CHAPTER-2

TRADITIONAL KNOWLEDGE AND SOCIO-ECONOMIC VALUES OF IMPORTANT PLANT SPECIES IN FOREST FRINGES OF GONDIA DISTRICT (MS), INDIA

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Summary

This study investigates the role of economically important wild plants in supporting the livelihoods of forest dwellers in selected villages in Gondia Tehsil, focusing on plant materials used for both subsistence and income generation. A variety of forest plants such as *Dendrocalamus strictus* (bamboo), *Madhuca longifolia* (mahua), *Termitomyces sp.* (edible mushrooms), *Buchanania lanzan*, *Phoenix sylvestris*, and *Diospyros melanoxylon* (tendu leaf) were identified as key resources. These plants are harvested for personal use and commercial purposes, providing substantial income to rural households, particularly for the poorest segments of the population. The study found that forest residents are heavily reliant on forest products, with the peak season for collection spanning from February to June. Various socioeconomic factors, such as gender and economic status, were considered in analyzing participation in plant collection activities. The study's findings highlight the economic significance of these forest materials, especially in areas where agriculture is not a reliable source of livelihood due to poor land quality. The forest products are often sold in local markets, contributing to the financial sustainability of the community. This research underscores the crucial role that wild plants play in the socioeconomic development of forest-dependent communities, particularly in rural and underdeveloped regions.

Keywords : Traditional Knowledge, Forest Products, Socioeconomic factors.

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Introduction

Many people living in and around forests in India derive their livelihood Support from the collection and marketing of plant products. Thus, the issue of rights and access to, and income from, plant materials is basic to sustenance and livelihood for the forest dwellers. Since time immemorial, thousands of wild plant species offer various significant economic, social and ecological values which are of fundamental importance for human well-being, livelihood development and ecosystem resilience to environmental change (FAO, 1995 and Falconer et all, 1997). In most societies and more especially in developing countries wild plants generate tremendous direct economic benefits being important source for significant marketed goods (food, medicinal plant, firewood, cork etc) as well as indirect high value for non-marketed services (biodiversity conservation, soil protection, water regulation, recreation possibilities) (Ahenkan et al., 2008 and Chandrasekharan, 1996).

People depend on natural resources supplied by wild plants, for food, construction, energy, and medicine all over the world and particularly in developing countries (Beer, et al., 1989). Apart from the direct use or consumption of wild plant resources, the commercialization of plant raw materials or the sale of products manufactured from them provide cash income, reduces poverty, and represents a safety net during emergencies and times of food shortages. Furthermore, human societies also depend on a variety of indirect ecosystem services, such as water catchment, erosion control, carbon storage, etc. (Shiva et al., 2002), a major portion of which is provided by wild plants (Lynch, 1990).

Economic returns from plant material collection were variable and highly influenced by socio-economic status. For example, many migrants and forest-dwellers earn, less income from plant collection due they are not well equipped in terms of social status and education to deal with middlemen, and hence can be exploited, but also because they are less able to add value to their collection because of their poorly developed skills and restricted access to the resources required to invest in storage, processing, and marketing (Lintu, 1997; FAO, 1995 and Premlet et al., 1997).

Another factor is political patronage. Plant material harvesting is illegal and, with little local political influence, migrants face a much higher risk of capture and prosecution by the Forest Department, especially when they harvest high value Plant materials such as *Cinnamomumm alabatrum*. In contrast, better placed local people enjoy a degree of protection from local political leaders and can afford to take the risk of being caught and prosecuted for illegally harvesting commercially higher value plant products, which is considered a more serious offence than harvesting lower value plant materials (Ahemad et al., 2006, Bauri et al., 2015 and Gubbi et al., 2008). These findings are consistent with other studies showing that wealthier households from higher classes in society tend to reap greater benefits from plant collection than poorer households (Hasalkar, 2004; Marshal et. Al., 2003). Other studies also highlight the importance of land tenure security, local institutions, and social dynamics to

plant incomes and unsustainable extraction practices (Rout et al., 2011 and Saha et al., 2012).

