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Forest Product Preference and Timber Subsidies: Unveiling Economic Differences in Forests of Eastern Mid-hill

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ABSTRACT

The preferences of forest users regarding forest products are shaped by diverse socio-economic conditions, contributing to a complex preference-policy nexus. However, the factors influencing these preferences remain puzzling. This study aimed to analyze the preferences for forest products and assess the relevance of price subsidies across different economic strata (i.e., rich, medium, poor, and ultra-poor) based on cases from four community forests. The study employed stratified random sampling and well-being rankings to explore the socio-economic dynamics in community forests. Our findings revealed significant variations in forest product preferences among economic classes, with the wealthier class favoring timber, the medium preferring fuel wood, and the poorest class striving for fodder. Despite efforts to implement price subsidies, they proved ineffective, as the discounted timber rates failed to attract households with lower income. Therefore, to ensure the sustainability of community forestry, this study recommends initiating discussions among policymakers to develop policies that facilitate a fair distribution system. One practical solution suggested is to reconsider the current subsidized price differences between wealth groups. By addressing these issues, community forestry can achieve a more equitable and sustainable approach.

INTRODUCTION

Community forest (CF), one of the highly prioritized programs of the Master Plan for the forestry sector, provides users with the rights of forest management and utilization in accordance with the operational plan (OP) through formation of user groups (Acharya, 2002). Initially, the primary objective was solely focused on restoring forests and meeting the forest product demands of forest-dependent communities (Kanel & Kandel, 2004). These objectives were partially fulfilled, leading to the halting of forest loss and degradation, especially in the mid-hills (Gautam et al., 2004; Yadav et al., 2003). As

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CF progressed, its objectives were expanded to include cross-cutting themes such as reducing poverty and enhancing fair and equitable resource sharing. However, incorporating these issues posed significant challenges due to prominent governance concerns in CF (Rutt et al., 2015; Toft et al., 2015). Particularly noteworthy were the issues related to fair and equitable benefit sharing, as studies have shown limited participation from lower economic and social classes and the existence of elite capture in CF (Gurung et al., 2012; Chhetri et al., 2013).

Nepal is rich in diverse castes and ethnicities, and so are the forest user groups within the country. These user groups and communities exhibit heterogeneity in terms of socio-economic characteristics (Varughese & Ostrom, 2001), resulting in a diverse range of preferences and needs for different forest products. Cases from Nepal's community forests clearly highlight significant differences in the income levels of users, with poorer individuals relying more heavily on forest resources (Dev et al., 2003). The dynamics of forest product distribution vary significantly across wealth groups (Pokharel, 2009), and this pattern extends beyond Nepal (Bocci et al., 2018). Therefore, for long-term stability, community forestry should consider the demand for forest products from every user group and address their preferences, regardless of wealth class. Persistent issues related to participation and equitable benefit sharing across the wealth spectrum are prevalent. It is important to note issues such as forest product sales and distribution being more favorable and accessible to wealthier households (Adhikari et al., 2004; Pokharel and Nurse, 2004; Thapa-Magar and Shrestha, 2015; Karki and Poudyal, 2021), poorer individuals receiving fewer benefits while bearing higher costs (Sunam and McCarthy, 2010; Parajuli et al., 2015), and the social status of the poor and marginalized limiting their meaningful participation (Nightingale, 2002; Sunam and McCarthy, 2010). Considering that the poorest segments of society primarily rely on forest resources, community forests were granted the right to independently set prices for forest products. This price fixing often follows a low pricing strategy (Dhakal & Masuda, 2009), and at times, users establish contrasting price variations across wealth groups, providing price subsidies specifically to the poorer individuals to enhance their rights over forest products. However, the efficiency of these subsidies across wealth groups and how they influence forest product preferences remain unanswered.

In the current era, CF is widely recognized for its focus on enhancing livelihoods and alleviating poverty, presenting itself as a comprehensive solution to economic, ecological, and social challenges (Nuberg et al., 2019). This prompts a fundamental question: 'Who, across different economic classes, requires what specific forest products?' While researchers like Adhikari et al. (2004) and Baral et al. (2014) have delved into this inquiry to some extent, the existing evidence falls short of fully illuminating the governing policies in this domain. The improvement in the socio-economic conditions of users and the availability of forest product substitutes, particularly in the last decade, will certainly impact preferences, even in a short span of time. In this context, the evidence generated from this study can contribute to critically reflecting on, refining, and formulating constructive policies regarding the current practices of forest product distribution and preference dynamics.

