest Access

96% access the forest on foot, 2% use bicycles, and another 2% use motorbikes. Walking is the predominant method due to the nature of the track and terrain..

Time Spent in the collection

92% of respondents take 3-5 hours to collect tendu leaves, while 6% take 1-3 hours, and 2% take more than 5 hours. This shows that collecting tendu leaves is a time-intensive activity, especially for those who collect larger quantities.

Distance Travelled

97% walk more than 5 kilometers to collect tendu leaves, 3% travel 3-5 km, and none travel less than 3 km. This indicats that the collectors must cover significant distances to reach suitable tendu leaf collection areas.

Decrease in Tendu Patta

90% of respondents believe they do not receive as many leaves (patta) as before, 9% think they do, and 1% cannot say. The decline in tendu leaves is mainly attributed to the 95% who report a reduction in the number of trees and 5% who cite forest department regulations as the reason.

Season Quality

The year's season for tendu leaves was rated as good by 8%, average by 52%, and poor by 40% of respondents. This variation in perception could be linked to local environmental factors affecting the quality and quantity of tendu leaves.

Sustainable Practices

95% of respondents believe it is not right to cut trees to increase tendu leaf yield, and only 5% think it is acceptable. Similarly, 95% are against burning the forest to improve tendu leaf collection, with only 3% supporting the practice.

DISCUSSION

In the Tadoba range, villagers engage in the seasonal collection of tendu patta, which holds significant economic value. This work occurs during the harsh summer months when employment opportunities are otherwise scarce. The villagers often travel long distances 6 to 10 kilometers under extreme heat to collect the leaves. This task is not only physically demanding but also poses a challenge due to the risk of man-animal conflict, as these six selected villages lack a buffer zone and rely on resources from the core area of the tiger reserve. Most of the collectors were landless and agricultural laborers.

The collection process is largely dominated by women, who play a critical role. While men climb tall trees and cut branches with axes, women lead the way in plucking tendu patta leaves. They skilfully climb trees, collect large quantities of leaves, and always aim to gather as much as possible. Once home, the women continue their work by tying the leaves into bundles, all while managing household chores. Their contribution is essential, as they balance both the domestic responsibilities and the demands of patta collection.

When asked why women's participation is particularly high in the tendu patta collection, the reasons became clear. Women often juggle household responsibilities along with income-generating activities. Tendu patta collection offers flexibility in terms of time, allowing them to balance both roles. In many rural communities, women have traditionally been involved in the collection of forest products such as tendu leaves, mahua flowers, and firewood. Their familiarity with the forest and experience in such tasks make them well-suited for the patta collection. Since patta collection is a significant source of cash income during the lean months, women participate actively to support their families financially. These factors explain the high level of women's involvement in tendu patta collection, as it meets both their economic needs and fits within their traditional roles in the community. In addition to collecting patta, the women also gather Kuda flowers and fuelwood, as well as cut branches of trees like Palas, Apta, Murudsheng, and Katumbar, which provide the threads used to tie the bundles.

The villagers have shown a welcoming attitude toward the presence of the SCF team, engaging with them respectfully and allowing them to observe the process. The pluckers carefully select and pluck only the necessary branches, a behavior that might be influenced by the team's presence.

In the past, there was a tendu patta collection center within the village, but now villagers must travel to a nearby village to deliver their harvest. This has introduced a transportation issue, making the process more difficult. Additionally, the villagers noted several challenges affecting the quality of the patta leaves. Contractors have neglected proper pruning, leading to smaller leaves, and unseasonal monsoon rains have caused the leaves to tear. They also observed pests damaging the leaves. In the quantitative survey, the team asked questions regarding human-wildlife conflict during tendu patta collection. According to the collectors, sightings of wild animals are fairly common during their time in the forest. Animals like spotted deer, wild boar, and others are regularly encountered. Although tiger sightings are rare, when a tiger is spotted, the collectors immediately gather in one place, remain still, and begin shouting to alert others of the tiger's presence. This collective response helps ensure that everyone is aware of the potential danger and can take necessary precautions to avoid conflict.

Overall, the tendu patta collection in the Tadoba range is a complex process shaped by economic necessity, environmental challenges, and the crucial role of women in the community.

RECOMMENDATIONS

The study on tendu leaf collection highlights significant socio-economic and environmental factors affecting forest-dependent communities, particularly women. Given the challenges and intricacies of the process, here are some recommendations based on the findings:

1. Improve livelihood alternatives and reduce dependency on Patta

Establish training programs for alternative income sources like eco-tourism, handicrafts, agro-tourism, and improved agricultural practices. This would reduce dependency on tendu leaf collection, particularly during the harsh summer months, providing additional income opportunities. Encourage women, who are the primary collectors, to form SHGs. Through microfinance, these groups could engage in small-scale businesses, diversifying income streams away from forest exploitation.

2. Strengthen forest management practices

Collaborate with the Forest Department to establish a systematic pruning schedule and regulate leaf collection periods. Proper pruning and management will ensure the regeneration of tendu leaves, improving both yield and quality in the long term. This practice is not in the core area. Engage local communities, particularly women, in forest management through co-management

systems. They could act as forest stewards, ensuring sustainable harvests, reporting on wildlife encounters, and addressing overexploitation.

3. Enhance Safety Measures for Man-Animal Conflict

This system is already in place in TATR buffer villages.

4. Transportation Solutions

Explore shared transport models where villagers can pool resources (such as bicycles or carts) to transport tendu leaves to collection centers in nearby villages, reducing the burden on individuals.

5. Environmental Conservation Education

Since most respondents reject cutting trees and burning forests to increase yield, build on this awareness by introducing educational programs on forest regeneration, soil conservation, and sustainable harvesting techniques. Partner with NGOs and government agencies to initiate reforestation projects that replenish tendu-producing tree species and other native flora. Community involvement in tree planting would ensure long-term forest health.

CATTLE GRAZING

INTRODUCTION

Livestock dependency for fodder is a significant issue in the villages surrounding the forests. Despite the availability of vast village pastoral lands, cattle are routinely driven into the forests to meet their fodder and water needs. This practice is common among herdsmen, shepherds, and cattle owners. Although there are laws in place to protect cows and a ban on cow slaughter, Maharashtra has still witnessed a 10% decline in cattle population, as reported by the Animal Husbandry Department's 2019 census. The cattle population dropped from 1.55 crore in 2012 to 1.39 crore in 2019.

In eastern Vidarbha, thousands of cattle are commonly found near the forest edges of villages. It is a regular sight to see a herdsman, locally known as a *`Gurakhi` or `Gayki`,* herding cattle into the forests in the morning with his characteristic loud calls. During the monsoon season, when agricultural fields are planted with crops, these herdsmen often take the cattle into the forest for grazing. However, they seldom follow rotational grazing methods, which places tremendous pressure on forest resources and leads to competition with wild ungulates. Notably, only a few families in these villages own milking cattle.

The herdsman is particularly vulnerable to human-wildlife conflict. He enters the forest for grazing more than 300 days a year, spending about 7 to 9 hours daily inside. In the Chandrapur district alone, 17 herdsmen lost their lives to large carnivore attacks between 2013 and 2021. Despite this risk, the herdsman remains one of the most knowledgeable and resourceful figures in the community, possessing detailed knowledge of forest ecosystems, wildlife, and illicit activities within the forest.

METHODOLOGY

To gather detailed information on cattle grazing in six selected villages within the Tadoba range, the team employed a combination of direct interviews, GPS tracking, and collaboration with local herdsmen. Information regarding cattle ownership and the herdsmen's economy was collected through structured interviews using data sheets. Additional data on cattle numbers were sourced from the local Animal Husbandry Department to cross-verify the accuracy.

To study the grazing patterns, the team employed GPS tracking devices. A cloth belt with a GPS was attached to the neck of selected cattle from each village, allowing the team to monitor the distance and routes traveled within the forest. A total of 12 GPS tracks (two tracks for each village) were recorded during the summer season from 8th to 20th June 2024. Another 12 during the monsoon season from 30th July to 10 August. These tracks provided a comparative understanding of seasonal variations in grazing patterns. To understand behavioral changes and grazing dynamics during different seasons, the team also accompanied herdsmen into the forest in monsoon for two full-day observations. In the monsoon season, the proximity of crops to the village agricultural fields led herdsmen to drive cattle deeper into the core forest, covering longer distances. During these field days, the team not only recorded GPS data but also photographically documented grazing patterns, vegetation types grazed, and any interactions with wildlife.

A cloth belt with a GPS was attached to the necks of selected cattle from each village, allowing the team to monitor the distance and routes traveled within the forest.

The project's long-term engagement with the local community, led by the project in charge, along with the involvement of local data collectors, was crucial for gaining access to the community for such detailed insights, especially regarding grazing practices. This sustained intervention helped build trust, allowing for a deeper understanding of the community's grazing patterns, challenges, and its relationship with the surrounding forest resources. Without this consistent and localized involvement, it would have been difficult to collect such comprehensive data on grazing activities.

Additionally, the study included wildlife conflict data from the tiger reserve, and focus group discussions were held with herdsmen and cattle owner to explore their perceptions of forest health, livestock dependency, and risks associated with grazing. This combination of quantitative and qualitative methods allowed for a holistic understanding of cattle grazing patterns and their impacts on the forest ecosystem, ensuring the study's findings are both accurate and comprehensive.

VILLAGE GHOSARI

Ghosari, a small village situated along the tar road to Ashata, has a significant livestock population despite its size, including 365 cattle, 150 goats, and 22 sheep. The village has three herdsmen responsible for tending to the livestock. During the summer months, however, most of the cattle roam freely without herdsmen in the village's fields, which remain uncultivated in this season. Only a few families with bulls and buffaloes take their cattle for grazing, preferring not to entrust them to the herdsmen. To better understand the grazing patterns in summer, our team fitted GPS collars on selected cattle on June 12 and 13, tracking their movements for a comprehensive summer survey. The total time of the grazing on the first day was 6.10 AM to 4.35 PM, the second day time was 6.34 to 3.15 PM. In contrast, during the monsoon season, the herdsmen gather all the village's cattle and lead them to grazing areas in Tamsi, Katezari, and the lakeside forest. In Ghosari two herdsmen manage 96 cattle together, while the third herder independently looks after 25-26 cows. Our team accompanied the two herders on the 3rd and 4th of August in the forest.

First, the herders called out to gather the cattle. Once all 96 cattle were assembled, they began the grazing journey at 9:40 AM. They started by grazing near the bus stop, in the area behind it, which is part of the Tamsi PF. The cows grazed through the Tamshi and then moved towards the Vadala PF. From Vadala PF, they led the cows to the fields of Ghosari village. Afterward, the herd made its way along the road to the Mangli Reeth near the core forest.

The cattle spent the entire day grazing in the Mangli Reeth forest. They paused for water and rested for some time before resuming grazing. When it was time to head back to the village, the

herders started gathering the cattle. They made sure the cattle didn't stray by guiding them from all sides. Before heading back, they brought all the cows together at one spot. Grazing through Mangli Reeth, the cows made their way to the Ghosari fields and then moved back into Vadala PF. After grazing there for a while, they took the main road back to the village. Upon returning to the village, the herders ensured that all the cows safely reached their homes, delivering any that did not return on their own to their owners. The cows arrived in the village by 5:45 PM.