India is a country which is flourished with profound forest resources. However the annual loss of Indian forest was about 1.5 million hectares (Zode, et al., 2015). As per the current assessment, India has a total land area of 329 million hectares of which around 21% is classified as forestland (Alexander et al., 2001). The total growing stock of the trees inside forests is 4829 million cubic meters and the average growing stock in Indian forests is 72 cum/ha (cubic meters per hectare), which is much lower than the world average. The forest cover in different states is diverse-ranging from 3% to 87% of their geographical area. Over 45,000 species of plants exist in India and of this several thousands are endemic to this country. Bamboo in India constitutes the largest bamboo resources in the world. Given the diversity in the forest cover it is extremely important to track these resources at the state level in a consistent manner. Efforts have to be launched on war footing for afforestation collaterally with restoration and conservation of the existing forest utilizing the self-designing capacity of the nature.

Materials and Methods

Study Area

Gondia is a city in Maharashtra, central India. It is also known as Rice City due to the large number of rice mills in the area. Gondia City is a district in Maharashtra, India. It is situated between 20° 39' to 21°38' N and 79° 52' to 80°42' E. The district covers around 5858.95 km2, or 1.83% of the total area of Maharashtra State (Venkateswaran, 2010).

For administrative reasons, Gondia district is divided into eight Talukas: Tirora, Gondia, Goregaon, Amgaon, Salekasa, Deori, Sadak Arjuni, and Arjuni Morgaon. The district's altitude ranges from 310 to 340 meters above mean sea level. This region has been incorporated into the Management Plan, and as a result, this division has a total area of 31503.730 ha, which includes 31492.430 ha of Reserved Forests (132 comptt.) and 11.300 ha of revenue land. These areas include Tiroda, Gondia, Goregaon, Amgaon, Salekasa, Deori, Sadak Arjuni, and Arjuni Morgaon.

Forest

Gondia district has a high level of forest cover. The entire forest area covered by this district is 2833 km2, accounting for 50.22% of the total area. This region's forest is classified as southern dry deciduous forest, which is separated into two major subtypes: teak forest and mixed forest. Reserved forest (RF) covers 81058.48 ha, Protected forest (PF) covers 68488.78 ha, Goss protected forest covers 2995.61 ha, Zudpi jangle (ZJ) covers 21915.96 ha, and unclassified forest covers 6461.14 ha.

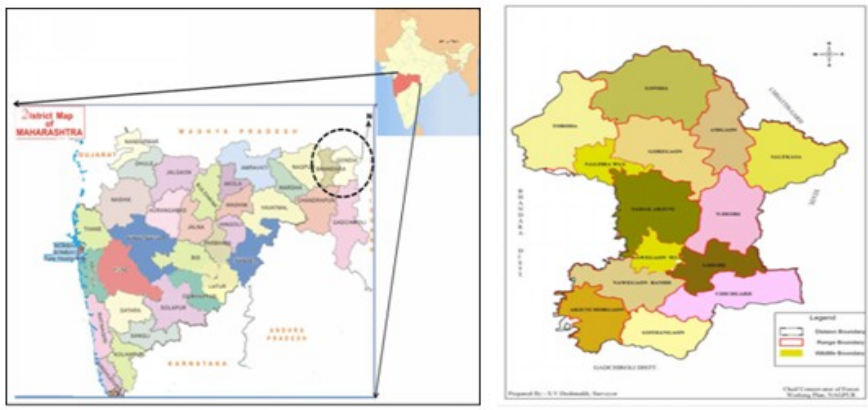

Figure1: Location map of Gondia district in Maharashtra state, India

Table 1: Types of forest area covered by Gondia tehsils (in ha.) of study area

Sr. No.	Name of Tehsils	Types of forest area					Total Forest Area (ha.)
		R.F. (ha.)	P.F. (Regular) (ha.)	Gose P.F (ha.).	Z.J. (ha.)	U.F. (ha.)	
1.	Gondia	1191.317	4177.52	803.100	3338.820	0.000	9510.757

Legend: RF=Reserved Forest, PF=Protected Forest, Gose PF= Goss Protected Forest, ZJ= Zudpi Jangle, UF= Unclassed Forest
Source: State forest report, Gondia

Selection of villages and sampling design

The study was conducted in three villages (Balmatola, Pangdi, and Gangazery) in the Gondia tehsil, where the majority of tribal members gather NTFPs from the forest.From each hamlet, fifteen (15) households were randomly selected. As a result, a total of four hundred (45) households were surveyed.
Because many of the tribals were illiterate, they were unable to provide the real time spent (hours) and absolute distance traveled (kilometers) when collecting wild herbs. As a result, the distance traveled and the time consumed were conservatively estimated. The overall money obtained in a season by forest dwellers or tribals during collection journeys was estimated using the total quantity of NTFPs gathered and the price received by collectors. The revenue from NTFPs was recorded in Indian Rupees.

