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# Environmental Investment in Community Forest Management (CFM): Its effects on Social Protection of the poor households of Mid Hill Nepal

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## Abstract

*This study investigates empirically what is investment of local community in community forest management and conservation in mid hill Nepal by using descriptive statistics based on primary data sources. This study results that poor member of the community invests in forest management and conservation more than rich. However, economic and forest product benefits return of the community forest to the poor is less than the rich. Its implication on social protection of the poor households is negative more than the poor households.*

*Key Words: environmental investment, local community, community forestry, social protection, Nepal etc.*

## 1. Introduction

Environmental investment of local community is an important financial source in community forestry management and governance. In Nepal, it is identified as a cost of local community's participation for property right in forest management and utilization for getting opportunity of alternative income, employment and fuel wood energy (Bista, 2008, Bista, 2011, Bista 2011c, Bista, 2011d, Bista, 2011e & Bista, 2011f). Annually, it grows in CF with respect to the growth of trees density and coverage, the requirement of regulation and risk management. Mostly, individual member of community forest user group deposit regularly average US\$ 2 per month in Community Forestry Fund and provides mandatory labor endowment in tree management (nursery management, sidling, plantation, cutting etc.) and day and night regulation for controlling illegal access and ride of members and nonmembers (Bista, 2011c, Bista, 2011d, Bista2011e & Bista, 2011f).

In Nepal, there is a huge amount of environmental investment. Approximately 0.4 million members of CF invest annually in community forestry by paying member fees and labor contribution in Community Forestry Fund, although the fund has various resources such as revenue from sale of forest products, royalty and financial support of local and national government (Bista, 2008, Bista, 2011, Bista, 2011c, Bista, 2011d, Bista, 2011e & Bista, 2011f). However, dominant member of socio economically marginal and low-income group in CFUG has to bear cost of membership, although the government of Nepal defines the community forestry management as means of poverty reduction (Bista, 2011d & Bista, 2011f). Thus, the government policy is a failure to stop cost of membership and further to make effective poverty reduction policy.

Environmental investment of the socio economically marginal poor group within CFUG may be critical issue in the course of poverty reduction, when National plan (2002-10) and PRSP perceives local resources decentralization as instrument of poverty reduction, although community forestry

has proved itself as a successful management system of forest conservation and utilization in developing country, Nepal over 28 years. In community forestry management economics and ecological institutional economics, this issue is very generously curiosity: what will be nature and size of environmental investment of the poor group, what will be perspective and behavior of the poor, how could they manage resources for it, what will be effect in CFUG institution and governance, what would be socio economic implication. Until now, none literature has not covered this issue.

This paper study has main objective to estimate environmental investment of local community in community forestry management in Nepal. Specific objectives are as follows: to assess nature, characteristics and size of environmental investment in community forest, to examine the impact of different income groups in environmental investment, to find out socio economic effect in CFUG institution and governance and to find out its implication on social protection.

This paper is organized into sections. Section 1 introduces the concept of environmental investment in community forestry management in Nepal, where the socio economically marginal low-income group has also environmental investment in CFM. Similarly, section 2 explains method of this study containing statistical method and source of data. Section 3 presents the case of environmental investment in community forest management in Nepal. Firstly, this paper describes nature, characteristics and size of environmental investment of local community in community forestry. Secondly, it presents socio economic of local community participations and contribution in community forestry. Thirdly, it explains institutional function, behavior and capacity to use environmental investment.

## **2. Method**

### **2.1. Statistical Tool**

This study used descriptive statistical tool for data presentation and analysis. Arithmetic means (AM) and Standard Deviation (SD) were applied.

### **2.2. Source of Data**

This study used primary data source of community forest, users' group, household characteristics and environmental investment. This data was collected from household survey and group discussion with users' group of Kafle community forest. Village Forest Range Post and Executive Committee of KCFUG was consulted before the survey. Out of 63 KCF households, the 48 households were selected randomly. It covers approximately 70 percent of the population.