MATERIALS AND METHODS

The study was conducted in four community forests in the Sankhuwasava district, Koshi Province of Nepal, selected purposively based on distinctive well-being rankings. The specific purpose behind this selection was to ensure representation from community forests with distinctive well-being rankings. By purposively choosing community forest user groups (CFUG) based on their well-being rankings, our aim was to capture a diverse range of socio-economic

Table 1: Description of community forest under study

S.N	Name of CF	Area (ha)	Year of handover	Household	Rich	Medium	Poor	Ultra-Poor
1	Thulopakha Dhungedhara	218.69	1993	245	36 (18)	65 (12)	76 (16)	68 (18)
2	Nigale Dandebhir	67.72	2001	130	11(8)	88 (21)	11 (10)	20 (10)
3	Manakamana	131.939	1993	170	5 (5)	82 (18)	56 (15)	27 (10)
4	Sighadevi	49.98	1997	109	34 (15)	17 (10)	38 (10)	20 (15)
	Total respondent surveyed				46	61	51	53

Source: Operational plan of individual community forest taken from DFO, Sankhuwasava.
Note: Figure in the parenthesis represented the number of respondents surveyed

conditions and community dynamics, allowing for a more comprehensive exploration of the economic heterogeneity within the studied region. The study sites were specifically chosen to include valuable timber species, such as *Shorea robusta*, to ensure that the main research question regarding the role of timber subsidies was not overlooked. Other tree species present in the sites included *Schima wallichi, Castonopsis indica, Albizia procera*, among others. Major non-timber forest products (NTFPs) included *Terminalia chebula, Terminalia bellerica*, and *Phyllanthus emblica*. In terms of socio-economic characteristics, community forest members primarily belonged to ethnic backgrounds and were engaged in subsistence agriculture and local labor. Detailed information, including the forest area, the year in which the forest was designated as a community forest, the number of household's dependent on the community forest, and the number of users in different economic classes for each studied CFUG, is presented in Table 1. These details were retrieved from the operational plan of each individual CFUG.

Data collection

Stratified random sampling was employed to select respondents, with economic class (Rich, Medium, Poor, and Ultra-poor) used as a stratification criterion to ensure proportional representation of users from different economic classes. Data on well-being rankings were obtained from the existing community forest operational plan. A semi-structured questionnaire was developed, and a survey was conducted with individuals (n=211) belonging to different economic strata, as indicated in Table 1. The questionnaire encompassed socio-economic characteristics, community forest benefit-sharing mechanisms, forest product demand and preferences, the relevance of subsidies for poorer groups, and supported by strong evidence.

Data analysis

The free listing methodology, as employed by Baral et al. (2014), was utilized to identify the three major forest products. Respondents were then asked to rank these products on a three-point ordinal scale, where 1 represented the first priority, 2 the second priority, and 3 the third priority. Minor forest products, referring to forest products other than timber, fuelwood, and fodder, were not considered in this study due to their negligible demand and preference.

The total price of timber was determined by considering both the subsidized rate and the average cost of harvesting and transportation. This estimation was based on group discussions that took into account the local wage rate. The responses obtained from the

respondents were supported by information provided by key informants and insights gathered through focus group discussions. The study results were analyzed quantitatively and supplemented with subjective narratives to provide a comprehensive understanding.

RESULTS

Preference of the forest product in different economic class

Different forest products hold distinct importance, and the degree of importance varies according to the economic status of the users. Table 2 presents the average rankings of preference based on the economic classes of the users. Since the ranking followed the order of first preference (=1), second preference (=2), and third preference (=3), it was observed that the average rank for timber was the lowest for rich households, indicating their first preference for timber. Similarly, the average rank for fuel wood was lowest for medium households, indicating the higher affinity of middle-class users towards fuel wood. On the other hand, the mean rank for fodder was the lowest for poor and ultra-poor households, signifying their higher preference for fodder among the lower economic spectrum.

Statistical analysis also revealed the preference in fuel wood, fodder and timber differ significantly among the varying economic groups (Table 3).

The results presented above demonstrate a significant differentiation in forest product preferences based on economic class, with rich individuals showing a higher preference for timber compared to the medium, poor, and ultra-poor (refer to Table 2). This disparity can be attributed to the fact that the poor primarily prioritize meeting basic household needs, while the rich and medium have the means to go beyond these basic requirements. Additionally, the community forest user groups (CFUGs) have strict provisions stating that timber can only be used for house construction and renovation, explicitly prohibiting its commercial use at the subsidized cost. This further restricts access for the poorer individuals.

Table 2: Average rank of preference of forest product as per the economic class

Economic Class	N	Mean rank for timber Preference	Mean rank for fuel wood Preference	Mean rank for fodder Preference
Ultra-poor	53	2.69	1.56	1.75
Poor	51	2.64	1.58	1.76
Medium	61	2.04	1.42	2.50
Rich	46	1.23	2.02	2.21

Table 3: Chi-Square test for preference of forest products in the studied CFUG with grouping variable economic class.

