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# Significance of Community Forestry for Rural Households: An Economic Analysis of Community Forest User Groups in Nepal

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# Significance of Community Forestry for Rural Households: An Economic Analysis of Community Forest User Groups in Nepal

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## Abstract

This study investigates the economic contribution of community forestry to rural households. The preferences for major forest products as well as the benefit sharing mechanisms among the different socio-economic classes are highlighted at the example of two Community Forest User Groups. Free listing, household surveys, group and key informant interviews were the research methods applied. In total, 115 households were surveyed. The results show, that the poor users are indeed the main beneficiaries of community forestry in spite of the fact that they have less influence in decision-making processes. It is primarily the poor who collect and market forest products thereby generating one-fifth to one-third of their total household income. Consequently, community forestry contributes to reducing poverty and the imparity of income. Further studies investigating indirect benefits and multiplier effects of community forestry as well as respective impacts on rural livelihoods and poverty alleviation are suggested.

**Key words:** Community Forest, Forest Products, Preference, Participation, Household Income, Nepal

## Die Bedeutung gemeinschaftlicher Waldbewirtschaftung für ländliche Haushalte in Nepal - eine ökonomische Analyse

### Zusammenfassung

Die Studie untersucht den Beitrag der gemeinschaftlichen Waldbewirtschaftung zum Haushaltseinkommen in ländlichen Regionen. Am Beispiel zweier Gemeinschaften werden die Mechanismen der Nutzungsregulierung sowie die unterschiedlichen Präferenzen der sozialen und ökonomischen Klassen in Bezug auf verschiedene Forstprodukte erhoben. Bei der Datenerfassung kamen verschiedene sozialwissenschaftliche Methoden wie Haushaltsbefragungen, Gruppen- und Experteninterviews zum Einsatz. Insgesamt wurden 115 Haushalte erhoben. Obwohl die ärmeren Mitglieder weniger Einfluss auf die Entscheidungen der Gemeinschaft nehmen können, sind es doch gerade sie, die besonders von der Gemeinschaftsforstwirtschaft profitieren. Im Unterschied zu den reicheren Mitgliedern, für die der eigene Naturalbedarf im Vordergrund steht, nutzen in erster Linie die Armen auch kommerziell verwertbare Forstprodukte und können so zwischen einem Fünftel und einem Drittel ihres Einkommens erwirtschaften. In beiden Gemeinschaften trägt dieser Ansatz der Waldbewirtschaftung somit dazu bei, die Einkommensunterschiede zwischen den wirtschaftlichen Klassen zu mildern. Um ein noch umfassenderes Bild von der Bedeutung der gemeinschaftlichen Waldbewirtschaftung für den Lebensunterhalt in ländlichen Regionen und die Armutsbekämpfung zu erhalten, werden weitere Studien, die auch die indirekten Nutzenkomponenten sowie Multiplikatoreffekte thematisieren, vorgeschlagen.

**Schlüsselwörter:** Gemeinschaftswald, Forstprodukte, Präferenzen, Partizipation, Haushaltseinkommen, Nepal

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## **1. Introduction**

People and forests in Nepal have existed interdependent relationships for many years. The economy of Nepal largely depends on the use of its natural resource, and is dominated by the agrarian sector (CBS, 2001 cited in Acharya, 2002). Dependency of rural population on forest is high for fuelwood, timber and fodder etc. Forest accounts 85% of the total energy consumption by the residence sector in the country (CBS, 2002). The rural people also have been involving in harvesting, processing and marketing of different forest product since ancient times.

Realising the importance of forest for rural livelihoods the government of Nepal has given emphasis on community based resource management. As a result, the community forest (CF) program was initiated during 1970's. The potential area of CF in Nepal is 3561600 hectares, which is 61% of the total national forests (HMG/N, 1989). Out of total forest land 129272 ha of forest have handed over to 14,337 community forest user groups (CFUGs), benefiting 1647717 households, which is about 25 % of the total potential CF area of Nepal (CFD, 2007). After almost three decades, community forestry is the most prioritized program of Nepal's forestry sector for poverty alleviation. Its main focused is on fulfilling the basic forestry needs of local people with their active participation in conservation, management and utilization of forest products (FPs) (HMG/N, 1989). However poverty alleviation in CFUG through commercialization of forest products is an immerging issue in community forestry of Nepal.

CFUGs are legally authorized body to take management decisions (Acharya, 2002) and to distribute the FPs according to their operational plan (OP). Timber, fuelwood, fodder, grasses, leaf litter and many other Non Timber Forest Products (NTFPs) are the direct benefits from CFUG. All users' should agree on distribution system of the products, without this, participation of the majority of users will be lost and management system will break down (Thompson, 1990). However, there are only limited data related to equity-based distribution of forest products to different groups of people (Verma, 1988). According to Timilsina and Luitel (2003) the approaches of natural resource management must be devised to allocate more resources to disadvantaged groups so as to make the system, as a whole, more fair. Therefore, interventions, which seek equity and social justice, should devise ways to give marginalized groups more benefits to poor.

In this context, the aim of this study is to explore the preference of different socio-economic classes on FPs and also analyse the economic contribution of community forestry to socio-economic classes. For this, two CFUGs of Dolakha district of Nepal were selected. Different participatory methods such as free listing, well-being ranking, household survey and group discussion were used to collect primary data. Secondary data were collected from records of CFUG, District Forest Office (DFO), related journals etc. Data were analyzed qualitatively and quantitatively. For quantitative data analysis SPSS and MS Excel were used. The results show that preference of FP depends on three factors; economic condition, livelihood strategy and landholding size. Generally rich prefers more valuable FP such as timber whereas poor prefers subsistence and commercial FPs as they have limited source of income (Paudel, 2003). Regarding participation, mostly rich dominate the decision-making forum (Gauli, 2003; Uprety, 2005). Nevertheless, the study shows that community forestry program is playing important role in minimizing income inequality with in community.

## **2. Community Forestry**

Traditionally, the people of Nepal are dependent on forests for supply of fuelwood, fodder, timber and NTFP. However increased human and livestock population and the effects of government policies on land registration resulted in the gradual depletion of forest resources (Pandit and Thapa, 2004). Realising the importance of people participation in natural resource management, **community forestry** programme was started in the late 1970s. This approach was initiated at the time when forest development strategies of the 1950s and 1960s that focused on industrial development were being criticized for overlooking rural development and not meeting the basic needs of the rural poor (Warner, 1997). Following more than twenty-five years of implementation experiences, the program now represents arguably the most advanced and progressive model worldwide for the participatory management of natural resources (Nurse et al., 2004 cited in Pokharel and Nurse, 2004). Gilmour and Fisher (1991) defined community forestry in terms of control and management of forest resources by the rural people who use them especially for domestic purposes and as an integral part of their farming systems.

**Community Forest User Group (CFUG)** is an independent autonomous institution. It has to be formed democratically and registered at the District Forest Office (DFO) with its

constitution and OP that defines the rights of the users to a particular forest (HMGN, 1993). Where the ownership of the land remains with the government, management and control of resources on the land belong to CFUG (Pardo, 1993). Based on the Forest Act of 1993, under 'Provisions Relating to Community Forests' the CFUGs are 'entitled to develop, conserve, use and manage such forest and sell & distribute the forest products independently fixing their prices, according to an approved operational plan'. During the last 28 years of CF history, nearly 1.2 million hectares national forest have been handed over to more than 14,337 CFUGs (CFD, 2007).

### **3. Role of Community Forestry for poverty alleviation**

Important progress has been made in improving overall living standard in the world in twentieth century. Despite of such efforts, the poverty in the world is accelerating specially in the third world countries. According to World Bank (2001), more than one third people are living in extreme poverty, earning less than US\$1 a day, in the world and majority of which falls in third world countries. This indicates that poverty alleviation is serious challenge for beginning of the 21<sup>st</sup> century.