Data collection

Field data was acquired through a survey from June to March of 2018. The study draws on both primary and secondary data sources. Primary data were gathered using Participatory Rural Appraisal (PRA), group discussions, semi-

structured interviews, and household surveys (Martin, 1995; Pretty et al., 1995). The questionnaire was created following an intensive preliminary survey that assisted in selecting the appropriate communities for sampling in the study area. Interviews were done in chosen villages. Questions were asked in the native languages, Marathi and Hindi. Each respondent gave approximately 10-20 minutes for the interview.

Table 2: Forest area (in ha.) in selected villages of Gondia Tehsil (T2)

Selected Village	**Village Code of T2**	**R.F. (ha.)**	**P.F. (ha.)**	**Gose P.F. (ha.)**	**Z.J. (ha.)**	**Total (ha.)**
Balmatola	V11	NA	525.95	NA	5.50	531.45
Gangezari	V14	489.23	10.12	NA	103.48	602.83
Pangadi*	V19	NA	735.62	NA	NA	735.62
Total		489.23	1271.07	0	108.98	1869.9

Total Village = 152 ; With Forest = 120 ; Without Forest =32; NA= Not Available
Source-: Forest division of Gondia

Results and Discussion

This chapter describes in detail the findings of the current study in terms of the various objectives, as well as the related discussion. A wide variety of forest plants are sold on the market as a source of income for the rural community. This study focused on a few economically important wild plants and the livelihoods of forest dwellers that rely on them.

Livelihood perspectives of forest produce

The current study discovered that forest residents in chosen villages rely heavily on Dendrocalamus strictus, Madhuca longifolia, Termitomyces sp., Buchanania lanzan, Phoenix sylvestris, and Diospyros melanoxylon for socioeconomic purposes, as detailed in table 4.1. The usage pattern of these wild economically important plants for personal consumption, selling for money generation, and other forms of selling by people was documented during field work, and an overview of this is provided in Table 4.1.

According to the socioeconomic data collected during the current inquiry, the majority of forest inhabitants in the three study sites are involved in the collection and harvesting of forest plant materials. As a result, people rely heavily on forest products to make ends meet. There is little doubt that plant materials play an important role in supplying subsistence and financial income to a considerable proportion of the population, both in the research area and around the world. According to the study, the poorest households in forest communities are frequently the ones who rely most directly on these plants.

In the current inquiry, various crucial plant species are identified, such as Bamboo (Dendrocalamus strictus), which is quite versatile Plant materials have a wide variety of home, commercial, and industrial applications. A huge number of rural craftspeople rely on bamboo for their livelihood.

Tendu leaf (Diospyros melanoxylon) is an important plant in all eight tehsil of research locations, providing seasonal employment to tendu leaf collectors year after year. The trade in tendu leaves has been nationalised in the district, which implies that only the state government or its authorized agents can purchase these leaves from collectors or producers. The annual procedure of tendu leaf collection begins in February when tendu trees or bushes are pruned to increase the number of leaves. The leaves are typically harvested between April and May. Tendu leaves are used to roll country cigarettes and beedi.

Mahua (Madhuca longifolia) has a unique place among plant materials since its blooms are utilized to make country whiskey. During the season (March to May), a huge quantity of naturally fallen flowers collected. Aside from tendu leaf collecting, baboo crafts, and mouha gathering, the availability of other natural resources for supplementary occupations by forest dwellers in the district has not been determined.

The edible mushrooms identified in this study are Termitomyces species and Agaricus species. Mushrooms, which are the fruiting bodies of fungi, are a natural gift that provide protein-rich sustenance for humans.These wild mushrooms grow extensively in the study region and are naturally harvested in huge numbers throughout the wet season, particularly from July to August. Forest dwellers employed these wild mushrooms for both nutritional and commercial purposes. These wild mushrooms have been reported for the first time in the region and provide an excellent source of revenue and food.

