# FOREST RESOURCE INCOME VARIATION IN MID-HILLS OF NEPAL: A CASE STUDY FROM TWO CFUGS OF PARBAT DISTRICT, NEPAL

Ganesh Paudel

District Forest Office, Parbat, Government of Nepal

Corresponding author: ganesh_paudel009@yahoo.com

## Abstract

Inequality persists in Nepali society and various source of income including forest resource contributes to it. This study was conducted in two CFUGs of the Parbat district, Nepal and examines the variability in the forest resource income at the household level. Focus group discussion, Key informants survey and Household survey methods were employed to collect the primary data and random sample of 120 respondents were surveyed. Along with simple mathematical calculations statistical test ANOVA was performed for data analysis.Rich categories of users derive significantly more income from the CF than the middle and poor categories of users although being the larger share of CF income to the total forest income for poor users. The CF income also varies with the sex of the household head and caste of the users in absolute terms but not significant. The Gini coefficient of the income distribution is found 0.48, 0.34 and 0.31 for CF income, Private trees income and total forest income respectively. It is recommended to the CFUGs that the benefit sharing should be in the equitable basis for the sustainable use of the resources.

Key words: Household, CF, Private trees, Gini coefficient

**Introduction**

Community Forestry (CF) is often lauded as a successful intervention at macro level that heralds the Forest Sector of Nepal (Sharma, 2004).The CF program became one of the major forestry components aimed at managing rural forests for equitable sharing of benefits among stakeholders and sustainable management of forest resources (Acharya and Gentle, 2006). The forest resources have generally been improved and poor degraded lands are turned in the good forests. Besides the ecological improvement of the forest the income distribution aspect is also associated with the CFs.

The forest products are often very important as an economic buffer and safety net for poor household (Byron and Arnold, 1999) and CF has strong equalizing effect on the local income distribution (Chhetri, 2005; Ghimire, 2007; Baral et al., 2008 and Kafle, 2008).Although being widely acclaimed as the successful program and having equitable distribution of benefits inequity in CF in Nepal continues to exist in multidimensional forms and at different scales and intensities (Hobley, 1996 and Chhetri, 2005). Different categories of users derive the different amount of income from the CF. For some of the users CF could be the main source of the forest income and for some it has negligible share to the total forest income they derive. Income from CF increases gradually as one moves from the lowest to the highest income group (Adhikari, 2003). Based on the research in the 8 CFs Adhikari (2004) reported that on average wealthier households receive three times as much forest incomes as the poor. In Nepalese CF, there is reduced access to forest products and some poor households are facing significant problems in meeting their needs (Pokharel and Nurse, 2004; Baginski *et al.,* 2003) but due to theirs low income they derive greater share of their overall need of forest income from CF (Arnold and Townson, 1998).

Several studies, (eg. Malla *et al.,* 2003; Pokharel and Nurse, 2004; Pokharel *et al.,* 2007), highlight that poor users bear disproportionate costs of their involvement in the management of CF. The empirical evidences from several other studies (Reddy and Chakravarty, 1999; Escobal and Aldana, 2003 and Chhetri, 2005) confirmed that poor households derived a relatively large share of their income from forests compared to better-off households but poor households cannot internalized the benefits and are less benefited (Pokharel and Nurse, 2004; Adhikari *et al.,* 2004 and Chhetri, 2005). Dependency of poor on CF for their subsistence needs is higher than that of other groups (Hobley, 1987) but Gentle (2000) found that CF

program is widening the gap between the poor and rich people involved in management of CF.

