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Amrit Journal | December, 2024 | Volume 4, Issue 1 | ISSN: 2594-3235

An Assessment of Non-Timber Forest Products in Siddhababa Community Forest, Gulmi, Nepal

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Received: 10 October 2024; Received in revised form: 24 November 2024; Accepted: 29 November 2024

Abstract

NTFPs (Non-Timber Forest Products) include all biological materials, excluding timber, derived from forests, pasturelands, other man-made and wild habitats which have socio-cultural, economic and other livelihood significance. The list of the NTFPs species found in SCF (Siddhababa Community Forest) was documented, the status of the NTFPs in the area was observed and the economic contribution of NTFP in the livelihood of community forest user group was studied. The systematic random sampling method was used for vegetation sampling. A total of 113 vascular plant species were documented from the study area among which 85 species were identified as potentially useful species (NTFPs). According to life form categories, among total NTFP species, 36 species (42.35 %) belong to herbs and grasses, followed by 33 species (38.82 %) tree and 16 species (18.82 %) shrub. Local people cultivated Amleeso (*Thysanolaena maxima*), Bans (*Dendrocalamus hamiltonii*), Tejpat (*Cinnamomum tamala*) and Timur (*Zanthoxylum armatum*). The status of the NTFPs suggest that western tropical regions of Nepal is suitable for large-scale production of the NTFPs in a commercial way benefiting local people and the economic development of the country.

***Keywords*:** *Chhatrakot Municipality, systematic random sampling, social survey, economic importance*

1. Introduction

NTFPs are defined in various ways, all biological materials (other than industrial round wood and derived sawn timber, wood chips, wood-based panels and pulp) that may be extracted from natural ecosystems, managed plantations etc., and be utilized within the household, be marketed, or have social cultural or religious significance (Edward, 1994).

Nepal, situated on the northern rim of south Asia, covers 147,516 sq.km, and contains a complex maze of mountains and ridges, interspersed by deep valley and lowlands. Nepal is very

rich especially in the biological resources which is nature boons. Most of the people residing in mid hill region area highly depend upon subsistence agriculture and natural resources for their livelihood. Nepal is enriched with NTFPs because of wide range of climatic, topographical and ecological variation. NTFPs are as all the forest resources other than timber that may be extracted from natural forest, plantations and semi-wild trees growing on farmlands and can be utilized within the household, marketed, or have scenic beauty, social, cultural or religious significance. All products originated from plants, animals and minerals as well as forest services are included. NTFPs are of significance primarily in household and local economies. However, some NTFPs channel into international markets, mostly in unprocessed or semi-processed forms. Such products play a significant role in earning foreign exchange, so valuable for most of the developing countries like Nepal. NTFPs play a significant role in income generation of rural people who are the consumers of community forestry. Many community forests have potential NTFPs but are not well identified and promoted for income generation on sustainable basis.

In Nepal, about 10,000-15,000 tons of NTFPs are harvested and traded (about 90% as raw material) to India and overseas markets comprising of more than 100 species that has great contribution to national economy, about 8.6 million USD per year, which is about six times the official value of Nepal's timber exports to India (Edward, 1996). Globally, inter-national trade in NTFPs is estimated at 11 billion USD annually (Ndoye and Ruiz Pérez, 1998; Shiva and Verma, 2002; Marshall, et al., 2005; Ahenkan and Boon, 2010). Community forestry has a very important role in increasing the income of local people or communities. Many NTFPs activities involve less destructive harvesting of annual renewable plant parts, which provide a very exciting avenue for increasing income at the local level (Campbell, 1995). NTFPs are often common property resources, like fuel wood, fodder, charcoal, fencing, poles, medicinal plants, and a variety of foodstuffs, such as fruit and nuts, mushrooms, fibre, and resins (Arnold, 1995). The use of medicines from the forest often overlaps with forest food use. The most important category of NTFPs is the loose group termed as Medicinal and Aromatic Plants (MAPs). There are 2000 Nepali plants reported to have medicinal properties, 1463 are known to be used locally (Shrestha and Shrestha, 1999). The people of several ethnic groups living in Nepal have made and still do make, in many similar and different ways, use of many available NTFPs since time immemorial. These species of NTFPs are used locally to provide medicines, foods oils, fibres, dyes, tannins, gums, resins, incense, building materials and agricultural implements. Similarly, there are more than 100 species of plant that are in trade commercially, which includes different uses in and outside the country (Subedi, 1997). It has been observed during the last decade that a significant number of potential products entered commercial trade. In the recent year realizing the diverge NTFPs resource base and their contribution to poverty reduction and sustainable community development, the tenth five-year plan has given more emphasis on the management of NTFPs for generating incomes and employments of local communities (HMGN, 2004). This study provides a glimpse into NTFPs status in the community forest of western Nepal with both cultivation status and economic outputs. It focuses on the recommendations for the sustainable use of forest resources.

