DISTRIBUTION ASPECTS OF COMMUNITY FORESTRY: WHO IS GETTING WHAT AND HOW MUCH

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Abstract

This paper examines the distribution of forest products from Kumariban community forest (Badikhel, Lalitpur) by wealth and caste. While assessing the preferential forest products, the study rejects the existence of such preferences by wealth and caste. The main findings are:
· No significant difference in the preference for low and high value products by wealth and caste.
· No significant difference regarding use of domestic fuel by wealth and caste.
· Firewood consumption is inversely related with wealth rank. The caste determines the magnitude of products being extracted from the community forest.
Main Findings
1. The poorest, due to lack of complementary resources, uses less quantity forest products.
2. Rich and poor do not differ regarding the collection of low and high value forest products due to the indifferent opportunity cost of time of women, mainly involved in gathering low forest products.
3. Despite an equal access in the community forest, the poor uses less forest products hence, the former becomes meaningless.
This study while analysing the distribution of forest products by wealth and caste also refutes previous findings regarding the difference in the preferences of high and low value products by wealth class in an empirical way.

Keywords: brahmin, caste, community forest, households, pahari, poor, forest products, rich, and wealth.

Introduction

Firewood, timber, fodder, grass and leaf litter are the essential forest products of households in the Mid hills of Nepal where sixty-seven percent of the total energy consumption and seventy-two percent of the domestic sector energy consumption is met through the firewood (Anonymous, 1996). The per capita annual household firewood consumption, in rural areas, is 689 kg of which fifty-five percent come from the forest. About thirty-eight percent of the annual firewood demands are supplied through private trees, and the remaining from cow dung and agriculture residues. The per capita timber consumption is 0.07 m^3/year, mainly for housing, agriculture implement and furniture needs. The forests play an important role supplying sixty percent of the total timber and the remaining is supplied from the private trees. The total digestible nutrient (TDN)

requirement for cattle on average is 519 kg / year and the same for goat is 57 kg/year. The estimated fodder supply, from the natural forests and the private farms, is about thirty-six and forty-four percentages respectively (Anonymous, 1988). It is obvious from these figures that forest plays a significant role in satisfying the basic needs of people, residing in the Mid hills, in Nepal. The distribution of productive lands is highly skewed favouring rich in rural areas of Nepal. The rich families have larger sizes, own big houses and maintain large herds of livestock as the latter is integrated in the farming system. Eventually, those families not only use larger quantities of forest products but also an Indian experience shows that the products are mostly of high value. The higher opportunity cost of time for gathering such products makes the rich interested only in high value products (Jodha, 1986) hence, it is logical to speculate that benefits from the community forestry trickles in favour of the rich households. There are studies on sharing of benefits in the community forests of Nepal (Maharjan, 1993; Mortensen, 1997). Various costs and benefits associated with community forests are dealt in these studies. The former study concludes "poor are not disadvantaged provided an equal access to the community forests" (Maharjan, 1993). While the latter study evaluates the economic performance of forest user groups in managing the community forests, using three case studies. The general observation is "community forests are under utilised" (Mortensen, 1997). There is a dearth of studies on the issue of equity in community forestry (Chhetri and Nurse, 1992). Nevertheless, equity in community forestry is perceived in three aspects: equity in distribution, decision making, and fund-allocation (Bosma, 1995).

Methodology

Study set-up and technique: The study area comprised of 112 households, located at ward no. 3 and 4 of Badikhel village development committee (VDC) in Lalitpur district. The Paharis, a Tibeto-Burmese group is the main inhabitant followed by the Brahmins - an Indo-Aryan group. A survey was administered in randomly selected forty-two households, stratified into rich and poor by wealth ranking. The household survey questionnaire covered mainly on forest products for subsistence uses, purposes and patterns of uses by wealth and caste. After pre-testing, the questionnaire was designed in MS Access database form. The survey information was probed at prima facie using MS Access software and was later analysed by SPSS, mainly Chi-square tests. Pearson's Chi-square test was employed mainly to determine significance of differences but the validation rule often required other tests such as Fisher's exact test.

Results and discussions

Kumariban plays a laudable role in supplying locally demanded forest products. The total demand was calculated on the basis of per capita consumption while the supply amount was obtained from the survey. The finding on demand and supply situation is summarised in table-1. A total of 666 cubic feet (cft) of timber was distributed to the sampled households, in the year 1994, hence, an annual average of 222 cft. The annual firewood consumption excluded twenty-eight percent households, using kerosene as the domestic fuel. Kumariban supplies seventy, ninety-eight and sixty-two percentages of annual demand for firewood, timber, and grasses respectively.