The next day, the herders took the cows out at 10:10 AM. They led them to the area near Tamshi Lake, which took about 10 minutes to reach. After grazing there for a short time, the cows were moved to the Bhavgad area. From there, they continued grazing through Vadala PF and eventually reached the Mangli Reeth forest again. The cows grazed through the Mangli Reeth area and followed the Katezhari fire line, which led them to the Katezhari region. After a full day of grazing, the cows returned to the village via Vadala PF, arriving at around 5:30 PM. The third herder, who grazes his cows independently, does not take them into the forest. Instead, he grazes them near Tamshi Lake, just outside the village.

Here is a detail about herdsmen from Ghosari village

Name: Kishor Dashrat Gajabhe

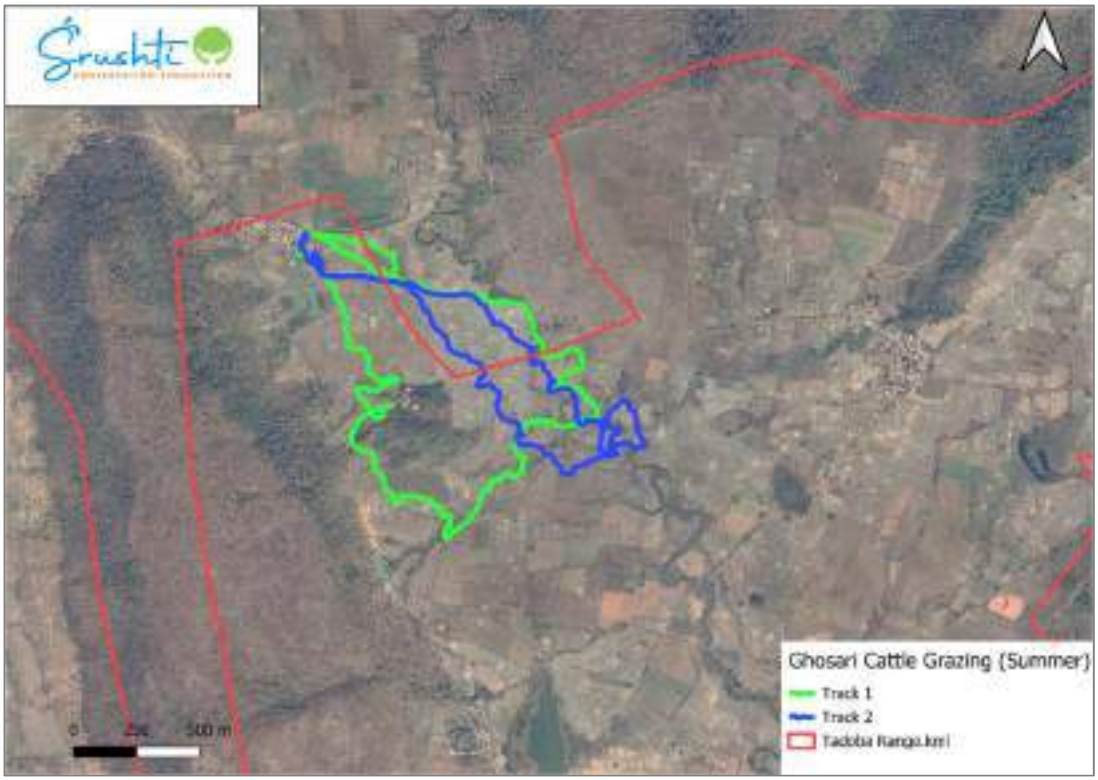
Age: 32 years, Education: 8th standard, Family: 4 members, Agriculture: None, Annual Income: Rs 27,000

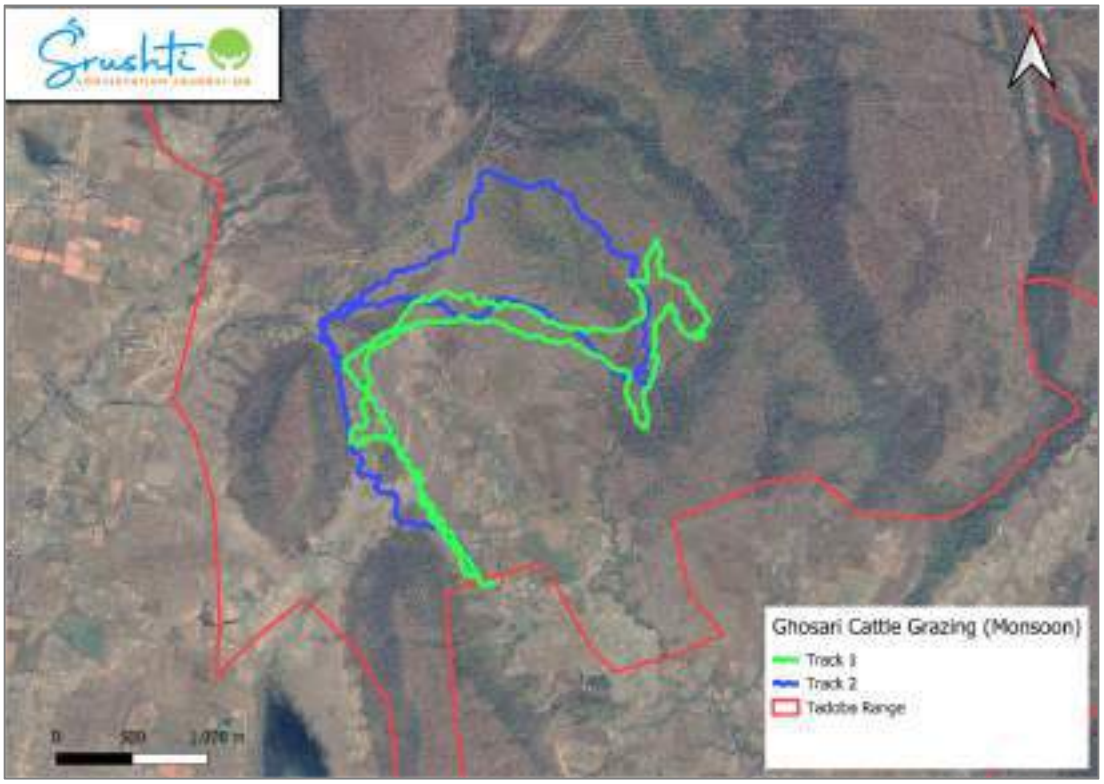
Kishor Dashrath Gajabhe has worked as a cattle herder for the past two years. He is responsible for grazing 20 cattle, charging Rs 150 per head per month. His work involves taking the cattle out for grazing daily, with his schedule varying slightly by season. In the monsoon, grazing begins between 9:30 and 10:00 AM. During the summer months, cattle cover a distance of around 5 to 6 kilometers without herdsman. In the monsoon and winter seasons, when the fields are planted with crops, the cattle are taken into the forest, traveling 7 to 8 kilometers. Kishor carries a stick and an axe for managing the cattle and is accompanied by a dog. The cattle are fitted with bells to help track their location while grazing. He does not collect any forest resources or products during his time in the forest. In Ghosari, there are also three *Shelki* who manage the goats in the village.

While herding in the forest, Kishor has encountered wildlife such as tigers, wild dogs, and spotted deer. However, he has never been attacked by any wild animals. The villagers primarily keep cattle for milk, cow dung (used as manure), and for raising young calves for future milk production.

The second herdsmen from Ghosari is Bandu Dadaji Labhane

Age: 56 years, Education: Passed 4th standard, Experience: 4 years in cattle herding, Annual Income: Rs 27,000 (plus paddy as additional remuneration)
Bandu has been involved in cattle herding for the last four years. He manages around 100 cattle and earns Rs 27,000 annually. In addition to his cash income, he also receives paddy from the cattle owners as part of his remuneration. Bandu carries a stick and an axe while herding and, like Kishor, is accompanied by a dog. In the summer, the cattle graze independently near the village, requiring minimal supervision. However, during the monsoon and winter seasons, Bandu and Kishor accompany the cattle into the forest for grazing, as the fields are used for crops during this time. Despite frequent encounters with wildlife such as tigers and other animals, Bandu has never been attacked. He also does not collect any forest produce during his time in the forest. Bandu charged Rs 150 per cattle along with paddy. In the village, the third herdsmen were reluctant to give information to the data collection team.





Ghosari summer and monsoon cattle tracks

VILLAGE ASHTA

Ashta is one of the largest among the six villages studied, with livestock farming serving as a significant livelihood activity for the residents. The village has a considerable cattle population of 980, along with 76 buffaloes, 400 sheep, and 640 goats, all of which contribute to the villagers' income and sustenance. There is only one herdsman in the village, a third-generation cattle herder from his family. Although the forest is far from Ashta, during the monsoon and winter seasons, cattle are taken to graze in the Sonegaon forest area and the Mahalgaon Rith region. In summer, however, the cattle primarily graze on the village's agricultural farms. To study the grazing patterns during this period, two GPS tracking devices were fitted on cattle on 19 and 20 June. In summer the first-day timing was 6.45 AM to 5.05 PM and the second day it was 7.05 to 4.05.

In this village, only herder manages a herd of 115 cattle. In monsoon season our team was accompanied by the herder on the 7th and 8th of August. Around 10 AM, the herders began rounding up the cows by calling them from the Kinhala road, leading them to the main road. Once all the cattle were gathered, they headed toward the Sonegaon forest, a journey that took approximately 30 minutes. The cattle started grazing in compartment 118, where they fed near the waterholes at Chichban, Kawathban, and Yenban. As the day wore on, the cows slowly moved uphill, continuing to graze within the confines of compartment 118 for the rest of the day. In the evening, the cattle retraced their steps, following the same path they had taken earlier. The herders made sure that each cow safely returned to its home. Since the forest is a considerable distance from Ashta village, it took longer to reach the grazing area. As a result, the herders decided to guide the cattle back earlier in the evening to ensure they returned before nightfall. On the following day, the herder took the cows along the same grazing route.