	Timber	**Fuel wood**	**Fodder**
Chi square value	80.983	25.424	65.232
Df	3	3	3
Asymp.sig	0.000*	0.000*	0.000*

Kruskal Wallis test
*Significant at 1%

Regarding fuel wood, the medium demonstrates the highest preference due to their engagement in the production of local alcohol, which requires a significant amount of fuel wood. However, wealthier households have easier access to alternative energy sources such as solar power, biogas, and LPG gas for cooking, leading to a substantial reduction in their reliance on fuel wood. In the case of fodder, some richer households have shifted away from livestock rearing, while others have sufficient income to afford improved livestock diets like wheat and bran purchased from the market. Additionally, these households often possess private land that can be utilized to meet their livestock needs. As a result, poorer and ultra-poor users exhibit a significantly higher preference for fodder compared to fuel wood and, particularly, timber. It is evident that the choices and preferences for all three forest products (timber, fuel wood, and fodder) significantly differ among the wealth ranking groups (rich, middle, and poorer households).

Price subsidies and ground realities

Different community forests have different provisions regarding the pricing of forest products, with some CFs offering price subsidies across wealth groups, while others follow an equality-based pricing mechanism. Subsequently, the results from the analysis of forest product preferences highlight how choices vary among different economic classes, emphasizing the restrictive policy regarding the sale of subsidized timber. Therefore, this section attempts to explore whether the price subsidies on forest products, especially timber, across different economic classes are actually worth it or if they are merely acting as token subsidies that ultimately lead to a poverty trap, considering the aforementioned restrictive policy.

Only Dhungedhara CFUG has provisioned the price subsidy on timber, as indicated in Table 4, based on the well-being ranking. The subsidized prices for *Shorea robusta* timber are NRs. 170, NRs. 160, NRs. 145, and NRs. 120 per cubic foot for rich, middle, poor, and ultra-poor households, respectively. Despite the subsidy on timber, the additional costs of harvesting and transportation (approximately NRs. 250 per cubic foot) significantly increase the overall cost of timber, making it an expensive commodity. While the numerical figures suggest that poorer and ultra-poor households have the opportunity to benefit more from the subsidy, their access to timber remains questionable due to their lack of purchasing power.

Table 4: Subsidized timber price of *Shorea robusta* per cft in studied CFUG

	Name of CF	Rich	Medium	Poor	Ultra Poor	Average Cost of Harvesting and transportation per cft
Rate per cft (NRs)	Manakamana	150	150	150	150	250
	Thulopakha Dhungedhara	170	160	145	120	250
	Nigale Dadebhir	150	150	150	150	250
	Singhadevi	200	200	200	200	250

Note: US$ 1= NRs.119

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DISCUSSIONS

User preferences for forest products in Nepal are strongly influenced by economic class. In the Nepalese agrarian economy, poorer individuals, mainly subsistence agriculturists lack both demand and means to utilize timber for personal use, making their preference for timber low. Timber, being the most valuable forest product, exhibits a wealth-sensitive demand, but only leftover products, particularly fodder, are available to the poorest users. The poorest individuals are not even willing to purchase subsidized timber due to the restrictions on its commercial use. The demand for timber, which can only be used for personal construction and renovations, fails to attract the poorest users. Similar findings have been reported by Pokharel and Nurse (2004) and Baral et al. (2014), highlighting the aversion of the poor towards timber. Adhikari et al. (2004) also emphasized that wealthier households have a larger share of forest products. Thus, it is evident that rich households enjoy high-value forest products, while the poorer ones are still deprived, even of basic ones. Therefore, in the long run, our study supports the claims of Lamichhane and Parajuli (2014) that these inequalities in the demand for forest products will widen the gap between the rich and the poor. Furthermore, studies such as those conducted by Yadav et al. (2021) and Karki and Poudyal (2021) have found that a significantly larger amount of timber is distributed to powerful stakeholders, especially rich households, compared to non-powerful stakeholder households. Hence, our study aligns with the notion that, in addition to preference, the complex socio-economic-political nexus has certainly influenced the distribution of forest products.