The survey of this study was conducted by coding households during April-May, 2010. The questionnaire used in the survey is divided into three sections: basic information about household socio-economic, household's participation and dependency in KCF

The study collected secondary source for supplementary data of membership fee, labor time endowment, regulation, managerial activity, patrolling etc. The data set was collected from minute of Kafle community forest and record books of labor and member fee.

### **3. Literature Review**

#### **3.1. Community forestry**

Community Forestry (CF) is explained as regime of local community to manage forestry by Klooster and Masera(2000). In the regime, Hardin (1968) and Osterm (2001) finds property right of local community. Taylor (1993) compliments it by arguing that local people are genuinely in control of management of forest resources. Poenberger and McGean(1996) Messerschmidt(1993) and Utting(1994) finds this approach similar with common resources management. However, Hardin (1968) finds difference between common resource management and community forest management because of property right. He mentioned the tragedy of commons, when there is overexploitation in forestry, fishery, water, public land, air etc. because of free riding. This absence of property right leads depletion in forestry, fishery, water, public land, air etc.

There are various institutional literatures of common resource management to address issue of *free riding*. The school of property right argues property right to local community as alternative measure to address free riding problem to avert the tragedy of commons. The school is advocated by Hardin (1968), Demsetz(1967), Johnson,(1972) Smith(1981) and Cheung(1970), although there are the school of public regulation and the school of voluntary. In recent years, collectivism institutions are quiet popular terms to community forestry management.

#### **3.2. Property right, Poverty and community forest management**

The literatures of common resources management indicate poverty as driver of free riding in open resources regime and common resources management. The relationship of poverty with depletion of common resource regime is negatively correlated.

Endorsement of property right in common resource management is alternative opportunity for local community's participation and poverty reduction. The study of Ostrom et al. (2001), Baland and Platteau(1996) and Bromley(1992) witnessed the role of property right and collective action in

CPR and also local community's participation. Moser (1996) further see importance of property right and collective action of local community to improve their capacity to earn and to consume for meeting minimum standard of quality life through collective behavior and supplementary income. Gibbs and Bromley (1989) and Chi (1999) further explain clearly three primary objectives of CFM: improving livelihood and security of local people, enhancing environmental conservation and empowering the local people. Therefore, local community, particularly poor community is passionate to be member of CFM for supplementary income, forest conservation and socio-economic empowerment.

However, there are literatures arguing that CFM is a greater efficiency in resource management due to a greater local knowledge, lower transaction costs and better decision making in accordance with Chi (1999). It is supplemented by cost effective local management and local knowledge of ecological dynamics.

Income expectation is determinant factor behind massive local community participation in CFM practice and experience. MoF(2011) notes 0.4 million population's active participation for alternative income source. Bista (2011) and Pokharel (2008) find it. It would be a great local shock of property right, collective action and community forest management. However, there are a large literature mentioning local poor community's sacrifice of labor time and financial resources, which is environmental investment. In recent years, there is a large relevancy and demand in environmental economics.

#### **4. Findings and Discussion**

##### **4.1. Community Forestry in Nepal**

Community Forestry is a successful management system in developing country. In Nepal, community forestry is well established with 28 years long age and growth (MoF, 2011). This management system *has vertical and horizontal replicate growth* all over the country. Currently, the system is available in 1.35 million hectares forest land, contributing to restore 40 percent forest land coverage in 2010 from 29 percent in 1992(NPC, 2010). Thus, this devolution of forest authority is noted effective and successful conservation policy effort and module.

Community Forestry Management (CFM) is a major evolution in Nepal, where the approach was first initiated by ethnic and tribal community with property right and ownership before 1950's. It was traditional practice of the ethnic and tribal community all over the country (Hobley and Shah, 1996). Such practice was not effective for ever after the implementation of nationalization policy to private forests in 1957. Subsequently, local communities lost their ownership in the conservation, utilization and management of forest in the country. However, the regulation of public authority (District Forest Office) could not stop free riding of local communities, despite higher regulation cost. Higher deforestation rate was reducing tree density and coverage. Again, the government of Nepal endorsed community forestry policy and program to devolve property right in forestry to local communities in 1970. The policy seems to be effective to govern forest resources at low cost of regulation and to increase trees density and coverage.