Here is a detail about the herdsmen of the Ashta village

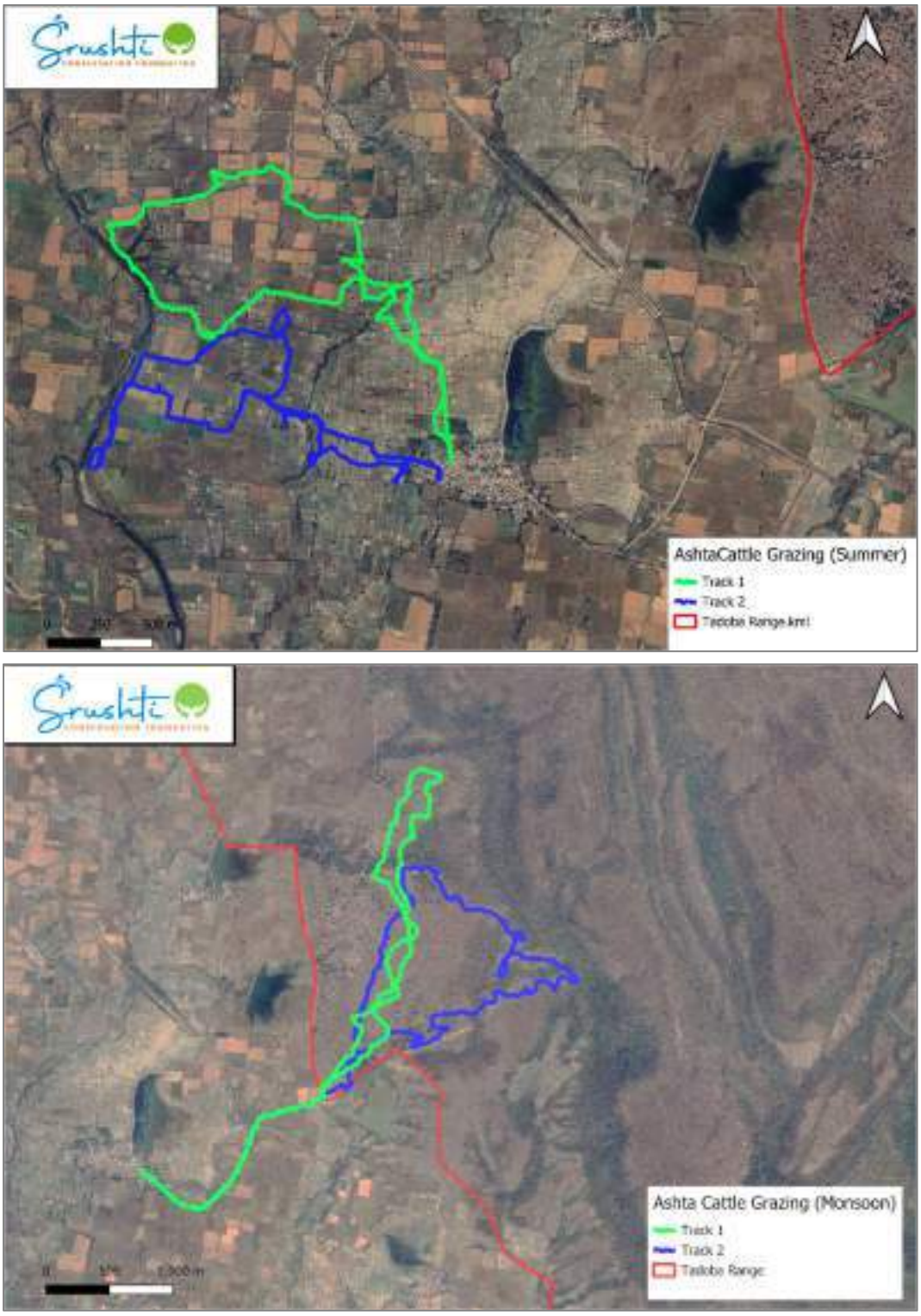
Name: Ganpat Samba Karmenge

Age: 50 years, Family: 3 members, Agricultural Land: 2 acres, Annual Income: Rs 2,26,000

Ganpat has been working in the cattle herding business for the past 30 years. This is his third generation to deal with the cattle. In this village, Ganpat is only herdsmen. Many villagers and farmers independently handle their cattle. He handles around 80 to 90 cattle daily and charges Rs 300 per head for his services. He owns two acres of land in the village but primarily relies on cattle rearing for his livelihood. Ganpat's

daily routine begins around 9 to 9:30 AM when he takes the cattle out for grazing, and he returns to the village by 5:00. In the monsoon season, he leads the cattle deep into the forest, where they travel a distance of 10 to 11 km for grazing. During the summer, the cattle graze closer to the village independently, covering a distance of 7 to 8 kilometers. While herding, Ganpat carries an axe and a stick for managing the cattle and protecting them from any potential threats. He does not use a dog to assist in herding. Occasionally, he collects tree branches while grazing to feed goats. In Ashta village, there are 8 Shelki who are responsible for managing the goats, which graze in nearby areas. However, most cattle are grazed by their respective owners. Ganpat has never been attacked by wild animals during his 30 years of herding. While grazing in the forest, he often encounters wildlife, including tigers and other animals, but no incidents have occurred.

In monsoon, Ganpat, the herder leads the cattle deep into the forest, where they travel a distance of 10 to 11 kilometers for grazing.

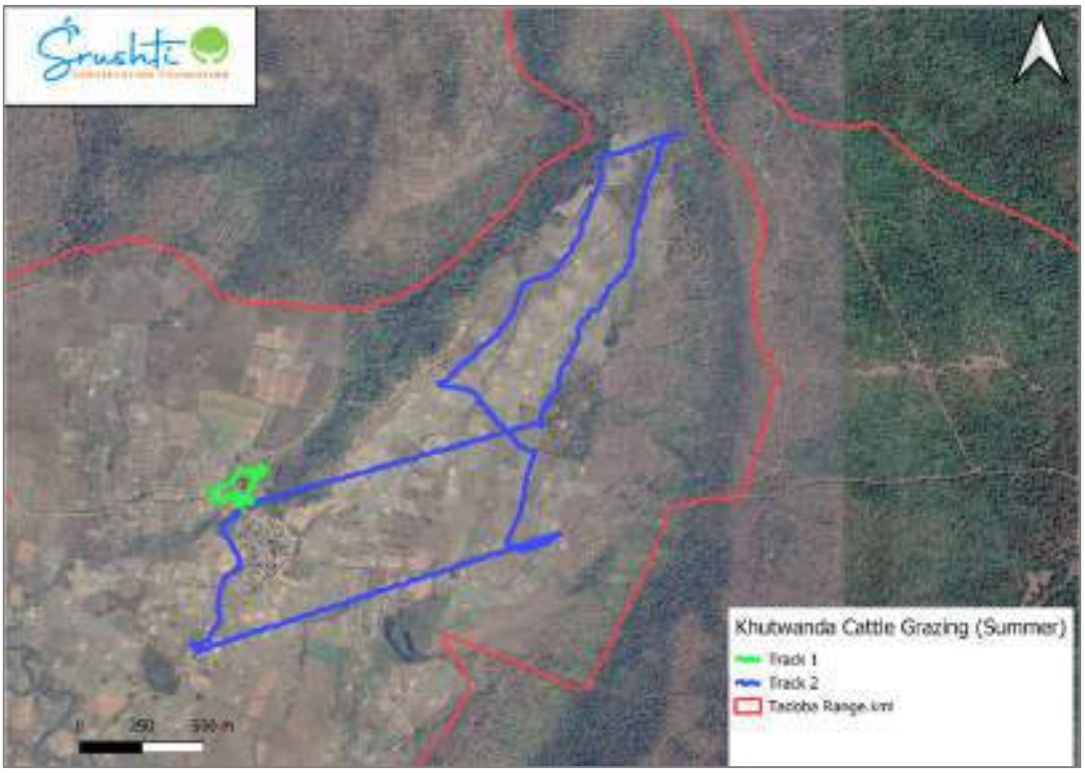


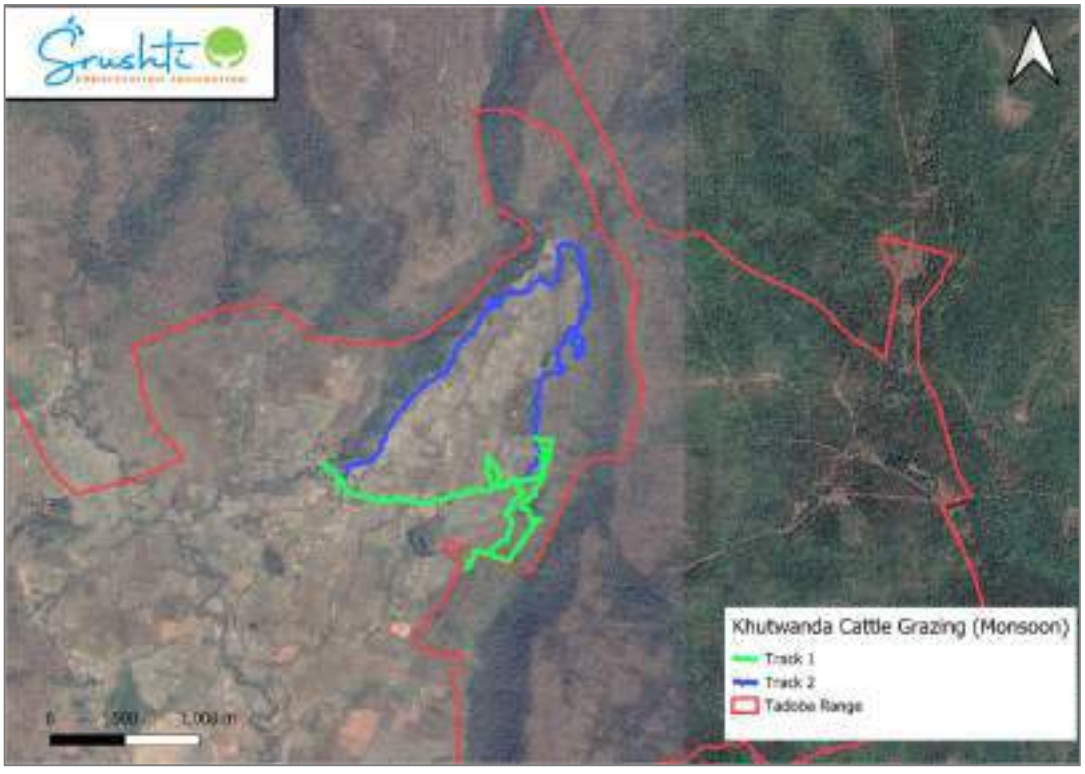
Ashta summer and monsoon cattle tracks

VILLAGE KHUTWANDA

This village is located very close to the core area of the tiger reserve and has a relatively small livestock population. According to the animal husbandry department, there are 269 cattle and 170 sheep in the village. Unlike other villages, there are no herdsmen here, so all cattle owners manage the grazing themselves through a rotational system in which all villagers participate. To study the grazing practices, our team conducted GPS tracking on June 10 and 11 for the summer grazing period and on August 1 and 2 for the monsoon season. On monsoon dates, our team also accompanied the villagers to observe closely their cattle grazing routines. In the summer on the first day the cattle started at 7.25 in the morning and returned at 2.05 and second day the cattle started at the same time in the morning and returned around 3.10 PM.

On the first day, of the monsoon the villagers began by calling out to the cattle early in the morning. The cattle gathered first, followed by those from the Tukum area. Once all 115 cattle had gathered, they started heading out of the village at around 10:35 AM. The cows initially began grazing in the farmlands surrounding Khutwanda village, and from there, the herd moved towards the Palora Protected Forest (PF) area for further grazing. After grazing in the Palora PF area, the cattle made their way to the gate area, where they continued grazing before eventually returning to the village surroundings. Here, they grazed for a while before heading towards the forest. After grazing in the forest, the cattle returned to the Palora PF area. As the day neared its end, they began their journey back to the village at around 5:20 PM and reached the village by 5:55 PM. The route taken by the cattle to leave and return to the village was the same.
Throughout the day, it was observed that all five villagers stayed close to the cows, ensuring they didn't stray off course. They remained vigilant and stayed with the herd for the entire day. Our team spent a total of 7 to 7.5 hours with the said villagers. The grazing track on the second day was very similar to the first day.





Khutwanda summer and monsoon cattle tracks

VILLAGE SONEGAON

According to official records, this village has a considerable livestock population, comprising 205 cattle, 140 goats, and 35 sheep. Located close to the core boundary of the tiger reserve, the village's cattle are typically taken to graze in the Bhanuskhindi, Arjuni, and Mahalgaon areas within the forest during the monsoon season. To study their grazing patterns, GPS tracking devices were fitted on two cattle on June 15 and 16 for the summer period, with additional tracking recorded on August 9 and 10 during the monsoon season.