According to Rahman and Hossain (1995) Cited in Paudel (2003) "poverty is not only the state of deprivation. It is equally also a state of vulnerability, powerlessness, physical weakness, isolation and income poverty". A great majority of the population of Nepal lives in the villages and a big segment of this rural population are under absolute poverty. HMG/N, (2002) statistics shows that about 44% people are under the poverty line. To address the rural poverty, the ninth and tenth five-year plans of Nepal have prioritised community forestry as one of the approaches for poverty alleviation.

Advocates of community-based management argue that community forestry offers the best prospect for the inclusion of the poor and marginalized in Nepalese society along with a method of promoting sustainable management of the nation's forest. The main vision of the community forestry is to create employment and income generation activities for disadvantaged groups and people living below the poverty line (Acharya et al., 1999). Still it is not clear to what extent the FPs harvested from the community forest contribute to overall household economy (Baginski et al., 2003).

Dependency of poor on CF for their subsistence needs is higher than that of other economic groups (Hobley 1987; Pandey 1999), however Gentle (2000) found that community forestry program is widening the gap between the poor and rich people involved in management of community forest. Where FPs does become available from community forests, they may not necessarily be the products which are most needed by the poor, or may not be equitably distributed within the FUG (Timsina, 2002; Neupane, 2003). However, Kanel (2004) suggests that community forestry can make a significant contribution to poverty alleviation, but the critical issues of forest sector governance and sustainable community forest resource management need to be addressed first.

To address the poverty issue in community forestry, the 4<sup>th</sup> National Workshop on community forestry, 2004 has recommended allocating at least 25% of CFUG fund for pro-poor activities, legal provisions for allocating community forest land to the poor, capacity building program for the poor and disadvantaged. In addition, three year interim plan, 2007-2010 has also recommended investing 35% of CFUG funds for pro-poor programmes.

#### **4. Research Issues**

The forest is an integral part of the daily lives of the rural population of Nepal (Pokharel, 2001). Given is the fact, Master Plan for the Forestry Sectors (MPFS) 1989 has prioritized community forestry to meet the basic needs of rural people. After the successful implementation of almost three decades with the major focus on conservation, most of the CFs is now in the stage of producing sufficient quantities of valuable FPs, such as fuelwood, fodder, timber, NTFPs and more.

In recent years, the discourse in community forestry of Nepal has changed; sustainable livelihoods and social issues have been fitted into current policies, and poverty reduction is an emerging issue in relation to forest policies. In a due course of time of three decades, community forestry is able to conserve the forest resource. However, its equitable benefit distribution is still a prominent issue with regards to the poorer people of the community who are also the stewards of the community forest. Two schools of thought have been emerging with regards to community forestry and poverty alleviation. On one hand several studies have mentioned that poor are deprived of getting benefit from community forestry (Pokharel and

Nurse, 2004; Banjade et al., 2006; Uprety 2006), as it has limited the access to the poor because the decision-making forums are mostly dominated by elites. On the other hand similar other studies have mentioned its positive contribution on poverty alleviation (Bartlett and Malla, 1992; Sharma, 1992; Chhetri and Pandey, 1994; Dahal, 1994; Khanal, 2001). There is growing concern about whether forest resources are acting as safety nets (Byron and Arnold, 1999; Wunder, 2001; Ghimire, 2007) or poverty trap.

Although, the community forestry is successful programme in Nepal in terms of conservation, there are still various emerging issues related to marginalized people in the community. In this context, it is necessary to have in-depth economic analysis of total forest benefit to local community. Overall economic analysis of CF only reveals its actual contribution in household income and hence poverty alleviation. Hence, this study assessed the economic evaluation of both commercial and subsistence forest products along with tangible indirect benefits that users are getting through different CF related activities.

The research issues are summarized below:

1. To know the preference of forest products for different economic classes.
2. To assess the benefit sharing mechanism in community forest users groups (CFUGs) concerning direct and indirect (tangible) benefit.
3. To analyze the economic contribution of community forestry in household income among different socio-economic classes.

Hypothesis:

- 1 The preference of FPs doesn't differ among economic classes.
- 2 There is no significant difference in the share of CF benefit among different economic classes.
- 3 There is no significant difference on total forest income among different socio-economic classes.

## 5. Study Site

Kalobhir and Bhitteripakha CFUGs of Dolakha district were selected as study site considering following criteria: legal tenure, CFUG running forest based enterprises, CFUG having identified poor, direct involvement of SPs in CF development, and CFUG's heterogeneity. A brief introduction of two CFUGs is presented in Table 1.

**Table 1: Brief overview of the Dolakha district**

SN	Name of CFUG	Year of Handover	Area	Economic Participants			Major NTFPs Products	Enterprises						
				HHs	Male	Female		SG	BE	DC	TD	FD	LE	EE
1	Kalobhir	30.03.00 (24.09.04)	545	215	553	535	Lokta, Argeli	-	-	-	-	1	1	1
2	Bhitteri pakha	30.03.00 (14.07.04)	362	234	656	642	Lokta, Argeli	5	1	1	1	-	1	-
<b>Total</b>			<b>907</b>	<b>449</b>	<b>1209</b>	<b>1177</b>	-	<b>5</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>2</b>	<b>1</b>

SG: Sub-group, BE: Bhimeshwor Handmade Paper, DC: Deodhunga Wintergreen Distillation, TD: Timber Depot, FD: Fuelwood Depot, LE: Lokta and Others NTFPs (cultivation, harvesting and trading) FUG Enterprise, EE: Everest Gateway Handmade Paper

## 6. Method used for data collection

Primary data was collected through well-being ranking, household survey, free listing, group discussions and key informant interview, informal recording of information. Secondary data was obtained from OP and constitution, minutes and other records of the CFUG and records from the relevant stakeholders. Forest documents and reports, and relevant scientific articles were also reviewed in detail. Total 115 respondents were interviewed by using questionnaire.

During the field study conducted in July-August 2007, 115 households were selected out of the total 449 for interviewed. Stratified random sampling was adopted to select respondents. Twenty five percent of the respondents were taken from the total households of each well-being class. In addition, eight group discussions (GDs) were organized in two CFUGs with the different economic classes to collect the different information on similar topic. Similarly, eight key informants; ex-committee member, trader, enterprise manager or staff, NTFP collector,

four from each CFUG and two from staff of facilitating organizations (I/NGOs and DFO staff) was selected.

**Table 2: Total households according to economic class**

SN	Name of CFUGs	Total HHs	No. of households			
			Rich	Medium	Poor	Very Poor
1	Kalobhir	215	47 (12)	106 (27)	39 (10)	23 (6)
2	Bhitteri	234	51 (13)	88 (22)	60 (16)	35 (9)
	<b>Total</b>	<b>449</b>	<b>98 (25)</b>	<b>194 (49)</b>	<b>99 (25)</b>	<b>58 (16)</b>

Figure in the parentheses indicates the percentage of respondent surveyed Source: Field data, 2007

For assessing the **preference** of the major forest products, first free listing was done with the four randomly selected individuals from each economic class of both CFUGs. Five most frequently mentioned forest products were selected as major forest products. Later each household was asked to rank the selected five forest products on the basis of three point scales for their economic value and daily use.

**Participation** of respondents in community activities was judged in terms of their participation in General Assembly (GA) / meetings and training/workshops/tours. Respondents were asked to indicate their presence in GA / meeting and training/workshops/tours in past one year of period. The households who used to participate in GA and meetings were again asked to mention their level of participation in those meetings. They were asked to rate their level of participation according to the "Ladder of Citizen Participation," with three levels as simplified by (Arnstein 1969) namely non-participation, tokenism and citizen Power. Information on benefit that users are getting from CF was obtained from detail household survey.

## 6.1 Analysis of the Information Gathered

To know the preference, average ordinal value for preference of forest products with preference to economic class was calculated and analyzed using a scatter diagram. Average preference value, being non parametric, statistical analysis was performed using Chi-Square test. It was used to test the significant difference on preference of forest products among different classes. Similarly, for the participation of the users in the community activities were analyzed by using bar diagram.

