Livelihood Dependency and Inequality in Community Forests of Nepal

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Abstract

The objective of this study is to examine empirically the livelihood dependency and inequality of the community from the community forest in Nepal. This study used the follow up survey data in 2018 in the Kafle Community Forest of Lamatar-6, Lalitpur District, Nepal. The data was collected from household survey of 48 sample households. Gini coefficient was used as analytical tool. As the results, 67 percent households are absolute poor and 23 percent households are relatively poor. The poor households excessively and directly dependent on the forest products of the community forests for their daily livelihood objectives. This study found that community forests contributed 45 percent livelihood income (firewood, leaf litter, grass and water etc.) to the forest-dependent households, along with service and agriculture income sources. Labor contribution based proportional distribution was used to meet social and economic justice. The poor could get more benefit than the well-off households. Additionally, the study found declining inequality among households after being a member of KCF. Without the income of the community forests, the inequality was 0.99. With the income of the community forests, the inequality sharply dropped at 0.64. Thus, the community forests reduce income inequality and poverty level of the poor households with increasing livelihood security and support. Therefore, the community forests are an effective and collective action to sustainable forest management and livelihood security.

Keywords: *Public goods, Poverty, Property rights, Collectives, Forestry, Forest products*

JEL Classification: *H41, I3, P14, P32, Q23, L73*

Introduction

Community forests is a game changer approach to stop forest degradation and deforestation under sustainable forest management and to reduce livelihood

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vulnerability of the community at the grass root level in Nepal (MoF, 2021), like a best global practices of community forest management approach to improve livelihood of the people. In 1978, the government of Nepal enacted this approach under the community forest programme with the enactment of 'Panchayat Protected Forest Rules –1988'. Its duel major objectives were to reduce forest degradation from free rider of the local people and to improve livelihood of the community through sustainable forest management practices. Its core factor was transformation of property right to the community (Crooke, 2000; Dev, *et al*., 2003; Richards, *et al*., 2003; and Adhikari, *et al*., 2007). At initial time, it was not popular. In the post 1990 AD, the open politics openly devolved such process to the community along with the leasehold forest management. In these process, there was a massive poverty at 42 percent with huger and unemployment issues (NPC, 1992). Simultaneously, it is also mentioned that 29 percent forests land with the higher rate of forests degradation from free riding (MoF, 1992; Bista, 2011). As an appropriate solution, the government used the community forests approach and movement. In recent years, it was popular and successful module to stop forests degradation and sustainable management of forests in order to reduce livelihood vulnerability.

In this non-market approach, the policy makers assume over dependency of the community on forest resources as a major cause of free riding in the extraction of forest goods and services without thinking its degradation and the relationship between forests and their livelihood and socio-economic security. It is argued for property right and collective action in the community forests. Over 50 years, the experiment of property right and collective action to forest user group (FUG) is a successful to stop free riding in the forest and to distribute the forest products with equity and justice approach to all individual members in the sustainable manner and so on. MoF (2021) reports 40.4 percent forest land, along with 4.4 percent shrubs. In this recovery of the forest, the community forest has a big contribution with their stakeholders. Out of total forest, the community forest shares 2.49 million hectares with 22682 forest user groups all over the country (MoF, 2021). No doubt, each community forest has contributed multiple environmental public goods and services having capacity to sequester carbon stock in the atmosphere to stabilize climate change and disasters to some extent. However, valuation of the environmental public goods is still virgin issue to assess the holistic non market and market value of the community forest.

Review of Literature

Thoms (2008) noted in the assessment of the impact of community forest on livelihood, there is a direct and indirect benefits of the community forest having a wider impact on livelihood of the community. In direct benefit, timber, fodder,

construction materials, saleable products, medicines, bedding for animals and leaves for composting whereas the indirect benefits include ecological services. DFID (1999) found direct benefits of the land and trees on income and the people's livelihood, along with indirect benefits of nutrition cycle of soil. Paudel (2011) found a similar positive impact on basic needs of the community through energy, water, transport, communication and housing. Poudel (2006) validated it through the study on CFUGs in Baglung District and the study argued 60 percent people having positive perception on the positive contribution of the community forest.