In the village of Sonegaon, there is only one herder responsible for taking 40 cows out to graze. When our team arrived in the village, the herder first walked from one end of the main road to the other, calling out to gather the cows. By around 10 AM, all the cows were assembled, and the grazing began near the village pond. From there, the cows grazed their way into forest Compartments 117 and 118. As the day progressed, they moved uphill towards Compartments 96 and 97, where they continued grazing. Since the herder was alone, he stayed in close contact with other herders in the area who were tending to buffaloes and goats, making sure that the cattle didn't stray too far. He guided the cows around the grazing area, ensuring they stayed within his reach. After spending the entire day grazing in this part of the forest, the herder began to lead the cows back to the village, following the same route they had taken earlier.

On the following day, the herder repeated the same process and took the cows along the same grazing path. A few years ago, there were over 100 cows in this village. However, since the village lacks its grazing land, most of the grazing was done in the core area of the forest. Due to its proximity to the village, there were incidents of tigers attacking and killing the cattle. As a result, many villagers sold their cows, and now the number of cattle in the village has dwindled, according to the herder.

Here is a detail about the herdsmen

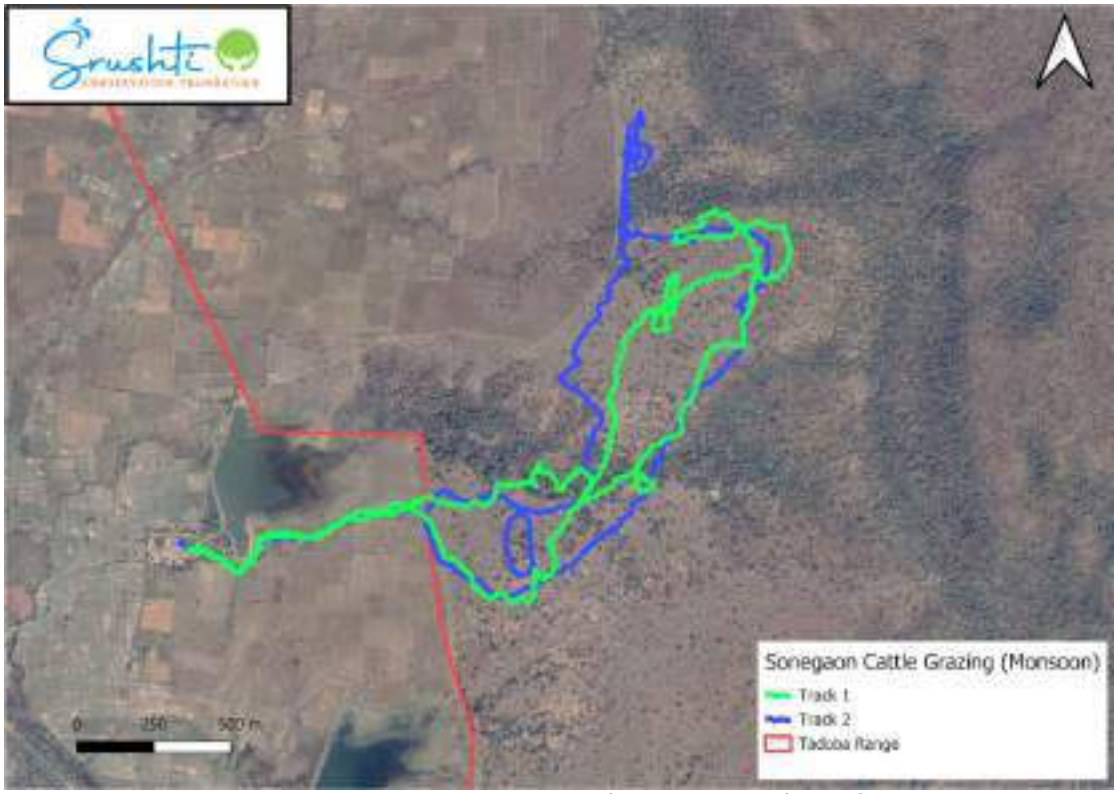
Name: Vishal Santosh Dhone

Age: 23 years, Education: Passed 10th class,
Family: 4 members, Agricultural Land: 5 acres,
Annual Income: Rs 1,28,000

Vishal has worked as a herder for the past five years. In this village, Vishal is the only herdsman. He manages around 40 cattle. He is the second generation to rear cattle. His father now manages 5 acres of land, which supports his family's livelihood. Vishal starts his day by gathering the cattle in the morning and heading

into the forest for grazing. His herding routine lasts until 5:30 PM, after which he returns to the village. He carries an axe, a stick, and a water bottle with him while grazing, primarily for safety and to ensure the cattle stay in control. During the monsoon season, Vishal and the cattle travel around 7 to 8 kilometers into the forest for grazing, as the fields near the village are planted with crops. In the summer months, the cattle graze closer to the village. In Sonegaon, five individuals rear goats, including Vishal's elder brother, who is also involved in this trade. The village is very near the core area of the forest Vishal often encounters wildlife such as tigers and other animals while grazing, he has never been attacked by any wild animals. Most villagers rear cattle for two primary reasons: cow dung, which is used as fertilizer in their agricultural fields, and milk, which is an essential source of income and nutrition for the families.

The village is very near the core area and Vishal often encounters wildlife such as tigers and other animals while grazing, he has never been attacked by any wild animals.



Sonegaon summer and monsoon cattle tracks

VILLAGE WADALA

In this village, livestock farming is central to the local economy, with a large population of 634 cattle and around 1,000 goats and sheep, providing livelihood for many families. Two herdsmen are responsible for taking the cattle to graze. During the monsoon, the herdsmen lead the cattle toward Katezari's protection hut, as well as into the Mahadev and Ran Talwa areas of the forest. To monitor the grazing patterns, GPS tracking was conducted, with the summer track recorded on June 17 and 18, and the monsoon track on August 5 and 6.

There are two herders. Two of them manage 110 cows together. Our team accompanied these two herders who graze their cattle together. First, the herders called out to gather the cows. Once all the cows were assembled, they were taken to the open space behind the Range forest office for half an hour. Then the cattle began to graze at 9:35 am. Before entering the forest, both herders moved together with their cows. However, once they entered the forest, the herders split up and went in different directions, paying closer attention to the cows. The herders first took the cows to graze in the Vadala PF. From there, the cows grazed through the Katezhari area and moved towards Mahadev Lake. After grazing for some time near Mahadev Lake, the herders led the cows uphill towards the Rantalav area, where the cows spent the longest portion of the day grazing. Later, the herders began the journey back, guiding the cows from Rantalav through the fields and back toward the village. The herders stayed by the road until the cows had returned to their homes. Our team spent the entire day with the herders, observing the process. On this day, the grazing lasted approximately 8.5 hours. The following day, the herders took the same route to graze the cows.

Here are details about the herdsmen of the village

Name: Padurang Hari Bagade
Age: 40 years, Family: 4 members, Education: Passed 4th standard, Agricultural Land: 1 acre
Annual Income: Rs 1,35,000

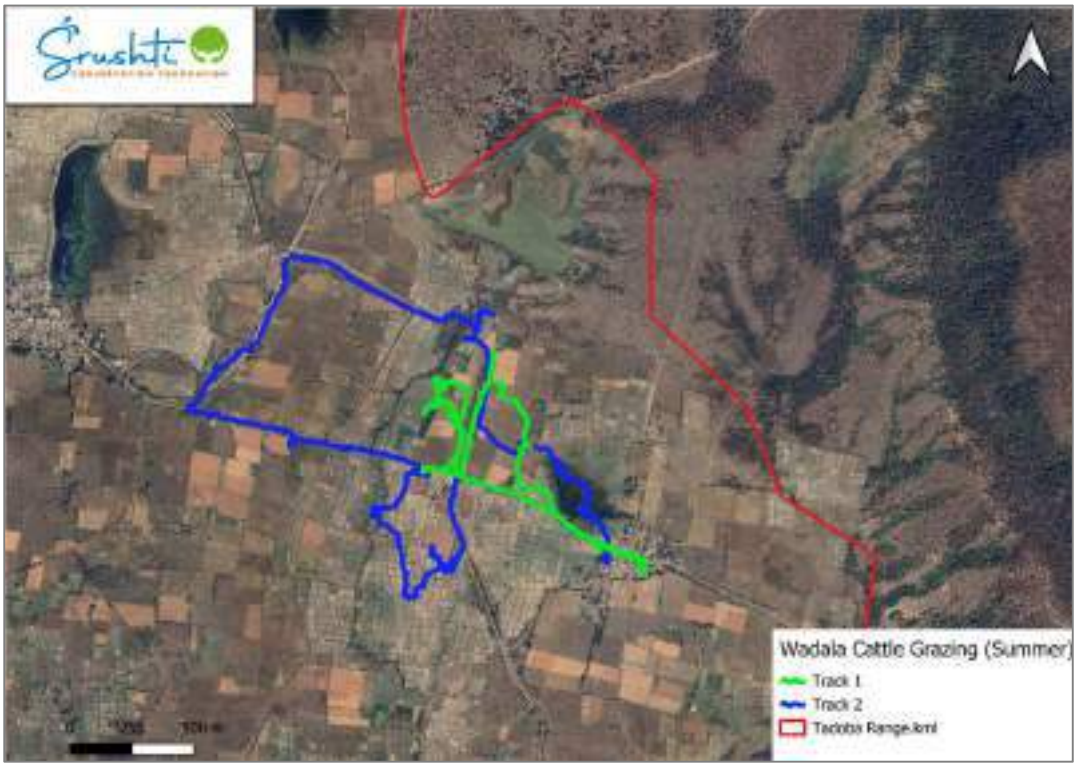
Padurang has worked as a cattle herder for the past four years. He manages around 120 cattle from the village. His herding activities take place for nine months of the year, as he is not on duty during the summer months. During the monsoon season, he carries a raincoat along with his regular stick and axe. His daily grazing schedule starts around 9:00 AM, and he returns to the village by 5:30 PM. In the summer, the cattle graze near the village, as the fields are mostly fallow. However, in the monsoon and winter seasons, when the fields are covered