In the experiences and practices of Community Forestry Management (CFM), there are four major features. They are as follows: local community's governance regime to conserve, utilize and manage the forest, negligible cost of forest governance, user group's fund, distribution of NTFP to livelihood energy and conservation of forest and local biodiversity. In addition, all members should pay annual member fees and contribute labor for forest governance. Furthermore, community's governance encourages the poor to be involved in such modality for socio economic empowerment. Women are preferred in the governance. Thus, local community is completely responsible for forest governance, management and distribution.

The community forestry Policy (1993) has an objective to conserve forest and to address poverty of local communities in the mid hill, where approximately 60 percent populations are absolute poor. The collective action in CFM is perceived for socio economically empowerment to the poor. Simultaneously, the policy wants to empower local communities to manage forest resources to fulfill their basic needs of forest produce through their active participation. In order to achieve these objectives, users' group is legally recognized as social institution to govern properly the community forest for creating environment of collective action and for implementing the operational plan. In addition, the group is self-governing autonomous body having a right to formulate rules and regulation and programs. It is given authority to operate the fund and to generate revenues to the fund. Forest user groups can implement income-generating activities

within forest like promotion of non-timber forest products (NTFPs) and can establish forest- based micro-enterprise.

#### **4.2. Community Forestry and Local Community Participation (user's group and households)**

It is estimated that there is a potential of 18,76,300 ha forested and 15,85,800 ha non-forested land which can be developed as community forests. Similarly, 23,13,100 ha of Nepal's current national forests can also be considered potential community forest. As of March 2010, HMG has handed over a total of about 0.650 million hectares of state managed forest to over 15,000 CFUGs for the development, conservation, management and sustainable use of the forest. Through this process, about 1 million people are directly benefited from being a member of the forest user groups (MOPE, 2000).

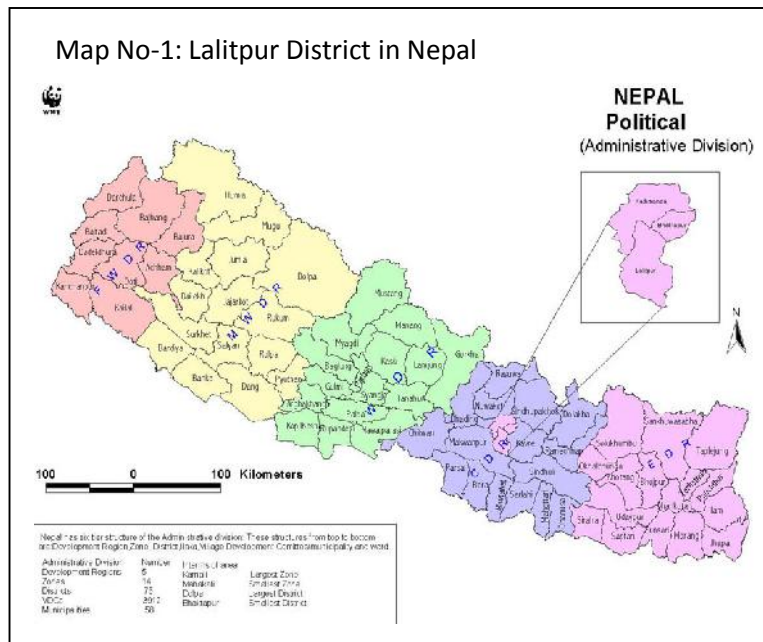
#### **4.3. A case of Kafle Community Forest (KCF)**

Community Forest has different motivation of local community. In Kafle Community Forestry (KCF), there were only two motivations to stop the tragedy of commons because of free riding and to maintain sustainability of NTFPs (firewood, leaf litter & grass) and water. The local community materialized such motive by establishing Kafle Community Forestry (KCF) in accordance with Forest Act 1993. Thus, approximately 63 households became user group of the forestry management. After two-year long process, KCF got legal status in 1994, when District Forest Office handed over the national Kafle forest to the community. The ownership and property right on Kafle forest was transferred to the KCF user group.