Two school of thought have been emerging with regard to the benefit sharing of the CF. On the one hand several studies mentioned that CF has an equalizing effect on income distribution (Chhetri, 2005; Ghimire, 2007; Baral *et al.,* 2008 and Kafle, 2008) and on the other hand some studies mentioned that poor are getting deprived of taking benefits from the CF (Pokharel and Nurse, 2004) as it has limited the access to the poor because the decision-making forums are mostly dominated by elites (Baral *et al,* 2008). But limited studies quantify the net economic return from community and other forest resources. While studies on fuel wood or specific forest products have been conducted, censuses and surveys do not usually include information on household-level use or activities for a more complete range of forest products (Byron and Arnold, 1999). In this context it is necessary to have in-depth economic analysis of forest income received by different category of the users.

## Methods and materials

### Study area

The study was carried at the two CFUGs namely Salghari and Uppalopakha from Kurgha and Pangrang VDC respectively of the Parbat District. As most of the national forests of this district have been handed over as the CF (DFO, 2012) the CFUGs from this district were selected for the study.



### Research methods

Focus group discussion and Key informant survey were done in advance to the household (HH)  **Fig 1 Study area showing VDCs and CFUGs** survey to get the overall information about the CFs. Then HH survey was carried out to collect primary information from the user's household using questionnaire. The questionnaire
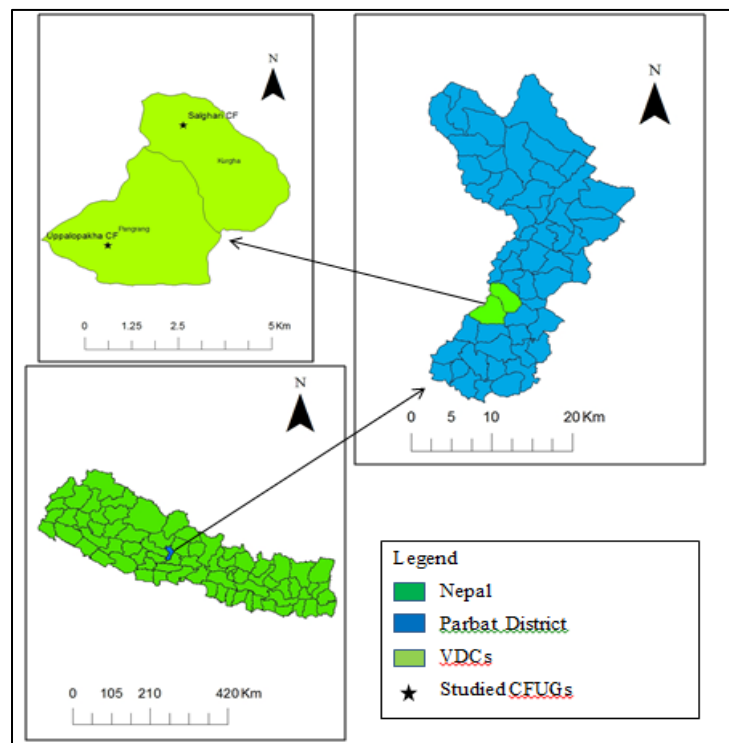
was structured with questions to gather information on household characteristics of respondents, quantity of major forest products consumed and sold in the market, wage rate, rate of forest products, participation in CF activities, etc.A total of 120 households from the 2 CFUGs were selected including at least 30 households from each wealth class with the sampling intensity of more than 20% as shown in Table 1.

**Table 1: Sampling frame showing the selection of the respondents**

| Name of CFUGs | No. of user's HH | No. of sample HH | No. of respondents by sex | | No. of respondents by wealth class | | |
|---|---|---|---|---|---|---|---|
| | | | Male | Female | Rich | Medium | Poor |
| Salghari | 413 | 95 | 47 | 48 | 25 | 31 | 39 |
| UpalloPakha | 97 | 25 | 13 | 12 | 5 | 9 | 11 |
| Total | 510 | 120 | 60 | 60 | 30 | 40 | 50 |

(Source; Field survey, 2012)

Various secondary sources of information such as CFUG records, research papers, journals, reports and articles were also reviewed to support the primary information.