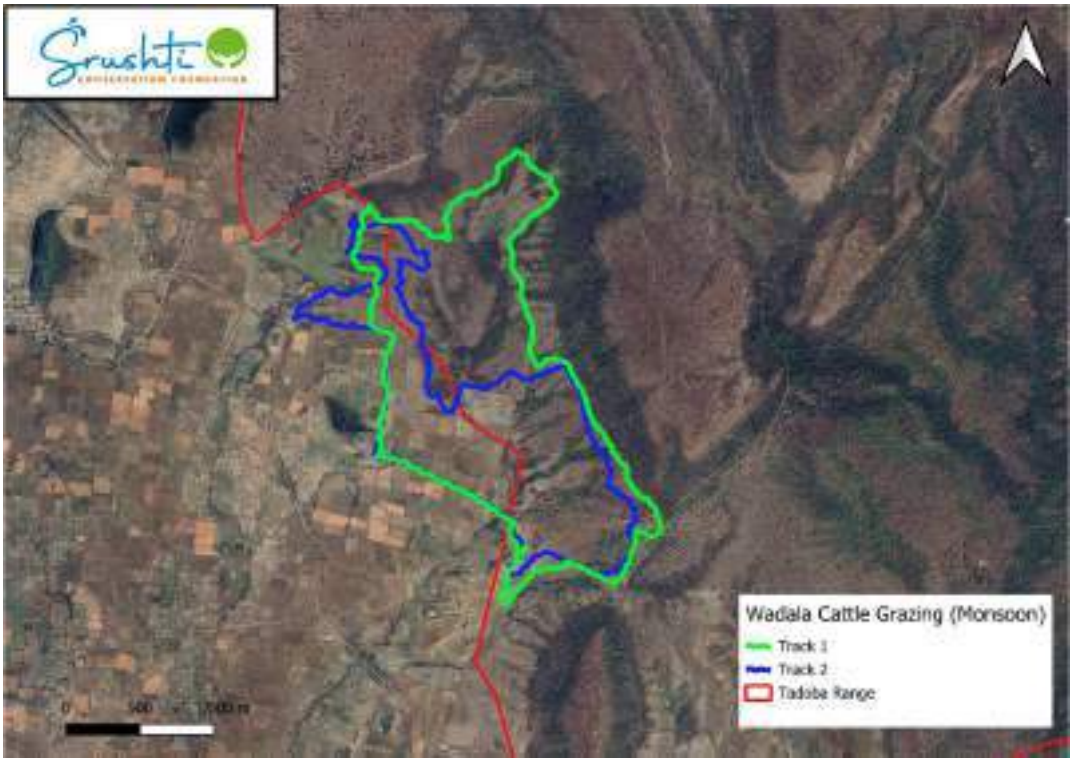
with crops, the cattle are taken into the forest to graze. According to Padurang, the cattle travel longer distances during the monsoon and winter, as they have to venture deeper into the forest for food. While grazing, Padurang sometimes collects firewood and tree branches, especially for feeding goats. In the village, five other individuals rear goats. During his time in the forest, he often spots wildlife, including tigers, wild boars, and spotted deer. Despite these frequent sightings, Padurang has never been attacked by any wild animals. When carnivores like tigers or leopards are seen, the herders typically shout to scare them away.

Anandrao Ramaji Atram, Age: 45 years, Education: Passed 4th standard, Family: 4 members, Agricultural Land: None, Annual Income: Rs 1,35,000

Anandrao has also been involved in cattle herding for several years and works alongside Padurang Bagade to manage a total of 120 cattle from Wadala village. Together, they are responsible for taking the cattle out for grazing and are paid Rs 250 per cattle, earning an annual income of Rs 1,35,000. Anandrao does not own any agricultural land, and herding is his primary source of income. He follows the same daily schedule as Padurang, starting grazing around 9 AM. Anandrao also carries a stick and axe and is equipped with a raincoat during the monsoon.

The grazing pattern in Wadala is consistent for both herders. During summer, the cattle graze near the village, but in the monsoon and winter, they are taken deeper into the forest. Anandrao has also spotted wild animals, including tigers, but has never been attacked.





Wadala summer and monsoon cattle tracks

VILLAGE ARJUNI

This village has a significant livestock population, with 490 cattle, 60 buffaloes, and 250 goats, as reported by the animal husbandry department. Livestock farming plays a crucial role in the agrarian economy of the village. Two herdsmen regularly manage and control the cattle, although many families also independently take their cattle to the forest for grazing. To study the grazing patterns, GPS tracking was conducted, with the summer track recorded on June 8 and 9, and the monsoon track installed on July 30 and 31.

To gather information about cattle grazing, on 30th July, our team arrived at Arjuni village in the morning. At around 10 am, two herders began gathering the cows from the village to take them for grazing. There were 96 cattle along with calves in the herd. One herder walked in front of the cows, while the other followed from behind, ensuring the herd stayed together. The herders carried an axe and a stick for managing the cattle, and some of the cows had bells tied around their necks. The herders explained that these bells helped them track the cattle and prevent them from wandering off.

The cattle were led out of the village, passing by the small huts near Arjuni, and headed towards the canal. Once they reached the fields surrounding the village, the cattle began grazing. They moved through the fields, eating grass as they went. Gradually, the cows made their way from the farmlands towards the forest, grazing along the way. After some time in the forest, the cattle circled back towards the fields of Vaigaon village, where they continued grazing. Throughout this, the herd of 10-12 cattle moved in the same direction, and whenever they seemed to stray, the herders would shout to bring them back together. The herders communicated with each other by calling out and ensuring the cattle stayed on course without wandering too far. By noon, as the temperature rose, the cattle stopped by the canal to drink water and rested in the shade of a tree. After a brief break, the herders checked the time, and at 5:55 PM, they began guiding the animals back to the village, allowing them to graze along the way. By 6:30 PM, they had returned to the village. On the first day, our team spent approximately nine hours with the herders, observing their daily routine and gaining insights into their grazing practices.

On the second day, our team continued to track the cattle grazing. GPS coordinates were recorded on both days to document the grazing routes. The herders started earlier this time, taking the cows out of the village at around 9:45 AM. On the first day, the cows began grazing near the huts of Arjuni, moving towards the canal and grazing through the fields.

After grazing for some time in the farmlands, they headed towards the forest. The cattle entered the forest at 11:57 AM, where they grazed for a while. Around noon, they stopped to drink water and rested under a tree for a short break. After the rest, they began to make their way out of the forest. The herd then entered the fields of Vaigaon village, grazing along the way, before finally

heading back towards the village. The cattle returned to the village at around 5:50 PM. Throughout the day, it was observed that each herd consisted of 10-12 cows and calves. The herders kept a close watch on all the herds, ensuring the cattle didn't stray into the forest. On this day, our team dedicated approximately 8 hours to studying the grazing practices.

Here are details about herdsmen from the village

Name: Kawadu Samba Dadmal

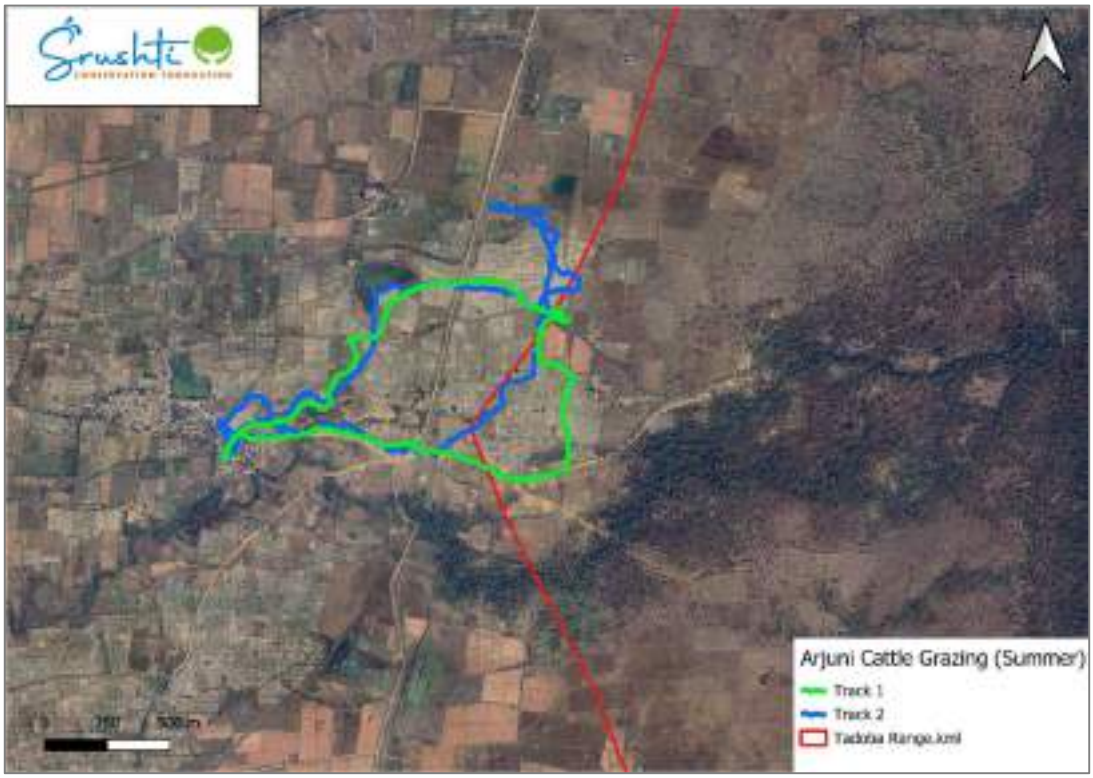
Age: 70 years, Family: 9 members, Uneducated, Landless
Annual Income: Rs 1,08,000 (approximately Rs 12,000 per month for 9 months)

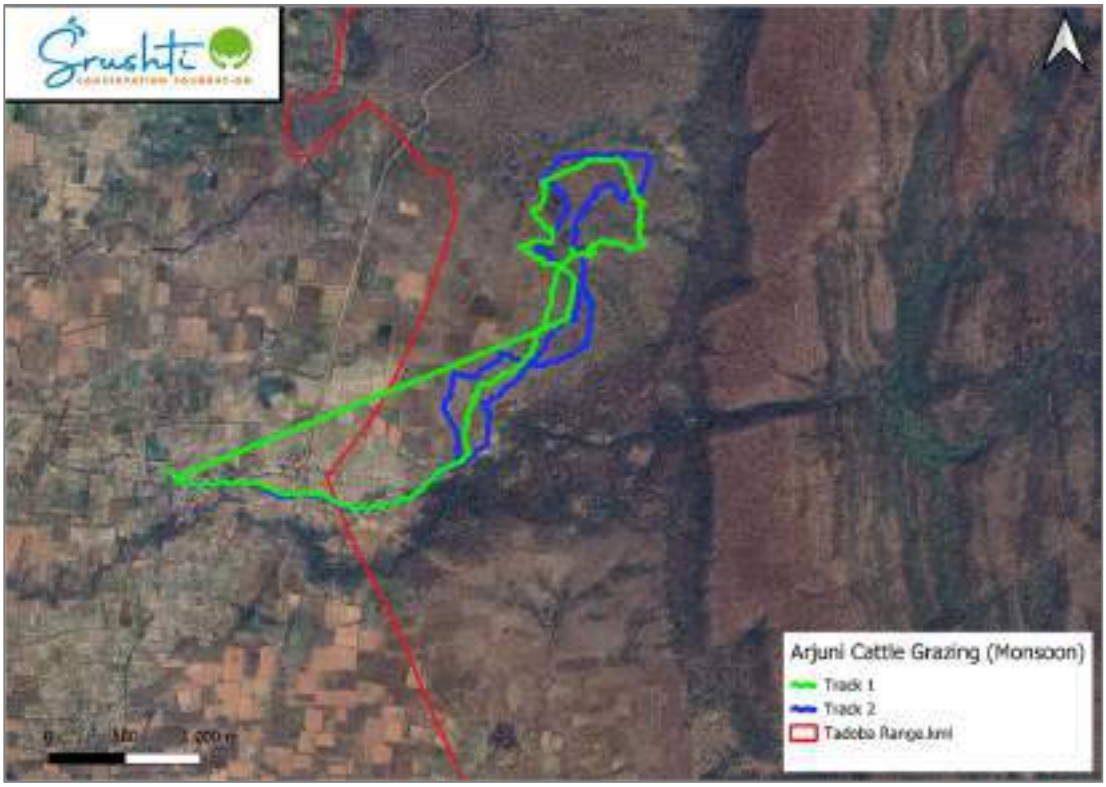
Kawadu has been herding cattle for the past 8 years. He is managing 60 to 70 cattle daily. His herding schedule starts around 9:30 AM and ends by 5 to 5:30 PM. He does not use a dog for herding, but carries a stick and an axe to protect and manage the cattle. The grazing pattern varies by season. In summer the cattle graze in nearby agricultural fields closer to the village, covering a distance of 5 to 7 kilometers. In monsoon the cattle venture deeper into the forest for grazing, traveling about 9 to 10 kilometers. In winter the grazing occurs in both fields and forests, with the cattle covering distances similar to the monsoon season, around 9 to 10 kilometers. When not grazing, the cattle are provided stall-feed, which mainly includes dry grass or tanis (paddy husk). Kawadu also collects leaves for the goats during grazing. In the village, there are six other shepherds, called *`Shelki`*, who manage goats. While grazing in the forest, he has encountered wildlife such as tigers, wild boars, and spotted deer. Upon seeing large carnivores like tigers, he and other herders shout to scare them away. Despite these encounters, Kawadu has never been charged or attacked by any wild animals. The villagers primarily raise cattle for milk, cow manure (used in agriculture), and breeding purposes.