Specifically, Shackleton et al. (2007) found one sixth to one quarter of total livelihood income as the share of forests in the study of forests and livelihoods in South Africa. In the study, they found stable and reliable livelihood contributions of forests. It argues positive impact of the community forests on the livelihood income of the community. Similarly, Ellis (2000) and Rai (2017) mentioned the positive impact of the community forests on his five livelihood assets, human, social, financial, natural and physical capital, and income generating activities. Similarly, Shanhbaz et al. (2012) showed the growth of financial and human capital of the community from the community forests.

Pokharel and Nurse (2004) argued proofs with a positive change in forests and availability of forest products and found positive impact of the community forests on time endowments for collecting forest products. Similarly, Yadav et al. (2003) found positive impact of the community forests improving forest resources with declining open grazing land, un-regulating extraction and illicit over three years in 11 different community forests. Ojha et al. (2009) found that the 46 percent of the poor FUG members had moved to higher wellbeing category as a result of their participation in CF programme within five years of time. Baral (2008) found increasing total income of the CFUGs by 61 percent over five years.

Ghimire (2006); GACF (2011); Adhikari (2011); and Adhikari (2014) found that the community forests had a positive impact on the livelihood of the rural people of the FUGs and the participation of the community forestry in decision making and FUG generating. In the assessment of community forests and its impact on livelihood of the community, most literatures reveal holistically positive but they are silent what is its market value such livelihood support and income of the community. In this gap, this study is relevant.

Objectives

The general objective of this paper is to study empirically the livelihood dependency of the community Forest User Groups (CFUGs) on the community

forest. Its specific objectives are as follows: a) to explore livelihood resources and endowment of households, b) to assess livelihood dependency of the CFUGs on the community forest, and c) to find out policy suggestions.

Methodology

Gini Coefficient Method

In community forests, the FUGs is a major stakeholder as well as major beneficiaries. The non-market forest products including *fruits*, *grass*, *herbs*, *timber*, *and fuel wood* are benefits directly to the member of FUGs without their economic values, along with indirect benefits of positive externality including *greenery, water, oxygen, wildlife*, etc. without market values. In the market values, these forest products have supported their livelihoods as well as income generating which have reduced livelihood vulnerability and inequality of the members of the community forests. Therefore, Gini coefficient method is relevant to the income distribution effects of the community forests and the sensitivity level of households.

The Gini coefficient value provides sensitivity of household. It is derived from Lorenz Curve and measuring the ratio of area between Lorenz Curve and the line of perfect equality distribution. Its value lies between 0 and 1. If the value is near 1, it indicates higher inequality but if it is near zero, lower inequality occurs. This method is very popular to measure poverty and inequality (Jiandong et al., 2014; Bista, 2005; Bista, 2019).

$$\text{Area of Lorenz Curve} = b1 / b1 + b2 \ldots\ldots\ldots\ldots (1)$$

$$\text{Gini Coefficient} = 0.5 \text{ Area of Lorenz Curve}$$

Where, b1 = First area of Lorenz curve (percent)

b2 = Second area of Lorenz curve (percent)

In the way of computation of Gini coefficient, household income is arranged from smallest to largest. Then, the data were grouped into quartiles having 20 percent each quartile of total income. Then, the sum of each quartile was calculated and cumulatively sum in percentage. It gave Lorenz Curve. Then, above mathematical equation provides Gini coefficient (Equation - 1). In addition, another Gini coefficient formula is also used as follows.

$$G1 = 1 - \Sigma (xk - x \, k-1) (yk + y \, k-1) \ldots\ldots\ldots\ldots\ldots (2)$$

Where, G1= Gini coefficient, xk=cumulated proportion of the population for k=1----n and yk = the cumulated proportion of the income variables for k = 1----n,