2. Sites, data and methodology

2.1 Study sites

Chhatrakot is one of the rural municilipaty of Gulmi district, lies in Lumbini province of Nepal. The area occupied by this rural municipality is 87.02 km^2. The population of this municipality is 19,357 (according to the 2078 census). The study area is located at 28.0065 degrees north latitude and 83.34603 degrees east longitude. It lies in the altitude range of 755 to 1325 m asl.

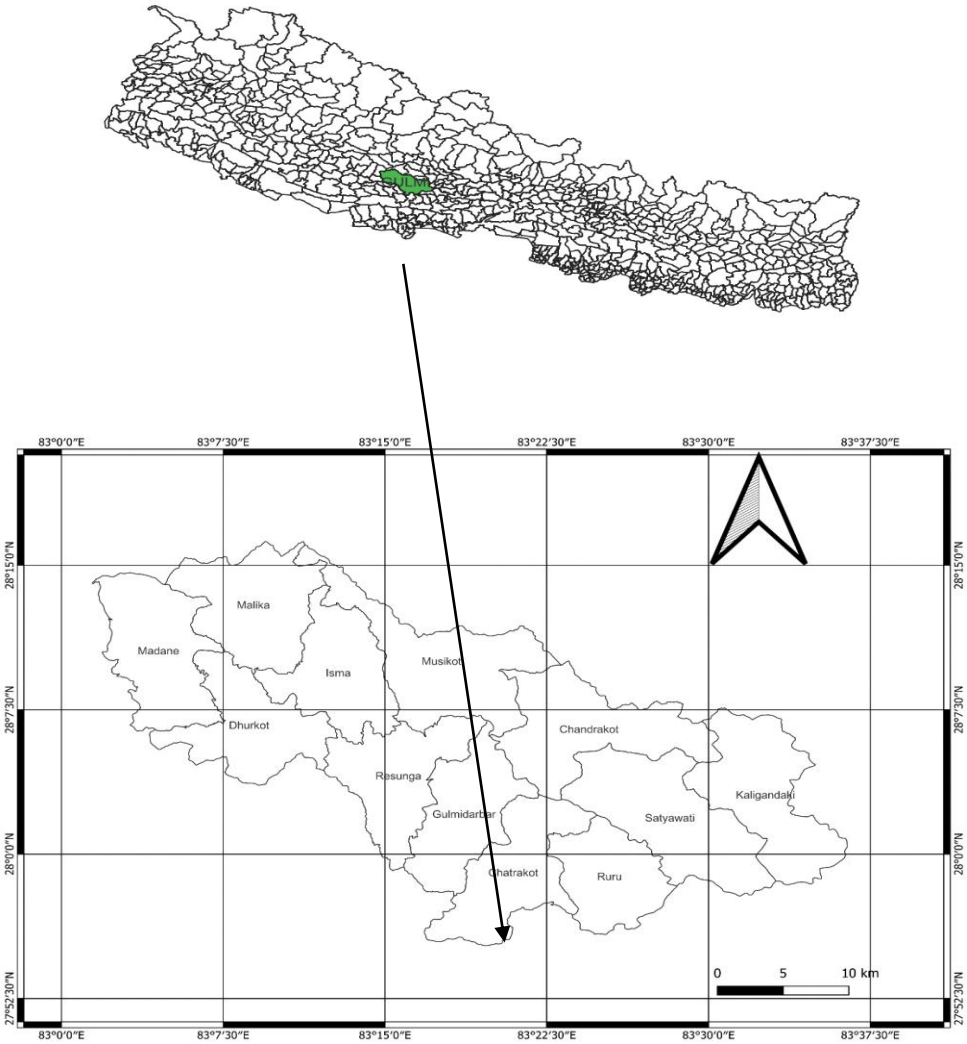

Fig. 1. Location of the study site

2.2 Methodology

Ecological sampling was carried out during the month of September 2021. The systematic random sampling method was used for vegetation sampling. Square plots