For calculating the benefit from community forest products different methods were used. Direct market pricing was done for the FPs which are sellable in the market. In addition indirect market price technique, the *surrogate prices method* was used for the valuation of fodder, and *opportunity cost method* was used for the valuation of leaf litter. For the surrogate pricing method, the value of fodder was calculated with the reference of the value of most potential alternative feed. For this, the value of wheat/ millet straw was used. For leaf litter, the time spent to collect, process and transport a *bhari*<sup>4</sup> (back load) of leaf litter from another nearest forest was calculated. Total time spent was then multiplied with local agriculture labor wage to get the value of one bhari of leaf litter. Time, in hours is converted into monetary term on the reference of the daily wages (<sup>5</sup>NRS 50) per 8 hours a day.

Lorenz curve and Gini-coefficients are used to calculate the income inequality among the sampled households. If all households have the same income, the Lorenz curve is a straight diagonal line, i.e.; line of equality. If not, the Lorenz curve falls below the “line of equality”. The total amount of inequality can be summarized by the Gini-coefficient (also called the Gini ratio), which is the ratio between the area enclosed by the line of equality and the Lorenz curve. Gini-coefficient (G) can be computed using,

$$G = \frac{1}{\mu N(N-1)} \sum_{i>j} \sum_i |x_i - x_j|$$

Where,  $\mu$  is the mean income,  $n$  is the total number of sampled households, and  $x_i$  and  $x_j$  are the shares of individuals  $i$  and  $j$  in total income. Alternatively, an equivalent but computationally more convenient method suggested by Deaton, (1997) was used which is expressed as,

$$G = \frac{N+1}{N-1} - \frac{2}{N(N-1)\mu} \sum_{i=1}^N \rho_i x_i$$

Where,  $\rho_i$  is the rank of individual  $i$  in the income distribution,  $x_i$ , counting from the top, i.e. the richest has the rank 1, second richest 2 and so on.

This study quantifies the benefit and cost from the CFs for each economic class. Two types of cost were identified: Forestry operation cost includes the time spent in collecting the FPs

<sup>4</sup> Bhari is local unit for measuring fuel wood in the mid-hills of Nepal (one bhari = 30 kg)

<sup>5</sup> Nepalese Rupees ( Whereas, US\$ 1 = NRS 65)

(timber, fuelwood, fodder, leaf litter, NTFPs) including the return travel time and if sellable, time required to sell in the market. In addition forest development activities (silviculture work), time spent on employing in the forest based enterprises and IGA activities supported by the CFUG were also considered as forestry operational cost. Opportunity cost includes time spent in institutional development activities (GA and meetings).

Both of these costs were added and then the total cost of the each economic class was calculated. Other cost, such as reception to the visitor, and informal meeting were not included in this calculation. Overall data for the benefit cost analysis was collected from the household survey (25%) of each economic class. The costs incurred were quantified and changed into monetary terms for the calculation. The benefit was deemed in this study as the value of entire tangible goods received from CF.

To calculate BCR, first total benefit of each household is converted into benefit @ NRs 100 cost to give similar weightage for benefit. The calculation was done as follows: Benefit at NRs 100 cost =  $\text{Benefit}/\text{Cost} * 100$ .

## **7. Results**

### **7.1 Preference on major forest products**

The preference of major forest products in Kalobhir and Bhitripakha CFUG is studied in terms of their use and its value. The results obtained are presented as follow.

#### **Major forest products**

Free listing was done to identify major forest products in each CFUG with four individuals of each economic class. Frequency was calculated for each forest products. Forest products having frequency more than eight (>50% respondent) were considered as major forest products of each CFUGs. As a result, fuelwood, fodder/grass, leaf litter, timber and NTFPs were selected as major forest products in both CFUGs.

#### **Preference on forest products**

Scattered plot was drawn taking average value given by each class for each FP. Average values were calculated from ordinal scale coded from 1 to 3. Figure 1 shows the average value given by each economic class for different FPs. Among different FPs, fuelwood is the most preferred for all economic classes except rich. Rich and medium classes prefer timber and leaf litter most whereas rich has the lowest preference for fodder and medium class for NTFPs. Timber and leaf litter are least preferred products for very poor class.

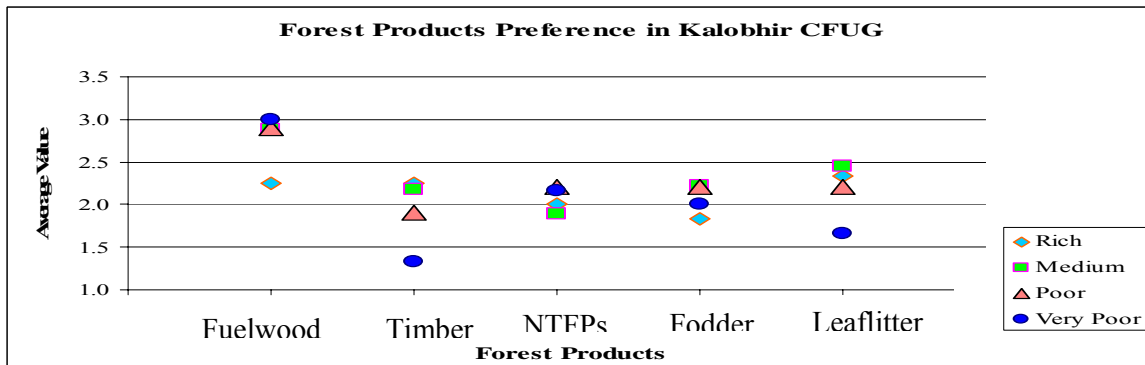


Figure 1: Preference on forest products in an average

Source: Household survey, 2007

Also in Bhitteripakha CFUG fuelwood is most preferred in comparison to other products. Similarly, as in Kalobhir, timber and leaf litter are highly preferred by rich and medium classes whereas it is least preferred by poor and very poor classes. Likewise, very poor class has high preference on fuelwood whereas they have least preference on timber, NTFPs and leaf litter.

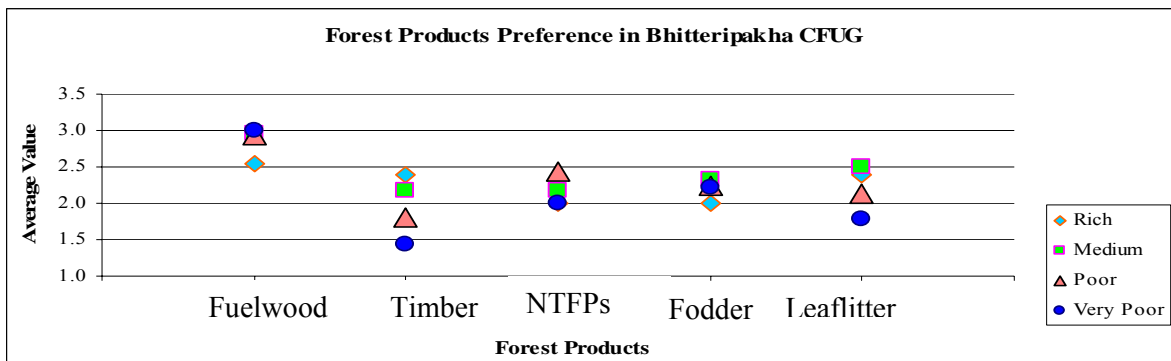


Figure 2: Preference on forest products in an average

Source: Household survey, 2007

### Test inference on the preference of forest product

Individual statistical analysis was done for the two sample CFUGs. In *Kalobhir CFUG*, it shows that there is a significant difference on the preference of fuelwood and timber among different economic classes at ( $p < 0.05$ ) whereas that of other products is insignificant. Thus, the

first null hypothesis, the preference of FPs does not differ among economic classes, is rejected for fuelwood and timber whereas in case of fodder, leaf litter and NTFPs it is accepted.