Data Sources and Sample

Data set for this study is primary. The primary data was collected through household questionnaires survey. The survey was conducted to 48 households as stakeholders of Kafle Community Forest (KCF) in Lamatar Village in 2018 (April-May-June) as the follow up survey in 2010. KCF was selected with the following rationales as follows: Firstly, KCF had a community forest management's 10 years long history and involvement in carbon inventory and activities with NGOs and INGO. Secondly, KFC was selected on these relevancy grounds to REDD. As stakeholders, there was assumed variation about community forests management participation and dependency and knowledge of REDD and heterogeneity in household socio-economic characters. Thirdly, the study site was visited for pre questionnaire test, understanding households, and carbon inventory. Thus, KCF was finally selected for the conducting household stakeholder survey and carbon inventory survey.

Its sample size was decided by using statistical method based Cochran (1977)'s Sample Size calculation method and then random sampling method to select sample house. In the second level, sample size of the study was 48 households out of 63 total household's stakeholders in KCF as user's groups after the required pre-information was collected from the Village Forest Range Post and Executive Committee of KCF user group to conduct a household stakeholder survey and carbon inventory survey. It covers approximately 70 percent of household stakeholders of KCF.

In the third level, the household questionnaire survey was conducted with the help of a KCF executive members. The survey was conducted by coding household stakeholders during three months (April-May-June). The questionnaire which was used in the household survey is divided into three sections: section 1: basic information about household socio-economic, and section 2: household participation and dependency in KCF. The survey had also focused to find out the impact of the community forest on livelihood and inequality.

Features of the Study Area

Features of Kafle Community Forests (KCF)

KCF is located at Mahalaxmi Municipality - 6, Lamatar Village, Lalitpur District (*Map - 1*). The selection of this community forest is because of its representative characteristics of the community forests, deforestation history but successfully avoided deforestation, higher livelihood dependency of the poor households, documentation of plant species, activities of carbon inventory, and easy accessibility.

Map 1: Mahalaxmi Municipality, Lalitpur District
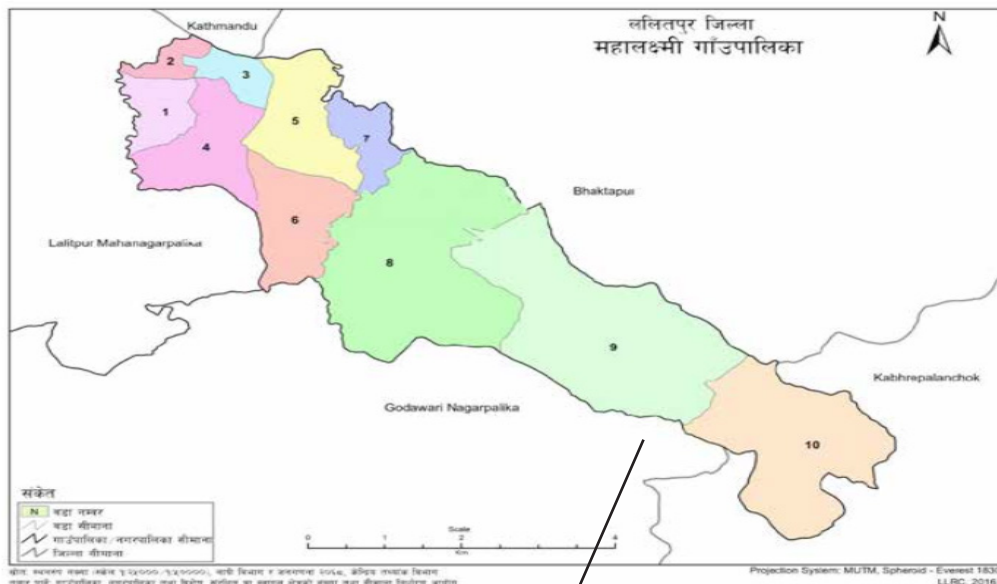
Map 2: Kafle Community Forest, Ward No 9, Mahalaxmi Municipality