Table 1: The demand and supply situations of forest products from Kumariban based on forty-two household surveyed.

Forest products	Demand of forest products	Supply from the private farmlands	Amount to be supplied from Kumariban-	Supply from Kumariban
Firewood (bhari)	2691	1420 Private trees 262 - Crop residue and cow-dung	1009	703
Timber (cu.ft.)	383	157	226	222
Grasses (bhari)	4981	3251	1730	1081
Leaflitters (bhari)				1049

High and low value forest products

In contrast to the preferential forest products by wealth due to the opportunity cost of gathering time (Jodha, 1986), the findings of the present study suggest "preference for forest products is independent of wealth and caste" (Table 2). One possible explanation: the opportunity cost of time of women, mainly responsible for the gatherings, remains the same regardless of wealth and caste. Hence, the return unattractive to the rich-men still can be attractive to the women as the latter are mostly involved in gathering of the forest products in the community forests.

Table 2: Preference of forest products by wealth and caste (Pearson's chi-square value within brackets).

Forest product type	Wealth class		Caste	
	Rich	Poor	no Pahari	Pahari
	% of household			
Low value product[1]	26.2	21.4	19.0	28.6
High value product[2]	21.4	23.8	19.0	26.2
Missing	2.4	4.8	2.4	4.8
	(0.227)		(0.018)	

1 - leaf-litters, grasses and firewood
2 - timber

Utilisation of forest products

The issue of equal distribution of forest products is an important aspect in community forestry. The use-pattern of forest products from the community forests is perceived by comparing with private sources, depending on average landholding, availability of trees on private land and other factors (Chhetri and Nurse, 1992). In this article, the use-pattern of forest products is analysed by using various statistical tools: multiple regression and Pearson's correlation matrix etc. The relationship between utilisation of forest products and wealth-rank is depicted for getting insights into prevailing uses.

Prevailing use pattern

The information, on utilisation of forest products, was obtained by interviewing mainly women, primarily responsible for gathering such products. The finding is summarised in table-3. The one-third poorest consumed half of the firewood gathered from forest whereas the share of the richest was less than one-tenth. The timber distribution was regulated, with a limit of 25 cubic feet of timber per household. However, one-third poorest used only 30% of the timber availed that too, only by the Paharis. The reasons being: some of the poorest taking only a part of the quota. One-third poorest gathered nearly half of the grasses from Kumariban. The richest households gathered comparatively less leaf litters and grasses than their poor neighbours did. The Chi-test on utilisation of forest products, by wealth and caste, is given in table-4. This table shows that the rich did not differ from the poor regarding firewood consumption. However, Brahmins used significantly less firewood than Paharis or vice versa. Similarly, the rich did not differ significantly from their poor neighbours regarding the use of timber and grasses. But Paharis differed significantly from the rests regarding timber-utilisation. In comparison to Brahmin, Paharis gathered significantly larger quantities of grasses. However, gathering of leaf litters neither differed significantly by wealth and nor by the caste.

Table 3: Average utilisation of forest products (per household) from Kumariban by wealth and caste

Wealth class/caste	Forest Products (all except timber: in Bhari[1])			
	Firewood	Timber[2] (cu.ft)	Grasses	Leaf litters
1/3 rd poorest				
Brahmin	4.0	0.0	11.0	22.5
Pahari	31.9	20.0	49.0	31.4
Others	25.0	0.0	0.0	0.0
1/3 rd average				
Brahmin	0.33	4.0	0.0	11.7
Pahari	21.0	20.8	31.4	36.2
1/3 rd richest				
Brahmin	5.0	12.5	14.8	15.4
Pahari	13.5	18.8	14.5	20.5
Others	0.0	25.0	24.0	26.0
Average for all households	16.7	15.9	25.7	25.0

1-Bhari is a back-load. The estimated mean weight for firewood = 34.5 kg, for grasses and litters = about 20 kg.
2-timber was distributed in large quantities, only once in 1994.

Firewood

Firewood was used by all, regardless of wealth and caste, however, one-third of surveyed households, mostly Brahmins, did not bring even a single bhari from Kumariban. Therefore, a logical assumption: the affluent households might have substituted firewood for kerosene as domestic fuel, also supported by an inverse-relation between firewood-consumption and wealth rank (see table-6). The increased ownership of private trees along with substitution-effect could be the reason for diminishing trend of firewood-consumption among the rich. However, field-data on domestic fuel fails to manifest any difference between rich and poor and also between Brahmin and Pahari, proving the use of firewood as domestic fuel even by the affluent (refer table-5). Hence, substitution-effect cannot be the sole reason for diminishing trend of firewood-use, from Kumariban, by the rich. Among one-third households, using kerosene as domestic fuel, about sixty percent were rich and the rests were poor. Some of the orthodox Brahmins regarded kerosene as impure and had taboo against eating the cereals cooked on it. The use of firewood, from Kumariban, did not differ significantly in Chi-tests by wealth. The fact: the rich were not using firewood, alone, is not sufficient to prove statistically the difference in firewood consumption. However, there was significant difference between