The data obtained were fed into Ms-Excel and SPSS and analyzed accordingly. In addition to the simple mathematical calculations ANOVA was carried out to test the significance of difference in income between different categories according to different variables like, income class, sex, education etc. Price of the forest products were fixed according to current market price and opportunity cost.

Gini coefficient was calculated to find out the magnitude of inequality in the income. Following formula which was computationally more convenient method suggested by Deaton (1997) and used by Chhetri (2005), Baral (2007), Ghimire (2007) and Kafle (2008) was used,

$$G = \frac{n+1}{n-1} - \frac{2}{n(n-1)\mu}\Sigma\rho_i Y_i$$

where, i is the rank of individual i in the income distribution Yi counting from the top, so that the richest has the rank 1, second richest 2 and so on.

**Results and Discussions**

*Forest income and its variability*

CF is the major sources of fodder, fuel wood, timber and leaf litter to the users (Kafle, 2008).In this study only direct benefit from the forest resources are taken into consideration so obtained empirical figures could be lower than the actual benefit from the forest.

**Table 2: Annual average CF income and total forest income per household, and contribution of CF income to total forest income according to the household's categories (N = 120)**

| HH category | CF income (NRs.) | Total forest income (NRs.) | CF share to total forest income (%) |
|---|---|---|---|
| Rich | 2603.33 | 13351.33 | 19.01 |
| Middle | 1722.4 | 8366.28 | 20.01 |
| Poor | 1410.5 | 4281.3 | 27.06 |
| | | | |
| Brahamin/Chhetri | 2056.72 | 8920.46 | 22.87 |
| Janajati | 1447.69 | 9404.23 | 15.3 |
| Dalit | 1293.57 | 4367.32 | 25.66 |
| | | | |
| Male headed | 2044.1 | 8703.35 | 24.11 |
| Female headed | 1581.25 | 7117.58 | 21.29 |

(Source: Field survey, 2012)

Table 2 shows the average annual CF income, total forest income and CF income share to total forest income. In the Table 2 it has been revealed that the rich categories of the users derive the more income than the medium and poor categories of the users. The finding is similar to that of Richards *et al.,* (1999) and Adhikari (2003) in case of poor household which confirm that poorer households are currently benefitting less from CF mainly because they have livestock and farmland, which provide the main demand for forest products as input. Adhikari (2004), Pokharel and Nurse (2004), Chhetri (2005), Baral *et al.,*(2008), and Kafle (2008) also reported that poorer households are less benefitted compared to the richer households. Inequality is not only the matter of income variation between different well being class. Paudyal *et al.,* (2006) reported that substantial disparities also exist in terms of caste, ethnicity and gender. Similar to that in the study it was found that Dalit household derives the less income from the CF as compared to the other caste. Findings were consistent

with the result of the Adhikari (2002). Adhikari (2002) in his research found that lower caste and female headed households extract less form the CF than the upper caste and the male-headed households.

CF has 22.91% of share to the total forest income in the study area. The percentage share of CF income to the total forest income to the poor (27.06%) household is more than the middle (20.01%) and rich (19.01%) class of households (Table 2). Although the actual amount of income to the poor households is lower than the rich class households it has the significant impact on support to the poor households (Kafle, 2008). The findings of other several studies (Reddy and Chakravarty, 1999; Cavendish, 2000; Escobal and Aldana, 2003; Chhetri, 2005; Ghimire, 2007, Baral, *et al.,* 2008 and Kafle, 2008) also confirmed that poorer household derived a large share of total income as compared to the better-off households in the same community.

The one way ANOVA shows that CF income differs significantly with the income class of the users (Table 3), indicating that household from the different income class and managing different CF receive different amount of the income from the CF. Total forest income significantly varies with income class and caste (p-value >0.05). This is because on the one hand there is discrimination in CF benefit sharing and on the other hand poor and dalits owned less land hence low income from the forest.