Consequently, the study also supports the statement made by Anderson et al. (2015) by questioning the role of community forests in providing equitable access, particularly regarding valuable resources like timber. Regarding fuelwood, it was one of the top preferred forest products by all economic classes in the last decade Adhikari et al., (2004). However, advancements in clean and cheap alternative energy since then have certainly changed the preference of rich households which can afford such alternatives. Baral et al. (2019) and Joshi and Bohara (2017) also highlight how socio-economic conditions act as motivating factors for fuel transition, as high-income households tend to rely on alternative energy sources. Baral et al. (2019) reveal that dependence on community forests for fuelwood collection is still high, particularly among low-income families. Furthermore, the poorer and ultra-poor households only require fuelwood for subsistence purposes, as they have lost their market when richer households shifted to alternative energy sources. Baral et al. (2014) also explain how the availability of substitute forest products has affected the economic activities of the poor, as selling fuelwood was one of their important livelihood strategies.

Additionally, since the demand and collection of fodder depend on the number of livestock holdings (Adhikari et al., 2004), fodder is preferred by the poorer households whose primary livelihood activity is livestock rearing. Apart from preferences, this study argues that even though differential pricing exists in community forests between the rich and the poor, such practices are either barely followed or inefficient in enhancing the access of poorer households to timber. This raises a debatable question: why do richer households demand timber every year while poorer households struggle to access it, despite both groups benefiting from the subsidized price? Therefore, rethinking the relevance of price subsidies to poorer households is crucial, as the current price discrimination and subsidy are not contextually and temporally relevant. Alternatively, it may be another role played by dominant stakeholders, which needs to be further discussed.

Karki and Poudyal (2021) highlighted how higher subsidies on forest products can be

beneficial to all users, but lower subsidies may result in less benefit for poorer communities. Dhakal and Masuda (2009) also discussed how low pricing strategies for timber were intended to ensure equitable distribution among different wealth groups but ended up being counterproductive. However, these studies did not extensively assess the ratio of subsidy between poorer and richer households. Iversen et al. (2006) also questioned the relationship between distribution outcomes and wealth inequality, illustrating how hidden economies (such as subsidized prices) only contribute to wealth inequality in the long term. Therefore, we argue that these subsidies are often used merely as a demonstration of community forest plans to respond to the needs of poorer groups, rather than actively working towards improving their livelihoods.

Policymakers need to evaluate not just the subsidized rate but also the essential need for timber among poorer households. The study underscores that financial constraints and policy restrictions often prevent these households from participating in construction or reconstruction activities. Furthermore, their reluctance to use timber raises questions about the justification of subsidized timber in contributing to poverty reduction. Therefore, subsidies and price discrimination for the ultra-poor can only be relevant if the subsidized price significantly differs between wealth groups or if the poorer households are given access to sell or lend their share of timber to other users. However, allowing the poorer households to sell or lend timber may not be a practical solution at present. This perspective requires critical evaluation before implementation and can be gradually implemented by allowing the poor to sell or lend their timber strictly within the community, with specific criteria. However, thorough research on its impact should be conducted beforehand.

For example, one approach could be to allow the poorer households to sell or lend a portion of their timber (initially within the group, and potentially expanding outside if resources allow) using a specific criterion (such as allowing only 10% of the timber share to be sold, while the remaining 90% is used for personal use). This way, the poorer households can obtain equitable monetary benefits, but strong monitoring should be in place. However, rethinking the subsidized price for the poor and ultra-poor is an immediate necessity, as the benefits of subsidized prices should not only be limited to richer households.

CONCLUSION

This study concludes that the preference for forest products varies based on economic heterogeneity, where wealthier households prefer timber, the medium has the highest preference for fuelwood, and the poor and ultra-poor have a higher affinity for fodder. These findings deviate from the ideal human nature, which tends to incline toward valuable resources, as they depict a lower affinity of the poorer households for high-value timber even with price subsidies. Furthermore, the study reflects how price subsidies on forest products are more favorable to wealthier households than to the targeted poorer groups. With this scenario, inequality in community forests will persist in the long run unless practical policies are developed that allow every user, regardless of socio-economic condition, to demand valuable resources such as timber.

The inefficiency of price subsidies in stimulating the preference of poorer users for high-value resources like timber raises the question whether policies that provide financial subsidies (with minimal differences between wealth groups) play a pivotal role in alleviating poverty among forest-dependent communities. Therefore, this study does not recommend straightforward findings such as distributing fodder to the poor and timber to the rich, but rather emphasizes the need to focus on endorsing benefit distribution mechanisms for the ultra-poor CFUGs. It also contributes new empirical evidence to the

discussion on community forests, questioning the fairness and equity of current practices.

To resolve this complex nexus between preference, policy, and poverty, one possible solution might be to reevaluate the ratio of price subsidies among wealth groups. Another option could be to relax the policy regarding the sale or lending of subsidized timber by the poorer households. Otherwise, if the poor cannot sell the timber and do not need it for their own consumption, they will remain trapped in a vicious cycle of poverty, demanding only fodder and fuelwood.

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