Brahmin and Pahari in the consumption of firewood (see table-4). More than ninety percent of Brahmins either did not gather or gathered only up to ten bhari of firewood from Kumariban. Where as nearly seventy percent of Paharis gathered more than ten bhari of firewood. Some households, mostly Brahmins, acknowledged the use of sawdust and husk to economise firewood.

Table 4: Utilisation of forest products from Kumariban by wealth and caste (Pearson's chi-square value within brackets).

Variables											
	Forest products from Kumariban										
	Firewood (Bhari)		Timber (cu.ft.)			Grasses (Bhari)				Leaf-litters (Bhari)	
						no	yes				
	<10	>10	<15	>15	missing		<36 - >36		missing	no	yes
Wealth class											
	% of households										
Rich	33.3	16.7	16.7	30.9	2.4	21.4	19.1	7.1	2.4	16.7	33.3
Poor	21.4	28.6	23.8	26.2		21.4	11.9	16.7		19.0	31.0
	(2.403)		(0.672)			(2.269)				(0.104)	
Caste											
Brahmin	31.6	2.6	26.2	11.9	2.4	21.1	13.1			19.0	21.5
Pahari	21.1	44.7	14.3	45.2		18.4	44.8		2.6	16.6	42.9
	(12.477)***		(8.050)**			(3.666)*				(1.601)	

Significance levels * <0.05 ** <0.01 *** <0.001

Table 5: The use of domestic fuel by wealth and caste (Pearson's chi-square value within brackets).

Domestic Fuel	Wealth class		Caste	
	Rich	Poor	Brahmin	Pahari
	% of households			
Firewood	32.5	33.3	21.0	47.4
Kerosene	17.5	16.7	13.2	18.4
	(0.011)		(0.433[a])	

a Validation rule: Fisher's exact test (2-tailed significance = 0.714)

Timber

Timber is an important product of Kumariban but still one-third of the sampled households did not bring it. More than a half of those not using timber of Kumariban were poor. The forest user group made a decision, in 1994, to distribute a maximum of 25 cubic feet of timber per household at a much subsidised rate. However, on average the rich got more timber as compared to the poor (see table-3). Subsequent Chi-tests on the difference between rich and poor, regarding timber-use, failed to show any statistical significance. However, there was a relationship between the caste and timber-use, Paharis significantly using more timber than the rests (see table-4).

Grasses

As already mentioned livestock is an integral component of farming system in rural Nepal. The forest user group prohibited free grazing in Kumariban, abolishing free ride for animal grazing. The grasses from Kumariban were used by all, regardless of wealth and caste and even Chi-tests did not show significant difference between rich and poor. However, the poorest of the poor lacked livestock hence, were deprived of the benefit. The findings and subsequent tests for statistical significance are given in table-4. Nevertheless, Paharis significantly differed from Brahmins regarding the uses of grasses from Kumariban.

Leaf litters

A large amount of manure was applied on the infertile and sloping lands in the study area. Even, the pine needles were used along with cow-dung for preparing the compost. Thus, gathering leaf litters was an important farming activity pursued by most of the households. However, one third of the surveyed households, some of them the poorest, did not collect the leaf litters as they owned no or very little land. The tradition of using leaf litters was popular among Paharis than the rests, may be due to their close cultural resemblance with the low-caste farming community of Newar. But there was no

significant difference between Paharis and the rests regarding the use of leaf litters from Kumariban. Similarly, the uses of leaf litters did not differ by wealth as summarised in table-4.

Multiple regression and correlation matrix

The relationship between the use of forest products by wealth rank is presented in table-6. However, the regression failed to explain even fourteen percent of the variations observed. There could be two eminent reasons: either all the relationships were not linear or the factor e.g., caste structure was more important, as the use of leaf-litters can also be culturally determined.

Table 6: Multiple regression of wealth rank and utilisation of forest products from Kumariban.

		Predictor variables			
		Firewood	Timber	Grasses	Leaf litters
Wealth rank					
Constant/coefficient		(49.625)			
T-value		(6.229)***	(-2.384)*	(1.756)	(-1.042)	(0.712)
R^2	0.220				
Adjusted R^2	0.131				
F-ratio	2.468				

Significance level *<0.05 **<0.01 ***<0.001

Hence, other factors e.g., incomes, caste, farm-size, household-size were also included in the regression. The result as is presented in table-7, shows that the caste significantly explains utilisation of forest products from Kumariban. However, non-of these relations explained more than thirty percent of variations. Furthermore, correlation matrix was used to explore the relationship between use of forest products and wealth rank and its outcome is presented in table-8.