**Table 3: Preference of forest products for different classes in Kalobhir CF**

	Fuelwood	Fodder	Timber	Leaf litter	NTFPs
<b>Chi-Square</b>	19.938	5.850	9.173	1.350	5.329
<b>df</b>	3	3	3	3	3
<b>Sig. level</b>	0.000*	0.119	0.027*	0.717	0.149
<i>a</i>	<i>Kruskal Wallis Test</i>				
<i>b</i>	<i>Grouping Variable: Economic class</i>				

\*Significant at 5%

Similarly in *Bhitteripakha CFUG*, preference on fuelwood and timber is significant ( $p < 0.05$ ) whereas fodder, leaf litter and NTFPs are insignificant among economic classes.

**Table 4: Preference of forest products for different classes in Bhitteripakha CF**

	Fuelwood	Fodder	Timber	Leaf litter	NTFPs
<b>Chi-Square</b>	11.776	3.429	15.371	2.718	6.586
<b>df</b>	3	3	3	3	3
<b>Sig. level</b>	0.008*	0.330	0.002*	0.437	0.086
<i>a</i>	<i>Kruskal Wallis Test</i>				
<i>b</i>	<i>Grouping Variable: Economic class</i>				

\*Significant at 5%

Furthermore, Table 5 shows the overall preference of the respondents by combining respondents of the two forests by economic classes. The statistical analysis shows that there is a significant difference ( $p < 0.05$ ) on preference in fuelwood, fodder, timber and NTFPs whereas insignificant only in case of leaf litter among economic classes.

**Table 5: Preference of forest products in total sample of the study**

	Fuelwood	Fodder	Timber	Leaf litter	NTFPs
<b>Chi-Square</b>	31.819	8.593	24.003	3.390	11.864
<b>df</b>	3	3	3	3	3
<b>Asymp. Sig.</b>	0.000*	0.035*	0.000*	0.335	0.008*
<i>a</i>	<i>Kruskal Wallis Test</i>				
<i>b</i>	<i>Grouping Variable: Economic class</i>				

\*Significant at 5%

Therefore, null hypothesis is rejected except in case of leaf litter.

## 7.2 Participation in decision-making and benefit from CFUG

### Participation in decision-making

Decision-making in CFUGs is comprised of users' representation in the CFUGC, involvement in the program planning and implementation and benefits sharing processes. In this study, participation of users in decision-making processes, training/workshops and tour as well as benefit sharing is studied. The results obtained are briefly explained under following topics.

### Participation in general assembly and meeting

Participation of respondents in decision-making process is studied in terms of their physical presence in General Assembly (GA)/meetings and involvement in discussion. Respondents were asked whether or not they participated in GA and meetings in the last one year period.

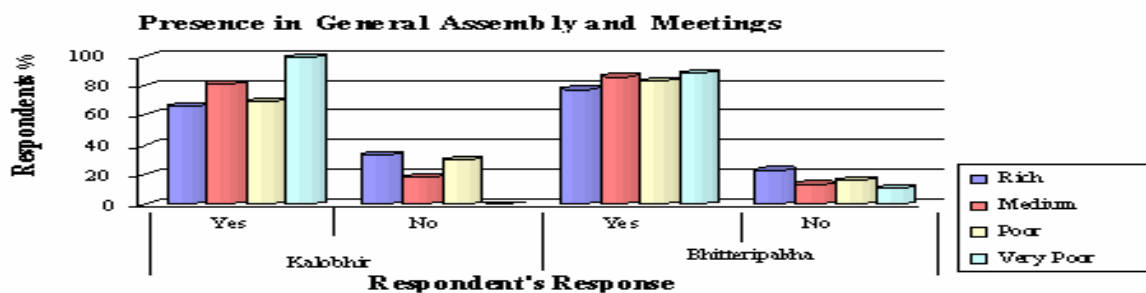


Figure 3: Presence in general assembly and meetings

Source: Household survey, 2007

In *Kalobhir CFUG*, around one-third of rich and poor household did not participate in GA and meetings whereas all the very poor respondents were participated. In *Bhitripakha CFUG* also one-fourth of rich respondents mentioned, they did not participate in GA and any meeting whereas only one-tenth from other classes did not participate.

### Consideration of user's voice

The respondents having citizen power and tokenism level of participation in decision-making process were asked how much CFUGC consider their voice. Figure 4 shows that more than two-third respondents of rich and medium mentioned their voice is considered. Where as, most of the respondents of poor and very poor from both CFUGs mentioned that CFUGC do not consider their voice.

### Consideration of voice of users' in decision-making process

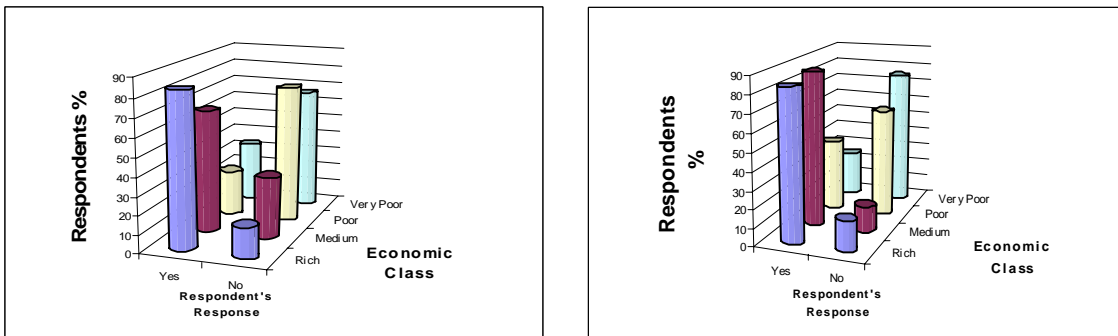


Figure 4: Consideration of users' voice decision-making process Source: Household survey, 2007

### Participation of users in training/ workshop and tour

Participants of both CFUGs were asked whether or not they had an opportunity to participate in training/workshops and tours. In Kalobhir CFUG, majority of rich and very poor classes had participated in the trainings and workshops followed by the poor class. There is almost equal participation of all economic classes in training/workshops and tours in Bhitteripakha CFUG.

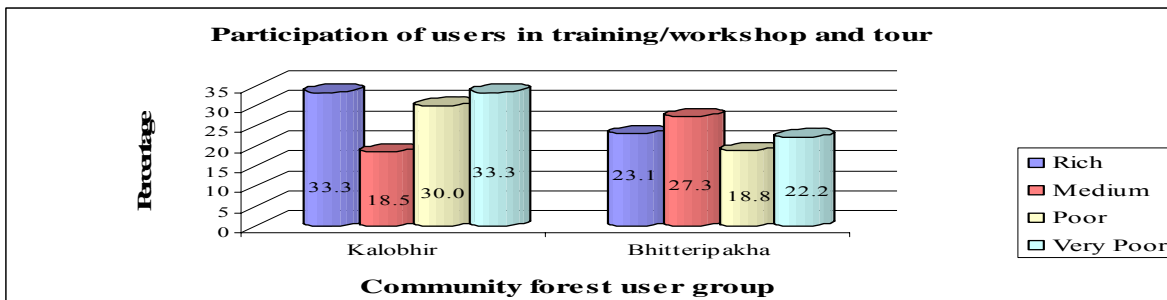


Figure 5: Participation of users in training/ workshop and tour Source: Household survey, 2007

## 7.3 Forest product distribution mechanism and benefit from CFUG

Benefit sharing is studied in terms of the FPs distribution mechanism, and distribution of commercial and subsistence FPs from CF. In addition, it also covers the income from different IGA supported by CFUG.

### Forest product distribution mechanism

Every CFUG has their own constitution and operational plan (OP) as guiding documents for FP distribution, and their executive committees are responsible for the implementation of these documents.