of 10 m × 10 m were sampled for trees, 5 m × 5 m for shrubs and 1 m × 1 m for herbaceous and graminoid species including seedlings of trees and shrubs species. One 5 m × 5 m and four 1 m × 1 m size sub-plots

were designed inside each 10 m × 10 m size plot. A total of 10 plots of 10 m × 10 m, inside each plot ten sub-plots of 5 m × 5 m and 40 sub-plots of 1 m × 1 m size were laid in each block (DOF, 2012).

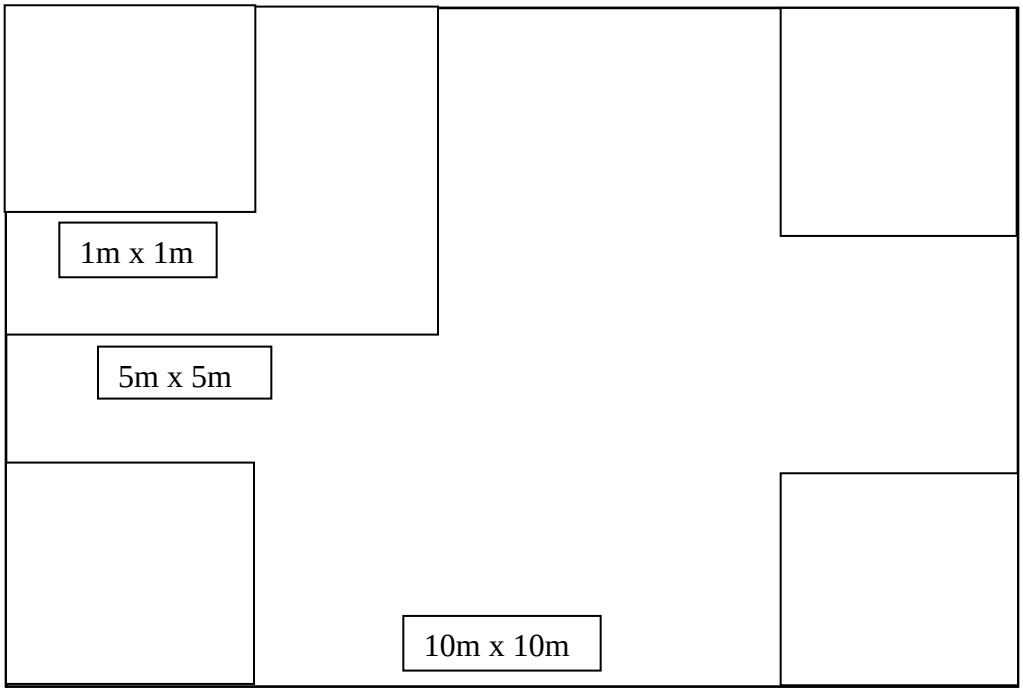

Fig. 2. Sampling design

Vegetation analysis

The methods and equations from Zobel et al., 1987; Dallmeir, 1992; Ghimire, et al., 2001 was applied to calculate density.

Density (D)

Density is the number of individuals per unit area.