Table 7: Multiple regression of income, caste, farm-size, and household size etc., on the utilisation of forest products from Kumariban.

Predictor variables	Dependent variables			
	Firewood	Timber	Grasses	Leaf-litters
Income	(0.303)	(1.566)	(-0.030)	(-0.736)
Caste	(-2.574)*	(-4.082)***	(-2.631)**	(-2.882)**
Farm-size	(-0.549)	(1.488)	(1.747)	(3.205)**
Household size	(1.565)	(0.119)	(-1.217)	(-0.869)
Constant	(8.202)	(10.289)	(42.778)	(31.775)
t-value	(0.886)	(2.020)*	(2.707)**	(2.606)**
R^2	(0.233)	(0.375)	(0.204)	(0.296)
Adjusted R^2	(0.148)	(0.303)	(0.113)	(0.218)
F-ratio	(2.738)*	(5.241)**	(2.244)	(3.792)**

Significance level *<0.05 **<0.01 ***<0.001

The matrix gives an insight into use-pattern and relations among the products gathered from Kumariban. The only significant relationship between wealth rank and use of forest products was for firewood, reinforcing earlier contextual findings. Firewood-use was positively and significantly correlated with the use of timber and grasses from Kumariban but not with that of leaf litters. The utilisation of timber was unrelated with wealth rank but was positively correlated with the use of grasses. Hence, timber users were also the collectors of grasses and leaf litters or the other-way round. Most of the users gathered firewood, simultaneously, with grasses and for that reason, a significant positive correlation was observed. Both of the products, being of temporary nature, were required regularly. The gathering of leaf litters, however, was not significantly correlated with firewood, as the process was highly seasonal.

Table 8: Pearson's correlation matrix between the wealth rank and the utilisation of various forest products from Kumariban.

	Wealth rank	Firewood	Timber	Grasses	Leaf-litters
Wealth rank	-	(-0.361*)	(0.136)	(-0.119)	(0.002)
Firewood	(-0.361*)	-	(0.318)*	(0.353)*	(0.234)
Timber	(0.136)	(0.318)*	-	(0.505)***	(0.483)***
Grasses	(-0.119)	(0.353)*	(0.505)***	-	(0.835)***
Leaf-litters	(0.002)	(0.234)	(0.483)***	(0.835)***	-

Significance level * <0.05 **<0.01 ***<0.001

Conclusion

The study sheds light on the distribution aspects of community forestry, mainly by whom and how much? It also attempts to answer the discrimination and variations observed on the acquisitions of forest products from wealth and caste perspectives. The main conclusions are:

1. Firewood, grasses and leaf litters are important forest products for subsistence uses. Though, timber is an important product for the rich, even the poor uses it in substantial quantity. However, due to the lack of complementary resources, the poorest of the poor uses lesser quantities of grasses and leaf litters.
2. There is neither a significant difference between rich and poor nor between Paharis and the rests, regarding use of low and high value forest products from Kumariban. The lack of preferential forest products by wealth is due to the indifference in opportunity cost of time of women, mainly involved in gathering low value products from the community forest.
3. In comparison to rich, the poor gathers larger quantities of firewood, grasses and leaf litters, however, this difference is not statistically significant. Paharis use significantly more firewood, timber and grasses than the rest households do but there is no difference in the use of leaf litters.
4. There is neither any significant difference between rich and poor nor between Pahari and Brahmin regarding the use of domestic fuel.
5. Multiple regression explains only a small portion of variations regarding use of forest products by wealth rank hence, either all the relations are not linear or other factor e.g., caste-structure is more important.
6. The use of firewood is positively and significantly correlated with the uses of timber and grasses, however, that of leaf litters is insignificant.
7. Among various factors, the caste is most significant in explaining variations in the use of forest products. Besides caste, farm-size is significant in explaining variations in use of leaf litters.
8. Pearson's correlation matrix shows a significant but inverse relationship between wealth rank and use of firewood. It implies that the richer the household, the lesser amount of firewood it gathers from Kumariban.
9. The use of timber is not related with wealth but is positively and significantly correlated with uses of grasses and leaf litters.
10. The above findings leads this study to conclude that 'equal access' alone, cannot ensure equity in product distribution in community forest, moreover, metric regulation is not the solution. Hence, others aspects of equity e.g., in decision-making and fund allocation should get due attention.

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