In both CFUGs, they have provisions for distribution of the FPs. Distribution of timber is by need basis. Any household of the CFUG, which require timber for the purpose of house construction and renovation, can get timber after paying royalty as mentioned in OP. But the users cannot sell the timber to any person inside or outside the group. However, poor users do not have to pay royalty. Furthermore, there is provision of providing timber at free of charge to victims of the natural hazards for house construction and blacksmith to make charcoal. In case of surplus timber in CF, CFUGC decides the price and sale it but the price should not be less than the government royalty.

Fallen and dried wood which cannot be used as timber can be used as fuelwood and can be collected through out the year. In Kalobhir CFUG, to get such fuelwood, each household must pay NRs 25 annually. Cutting down green trees for fuelwood is prohibited except during silvicultural operations. The fuelwood obtained after the silvicultural operation is distributed to all of the users taking NRs 5 per *bhari* by giving seven days notice beforehand. There is no fee for dry and fallen fuelwood in Bhitripakha CFUG. Users are allowed to sale fuelwood to local market and hand made paper enterprise. Many users are engaged in the collection and selling of fuelwood to run their livelihoods.

*Kharshu* is the main fodder species in both CFs which is prohibited for harvesting. CFUGC is responsible for fixing and notifying the harvesting period to its users which lasts around six months, generally from December to May, when there is a scarcity of fodder in private land. At this time any household can go to the forest and harvest fodder free of charge.

Lokta, Argeli, Dhasingare, Allo, Mushroom, Chiraito, Lichen, Pine cone, Dhupi leaves, Pakhanbed, Majitho are major NTFPs of both CFs. CFUGs have set a ban on the collection and sale of few high value NTFPs such as Lokta and Argeli. Lokta and Argeli are used as raw material for Nepali hand made paper. Users are only allowed to harvest these NTFPs during specified periods and traders have to pay royalty to CFUG. Another major NTFP, mushroom is a seasonal NTFP which has a local market, but there is no any regulation mentioned in OP, any user can collect and sell it. Nevertheless, the royalty rate is mentioned for some other NTFPs like, Chiraito, Lichens, Pine cone, Allo and Majitho. There are no clear rules and regulations

exist to harvest and sale NTFPs other than Lokta and Argeli. In practice, the CFUG takes royalty from other NTFPs too.

### **Benefits from community forest**

*Kalobhir CFUG*, with its internal fund and also in coordination with other GO and I/NGOs, is conducting various pro-poor programmes. It has invested a total of NRs 22500 in potato cultivation program covering 13 poor and very poor households. The money they took must be paid back to CFUG within two years through potato sales; and that money will then be provided to other interested poor users. They have supported five very poor users for goat farming by providing NRs 2000 for each. CFUG has provided NRs 300 per year as scholarship for three girl students from three very poor households. In addition, they have provided NRs 200 for four very poor users to improve their fuelwood ovens and also provided NRs 2000 to a user for ginger cultivation. Likewise, there was a provision of fund for those households who are willing to construct toilets.

In addition NSCFP has granted NRs 5000 each to 19 very poor users in order to purchase share in Nepali hand made paper enterprise and also trained interested very poor users in coordination with ANSAB to make paper. Three very poor users have been working in paper enterprise.

*Bhitteripakha CFUG* has also supported NRs 4858 for seven poor and very poor households for potato cultivation in 2006/2007. In addition, three users were provided NRs. 5000/ person for poultry farming with a support from NSCFP. Likewise, ten poor and very poor class users were granted NRs 2000 each for improved cattle farming. All these supports were conditional, and users must pay back the loan within three years after they start to get benefits.

In addition, there are also other pro-poor programs; such as investment on share (NSCFP has provided financial support of NRs 5000 and CFUG itself support NRs 1000 for each) in essential oil distillation enterprise and Nepali hand made paper for five and two very poor users respectively. Other benefits are employment of the poor in oil distillation and hand made paper enterprise. For forest development work and harvesting of timber, CFUG used to employ poor users. Last year, 30 users were involved in timber harvesting for 30 days at the rate of NRs 100

per day. In addition, CFUG has allocated piece of forest land for ginger, potato and NTFPs cultivation as pro-poor program though it is not defined in the CF legislation.

In this study, benefit from CFs is studied in terms of cash income and use of subsistence products. Cash income covers all income from selling fuelwood, NTFPs, and worked as labour in harvesting timber. In addition, it also includes income from forest based enterprise and IGA programs supported by the CFUG. Subsistence products are timber, fodder and leaf litter whereas fuelwood is used for both purposes. To calculate the benefit from fuelwood, quantity sold and used as subsistence is separated and calculated accordingly. Values of all forest products for subsistence use are calculated using different methods. The *surrogated pricing* method is used to estimate the value of fodder whereas the *market price* method is used to estimate the price of timber, fuelwood and NTFPs. Value of leaf litter is calculated using the *opportunity cost* method as it does not have any substitute product.

**Table 6: Share of community forest benefit**

Economic Status	Kalobhir CFUG			Bhitteripakha CFUG		
	Cash Income (%)	Subsistence Income (%)	Total Income (%)	Cash Income (%)	Subsistence Income (%)	Total Income (%)
Rich	20.9	29.6	26.0	10.6	28.8	23.7
Medium	13.0	33.5	25.1	17.0	32.0	27.8
Poor	45.1	21.5	31.2	49.1	25.1	31.8
Very Poor	20.9	15.4	17.7	23.3	14.2	16.7

Source: Household survey, 2007

### The annual benefit cost at household level

For benefit cost analysis, values of all major FPs and the benefit from IGA were calculated. The cost comprised of time spent for harvesting and transporting of FPs, time spent in institutional development (meetings) and forest development activities (silviculture work).

In *Kalobhir CFUG*, benefit from FP harvest is more than double the cost involved for all classes. Among four classes, rich has the highest ratio followed by poor which shows return on investment of the rich class is the highest that of medium and very poor class has least.

**Table 7: Economic class wise benefit cost ratio in Kalobhir CFUG**

<b>Economic class</b>	<b>Benefits (NRs)</b>	<b>Costs (NRs)</b>	<b>Benefits @ (NRs) 100 Cost</b>	<b>Net Benefits (NRs)</b>	<b>B/C Ratio</b>
Rich	20375	9771	236	10604	2.36
Medium	20414	9881	217	10533	2.17
Poor	23123	10104	232	13020	2.32
Very Poor	13605	6498	203	7107	2.03

Source: Household survey, 2007

In *Bhitteripakha CFUG*, benefit cost ratio is the highest (2.58) for poor and the lowest (1.78) for very poor followed by medium class. As medium and very poor have low benefit cost ratio, it means that their return on investment from CF is low compared to rich and poor.

**Table 8: Economic class wise benefit cost ratio in Bhitteripakha CFUG**

<b>Economic class</b>	<b>Benefits (NRs)</b>	<b>Costs (NRs)</b>	<b>Benefits @ (NRs) 100 Cost</b>	<b>Net Benefits (NRs)</b>	<b>B/C Ratio</b>
Rich	12078	6158	240	5920	2.40
Medium	21234	9318	233	11916	2.33
Poor	16465	7395	258	9070	2.58
Very Poor	9795	5543	178	4252	1.78

Source: Household survey, 2007

## 7.4 Contribution of CF in household income & inequality measures

### Contribution of CF on total household income

This section describes the contribution of cash and subsistence income from CF in total household income of users. For this study, total household income is disintegrated in following income sources; agriculture, livestock, off-farm and both cash and subsistence incomes from CF. Average income for each source were calculated for all classes.

### Sources of income of different economic classes

In both CFUGs rich class has dominated in agriculture and off-farm income. Furthermore, income difference among economic classes is the highest in off-farm income. However, medium class has the highest income in livestock income in the Kalobhir whereas in the Bhitteripakha again rich class has the highest income. In both CFUGs, poor has dominated in income from CF while very poor has the lowest income in all sources.