KCF manages a block of 96 hectare involving 63 households of the Village Development Committee (VDC). The forest is located in Mathilo Khoriya Dada in the east, Gumati khola in the north, Chisapani Peepal Tree to way to Bhihawar in South and main road to Khatri Bhajho in the West (*see its details in map no-3*). Altitude of KCF ranges from 1540 meter to 1970 meter. For forest management and utilization, KCF is managed into five blocks such as A, B, C, D, and E with area of 20, 31,27,6 and 10 hectares respectively. The forest is dominated by mixed type regenerated trees (DFO, 2002).

### 4.3.1. Location of KCF

KCF in Lamatar Village is one of 162 CFUGs managing approximately 65 percent (9,923 hectares) of community forest in Lalitpur District. This district is small district of 75 districts lying in the central development region of Nepal.



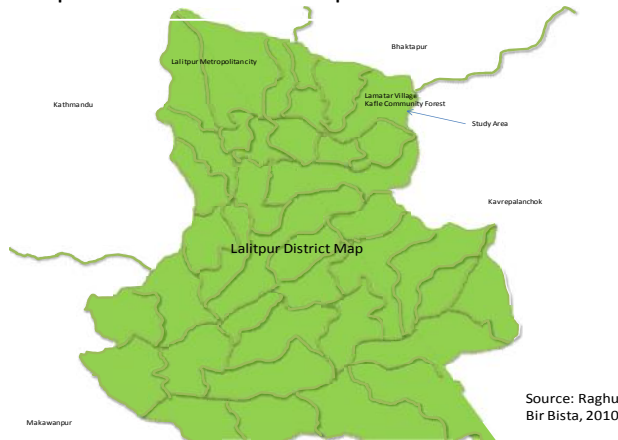
Socio economic background of Nepal is an important to understand KCF. Nepal, small Himalayan country of 147,181 sq.km areas with the length of about 885 km, and an average width of 193 km is located in between: China in the North Side and India in three sides: east, west and south (see its details in map-1). Latitude is 26° 22' N and 30° 27' N and the longitude of 80° 04' E and 88° 12' of the

World (CBS, 2009). Nepal occupies 0.03 percent of the World and 0.3 percent of Asian Land mass (CBS, 2009). Economically, GNP per capita of this land locked country is less than \$ 300 in the world (WB, 2010). Economic growth is less than 3 percent (MoF, 2010). Population is 28 million (CBS, 2007). Geographically and ecologically, this country spreads from low land of 60 meters above sea level altitude to high land of 8848 meters above sea level (ADB, 2004). Between low land and high land, there is Terai (plain land) and inner Terai, Siwalik Hills, Mahabharata Range Hills, Middle mountains and Mountains (see its details in map-1).

In addition, Nepal is rich in forest diversity comprising of different species, ecological character and ownership. From species perspective, forest diversity is more than 35 categories (Forestry studies of Forest Development Master Plan, 1980 and Stainton, 1972). From ownership jurisdiction perspective, the forest was classified into only of two forms: Public and Private (HMG, 1964). National forest statistics shows 99.9 percent public forest and 0.1 percent private forest in 2002. Recently, this classification has been broadly divided into two groups: State owned (protected