Density (per ha) = $\frac{Total\ no.of\ individual\ of\ species\ in\ all\ plot}{Total\ no.of\ plot\ examined \times size\ of\ plots} \times 10000$

3. Results and Discussion

3.1 Lifeform

A total of 113 species of plants (belonging to 57 families and 102 genera) have been recorded from community forests. Among total species recorded from the study area, 85 species were found to be potentially useful NTFPs. As reported in previous studies (Shrestha, et al. 2003 a, b; Aryal, 2005) this study also identified some high-value medicinal plant species, in terms of subsistence and local economy. The most important species being *Asparagus racemosus*, *Cinnamomum tamala*, *Curculigo orchioides*, *Phyllanthus emblica*, *Shorea robusta*, *Terminalia alata*, *T. bellirica*, *T. chebula* and *Woodfordia fruticosa*. Out of total NTFP species recorded from the study area, Fabaceae (Leguminosae) was found to be the largest family comprising seven genera and nine species.

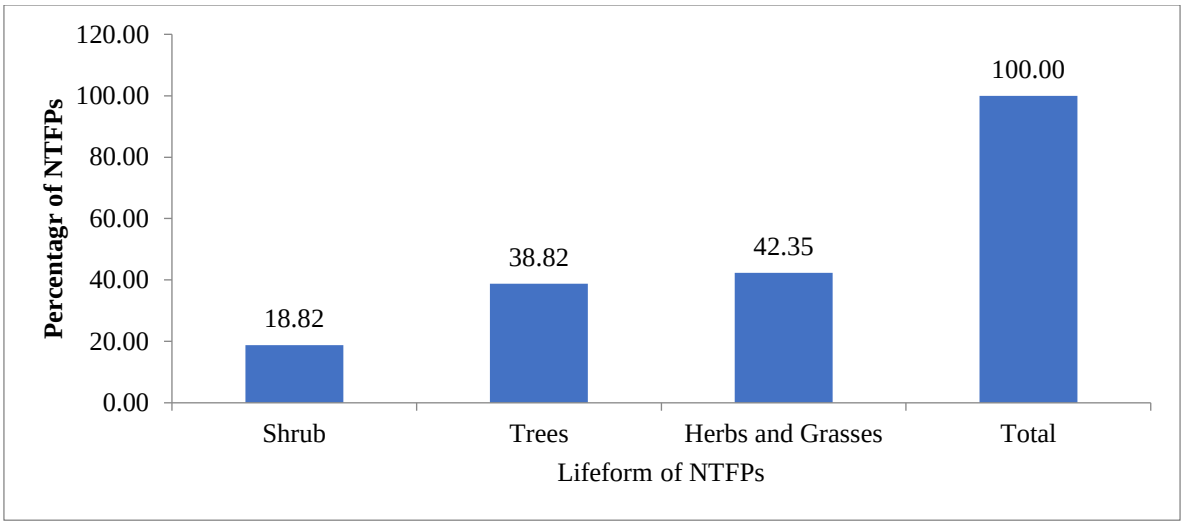

Fig. 3. Life form categories of total NTFPs

Table 1: Density of total species

S. N	Life form	Density per m^2	Density Per ha.	Remarks
1	Herbs and Grasses	0.283735	2837.347	Total number of Herbs and Grasses encounter (n=49)
2	Shrubs	0.018869	188.685	Total number of Shrubs encounter (n=20)
3	Trees	0.010803	108.0273	Total number of Trees encounter (n=44)

3.2 Cultivated NTFPs

According to our social survey we have found among 100 respondents, 55% people cultivated Amleeso (*Thysanolaena maxima*), followed by 20% Bans (*Dendrocalamus hamiltonii*), 15% Tejpat (*Cinnamomum tamala*) and 10% Timur (*Zanthoxylum armatum*). The result showed that most of the people like to cultivate amleeso and followed by bans. It is due to high market demand and local consumption in the area.