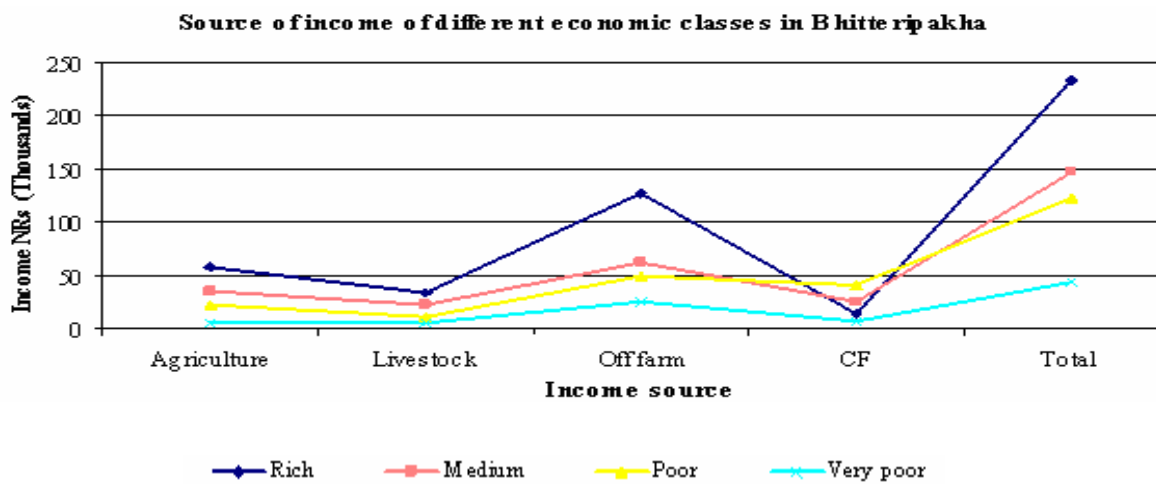
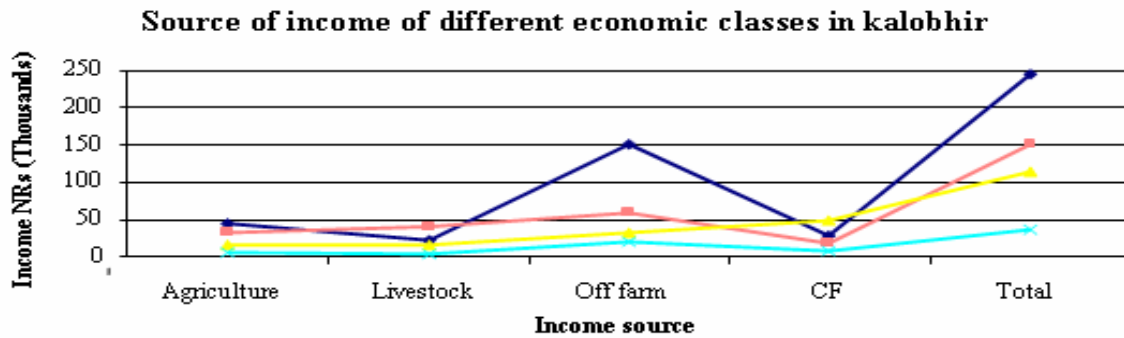


Figure 6: Source of income of different economic classes

Source: Household survey, 2007

### Share in total cash income and CF cash income

In both CFUGs, more than 50% of total cash income within the community goes to the rich class followed by the medium class. Very poor household has only about one-tenth share in overall cash income of community. However, in both CFUGs, share in total CF cash income of poor was the highest followed by very poor. In the Kalobhir, the medium class has least share in CF cash income whereas in Bhitte ripakha the rich has least share. It shows that, though the poor and very poor classes have very less share in total cash income of community but they have more shares in CF cash income.

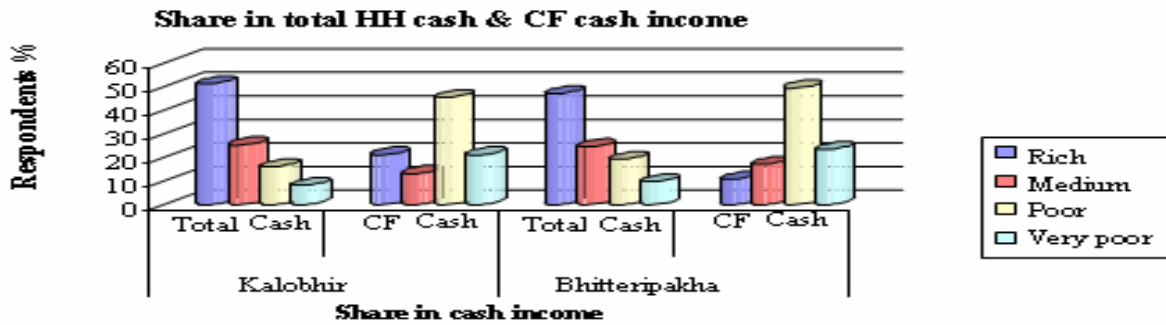


Figure 7: Share in total HH cash and CF cash income Source: Household survey, 2007

### Share of CF income in total household income

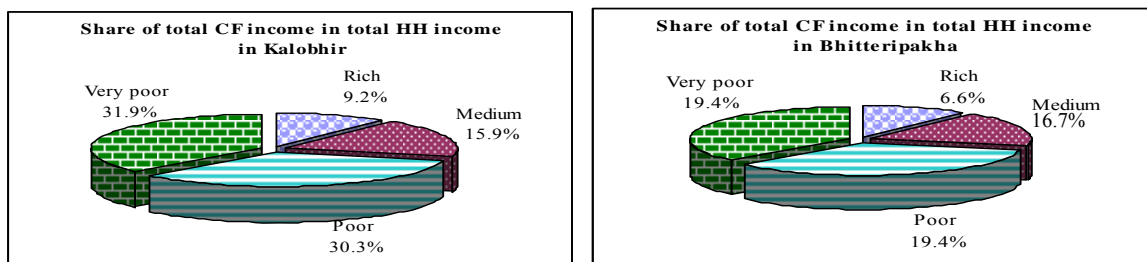


Figure 8: Share of CF income in total household income Source: Household survey, 2007

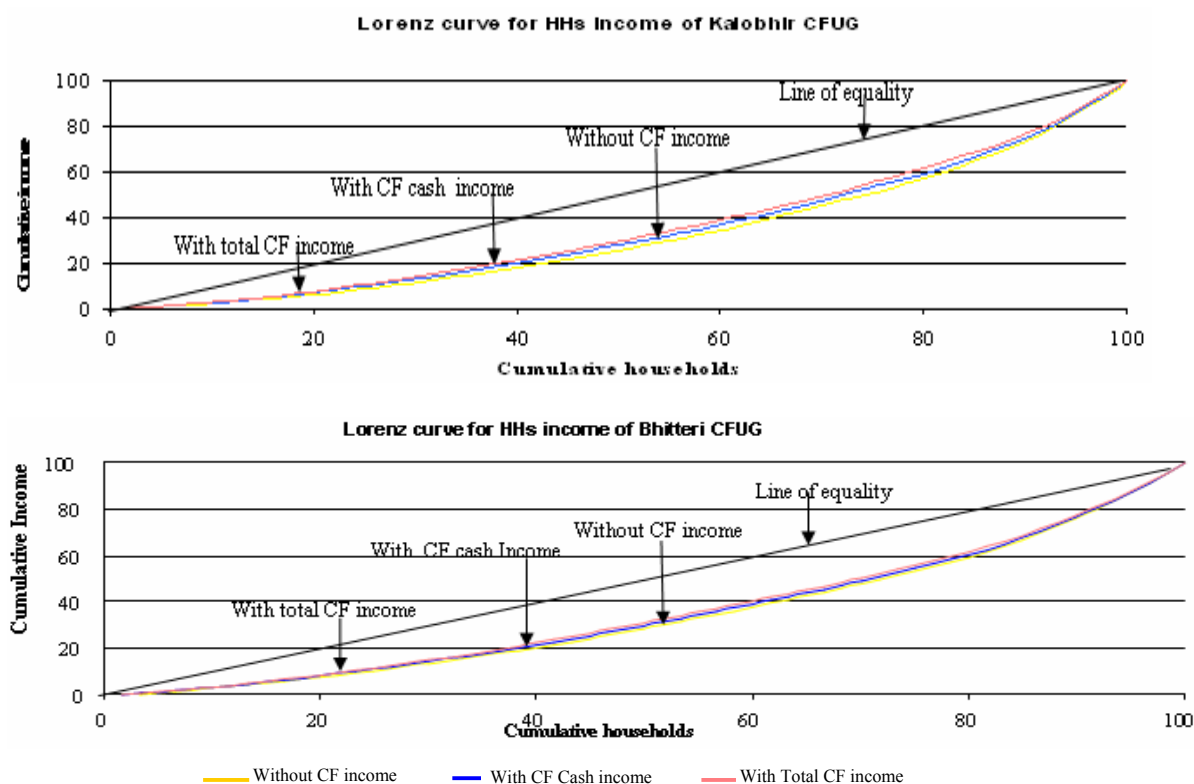
Figure 8 shows, in both CFUGs, contribution of CF income in total household income is the highest in poor and very poor classes. In the Kalobhir, CF income covers almost one-third of total household income of both the poor and very poor classes whereas in Bhitteripakha, it covers almost one-fifth of total household income. Furthermore, in both CFUGs, there is least contribution of CF income to the total income of the rich class. It implies that dependency on CF increased as economic status decrease.