Nanaji Shamrao Khandekar

Age: 59 years, Family: 2 members, Education: Passed 1st standard, Agriculture: None
Annual Income: Rs 54,000
Kawadu and Nanaji accompanied each other for herding cattle just last year and currently take care of about 70 cattle. Like Kawadu, Nanaji does not use a dog for herding but carries a stick and an axe when he takes the cattle out for grazing. His herding schedule is the same as Kawadu's. He also follows a similar grazing pattern across the seasons, with cattle

grazing in agricultural fields in summer and venturing into the forest during the monsoon and winter. In addition to herding, Nanaji sometimes collects firewood while in the forest. Over the past year, he has seen wild animals several times, but like Kawadu, he has never been attacked or harmed by them. Nanaji's primary source of income comes from raising cattle. He charged Rs 200 per cattle whereas Kawadu charged Rs 300 per cattle. This amount is for adult cattle.





Arjuni summer and monsoon cattle tracks

DISCUSSION

The livestock grazing patterns observed across the studied villages reveal a strong reliance on traditional herding practices, which play an essential role in the rural economy. In many of the villages, livestock farming is a significant livelihood activity, with cattle, goats, and sheep contributing to the sustenance and income of local families.

Herding Practices

The presence of herdsmen varies by village, with some communities having dedicated herdsmen responsible for managing the livestock, while others rely on individual families to graze their cattle. Villages with fewer herdsmen or no formal herding system, such as those located closer to the tiger reserve, adopt rotational grazing practices, where each family takes responsibility for grazing their cattle. In contrast, villages with established herdsmen, such as those in more distant areas, demonstrate a more organized and consistent approach to livestock management.

Seasonal Grazing Patterns

A clear distinction can be observed between the grazing patterns in the summer, monsoon, and winter seasons. During the summer, cattle are primarily grazed on agricultural farms near the village due to the scarcity of green fodder. In contrast, during the monsoon season, herdsmen and villagers take the cattle deeper into forested areas such as Bhanuskhindi, Mahalgaon, and Katezari, which become lush with vegetation, also no grazing land is available as agriculture is in full swing. The GPS tracking data collected during these seasons provides insight into the spatial-temporal movement of the cattle, offering valuable information for understanding grazing pressures on different parts of the forest ecosystem.

Community and Economic Impact

The growing livestock population presents challenges, particularly in terms of managing grazing pressure on forest resources. As more families independently take their cattle to the forest, this could potentially lead to overgrazing and conflicts over resource use, especially in areas like Tadoba tiger reserves.

Environmental Considerations

The proximity of some villages to core tiger reserve areas raises concerns about human-wildlife conflict. Increased grazing activity in forest areas, particularly during the monsoon, could result in competition with wildlife for resources, as well as increase the likelihood of livestock predation by tigers and other predators. The absence of herdsmen in some areas might exacerbate this issue, as cattle are more vulnerable when they roam freely without supervision. During the monsoon, the forest cover is disrupted by a significant number of cattle grazing in the forest, resulting in habitat degradation, and disturbances to the wildlife also. In this study, the team

found that in many areas, a minimum of 130 hectares to a maximum of 250 hectares of forest is disturbed due to grazing. This is a huge area disturbed due to the continuous grazing of cattle especially in monsoon. The team followed the grazing pattern for only a few days in the year and observed a tremendous impact on the forests.

Increasing number of Goats and Sheep

Goats and sheep are known to be voracious grazers and are less selective in their feeding habits compared to cattle. They feed on a wide range of plant species, including grasses, shrubs, and saplings, which can result in significant vegetation loss. Due to the meat of these animals in local as well as outside markets, the population of these animals is increasing very fast in the buffer village of TATR, this puts immense pressure on the available vegetation.

Fix mindset of herdsmen

The herdsmen are one of the neglected communities in the villages. They are uneducated, fixed mindsets, and are above the age of forty mostly. Educating them about the conflict, precautions, and behavior in the forest is a big challenge. Previously our team conducted a sensitization program for this community in the same area of the Tadoba range. This is a continuous process to address and mitigate the human-tiger interface.

RECOMMENDATIONS

These recommendations aim to foster sustainable livestock management while balancing the needs of the rural economy and conservation efforts.

1. Sustainable Grazing Management Plans

- Rotational Grazing System: Implement a rotational grazing system where specific forest areas are designated for grazing at different times of the year. This would allow forest vegetation to regenerate, reducing the risk of overgrazing, especially in sensitive areas near TATR.

- Livestock Carrying Capacity Assessment: Conduct studies to determine the carrying capacity of the grazing lands within the forest and on agricultural lands. Based on this assessment, communities could limit the number of livestock allowed to graze in a given area, thus preventing habitat degradation.

- Grass management plan**:** Promote the villagers as well as farmers to propagate grass according to their needs.

2. Alternative Livelihoods for Herdsmen

- Capacity Building Programs: Since many herdsmen are uneducated and hold fixed mindsets, organizing targeted capacity-building programs focusing on sustainable herding practices, conservation awareness, and conflict prevention with wildlife is crucial. This can include practical training on forest behavior, tiger safety, and community-driven conservation efforts.

3. Control the Population of Goats and Sheep

- Incentivize Livestock Population Management: Develop schemes to encourage families to maintain sustainable herd sizes and fenced goat-rearing models. Providing subsidies or incentives for fewer, higher-quality animals (with improved productivity) can help shift the focus from quantity to quality in livestock farming.

- Breed Improvement Programs: Introduce programs aimed at improving the breed quality of goats and sheep, focusing on higher yields of milk and meat without increasing herd size, which would decrease grazing pressure on forests.

4. Community Education and Awareness Programs

- Raising Awareness about Overgrazing: Conduct awareness campaigns to educate communities about the long-term environmental impacts of overgrazing, especially in forests near sensitive tiger reserve areas of Tadoba. Highlight the need for responsible livestock management and the importance of maintaining biodiversity.

- Involvement of Local Schools and Youth: Engaging the younger generation in conservation activities and livestock management programs can help instill better practices from an early age. Organizing nature camps, forest visits, and conservation workshops could empower them as future ambassadors for environmental sustainability.

5. Addressing Human-Wildlife Conflict

- Conflict Mitigation Strategies: Work with tiger reserve authorities and local communities to develop conflict mitigation strategies, such as the creation of predator-proof livestock enclosures, and the establishment of early warning systems for tiger movements near villages.

- Forest Grazing Regulations: Introduce regulations for controlled and supervised grazing in buffer zones and forest areas, with clear guidelines to reduce the risk of human-tiger conflict. Strict penalties for unsupervised grazing and incentives for following regulations can improve compliance.

6. Use of Technology and Data for Better Management

- GPS Tracking of Grazing Patterns: Expand the use of GPS tracking systems to monitor livestock movements and grazing patterns throughout the year. The data gathered from these devices can inform better grazing strategies and help identify critical areas of concern where grazing pressure is highest.

- Digital Platforms for Livestock Management: Introduce digital platforms where villagers through herdsmen and farmers can log information about their livestock, grazing schedules, and interactions with wildlife. This will help both communities and forest authorities keep track of grazing activities and reduce the risk of overgrazing. Engage various NGOs in this monitoring program.

MAHUA COLLECTION

INTRODUCTION

The Mahua tree (*Madhuca longifolia*) holds a place of immense significance in the forests of Central India, particularly in the lives of rural and tribal communities. Its importance is not only ecological but also deeply economic and cultural. The economy surrounding the Mahua tree is substantial, providing essential livelihood security to thousands of households in these regions. Its flowers, in particular, are highly valued both for self-consumption and sale, making it a crucial resource for the local population. The Mahua tree plays a vital role in supporting the livelihoods of poor households across the forested landscapes of Central India. The flowers are the most prized part of the tree, and families rely on their collection for a portion of their income. This income is often used to purchase basic household necessities, ensure food security, and meet other daily needs. Mahua flowers are sold primarily in local markets or to traders who process them into various products, including the production of traditional liquor, which has long been an important cultural and economic activity in the region. For many households, the sale of Mahua flowers represents a critical seasonal income, providing financial support during the dry months when other sources of income may be scarce.

Since these flowers are a key economic resource, villagers are highly diligent and methodical in their collection efforts. Villagers begin their collection activities early in the morning to minimize losses to wild animals, which also consume the flowers. Wild ungulates, small mammals, and birds are known to feed on Mahua flowers, especially during the harsh summer months when food is scarce. To maximize their harvest, villagers often compete with each other and with wildlife, striving to gather as many flowers as possible before they are consumed by animals.

The flowering season of the Mahua tree typically lasts until mid-April, with a flowering window of 20 to 25 days. During this time, each tree can produce between 50 to 60 kilograms of flowers, making the collection period both short and intense.

TADOBA RANGE SCENARIO

The Tadoba Range of the Tadoba Andhari Tiger Reserve is not particularly well-known for the abundant presence of mahua trees. Unlike other regions, the density of these trees in this area is relatively low (as per the villagers) and as a result, the collection of mahua flowers has seen a noticeable decline in recent years.

A total of 80 families across six villages in the Tadoba Range participated in the survey, providing insights into the current status of the mahua flower collection. The villagers typically collect mahua flowers from two main locations:

1. Farm Collection: Some families have mahua trees on their agriculture farms. However, even in these cases, the collection this year has been minimal. Over the period the trees also decline.

2. Forest Collection: In the forested areas of the core zone, the number of mahua trees is even lower, further impacting the collection volume. As compared to the other part of the buffer area of TATR, the density of trees is less as per the forest department staff.

A significant decline in the mahua collection was observed this year in the six villages of the Tadoba range. Through intervention, several reasons have been cited for this decrease:

- Unseasonal Rains: Villagers reported that unpredictable and untimely rains have adversely affected mahua flowering. Inconsistent weather patterns have led to a reduction in flower production year after year.

- Tree Decline: There is also a reported decline in the number of mahua trees in the region, which directly impacts the quantity of flowers available for collection.

- Wildlife Threats: The fear of wild animals, particularly in the vicinity of the forest, has further deterred villagers from venturing into the forest for flower collection.

- Tiger Project restrictions: Due to strict restrictions the villagers are reluctant to venture into the core forest to collect the flowers.