Source: Raghu Bir Bista, 2010 based on Original Local Map of KCF
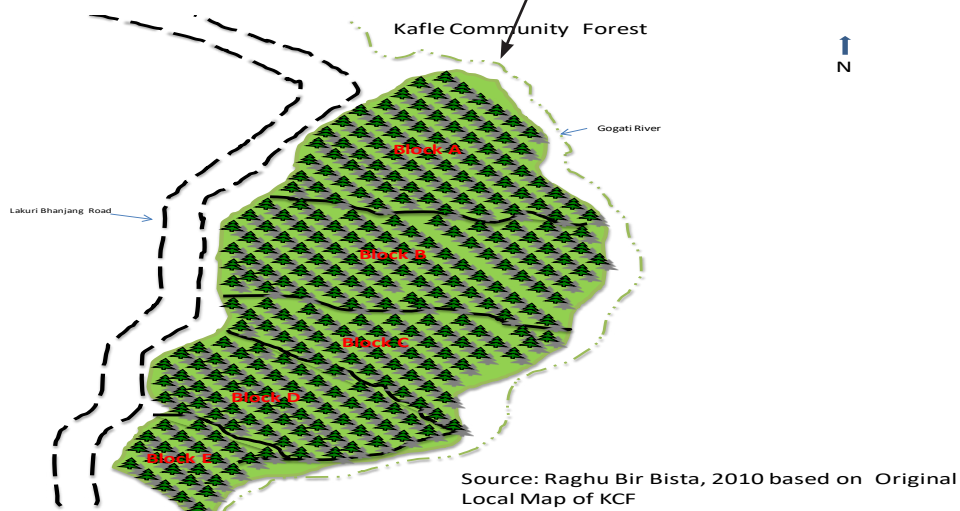
Mahalaxi Municipality is one of six major municipalities of Lalitpur district. In the district, geological location of the municipality lies in Kathmandu Valley locating the Bagmati Province. Its boundary is with Lalitpur Metropolitan City in the west, Lalitpur Metropolitan City and Godawari Municipality in the south, Madheypur Thimi Municipality and Suryabinak Municipality, Bhaktapurin in the north and Panuti Munciaplty, Kavrepalanchok in the east (Map 1). The geographical area of the municipality is of 26.5 km² at 1564 meters' elevation

(MM, 2075). In the municipality, there were 10 administrative units as wards. Out of 10 wards, ward no 9 was the study areas where about eight community forests were registered. Out of these community forest, KCF was one of community forest of the municipality (MM, 2075).

The KCF was a block of 96 hectare managed by 63 households of ward no 9, Mahalaxmi Municipality (Map 2). KCF shares a boundary with Mathilo Khoriya Dada in the east, Gumati Khola in the north, Chisapani Peepal Tree to way to Bhihawar in the South, and the main road to Khatri Bhajho in the west (MM, 2075). The altitude of KCF was in the range from 1,540 meters to 1970 meters (MM, 2075). With the objectives of forest management and utilization, The KCFUG divided KCF block into five blocks as A, B, C, D, and E with the area of 20, 31, 27, 6, and 10 hectares respectively (Map 2). Feature of the forest was of mixed type regenerated trees dominated by lower temperate broad-leaved species, particularly Schima-Castanopsis (Katus - Chilaune). In KCF, 52 species of NTFPs were listed. (DFO, 2002). The elevation of the forest was between 1,830 and 1,930 meters.

Institutional Characters

Basic motivation of the need for the collective institution was higher deforestation from over-extraction and free riding under open access and public regime in 1980s, along with the scarcity of firewood, leaf litter, grass, water resources, etc. following discussion with KCF executive. The need for FUG institutions was for collective action for forests management, conservation, and utilization. For the collective decision process, all households (nearly 63 households) gathered and reached to form a FUGs known as KCF user group following the Forest Act -1993 and the proceedings of the community forest programme. This institution is called the common property rights regime (CPRR). The property right of the local Kafle forests was legally transferred to the community for three-tier objectives: conservation, management, and utilization. In addition, the institution must encourage effective community participation and follow democratic norms, values, and systems.