Table 2: Cultivated NTFPs with density

S. N	**Latin Name**	**Family**	**Nepali Name**	**Life form**	**NTFPs**	**Cultivated species**	**Density m^2**	**Density per ha.**	**Remarks**
1	*Cinnamomum tamala* (Buch. -Ham.) T. Ness. & Eberm.	Lauraceae	Tejpat	Tree	√	√	0.0134	134	Tooth powder to treat dental caries, bad odor and gingivitis
2	*Dendrocalamus*	Poaceae	Tama	Shru	√	√	0.041	410	Food and

	hamiltonii var. *hamiltonii* Nees & Arn. ex Munro		bans	b					local items
3	*Thysanolaena maxima* Roxb. O. Kuntze.	Gramineae	Amleeso	Grass	√	√	0.319	3190	Anti-inflammatory, expectorant
4	*Zanthoxylum armatum* DC.	Rutaceae	Timur	Shrub	√	√	0.0089	89	Remove cold, pickle, teeth treat

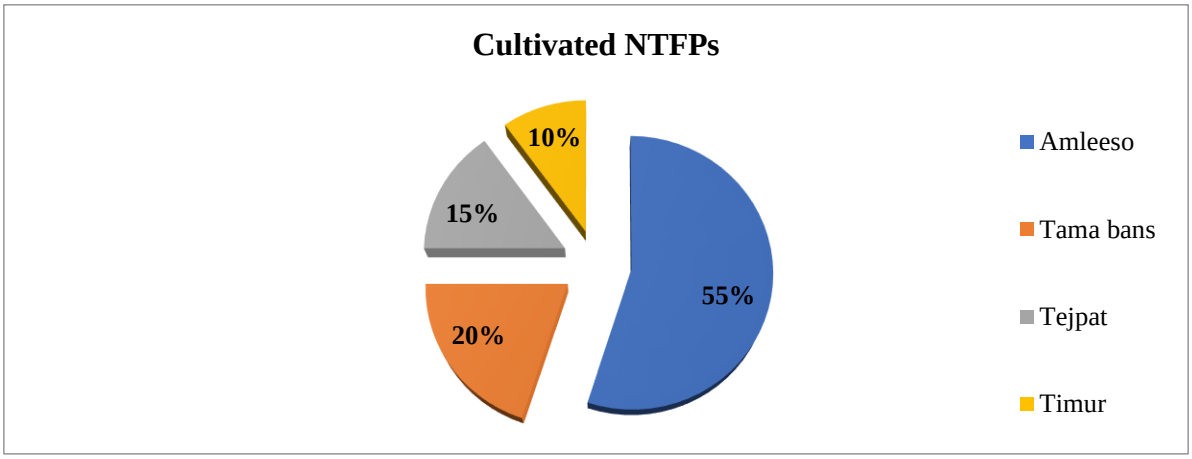

Fig. 4. Cultivated NTFPs in the study area

3.3 Economic contribution of NTFPs

According to the study the role of the NTFPs in meeting daily family need among members of community forest was found medium level. The annual income of the people was in increasing trend and the people are also much interested in domesticating and commercial production of NTFPs. According to data 10% of people earn between NRs. 15,000-20,000, 15% earn NRs. 21,000-30,000, 45% earn NRs. 31,000-60,000 and 30% earn more than NRs. 60,000 every year. The more income was observed in Janajati and Dalit followed by Chhetri and Brahmin. Brahmin and Chhetri have other high-income source rather than NTFPs harvesting. Also found that, Janajati and Dalit cultivate higher percentage of amleeso, bans, tejpat and timur rather than Brahmin and Chhetri. There was high market demand for these cultivated NTFPs. In an average 10% of economic support was through NTFPs in the area. According to district traders, if they provide training to local harvesters and farmers about harvesting and value addition there will be an increase in average income percentage. In Baitadi, Bista and Webb (2006) documented a NTFPs contribution of 11.7%. In Baitadi, Darchula and Dadeldhura, Kunwar et al., (2013) approximated 20% sales revenue. Olsen and Larsen (2003) estimated 12% contribution of MAPs in higher elevations in Nepal.