The collection of mahua flowers provides a modest income for many families. On average, each family earns between ₹2,000 and ₹5,000 from selling the flowers. The flowers are sold either directly to local markets or to traders who visit the villages to purchase them. A smaller portion of the collected flowers is reserved for feeding cattle, particularly during the rainy season.

DISCUSSION

Historically, mahua flowers were used in the production of local brews. Villages such as Ghosari once had active local breweries. However, in recent years, the production of liquor from mahua flowers has significantly declined, leading to a drop in demand for the flowers. This shift has further impacted the enthusiasm and economic incentive for villagers to collect mahua. It was observed that women play a prominent role in the collection of mahua flowers. This aligns with traditional practices in many rural and tribal communities, where women often take on the responsibility of gathering forest produce. Forest fires have posed an additional threat to the mahua flower collection. Villagers reported that fires often damage or destroy flowering trees, further diminishing the available yield.

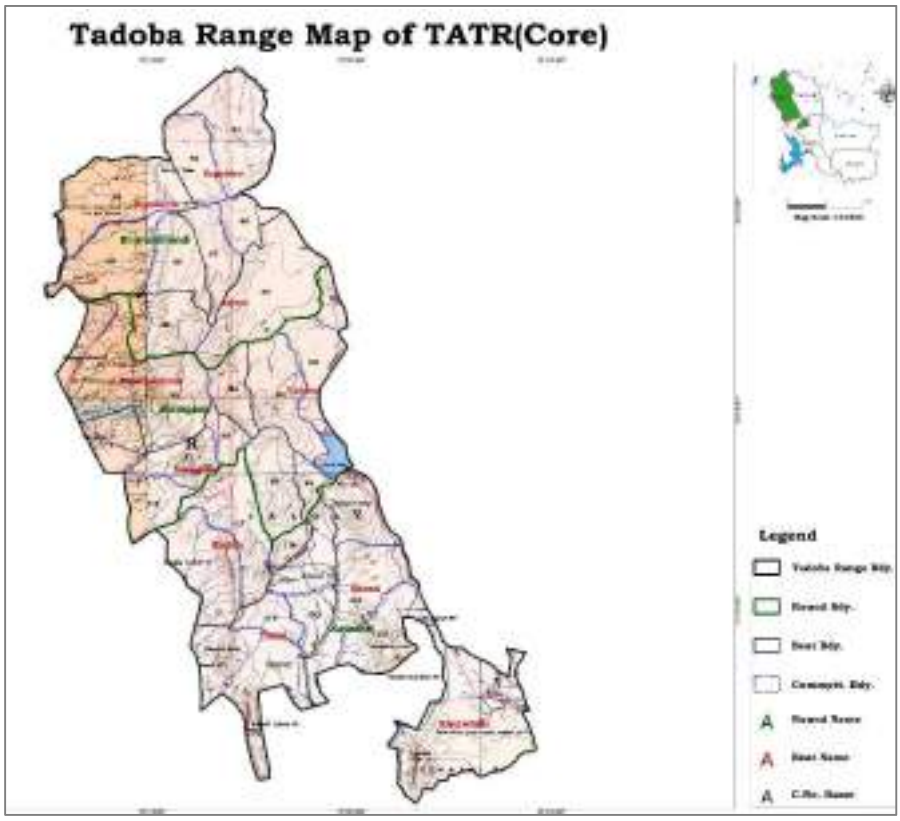
The mahua collection in the Tadoba Range has experienced a significant decline, driven by a combination of factors such as unseasonal rains, tree decline, wildlife threats, resistance from the tiger project staff, and decreased demand due to the reduced production of local brews. The income generated from mahua collection remains crucial for many families, but the declining availability of flowers and economic returns highlights the need for attention to sustainable management practices. The high participation of women in the collection process underscores the importance of empowering these groups through alternative livelihood opportunities, especially in the context of changing environmental and economic conditions.

HUMAN-WILDLIFE CONFLICT

INTRODUCTION

Before 2019, the Moharli Territorial Range was responsible for overseeing all 11 villages located on the western side of the Tadoba Andhari Tiger Reserve. However, these villages were situated at a considerable distance from Moharli, the range's headquarters, leading to logistical challenges in management and administration. To address these issues, a reorganization took place in 2019, which resulted in significant changes aimed at improving the efficiency and effectiveness of forest management.

In 2019, the Moharli range was reorganized, and its jurisdiction over the 11 villages was transferred to the Tadoba Core Range for more streamlined management. The Tadoba range, an older and well-established core range, was also divided into two separate ranges—Kolara and Tadoba—following this restructuring. The newly defined Tadoba Range covers an area of approximately 106 square kilometers and includes three rounds and 10 beats. The villages that now fall under the Tadoba Core Range include Ashta, the largest among them, along with Arjuni, Khutwanda, Sonegaon, Khinala, Kokewada (M), Kokewada (T), Ghosari, Katwal, Viloda, and Wadala.



Each of these villages is unique in its composition and relationship with the surrounding forest areas, and all are integral to the conservation efforts within the core zone of the Tadoba Andhari Tiger Reserve. The Tadoba Range headquarters is located in Wadala, providing a **more centrally** positioned **administrative hub for** the effective management of these villages and the surrounding forest areas. There are 11 Eco-Development Committees (EDCs) in these villages, which play an active role in forest conservation and community development.

CONFLICT SCENARIO

The 11 villages in the Tadoba Range are located very close to the core area of the TATR. Unlike other areas that benefit from buffer forests acting as a barrier between human habitation and wildlife, these villages have no such protective buffer zones. This proximity to the core forest increases the dependence of the local communities on forest resources and heightens the likelihood of human-wildlife encounters.

Wild animals have been a constant presence for the villagers, and historically, there was significant reliance on forest resources for daily needs. However, over time, villagers have transitioned to alternative livelihoods, including agriculture and other forms of work. The restrictions imposed by the tiger reserve have also played a key role in this shift, as access to the forest for resource extraction has been limited.

Interestingly, our team observed that the Western part where these 11 villages are located, shows greater diversification in livelihood options compared to the Eastern and Southern parts. Paddy remains the main crop in both the Eastern and Southern areas, but unlike other regions, farmers here often practice multiple cropping systems, with some continuing their agricultural activities until April. Many villagers remain engaged in farming well into the dry season, reducing their reliance on the forest for income and forest resources.

Though the shift in livelihood patterns has lessened forest dependency to an extent, conflicts between humans and wildlife still occur, primarily due to the lack of buffer forests. Wild boars are responsible for most human injuries in this region. In 2021-22, a resident of Sonegaon was injured in a wild boar attack. In the following year, 2022-23, three villagers from Arjuni, Viloda, and Sonegaon were injured in similar incidents. Thankfully, there were no fatal injuries during this period.

To mitigate human-wildlife conflict, Primary Response Teams (PRT) have been established in all villages, except Khutwanda. These teams play a crucial role in addressing and managing conflicts as they arise. In addition, our organization has implemented several social fencing programs in these villages, which aim to reduce conflict by creating a physical and psychological barrier between wildlife and human communities. Schools in the area have also been engaged in conservation education programs to raise awareness among the younger generation about the importance of coexistence with wildlife.

Human-wildlife conflict is not limited to personal injury; crop damage and cattle kills are also prevalent. In six of the key villages—Khutwanda, Ghosari, Ashta, Viloda, Sonegaon, and Arjuni—crop damage incidents have been recorded over the past three years. These incidents are often caused by wild animals such as wild boars and spotted deer that invade fields in search of food.

The following table outlines the number of crop damage incidents in each village from 2021 to 2024:

Crop damage in Six Villages

Sr No	Village	2021-22	2022-23	2023-24
1	Khutwanda	0	1	3
2	Ghosari	1	6	8
3	Ashta	17	26	22
4	Wadala	53	42	43
5	Soanegaon	0	5	16
6	Arjuni	22	17	16

Source: TATR

The crop damage data over three years shows that Wadala consistently faces the highest number of incidents, with 53 cases in 2021-22 and around 43 cases in the following years. Ashta and Arjuni also have high but slightly decreasing numbers, indicating persistent issues. Ghosari and Sonegaon are experiencing rising trends, especially Sonegaon, which saw a sharp increase to 16 cases in 2023-24. The Khutwanda has a low but gradually increasing problem. Overall, crop damage remains a major concern, particularly in Wadala, while Ghosari and Sonegaon show emerging issues.

As per the data, Cotton is the most vulnerable crop to damage followed by Paddy, Chana, and Tur. The farmers get compensation for the crop which is damaged by wild ungulates. Rs 10 thousand was the maximum amount given to the farmer as compensation.

In addition to crop damage, cattle kills by predators such as tigers and leopards are another major source of conflict between villagers and wildlife. The following table details the number of cattle kill incidents in the same six villages between 2021 and 2024:

Cattle Kill in Six Villages

Sr No	Village	2021-22	2022-23	2023-24
1	Khutwanda	5	2	3
2	Ghosari	4	0	7
3	Ashta	3	2	0
4	Wadala	3	2	3
5	Soanegaon	4	0	2
6	Arjuni	3	1	6

Source: TATR

As seen in the table, Khutwanda, Ghosari, and Arjuni have recorded the highest number of cattle kill incidents in the most recent year (2023-24), while other villages such as Ashta and Sonegaon experienced fewer incidents.

Very few cases of forest fire were recorded in this range. In 2021, 1.5 Ha, in 2022, 5.35 Ha and in 2023, 29.31 Ha of forest was burned in the fire as per the data.

DISCUSSION WITH STAKEHOLDERS

INTRODUCTION

The six villages located near the Tadoba Andhari Tiger Reserve, are experiencing significant socio-economic and environmental changes as a result of increased wildlife presence and restrictions imposed by the Tiger project. Historically, these villages relied on the forest for sustenance, collecting resources like Mahua flowers, bamboo, tendu patta, and fuelwood. However, with rising wildlife populations, particularly tigers, and shrinking forest areas, the villagers are facing new challenges. Crop depredation by wild animals is a growing concern. Villagers report that tigers have become bolder, with their numbers increasing due to successful conservation efforts, creating more frequent encounters with humans and leading to occasional human fatalities.

The introduction of government-imposed restrictions on accessing Protected Forest (PF) compartments has disrupted the villagers' traditional practices of collecting forest resources. These restrictions have caused economic strain, particularly on families that depend on the forest for bamboo and tendu patta collection. Additionally, the rise in tiger numbers has heightened the fear of wildlife attacks, further discouraging villagers from entering the forest for resource collection. Compounding this issue is the inadequate compensation for crop loss due to wildlife, which fails to cover the actual damage incurred by farmers.

Though there has been a reduction in fuelwood extraction due to the introduction of LPG for cooking, villagers still rely on firewood for certain activities like cooking, heating water, and conducting ceremonies. Eco-tourism initiatives, which could provide alternative livelihoods, are underdeveloped in these villages, leading to a lack of employment opportunities. The Eco-Development Committees, intended to promote sustainable development, are not functioning effectively, and adding to the villagers' dissatisfaction. Overall, the balance between wildlife conservation and the livelihoods of local communities remains a significant challenge in these regions.

The project in charge engaged in meaningful discussions with a variety of stakeholders from the community, including the village head, Police Patil, Eco-Development Committee (EDC) president, farmers, Primary Response Team (PRT) members, and women from six different villages. These interactions provided valuable insights into the issues and concerns faced by the local communities. Due to the busy schedule of the Ashta Sarpanch, the meeting was cancelled twice.