### Income distribution and inequality measures

Both Lorenz curve and Gini-coefficients are used to show the income inequality among the sampled households. The Gini-coefficient is a number between 0 and 1, where 0 corresponds with perfect equality (where everyone has the same income) and 1 corresponds with perfect inequality (where one person has all the income, and everyone else has zero income).

Figure 9 represents the Lorenz curves for the households' income of both CFUGs when the community forest income is included and excluded in the total household income. The inner curve (towards the line of equality) represents the results when total CF income is included, the

middle curve represents when only CF cash income is included, and the outer curve (away from the line of equality) represents the results when the community forest income is excluded from total household income. Figure 9 shows, in both CFUGs, curves are closer to the line of equality when CF cash income is included in total household income. Furthermore, they are more close to the line of equality when total CF income is included in total household income.



**Figure 9: Lorenz curve for HHs income**

Source: Household survey, 2007

The Gini-coefficient is often defined from the Lorenz curve, but also can be derived directly. In this study it is derived directly by using the formula. The national Gini-coefficient of Nepal is 0.49 (FAO, 2004) whereas that of both CFUGs have quite low than that. So, it can be said that there is low income inequalities within different classes' households in comparison to the national level.

**Table 9: Gini-coefficient of two CFUGs**

CFUG	Without CF income	With CF cash income	With total CF income
Kalobhir	0.36	0.32	0.30
Bhitthari	0.32	0.30	0.28

Hence, it implies that inclusion of CF income in the total household income helps in reducing the income inequalities among the households. These values of Gini-coefficients or the departure of Lorenz curves from the line of equality (figure 9) clearly indicate the community forest income helps in reducing the income inequalities among the sampled households.

### Per capita income of individual

Per capita income is the annual income of an individual. In both CFUGs, per capita cash income from CF is the highest for the poor class. It is the lowest for the medium class in Kalobhir CFUG whereas in Bhitteripakha CFUG it is the lowest for the rich class. In case of total CF income, it is the highest for the poor and the lowest for the very poor in both CFUGs.

**Table 10: Per capita income by economic class of Kalobhir & Bhitteripakha CFUG**

Per capita income										
	Kalobhir CFUG					Bhitteripakha CFUG				
Economic class	Total income (NRs)	Total income per day (US \$)	CF cash income (NRs)	CF total income (NRs)	CF income per day (US \$)	Total income (NRs)	Total income per day (US \$)	CF cash income (NRs)	CF total income (NRs)	CF income per day (US \$)
Rich	45931	1.94	1388	4207	0.18	39834	1.68	326	2612	0.11
Medium	23973	1.01	812	3806	0.16	21446	0.90	485	2825	0.12
Poor	14345	0.60	2580	4346	0.18	17308	0.73	1479	3416	0.14
Very poor	8640	0.36	1340	2757	0.12	10312	0.43	780	1999	0.08

Source: Field data, 2007

In both CFUGs, poor has higher per capita per day income from total CF whereas that of very poor is least.

## 8 Discussions

### 8.1 Preferences for forest products

Many studies have shown that the variation in household economy is associated with difference of interest in the use of the FPs among users (Adhikari, et. al., 2004 and Poudel, 2003). In this study also, majority of the rich class has preferred timber followed by medium class (Figure 1 and 2). Although, in both CFUGs there is a provision of providing timber for very poor class without taking any fee, timber is a low priority for them. The very poor class is unable to construct big houses. Despite of having the special provision on timber, they are

deprived from getting benefit. It was observed that as economic status improves the preference on the timber also increased, showing a positive relationship between the preference and the economic class.

Fuelwood is preferred by all economic classes, none of the users except a few from the rich class have low preference. Despite various degrees of forest product dependency, all economic classes' rely on fuelwood for their daily livelihood (Adhikari et. al., 2004). Particularly in the mid-hills, 94% of rural households rely on fuelwood as primary source for cooking and heating (Edmonds, 2002). Fuelwood is not only important for cooking but also for protecting them from cold. Generally, poor and very poor household do not have sufficient money to invest in warm cloths for winter and hence use more fuelwood to make their children and themselves warm. Furthermore, fuelwood is also one of the major sources of cash income in both CFUGs. As Kalobhir CFUG is very close to *Jiri*, the second largest market of the district, there is high demand for fuelwood in hotels and private houses. Likewise, in both CFUGs, there is a paper making company which consume considerable amount of fuelwood. Generally, users from both poor and very poor classes are engaged in trading of fuelwood which has considerably positive impact on their livelihoods.

NTFPs collection is the most important rural livelihood strategy mainly for poor people. The poorest part of the Nepal hill population depends on NTFPs for income generation and subsistence use. Up to 50% of rural households' income is derived form commercial collection of NTFPs (Edwards, 1996). Usually, those users who don't have alternative cash income for meeting their basic need are found to be highly dependent on its collection, processing and trading. In this study, it is found that the poor and very poor respondents are generally engaged in harvesting of Argeli, Lokta, Chiraita, mushroom and other NTFPs. In Kalobhir, as the market is very close they have easier market access for the collected mushrooms than in Bhitteripakha. Not only that, but also mushroom is easy to collect than Agreli and Lokta which attract old and disable people also. In one study of mushroom collection in Nepal, Christensen et al., (2008) has also reported that mostly the poor are engaged in commercial trading of mushroom.

Another reason for being a high preference of NTFPs for the very poor class of Kalobhir could be because these users are getting profit out of their share in a Nepali hand made paper

company whereas none of the shareholders of a paper company of Bhitripakha are getting a profit out of their share. The middle class has a medium preference for NTFPs in both CFUGs as they are mostly involved in agriculture activities and very few are engaged in NTFPs collection and trading.

## **8.2 Participation and decision-making process**

Participation is one of the indicators to measure performance of CFUG. Active participation of maximum users, in every activity of CF, develops a sense of ownership feeling and is also an indicator of how successful the CF management is. Guidelines for the Community Forestry Development Programme, 1996 have also emphasised the importance of participation of local people in all activities of CFUG. Participation, in its true meaning, is not only physical presence of stakeholders but also the active involvement of each individual stakeholder in decision-making.

In both CFUGs, throughout 2006 to 2007, presence of the rich and medium class was less in GA and meetings. However, in both CFUGs, active participation, that is, participation at Citizen Power level is the highest for the rich class followed by the medium class. Approximately 50% of the poor and very poor remain quiet in GA and meetings (Figure 3). On an average, respondents show a greater degree of participation in forest protection and resource utilization than in decision-making (Chhetri, 2005). Like many studies regarding participation in CFUG (Hobely, 1997; Gauli and Parul, 2004), this study also found that the participation of the majority of the poor is limited to only being observers of the process.