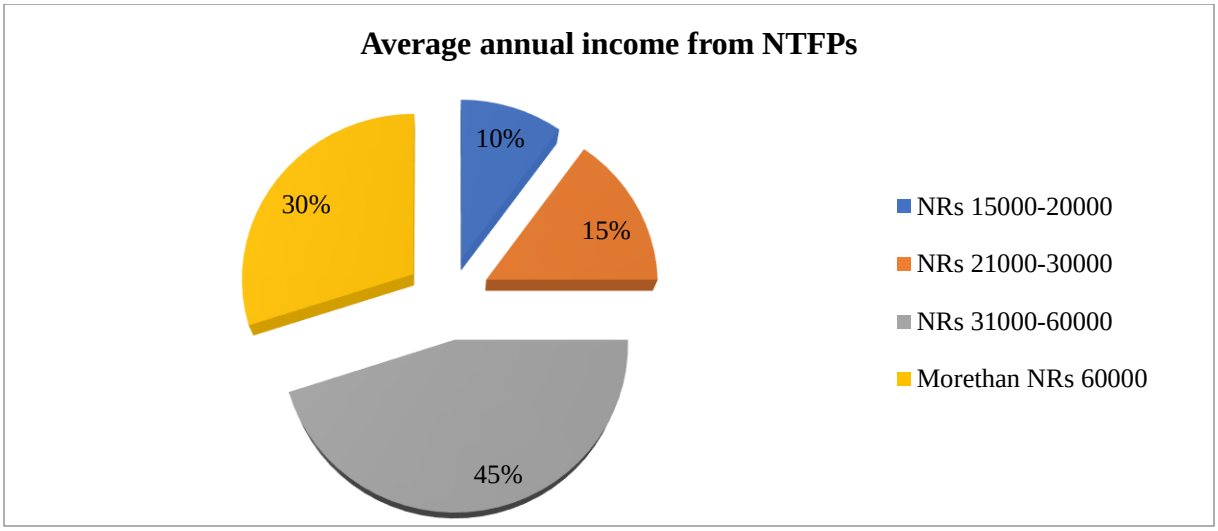

Fig. 5. Average annual income from NTFPs

4. Conclusions

Species diversity and richness is directly proportional to the area. There was total of 113 plants species encountered in the study area. Among total species encountered 85 were NTFPs, where 36 were herbs and grasses, which was followed by 33 trees and 16 were shrubs. The largest family was Fabaceae (Leguminosae) which compromised seven genera and nine species. Four NTFPs species were cultivated by the local people they are Amleeso, Bans, Tejpat and Timur. The life form among the total NTFPs species was 36 species (42.35%) which belong to herb and grasses, which was followed by 33 species belonging to tree (38.82%) and 16 species belonging to shrub (18.82%). Similarly, the average density of herbs and grasses was 2837.347 per hectare which was followed by shrubs 188.685 per hectare and trees 108.0273 per hectare. It was found that there was high density of invasive species which indicated that invasive species was among one of the key threats. The presence of NTFPs was found higher in larger size forest and low in small size forest. This is directly interlinked with production which determines the economic activities. The social survey among 100 respondents resulted as 55% people cultivated amleeso, which was followed by 20% bans, 15% tejpat and 10% timur. NTFPs were categories based on their uses as, medicinal and aromatic plants, fiber, dyes, bamboos product, and wild food including spices, culinary and others in the area. Those NTFPs which have good market value were sold by harvester to local traders and others are locally consumed for their household purposes. The contribution of NTFPs was 10 % in the area. Janajati and Dalit were more involve in collecting and harvesting of NTFPs rather than Brahmin and Chhetri. Local traders collect NTFPs from local harvester and export to Kathmandu and Nepalgunj from where NTFPs is exported to China and India respectively. The lack of proper harvesting and storing knowledge has unable harvester to get well price of NTFPs. Due to high market demand and over collection, immature collection and lack of proper harvesting knowledge NTFPs were at risk of declining and extinction.

Acknowledgements

Authors are thankful to the authorities of SCF for granting permission to work in the forest and to the local people of the study area for their kind cooperation and information relating to this study. Authors also acknowledge the Department of Botany, Tri-Chandra Multiple Campus for their valuable suggestions.

Conflict of interest

The authors declare no conflicts of interest regarding the publication of this article.

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