Structural analysis of KCF shows the two-tier systems like 'General Assembly' and 'Executive Body'. As per by laws, the features of 'General Assembly' are similar to the general gathering of the community with legitimate power. The General Assembly is normally mandatory to the executive body and the institution once a year. Its major work is to select or elect 11 members of the executive body to govern the institution. Major work is to take a collective decision on policy, budget, and election of the executive body in the active participations of stakeholders (KCFWP, 2007). The major responsibility of the executive body is to execute the decision of the General Assembly. Its meeting is held per month. Major work of the executive body is to protect the forests, proper utilization of forest products, and other functional activities.

Household characters of the institution was homogeneity in upper-caste *Brahmin*. However, their socio economic character was heterogeneity. The majority of households lived below less than 12 months of food sufficiency. Therefore, the objectives of KCF user group was to improve livelihood objectives like fuel wood, fodder, grass, leaf litter, etc. (KCF, 2007).

Self and Collective Governance

It is the basic governance system of KCF user group as per endorsed by the community forest management approach. KCF user group as the institution followed collective decision and action as per mandatory to reach out policy decisions and execution at the grass root level. The 'Operating Plan' of KCF was prepared in 2005 and executed for five years. In KCF, collective action was a rule and regulation to forests protection and management.

Forest Protection

It is an important dimension to forest management in which free rider is considered as major driver of deforestation through encroaching natural growth of forest resources and excessive exploitation as possible as they can without pay. Forest protection aims to control free riding including the prohibition of grazing, poaching of wild animals and plants, illegal cutting, mining, encroachment, and patrolling from illegal extraction. In KCF, user group endorsed it strictly with prohibition, fines and punishments. Besides, the proper distribution of livelihood forest products was regulated and managed. In the distribution of NTFPs, there was the rule of extracting about 1000 kg. of green fuel wood, 500 kg. dry fuel wood, 500 kg. grass fodder, and 1000 kg. leaf litter, and 500 kg. *Nigalo* every year. Besides, on special occasions, any member was allowed to extract 350 kg. fuel wood for the same price like marriage, religious ceremony, or funeral.

Forest Management

KFC has 96 hectares of forests. The KCF land was categorized into five blocks for these activities in the support of NGO, CBO, and District Office of Forest. KCF using modern scientific techniques of forest management had established a 'Demonstration Plot' of 0.08625 hectares in 2002 and extended it to 1.64 hectares. In the plot, there were planted with 787 seedlings and 46 plots size NTFPs like *Chialune, Jingaine, Hinguwa, Angari, Bakle, Laligurans, Lakuri, Saru,* etc. KCF had further extended the size of a 'Model Plot' by planting different medicinal and other NTFSs. In addition, KCF planned to develop a 'Model Community Forests' based on the experiences of the KCF. The forest management activities of KCF was comprised of cutting, cleaning, thinning, pruning, and planting as a part of collective action.

Estimation and Discussion

Descriptive Statistics of KCF and Forest User's Groups (FUG)

This section presents descriptive statistics of KCF households with their household resources endowments, household socio-economic condition, HH size and composition, and household economy discussed.

Household Resource Endowments

Table 1: Household Resource Endowments

Land Holding	Mean	Standard Deviation	Minimum	Maximum
Irrigated land	2.7	2.0	0.1	10.0
Marginal land	2.3	1.6	0.1	8.0
Livestock Keeping				
Cow / buffalo	1.57	0.5	1	2
Goat / Sheep	2.73	1.5	1	6

Source: Field survey, 2018.

In household resource endowments, the study found '3Ls' variables: land, labor, and livestock (Table 1). In the survey, almost households considered land and livestock as major assets with the belief that more assets mean more wealth as shown in given Table 1.