Season of forest plant collection

The late winter and summer season, which runs from February to June, is the peak season for collecting various forest plants in the districts.

Socio-economic analysis

The majority of plant materials are sold in primary tribal markets (PTMs), weekly hats, or bazaars. Such markets aid in determining what villagers, tribes, and local residents, as well as customers, prefer and belong to in order to establish production that matches demand while maximizing profitability.

The socioeconomic features of individuals engaging in plant collection activities (gathering) were analyzed using a survey. The investigation includes sex, economic level, and other factors. The findings show that both males and females are participating in forest material activities.

Table 3: Data as documented for socio-economic purpose from different informants for their livelihood

Sr. no.	Plant species	Local Name	Seasonal availability	Collected by M/F	Rate in Rs. (Monetary value of the product)	Local market Available or not	Which items collected for sale in local market (Form of selling)	**Use pattern** (Raw/ Processed)
1.	Dendrocalamusstrictus	Bamboo	Jan-jun	M	20-60	YES	Stem	Baskets
2.	Madhuca longifolia	Mouha	March-April	M/F	15-25	YES	Flower	Medical/ Edible
3.	Termitomyces sp.	Mushroom	July-Aug	M	120-150	YES	Fruiting body	Edible
4.	Buchanania lanzan	Charoli	jan-jun	F	60	YES	Leaves	Plate
5.	Phoenix sylvestris	Sindi	jan-jun	M/F	15-20	YES	Leaves	Broom
6.	Diospyros melanoxylon	Tendupatta	March-May	M/F	1.60	YES	Leaves	Bidi

Observation of forest product for self-use and income generation

The chapter on Materials and Methods contains information on the production of livelihoods through plant-based self-employment in the sample villages. One of the study's goals is to find commercially significant plants in Gondia tehsil.
In the current study, 45 households from three forest communities in Gondia Tehsil District were questioned. Although the data is limited, it can indicate the overall trend of forest inhabitants' dependence on forest resources in a variety of ways.
Forest inhabitants extract the species and use them for both personal and commercial purposes. The number and quantity of collections, as well as income, vary by village. Table 3 displays statistics on the quantity of household collection, consumption, and sale of commonly utilized forest plants in the research area.

Estimation of the quantity of plant materials available for self and commercial purpose

Forest products are extracted in varying amounts each year and used for personal consumption, commercial reasons, or both. In this regard, an estimation was made to determine the overall quantity of forest products that contribute to the socioeconomic progress of forest residents.
The twenty-seven most important plant materials of these eight tehsils of the district have been ranked separately based on their availability in a year, monetary value, amount of collection, usability, and commercial and domestic relevance (Table 4).

The yearly status of plant collection of selected villages of study area

Out of the entire amount of harvested material, some is used to generate cash by selling it locally. The current study found that Gangazari forest dwellers extracted more total forest products than Balmatola and Pangdi. It was discovered that the majority of forest materials were used for money generating rather than for self-purpose (Figure 5).
In this investigation, we discovered that one of the most important plant components extracted in huge quantities is *'Dendrocalamus strictus'*. Gangazari forest dwellers extract significantly more *Dendrocalamus strictus* and *Termitomyces* than residents of other villages such as Balmatola and Pangdi. Pangdi extracts more Madhuca longifolia, Phoenix sylvestris, and Diospyros melanoxylon than Balmatola and Gangazari. However, *Buchanania lanzan* is extracted in greater quantities in Balmatola village than in Pangdi, but in much smaller quantities in Gangazari.

Table 4 Documentation of total quantity of Plant materials extracted from forest area of selected villages

Sr. no.	Plant species	Name of extracted parts/product	Balmatola			Pangdi			Gangezari		
			Total quantity (kg/ annum)	Total for own Consumption (kg/an	Quantity for selling (kg/annum)	Total quantity (kg/annum)	Total for own Consumption(kg annum)	Quantity for selling (kg/annum)	Total quantity (kg/annum)	Total for own Consumption(kg/annum)	Quantity for selling (kg/annum)
1.	Dendrocalamus strictus	Baskets	12240	2000	10240	0	0	0	48000	3000	45000
2.	Madhuca longifolia	Fruit	800	137	663	1985	435	1550	675	218	457
3.	Termitomyces sp.	fruiting body	6	6	0	52	21	31	66	34	32
4.	Buchanania lanzan	leaf disk	6720	480	6240	150	36	114	0	0	0
5.	Phoenix sylvestris	Broom	900	10	890	4300	10	4290	2500	200	2300
6.	Diospyros melanoxylon	Bidi	164.7	6	158.7	452.94	29.41	423.53	341.17	17.64	323.53
	Total		20830.7	2639	18191.7	6939.94	531.41	6408.53	51582.2	3469.64	48112.5