**Table 3: Significance of CF income, total forest income and relative CF income by categorical variables**

| Categorical variables | CF income | Total forest income | Relative CF income |
|---|---|---|---|
| | F- values | F- values | F- values |
| Income class | 5.52* | 94.19* | 2.64 |
| | (0.005) | (0.000) | (0.075) |
| Sex of the household head | 2.46 | 3.641 | 0.744 |
| | (0.120) | (0.059) | (0.390) |
| Caste | 2.718 | 13.097* | 1.512 |
| | (0.070) | (0.000) | (0.225) |

Numbers in parenthesis show the p- values. *Significant at 5%

**Forest income decomposition and inequality measure**
**Table 4: Forest income decomposition and inequality measure**

| Forest type | Income (NRs.) | Relative income (%) | Gini coefficient |
|---|---|---|---|
| CF | 217521 | 22.91 | 0.48 |
| Private trees | 731735 | 77.09 | 0.34 |
| Total | 949256 | 100 | 0.31 |

Table 4 shows that the Gini coefficient for the total forest income in the study is found 0.31. The Gini coefficient of CF income is found 0.48 which is slightly less than the findings of the Kafle (2008) in three CFUGs of Gorkha. Kafle (2008) in his research found that the Gini coefficients were 0.51 and 0.39 for the CF income and income from private trees respectively. Similar to that the Gini coefficient of private trees income (0.34) is less than that of the CF income. Kanel and Sharma (2003) reported the higher inequality in private tress income as compared to CF income. But this study is case specific so the variation in result is obtained. All of the households don't extract the forest products in the same year that's why the Gini coefficient of CF income distribution becomes higher. Although having inequality itself in the CF income it helps to reduce the inequality in the total forest income in the study area. The Gini coefficient of total forest income is decreased from 0.34 to 0.31 when CF income is taken into consideration. From this we can say that CF has equalizing role in the forest income distribution at the household level. Previous researchers (Chhetri, 2005; Ghimire, 2007; Baral *et al.,* 2008 and Kafle, 2008) also reported the equalizing role of CF income on income distribution.

**Conclusion**

The study concludes that there is variation in the forest income in the rural households of mid-hills of Nepal. Rich and male headed households derive more income from CF as compared to the poor and female headed households. Forest income also varies with the caste of the users. Household from the lower caste i.e. dalits are less benefitted from the CF although they are already having low private environmental resources. To some extent CF have equalizing effect on the forest income among user households. Equitable sharing of CF benefit is recommended to reduce the inequality in forest resource income in the household level.

## References

Acharya, K. P. and Gentle, P., 2006. Improving the Effectiveness of Collective Action: Sharing Experiences from Community Forestry in Nepal. Collective Action and Property Rights (CAPRi) Working Paper No. 54, July 2006 pp. 2.

Adhikari, B., 2002. Household characteristics and common property forest use: complementarities and contradictions. *Journal of Forest and Livelihood* 2(1):3-14.

Adhikari, B., 2003. Property Rights and Natural Resources: Socio-economic Heterogeneity and Distributional Implications of Common Property Resource Management. Working Paper No. 1.03.South Asian Network for Development and Environmental Economics (SANDEE). Kathmandu, Nepal pp . 15-20.

Adhikari, B., 2004. Community Forestry in Nepal: Management Rules and Distribution of Benefits. South Asian Network for Development and Environmental Economics (SANDEE) Policy Brief, Number 1-04, March, 2004.

Adhikari, B., Falco, S. D. and Lovett, J.C., 2004. *Household characteristics and forest dependency: evidence from common property forest management in Nepal. Ecological economics* 48 (2): 245-257.

Arnold, M. and Townson, I., 1998. Assessing the potential of forest product activities to contribute to rural incomes in Africa. Natural Resources Perspectives, No. 37, Overseas Development Institute, London.

Baginski, O., Yadav, N. P., Dev, O. P. and Soussan, J., 2003. Community forest management in the middle hills of Nepal: the changing context. *Journal of Forest and Livelihood* 3(1): 5-20.