In Table 1, landholding that is valuable reproducible assets is 2.7 *Ropani* (0.2 hectares) and mean marginal landholding is 2.3 *Ropani* (0.17 hectare). In total, per household holds 0.37 hectares below national average 0.5 hectares. It means almost all households are small landholders having economic vulnerability. As supplementary, in livestock asset, mean number of cow/buffalo is 1.57 and mean number of goat/sheep is 2.73. Thus, household resource endowments indicate the characteristics of poor households.

Table 2: Household Composition and Demography

Description	Mean	Standard Deviation	Minimum	Maximum
Household Size	4.85	1.42	2	9
Male	2.48	0.88	1	6
Female	2.46	1.009	1	5
Education				
Literate	4.45	1.54	1	9
Illiterate	1.04	0.21	1	2

Source: Field survey, 2018.

Household (HH) Size and Composition

The mean household sizes are 4.85 (Table 2) in the range between 2 and 9 family members. The average household size is smaller than national household size (5.4) (CBS, 2011). As per population policy, it is a good indicator. It is different across different income groups. The household size of the rich income group is smaller than the poor and medium-income group. In KCF, larger households of the poor and medium-income group are a major source of labor endowments in the forest management and conservation. Thus, the correlation between HH size and labor endowments in the forest is observed in different kinds of literature. In sex composition, household has of 50 percent male and 50 percent female. It is better than national composition (male 49 % and female 51%). There is not so much difference. Mean Male size is 2.48 and mean female size is 2.46. Sex ratio is 1.008.

Household's Economic Condition

Table 3 shows the poverty scenario and food sufficiency across income groups, education, and sex. In poverty measure, relative poor is 32.6 percent HHs and absolute poor is 67.38 percent HHs following per day earning poverty line of the World Bank (1.9US $) despite higher literacy level.

Table 3: Poverty Scenario

Poverty	Relative poor	Absolute Poor
Mean	5.06	14.17
Standard Error	0.419	1.31
Standard Deviation	1.6	4.18
Population	76	157
Percent (%)	32.62	67.38

Source: Field survey, 2018.

Besides, 12 months' food sufficiency measure that is a popular poverty measure in the action research and project of the developing countries shows 66.6 percent less than 12 months' food sufficiency (Table 4). Majority of HHs are absolute poor having the constraints of resource endowments. They have not livelihood alternative to meet their food deficit months, except for KCF.

Table 4: Household Socio Economic Condition

HH Categories	No of HH	Average Size of HH	Average food Sufficiency	
			12 Months	Less than 12 month
Economic				
Poor	12	4.9	4	8
Medium	25	4.9	8	16
Rich	11	4.58	4	8
Education				
Literate	45	4.35	15	29
Illiterate	3	0.5		3
Sex				
Male	45	2.37	12	26
Female	3	2.45	3	6

Source: Field survey 2018.

Household Participation

Table 5 shows HH participation in KCF in percent. It is an important indicator because the community forests are the people participatory model. Higher and medium participation in percent can be considered as effective participation but lower and none measures cannot be considered effective participation.

Table 5: Household Participation (in Percent)

Participation	Higher	Medium	Lower	None
Decision Making	29.5	43.2	25	2.2
Development Activities	28.8	53.3	17.7	
Forest management	27.2	56.8	15.9	
Forest Protection	29.2	56.1	14.6	
Resource Utilization	16.2	60.46	16.29	6.9
Training	15.9	40.09	34.09	9.09

Source: Field Survey, 2018.

HHs participation in forests protection activities is 85.3 percent, followed by 84 percent in forests management, 82 percent in development activities, 76.6 percent in resource utilization, 73.0 percent in decision making, and 55.99 in training. These measure values indicate the effective participation of households in terms of labor contribution and attendance without market value of labor (Opportunity cost of labor).