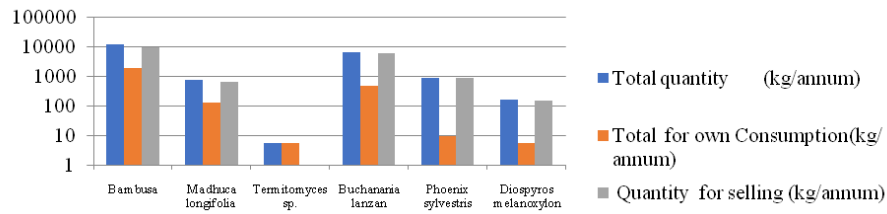

Figure 2 Documentation of total quantity of forest product extracted from Balmatola forest and its used pattern

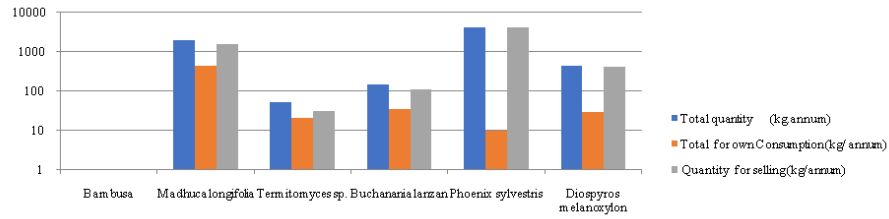

Figure 3 Documentation of total quantity of forest product extracted from Pandgi forest and its used pattern

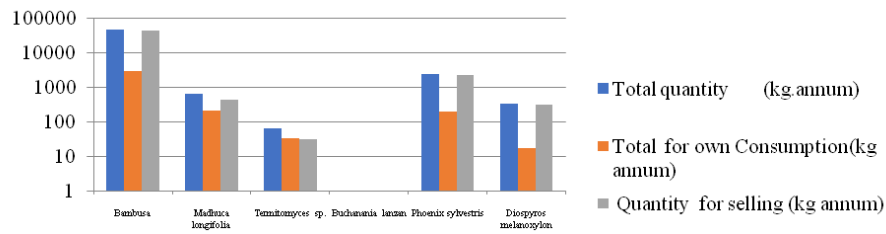

Figure 4 Documentation of total quantity of forest product extracted from Gangezari forest and its used pattern

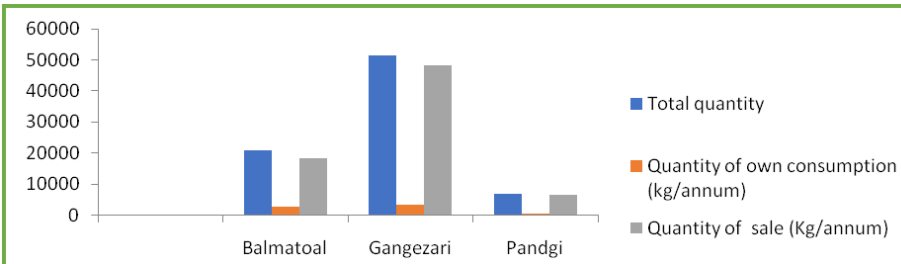

Figure 5 Village wise analysis of quantity of plant material extracted from forest and used for own consumption and income generation

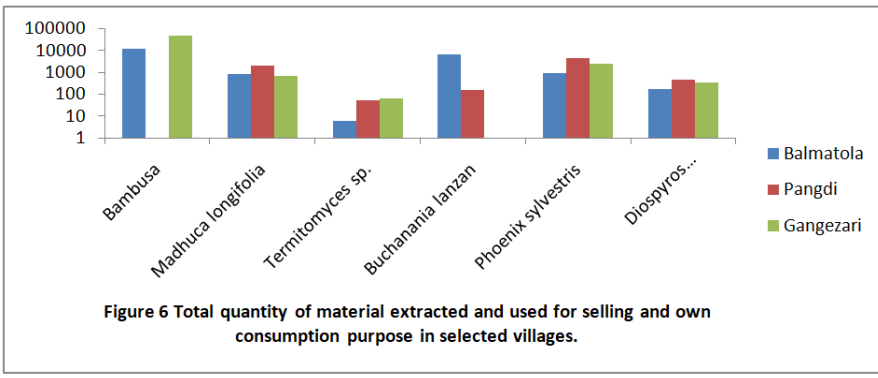

Figure 6 Total quantity of material extracted and used for selling and own consumption purpose in selected villages.