Map No-2: Lamatar in Lalitpur District



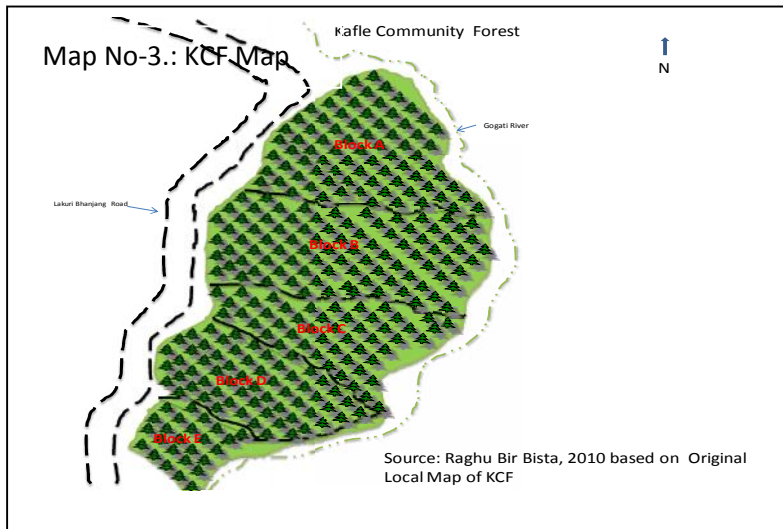
forest, religious forest) and People owned (community forest, leasehold forest and industrial forest) (HMG, 1986, HMG, 1993 and HMG, 2005).

#### 4.3.2. Justification of selection

This study focus on Kafle Community Forest in Lalitpur District (*see its details in map no-2*) for the following reasons:

first of all, this hilly CF possess of similar deforestation characters of hilly forest but now there is successful avoided deforestation management program as well. Secondly, this CF has been selected for policy intervention and thirdly, KCF is one of old community forest having best practices of community forest norms, values and systems, fourthly, this area can provide reliable information on the socio-economic

characteristics of households and forest and fifthly, area is easily accessible.



#### 4.3.3. Characteristics of KCF

##### 4.3.3.1. Institutional Characters:

Collectivism concept came out in the community level for collective action for forest conservation, when Kafle forest had over extraction and free riding under open access and public regime in 1980's. Its consequences were scarcity of livelihood forest products (firewood, leaf litter, grass, water resources etc). This forest dependent community was suffering from livelihood issues. In 1993, the community collectively decided to set up Kafle community forest user group (KCFUG) in accordance with Forest Act 1993. In this common property right regime (CPRR), the community became the owner of the Kafle forest for conservation, management and utilization. The institution functions democratically through General Assembly and Executive Body. In General Assembly, all general members of KCF are included to be members of this Assembly. Major work is to reach collective decision on policy,

budget and election of executive body (KCFWP, 2007). Executive body is governing body having 11 members from the General Assembly. It executes the decision of the General Assembly. Its meeting is held per month. Major work is to protect the forest, proper utilization of forest products and other functional activities.

Households were homogeneity of upper caste Brahmin in caste wise but were heterogeneity in socio economic level and status, despite upper caste Brahmin. There were majority households having less than 12 months food sufficiency. Kafle Community Forest is used for livelihood objectives (KCF, 2007).

**4.3.3.2. Self and Collective Governance:** KCFUG has the self-governance system. Policy decision and execution process is collectively done within the institution for transparency and effective community participation. Its result is Operating Plan prepared in 2005 and executed for five years. Collective action is ruled into forest management, protection and patrolling from illegal extraction and proper distribution of livelihood forest products. In forest protection, there is prohibition of grazing, poaching of wild animals and plants, illegal cutting, mining and encroachment. Violation of this prohibition will attract fines and punishments. In distribution of NTFP, there is rule of extracted about 1000 kg of green fuel wood, 500 kg of dry fuel wood, 500 kg of grass fodder, and 1000 kg of leaf litter and 500 kg of nigalo every year. On special occasions such a marriage, religious ceremony or funeral, any member was allowed to extract 350 kg of fuel wood for the same price. It is only for 96 hectares of KCF.

**4.3.3.3. Forest Management:** Forest management including cutting, cleaning, thinning, pruning and plating is a part of collective action. 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 Demonstration Plot of 0.08625 hectares in 2002 and extended to 1.64 hectares. In the plot, there were planted with 787 seedlings and 46 plot size NTFPs such as *Chialune, Jingaine, Hinguwa, Angari, Bakle, Laligurans, Lakuri, Saru*, etc(see its details in map-3). KCF had further extended the size of model plot by planting different medicinal and other NTFPS. In addition, KCF has planned to develop the whole Kafle Community Forest as the Model Community Forest.