The stakeholders acknowledged that while wildlife conservation is important, the impacts on their everyday lives—such as reduced access to forest resources, economic hardships, and the growing sense of fear around wild animals—are significant. Many called for better support from the forest department, improved compensation mechanisms for crop losses, and the need for developing eco-tourism opportunities to create alternative livelihood options. The project in charge gathered these insights to inform the next steps in addressing the balance between conservation efforts and the community's needs.

Khutwanda

Present: Yaday Waman Sidam, ex-Deputy Sarpanch and guide, EDC president Ramrao Dhondu Chukhe, Farmer Dattu Kannake, Rajeshwar Pendam, Gautam Gadem and Amit Jumnake.

Highlights of discussion

- Crop depredation is increased because fodder (grass) is not available to the wild animals. The invasion of *Bhutganja* is one issue near to village. In the agriculture field, wild animals have good grass/crops compared to the forest.
- Kapas (Cotton) is a new crop. Previously only paddy was the crop. Now add wheat and chana.
- Yes, the tiger becomes bold. Tiger numbers also increased whereas forests are shrinking. Previously there were one or two cubs, now 4 cubs are seen. The density is also very high. So they easily meet each other and cubs are born. Sambar, Chital also increased, so the tiger no. There is a fight between two tigers. The cattle depredation is less in this village.
- For the Mahua flowers collection, 99% of villagers have not entered the forests. This year due to unseasoned rains, the flowers are very less. Few families collected Mahua from their agricultural farms. The forest department is not allowed to collect the flowers due to fear of forest fire by villagers. We clean the area under the trees, but the wild animals eat all the flowers. There are 5-6 farmers who possess the mahua trees on their farm. Previously the extraction of liquor was big business in the village. Even the flowers were sold outside villages. Now the business of flower collection is reduced. Few families collected flowers from nearby fringe forests. In March Tiger Project issued a letter not to go inside the forest due to forest fire and wildlife attacks.
- The bamboo extraction was also reduced. Previously villagers entered the tiger reserve area till Jamani or Kosekanal. We had few farming families to harvest bamboo but now only for personal and agricultural use. Sometimes TR staff also stops for such type of collection. Previously one vendor came to our village to collect the end products of bamboo. But after he stopped the work as the business was reduced.
- We have *pan phadi* in our village 10-12 years back. At that time villagers collect the patta. Now the tendu phadi is in Tekadi. Everyone does not possess a bullock cart. It is difficult to go to Tekadi. If we had a *phadi* in the village, the collection would be high. Villagers collected tendu patta from the core area as we don't have a buffer area.
- The tendu patta trees are now reduced.
- We have more than 6 guides, 6 Gypsy, and a few people engaged in resorts. Apart from 5 youths engaged in fire watchers and *cooti majur.* Mostly youths were engaged in daily work, the experienced senior persons were not gating such type of work in the department. If the number of the quota of vehicles is increased at this gate, many people get a chance to work.

- Fuel wood extraction is reduced due to the use of LPG. We still use chulha for hot water and cooking. And also for some functions or funerals, we required fuel wood. In summer mostly we used chulha for preparing roti. But overall the use of fuel wood is drastically reduced. In our village, no one collects fuel wood for livelihood.
- There is no grudge about the forest department. Now villagers understand the consequences of the forest fire and other things.
- In our village, we don't have grazers. Previously the *Gayki* used to take cattle independently. But now due to fear of tigers and one human death before COVID, the villagers started a rotation system for grazing. The number came after 8 to 15 days for rotation.
- In all forest resource collection, the fuel wood is on a major.

`` *For the Mahua flowers collection, 99% of villagers have not entered the forests. This year due to unseasoned rains, the flowers are very less. Few families collected Mahua from their agricultural farms. The forest department is not allowed to collect the flowers due to fear of forest fire by villagers.* ``

Yaday Waman Sidam, Ex-Deputy Sarpanch

Ghosari

Present: Police Patil Bhanudas Rajarao Kulmethe, Farmer Ashish Lakhe, daily wage worker Arvind Dadaji Pegadpilliwar, PRT member Rajendra Meshram, Pradip Meshram

Highlights of discussion

- The previous generation was largely dependent on forest resources. Every day venture into the forest for their daily sustenance. But now the villagers are reluctant to go to the forests for various reasons.
- Project Tiger or the forest department first gives protection to the farms so that we do not request, support from anybody. The tiger number increase is a good sign and we are happy about that. But the support of local villagers in this regard is most important. स्थानिक माणूस वाऱ्यावर सोडून उपयोग नाही.
- Crop raid is a very serious problem. Though we get compensation but is much less as compared to the loss. It takes a long time to get.
- Though we collect fuel wood, tendu patta, and other things from the forest the fear of tigers is alarming. And TR staff warned us not to enter into the forests.
- In the agricultural farm of our village, there are very few Mahua trees. Previously villagers largely depended on these flowers. All the villagers collected these flowers from the forest. But now *Daru Bhatti* is almost gone. So the collection has gone down dramatically.

- The patta is collected each year. The fadi was in Kokewada. Now 30-40 families collect patta and deposit in Tekadi centre.
- The fuel wood is the main source for cooking as well as a hot water bath. The villagers mostly used LPG for cooking. But still, we required wood for farms as well as hot water chulha. The wood depot is necessary in the village for a program or ceremony.
- Bamboo is collected from the forest, obviously from the core. Around 15 to 20 families rely on that. These families convert bamboo in two seasons mainly summer and winter.
- As there are no direct tourism activities in our village. Around 10 youths are deployed as fire watchers, five youths are engaged in the primary response team, and very few are in resorts.
- Our EDC president is smart and educated but he is working with the tiger project on daily wages. So he is docile regarding the firm decision.

``I lost one acre of my chickpea due to a crop raid. But I received a very small amount as a compensation. जो पैसा आपण शेतीत लावतो, तो पण निघत नाही. I am very sad. ``

Police Patil Bhanudas Kulmethe

Wadala

Present: Deputy Sarpanch Dilip Nattuji Thok, Police Patil Sandip Shankar Nannaware, Tanta Mukkti member Ashok Devgade, EDC president Pravin Devgade, Farmer Jogesh Gajbe

Highlights of discussion

- The Tiger project has significantly impacted our village's relationship with the forest, which has historically been a crucial source of livelihood and resources for us. The Protected Forest (PF) compartment, spanning approximately a thousand acres, used to be accessible for collecting forest resources. However, the Forest Department has imposed restrictions on entering this area, leading to a longstanding court dispute that has been ongoing since 1990.
- The Tiger project's establishment has restricted our access to the PF compartment. This area, once vital for gathering forest resources, is now off-limits, causing significant disruptions to our traditional practices. The forest's core boundary now directly abuts our farms, escalating conflicts between villagers and the Forest Department.
- There has been a noticeable decline in forest-related work. The Forest Department increasingly relies on machinery, reducing the need for manual labor. Consequently, employment opportunities and payments for forest work have diminished. Although the department deploys laborers, the same workforce is used throughout the day, minimizing the need for additional manpower.

- Our area lacks a tourism gate, resulting in no tourism activities. This absence deprives us of potential income and economic growth that could arise from eco-tourism and related ventures.
- Fuelwood consumption has decreased significantly, though we still use it for heating water. The cancellation of subsidies and the high cost of LPG have exacerbated our challenges, making it harder for villagers to afford alternative fuel sources.
- Around 25 families in our village depend on collecting tendu patta from the core forest area. The restrictions and regulations imposed by the Forest Department have complicated this traditional practice, affecting these families' livelihoods.
- The Eco-Development Committee, which is supposed to facilitate harmonious relations and sustainable development, is not functioning effectively. The Tiger project operates according to its agenda, while villagers must seek permission from the department for various activities, leading to dissatisfaction and frustration.
- The villagers are increasingly unhappy with the Forest Department's management and the Tiger project's impact on their lives. The restrictions on forest access, the decline in employment opportunities, the lack of tourism initiatives, and the ineffective Eco-Development Committee contribute to a growing sense of disenfranchisement and resentment among the community.

`` The tiger becomes very bold. They stand on the road. There was no fear. We have various restrictions by the forest department for resource collection. The agriculture becomes difficult. ``

Tanta Mukkti member Ashok Devgade

Sonegaon

Present: Sarpanch Mrs. Vidya Dilip Sawasakade, Farmer Bhaskar Sawasakade, PRT member Subhasha Bagade, farmer Ankush Dhone, B. Wakade, and other

Highlights of discussion

- Due to the proximity to the core forest, we frequently have to venture into the same area to collect essential forest resources. This regular dependence on core forest areas highlights the challenges we face.
- Living near the core forest significantly impacts our livelihood. Crop depredation and cattle predation by wildlife are persistent issues, making it difficult for families to sustain themselves. These conflicts are common throughout the village.
- After the first harvest season, women in the village are left without work. It would greatly benefit the community if the Tiger Project could support these skilled women or Self-Help Groups (SHGs) by providing opportunities that enhance their family income and overall well-being.

- Our village has been deprived of tourism benefits. There is a pressing need to establish a tourism entry gate near the buffer zone of the forest, which could help bring tourism-related opportunities and economic growth to this area.
- As PRT members, we assist the tiger project's field staff as needed. However, we are unable to independently patrol the forest and rely on their guidance and supervision for such activities.
- The PRT staff currently lacks proper insurance coverage. The previous insurance policy has expired, and it is crucial to ensure that adequate and consistent insurance protection is provided to support the team's safety and security in the future.

``Our village's proximity to the core forest creates challenges for our livelihood, including frequent crop damage and cattle losses due to wildlife. Women are left without work after the first crop season, and we request the Tiger Project's support for skill development or SHGs to improve their incomes. Additionally, our area lacks tourism opportunities, and a tourism gate near the buffer zone could bring economic benefits.``

Sarpancha- Vidya Dilip Sawsakade

Arjuni

Present: Sarpanch Mrs. Sonabai Vikas Hanawate, EDC president and farmer Prakesh Warku Hanawate, Forest guard Prnaya Kosurkar, and other farmers and herders

Highlights of discussion

- Villagers rely on forest resources such as fuelwood and important materials like tendu leaves, especially during the summer months. These resources are crucial for sustaining our livelihoods during times when other income sources are limited.

- The SPM cheme has ended, and there are no remaining funds in the bank for further village development activities. While the Tiger Project provides some financial assistance, the amount is too small to execute large-scale plans aimed at improving village welfare.

- Although villagers have depended on the forest for generations, there are instances where Tiger Reserve (TR) staff prevent us from entering forest areas. Herders, in particular, face difficulties during the monsoon season as they have no place to graze their cattle. This often leads to tension between the villagers and forest staff.
- In recent years, tigers have become bolder, often resting on roads without moving. This poses a direct threat to villagers who need to access these roads, forcing them to turn back and increasing the risk of conflict.

- While there is already one buffer gate near our village, there is sufficient space to open another gate. Doing so would help involve more people in livelihood-generating activities related to tourism and forest conservation, thereby benefiting the community.

- Crop damage and cattle predation by tigers remain significant problems for villagers. Although the Forest Department provides compensation for these losses, the process of receiving the funds is often delayed, causing financial strain on affected families.

``A few years ago, our area experienced a high level of human-wildlife conflict, with several tragic incidents of tiger attacks resulting in human fatalities. This has made villagers very cautious and vigilant when accessing forest resources.``

Sarpanch- Sonabai Vikas Hanawate

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