Household Livelihood Dependency

In Nepal, community forests are perceived as alternative livelihood local resources for the poor (NPC, 1997). It is followed by KCF households for meeting their basic demand of fuel energy, fodder, leaf litters, clean drinking water, etc. as shown in the Table 6.

Table 6: Descriptive Summary of NTFP Extraction

Forest Products	Minimum	Maximum	Mean	Standard Deviation
Firewood	0	100	16.4	18.0
Grass	0	40	4.4	5.6
Leaf litter	0	50	7.6	12.9

Source: Field Survey, 2018.

The table shows that there are 16.4 *Bhari* (656 kg.) mean firewood extraction, 4.4 (176 kg.) *Bhari* mean grass, and 7.6 *Bhari* (304 kg.) mean leaf litter. There is a maximum of 100 *Bhari* (4,000 kg.) extraction of firewood followed by 40 *Bhari* (1600 kg.) grass, and 50 *Bhari* (2000 kg.) leaf litters. The FUGs has the constrained average demand to maintain sustainable forest management and equity and justice in the distribution of this forest products per household basis. In case of higher demand of forest products, the concerned household should pay nominal charges above the constraint demand curve following the charge per *Bhari*. Despite household dependency on leaf litter, grass, and firewood, a household's dependency on firewood for household energy consumption for heating and cooking is greater than on other NTFPs (leaf litter, and grass etc.). So far concerning about firewood, the households are very happy with the availability of firewood and not required more time allocation for firewood collection. In addition, almost every household uses firewood for household energy, instead of gas. Energy expenditure of households is claimed 70 percent less than their demands.

Similarly, the community has observed water resource availability in terms of higher scale and good quality in KCF after KCF has been regenerated and rehabilitated. The additional natural resource has a positive externality to the community in terms of free clean drinking water against the same opportunity cost of their labor for KCF management and conservation. The scale of clean drinking water is for 24 hours. This free public good is supplementary livelihood to the households.

Table 7 shows that monetary benefit value from KCF that is Rs 182,797.9 per annum. Mean income of KCF is higher than mean income from service and agriculture sectors.

Table 7: Annual Income of Sample Households from Different Sources (NRs.)

Income Source	Minimum	Maximum	Mean	Standard Deviation
Service	0	726000	179958.3	133483.1
Agriculture	- 1000	268800	41122.55	46675.5
CF	73000	328500	182797.9	52003.4
Total	72000	1323300	403878.8	232161.9

Source: Field survey, 2018.

Higher income of community forests shows the alternative livelihood sources having a substitution of huge economic value supplementary in terms of energy, chemical fertilizer, clean drinking water supply and other facilities. This is the motivation part behind the household's participation in KCF. It could be said that there is an equal participation in forests protection and management activities along with optimal distribution of forest protects among FUGs.

### *Share of Income of CF and Gini Coefficient*

Share of CF income and decomposition of household income are presented in Table 8.

Table 8: Share of Income and Gini Coefficient

Sources of Income	Total Income (in '000')	Share of Income (%)	Gini Coefficient
Without CF income			0.99
Service	8638	44.65	
Agriculture	1932.67	9.99	
With CF income			0.64
CF	8774.3	45.35	
Total	19344.37	100	0.81

Source: Field Survey, 2018.

Table 8 shows three major income sources like service, agriculture and community forests. in KCF user group. Individually, the calculated share of income of community forests is approximately 45.39 percent which is highest of all. Total income of HHs without community forests indicates approximately 53 percent having 0.99 Gini Coefficient. But including income of community forests, Gini coefficient becomes 0.64. Livelihood contribution of KCF is inevitable to meet daily livelihood and reduces inequality among households.