In this investigation, we discovered that one of the most important plant components extracted in huge quantities is 'Dendrocalamus strictus'. Gangazari forest dwellers extract significantly more Dendrocalamus strictus and Termitomyces than residents of other villages such as Balmatola and Pangdi. Pangdi extracts more Madhuca longifolia, Phoenix sylvestris, and Diospyros melanoxylon than Balmatola and Gangazari. However, Buchanania lanzan is extracted in greater quantities in Balmatola village than in Pangdi, but in much smaller quantities in Gangazari.

Table 5: Comparison in between Plants and Agriculture Income Of Gondia

Name of village	Agriculture income (Rs./Annum	Plant Income (Rs./Annum)
Balmatola	140900	556435
Pangdi	197700	200940
Gangezary	149600	721990
Total	4,88,200	14,79,365

In Gondia areas, the majority of forest inhabitants have no or very little cultivated land. Due to poor land quality and insufficient irrigation within the forest, harvests become low, and they are unable to rely solely on agriculture for livelihood. However, it is predicted that forest material generates a higher income in certain villages. As a result, the home economy relies heavily on wild plants rather than other sources like agriculture (Table4.3). Rice is the principal crop grown, with a portion of the output used for self-consumption and the remainder sold in the market for profit (Figure 7).

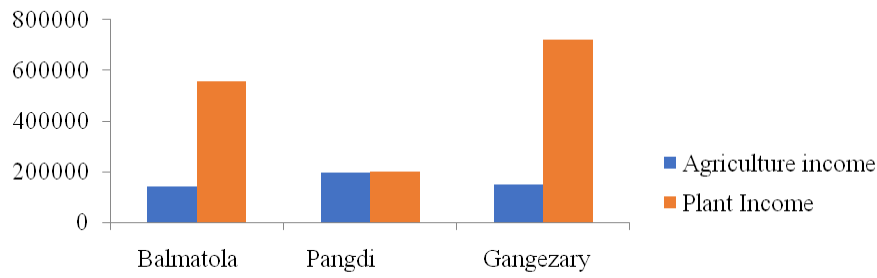

Figure 7 Village wise income comes from plants & agriculture in Gondia tehsil.

Conclusion

Our findings revealed that wild plants are significant to the locals who live in and around the study region's forest. The economic worth of these species emphasizes the importance of prioritizing them in research and development projects to support traditional communities' local livelihoods. Keeping in mind the rapidly fading traditional knowledge, this study records critical information to ensure that future users acknowledge the contributions made by traditional communities, the current custodians of traditional knowledge. The findings show that socio-economic household factors influence the usage and intensity of forest products, which should be taken into account in future management strategies for local and regional forest conservation.

The current study demonstrated that the forest provides a diverse range of items that contribute to people's basic necessities. People in these settlements rely heavily on numerous small forest products. Aborigines rely on a variety of small forest products for their daily requirements, and many of these provide an income.

It was discovered that these products are utilized to make a variety of goods, including baskets, plates, and brooms, as well as home and commercial uses such as agarbatti and beedi.

Regardless of their potential, forest products make a negligible contribution to the local economy. The current study revealed that locals rely on forest produce for their daily needs and income. As a result, there is an urgent need for sustainable management approaches in conjunction with a cultivation scheme.

It was discovered that the revenue of chosen communities is larger than agricultural income, indicating that forest residents rely more on the forest. As a result, communities should engage in sustainable management and the preservation of traditional knowledge about these multi-valued resources for the benefit of local communities. Forest people collect excess quantity of plant products that may be harmful for forest and forest communities both. To conservation forest, it is necessary to harvest forest plant product in sustainable way so that we can conserve it for future generations.

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