In group discussions and also in informal talks, some of the poor class users had expressed their dissatisfaction with CFUGC members regarding their role in the decision-making process. CFUGCs are mostly dominated by the rich class of people. They want to put their agendas first in meetings and that of poor users seldom become important for them (Thoms, 2008). The result (Figure 4) also shows that more than two-third of the poor and very poor users who used to speak in GA and meeting reported that CFUG do not considered their voice and hence they are disinterested in active participation.

Though there is high domination of the rich class in CFUG's GA and meetings, there is not much variation in the level of participation among different classes in training/workshops and tours (Figure 5). Generally, these programmes were organized by I/NGOs and GOs, who try to ensure the participation of the poor class people. Frequent participation of the poor users in these programs has improved their confidence levels to speak in-front of people.

### **8.3 Benefit sharing of Community Forestry**

In both CFUGs, users are getting direct and indirect benefit from CF. Direct benefits are all cash and subsistence benefits from CF whereas indirect benefits are mainly benefits from the IGA programme supported by or through CFUG. Users are getting cash incomes from selling NTFPs, fuelwood and involvement in forest based enterprises. Users are getting subsistence products for HH consumption. Ray et al., (2002) mentioned that direct and indirect benefits from community forestry have played a great role in the social life of the people.

For total benefit from CF, the poor has the highest share followed by the medium/rich. It indicates that the poor have the highest dependency on CF for running their livelihoods. The very poor users are getting least benefit from subsistence products. Their involvement is found in cash earning activities such as NTFPs collection and processing as well as selling of fuelwood. In addition, their participation in different IGA activities supported by CFUGs helps to increase their share of cash income from CF. In Kalobhir CFUG, the very poor class are also getting profit from a paper company. As the very poor class also comprised of old and disabled people, they cannot be involved actively in cash earning activities in CF, hence despite having the lowest economic status, they have less of a share in cash income than the poor class. Acharya (2005) concluded in his study that community based forest enterprises could play an important role in socio-economic empowerment of CFUG members in the mid-hills. Similarly, Subedi (2006) also reported in his findings that enterprise-oriented community forest management can generate positive outcomes in both conservation and local livelihood.

## **8.4 Contribution of CF in HH income and in inequality measures**

### **8.4.1 Contribution of CF to total household income**

The contribution of CF income to the total household income is varied for different economic classes. In total income from CF, the poor has the highest share followed by the medium class. In many studies, it was mentioned that medium class people are getting more benefit from CF (Bhattarai and Ojha, 2000; Adhikari, 2004; Mahanty et al., 2006) whereas they are second in both CFUGs in this study. It could be because both studied CFUGs are in enterprise mode. They have forest based enterprises where poor HHs are engaged for harvesting and processing raw materials such as Lokta and Argeli. In addition, they are also involved in trading of fuelwood to both local market and enterprise. Hence, the majority of poor HHs in both CFUGs are involved in cash earning through trading of FPs and engaging in forest based enterprise (Table 6).

However, the contribution from agriculture, off-farm and livestock is found to be the highest for the rich class in both CFUGs except from livestock for the medium class in Kalobhir. This could be because the rich have more landholding and greater opportunities for off-farm activities while the poor have less land and also less access to high earning off-farm activities.

The very poor HHs has the lowest share on all sources of income including CF. However, CF has the highest contribution to the total HH income of the very poor and poor (figure 8). It means that the very poor and the poor have the highest dependency on the forest for their livelihoods. CF income has particular significance for the poorer households with little or no private land, as they are less likely to meet their needs from private resources (Paudyal et al., 2006; Cooke, 2000).

### **8.4.2 Income distribution and inequality measures**

In both CFUGs, the income inequality among the HHs increased when the total income from CF is excluded from the total HH income and vice-versa (figure 9). It implies that inclusion of CF income in the total HH income helps in reducing the income inequalities among the HHs. Similar studies carried out by Khanal (2001) had also shown that CF is playing an important role to decrease income inequality within CFUG. This could be due to the income contribution from CF is found the highest as economic status of users worst (significant @ 5%). For

example, CF has the highest contribution to the total HH incomes of the poor while the lowest for the rich (figure 8). Furthermore, Gini-coefficients are less for Bhitripakha than Kalobhir, indicating that there is less income inequality in Bhitripakha than in Kalobhir. It may be because some households of Kalobhir are residence of *Jiri* who are running businesses and hence have high income whereas all the HHs of Bhitripakha are from the village area with their major occupation being agriculture. Although, there is significant difference in CF income among classes, there is no significant difference when analysed with the grouping variable caste and household head (gender). With this, the third null hypothesis- there is no significance difference on total forest income among different socio-economic classes, is rejected for economic variable whereas it is accepted for caste and household head.

#### **8.4.3 Per capita income of individuals**

Higher per capita CF income of the poor in both CFUGs could be because the poor are receiving more cash and subsistence benefit as compared to other classes. The lowest per capita income for the very poor in total CF income is because they are taking less subsistence forest product from CF. Though the medium class has the lowest per capita cash income from CF, they have high per capita in total CF income indicating that their high dependency on the forest for subsistence forest product. According to the United Nation's Millennium Development Goal (MDG) any person living on less than one US dollar (NRs 65) per day is poor. In studied CFUGs, rich and medium classes have per day per capita total income higher than one US dollar, except in Bhitripakha for medium class which is slightly less. Per day per capita total income of both the poor and very poor is less than one US dollar. In both CFUGs, the higher contribution by CF for per day per capita of poor is helping, to some extent, to meet the first goal of MDG, which is the eradication of extreme poverty and hunger.

## **9. Summary**

This study has concluded that the preference over different forest products varied across economic classes. The preference is determined by various factors such as economy, livelihood strategy and landholding. The preference for fuelwood is determined by all above factors. The higher economic class users have access to alternative energy sources, Liquefied Petroleum Gas and a substantial requirement is fulfilled from private land. Hence, they have less preference for it whereas for the poor and very poor, fuelwood selling is one of the important

livelihood strategies. Economic factors are responsible for preferences for timber and NTFPs also. Timber is most preferred by the rich class as they have the capacity for constructing new houses whereas, the poor preferred NTFPs most as they have limited sources of income and hence adopt it as an alternative livelihood strategy.

It can be concluded that socio-economic dimension is also responsible for the participation. Although rich and medium class people have less presence in the GA and meetings, they have decisive roles in the decision-making process. However, the influence of external agencies such as I/NGOs and GOs has helped to increase the participation of poor and very poor in activities like training/workshops and tour.

Concerning benefit sharing, the rich and medium class are economically better off and having large husbandry are taking mainly subsistence FPs from CF. Whereas, the poor and very poor are taking more commercial FPs and are also involved in forest based enterprises. Statistical analysis also shows that there is a significant difference ( $p < 0.05$ ) in cash income from CF among different economic classes. The high benefit cost ratio of the poor indicates extracting commercial products from forest is more profitable than subsistence products.

User's dependency on the forest increases with the declining economic status. Statistically, it can also be concluded that economic class is responsible for the dependency of users in CF, whereas other variables such as caste and household head (gender) are not responsible thus are insignificant ( $p > 0.05$ ). In both CFUGs, Gini-coefficients of total HH income including cash and total CF income are lower than without CF income. With this, it can be further concluded that access of poor users in CF products helps to lower the income inequality in community.

Finally, this study cautiously concludes that community forest running in enterprise mode by commercializing its FPs as well as supporting pro-poor programme provides more benefit to poor users. However, a lot has still to be done to deliver benefit to very poor users. The very poor are still deprived of getting maximum benefit from CF and are actual needy for that. As CF income per day per capita is the highest for poor, CF is moving forward to meet the first goal of the MDG. However, the lowest value for very poor implies that CFUG is still unable to alleviate poverty of vulnerable groups so in future the community forestry programme must focus on the very poor class.

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