Figure 1: Lorenz Curve
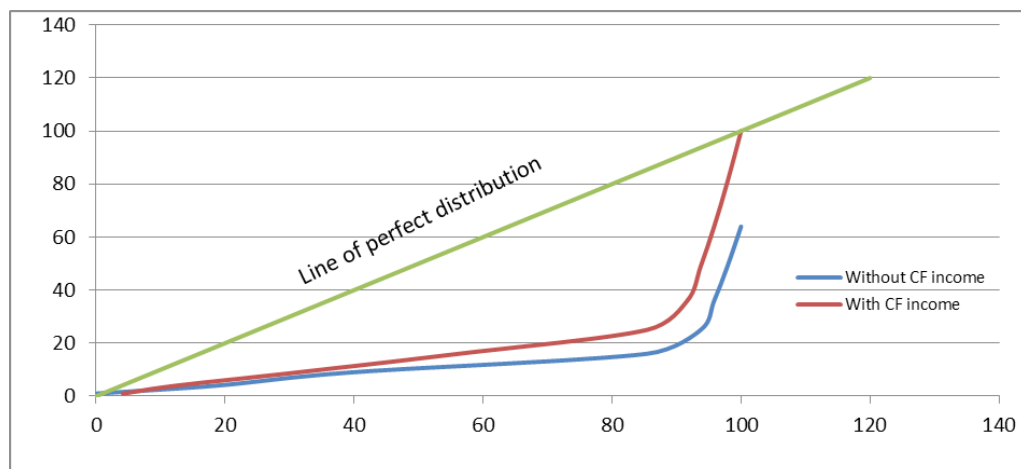
Source: Authoer's calculation.

Figure 1 is the Lorenz Curve which shows inequality, state, and income of community forests. The mid line in the Figure-1 is known as line of perfect distribution. Red line represents included income of community forests. Similarly, blue line represents excluding income of community forests. In the graph, including income of community forests indicates less inequality among household members. It provides evidences of effective livelihood role of KCF in Lamatar. This result is similar with the result of livelihood contribution to the local households (Schweik et al., 1997, 2003; Jackson et al., 1998; Gautam et al., 2002; Adhikari et al., 2007; Kanel, 2008; Tachibana and Adhikari, 2009; Pandit and Bevilacqua, 2011, Gurung et al., 2013, Ojha et al., 2014), along with social inclusion of marginal and untouchable community. However, these literatures have not quantified inequality reduction. Therefore, the result is quite specific more than the existing literatures.

Conclusion

The study assesses the impact of community forests on livelihood and inequality of the community forests in Nepal with reference to KCF as the test of the collective action and decision used as policy instruments of avoiding deforestation for livelihood objectives. As the results, per household holds 0.37 hectares below national average 0.5 hectares. It means almost all households are small landholders having economic vulnerability. As supplementary, in livestock asset, mean number of cow/buffalo is 1.57 and mean number of goat/sheep is 2.73. Thus, household resource endowments indicate the characteristics of poor households. Similarly, the household size of the rich income group is smaller than the poor and medium-income household group. In KCF, larger households of the poor and medium-income group are a major source of labor endowments

in the forests protection and management. In poverty measure, relative poor is 32.6 percent HHs and absolute poor is 67.38 percent HHs.

Its reflection is more than 80 percent HHs participation in forest protection, management, and resource utilization. Despite household dependency on leaf litter, grass, and firewood, a household's dependency on firewood for household energy consumption for heating and cooking is greater than on other NTFPs (leaf litter, grass, and etc.). The poor households are more dependent on the community forests for NTFPs. Their monetary benefit value from KCF (e. i. Rs. 182,797.9 per annum) is higher than mean income from service and agriculture sectors. The share of forest products is approximately 45 percent. Total household income without community forests indicates about 53 percent household income with the value of 0.99 Gini coefficient. But if the income of community forests included, the value of Gini coefficient becomes 0.64. Livelihood contribution of KCF is inevitable to meet daily livelihood and reduces inequality among households. Included income of community forests shows the less inequality among member households. It provides evidences of effective livelihood role of KCF in Lamatar village.

In conclusion, the community forest has a positive impact on livelihood security reducing poverty and inequality. Therefore, the community forest is an effective collective action to sustainable forest management and livelihood security.

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