Baral, S., Sekot, W., and Vacik, H., 2008. Significance of Community Forestry for Rural Households: An Economic Analysis of Community Forest User Groups in Nepal. Department of Economic and Social Sciences, University of Natural Resources and Applied Life Sciences Vienna pp . 2-28.

Bryon, N. and Arnold, M., 1999. What futures for the people of tropical forest? *World Development* 27(5): 789-805.

Cavendish, W., 2000. Empirical regularities in the poverty-environment relationship of rural households: evidence from Zimbabwe. *World Development* 28(11): 1979-2000.

Chhetri, B. B. K., 2005. Community Forestry Programs in the Hills of Nepal: Determinants of User Participation and Household Dependency .M. Sc. Thesis, Norwegian University of Life Sciences (UMB) pp . 9-63.

DFO, 2012. Annual Monitoring Report of Community Forest Development Program at Parbat District. District Forest Office, Parbat pp . 1-5.

Escobal, J. and Aldana, U., 2003. Are non-timber forest products the antidotes to rainforest degradation? Brazil nuts extraction in Madre De Dios, Peru.*World Development*31(11): 1873-1887.

Gentle, P., 2000. The Flow and Distribution of Community Forestry Benefits: A Case Study from Pyuthan District, Nepal. M.Sc. Thesis, University of Canterbury, Christchurch, New Zealand pp. 50-80

Ghimire, G. P., 2007. Contribution of Community Forestry in Community   Development and Household Income: A case Study from Kavrepalanchowk District, Nepal. Master thesis, Tribhuvan University, Institute of Forestry, Nepal pp. 40-80.

Hobley, M., 1987. Involving the Poor in Forest Management: Can it be done? The Nepal Australia Project Experiences: Social forestry Network paper 5c. Overseas Development Institute, London, U. K. pp. 1-12.

Kanel, K. R. and Sharma, A.R., 2003. "Economics of private trees: Impact on Income Distribution" paper submitted to the XII World Forestry Congress, Quebue city, Canada.

Kafle, M. R., 2008. Contribution of Community Forestry to Users Household Income: A Financial Analysis, A case study from three community forest of Gorkha District, Nepal. M. Sc. thesis, Tribhuvan University, Institute of Forestry, Nepal pp .8-77.

Malla, Y.B., Neupane, H. R. and Branney, P.J., 2003. Why aren't poor benefitting more from community forestry? *Journal of Forest and Livelihood* 3(1): 78-90.

Paudyal, B. R., Neil, P. and Allison, G., 2006. Experiences and challenges of promoting pro-poor and social inclusion initiatives in user group forestry. *Journal of Forest and Livelihood* 5(1): 34-45.

Pokharel, B.K., Branney, P., Nurse, M. and Malla, Y.B., 2007. Community Forestry: Conserving forests, sustaining livelihoods and strengthening democracy. *Journal of Forest land Livelihood* 6(2): 8-19.

Pokharel, B.K. and Nurse, M., 2004. Forest and people's livelihood: Benefiting the poor from Community Forestry. *Journal of Forest and Livelihood* 4(1): 19-29.

Reddy, S. R.C. and Chakravarty, S.P., 1999. Forest dependence and income distribution in a subsistence economy: evidence from India. *World development* 27(7): 1141-1149.

Richards, M., Maharjan, M.R., Kanel, K.R. and Davis, J., 1999. Towards Participatory Economic Analysis by Forest User Groups in Nepal. Overseas Development Institute in collaboration with the Nepal-UK Community Forest Project, London pp.17-30.

Sharma, A. R., 2004. The Impact of Community Forestry on Income Distribution in the Mid-hills of Nepal. Research Proposal Submitted to Faculty of Humanities and Social Sciences of Tribhuvan University for Permanent Enrolment in Ph. D. in Economics pp . 31.