#### 4.3.4. Household characteristics of Stakeholders

**4.3.4.1. Household Resource Endowments:** There are two major resource endowments: land and

Table No-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				
Cow/buffalo	1.57	0.5	1	2
Goat/Sheep	2.73	1.5	1	6

Source: Field Survey, 2013

households.

**4.3.4.2. HH size and Composition:** the poor households have generally large family size. However, family size (4.85) is less than national average (5.4) (CBS, 2010). Further, the rich family has less than the poor and medium income group. Outlier is 9 family members size. So, labor endowments may be less than of large family size. Family composition by sex is similar.

livestock presented in table 1. Each Household holds 0.2 hectare in average irrigated land and 0.17 hectare in average marginal land. Livestock resource endowments are just conventional. It indicates poor resource endowments of

Table No-2: Household Composition and Demography

HH	Mean	Standard deviation	Min.	Max.
HH 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, 2013

Table No-3: Poverty Scenario

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

Source: Field Survey, 2013

**4.3.4.3. Household economic condition:** In accordance with World Bank's per day earning poverty reference line, 67.38 percent households are poor, despite higher literacy level. This is also supplemented by food sufficiency measurement. This absolute poverty needs alternative resources for livelihood.

**4.3.4.4. Household Participation:** Household's participation in forest protection is 85.3 percent, followed by forest management at 84 percent, development activities at 82 percent, resource utilization at 76.6 percent, decision making 73.0 percent and training at 55.99. These measure values indicate effective participation of households in terms of labor contribution and attendance.

Table No-4: Household Socio economic condition

HH categories	No of HH	Average Size of HH	Average Food Sufficiency	
			12 month	less than 12 month
<b>Economic</b>				
Poor	12	4.9	4	8
Medium	25	4.9	8	16
Rich	11	4.58	4	8
<b>Education</b>				
Literate	45	4.35	15	29
Illiterate	3	0.5		3
<b>Sex</b>				
Male	45	2.37	12	26
Female	3	2.45	3	6

Source: Field Survey, 2013

**4.3.4.5. Household Livelihood Dependency:** In Nepal, community forest is perceived as alternative livelihood local resources for the poor (Ninth Plan, 1997). Each member annually extract in average 16.4 bhari (656 kg) firewood, 4.4 (176 kg) bhari grass and 7.6 bhari(304 kg) leaf litter. However, there are extreme extractions: 100 bhari(4000kg) firewood followed by 40 bhari(1600kg) grass and 50 bhari(2000kg) leaf litter. At nominal charges, member can extract additional forest product. Firewood extraction is higher than leaf litter, grass etc. However, there is not required additional time allocation for it. Members claim 70 percent less energy expenditure from firewood.

Table No- 5: Household Participation in percentage

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

Similarly, availability of water resources is positive externality to the community. It is supplied in all member households at free of cost.

KCF earns annually Rs 182,797.9 revenue from sale of timber and NTFPs. Average share KCF income is higher than average share income from service and agriculture sectors (see its details in table no-7 below). Thus, KCF is supporting livelihood of households.

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Table No-6: Statistical Descriptive summary of NTFP extraction

Forest Product	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, 2013

Table No-7: Annual Income of Sample Households from different sources (Rs)

Income Source	Min	Max	Mean	Sta Dev
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, 2013

allocated in various activities including meeting, plantation, training, cleaning, patrolling and administrative.

In KCF, approximately 63 family households are members of user groups. In other words, they are stakeholders. Every stakeholder member contributes annually 32 working days particularly for meeting, plantation, training, cleaning, patrolling and administrative activities. Out of total working

Table No-8: Day time allocation per capita per annum (Days)

activities	min	max	mean
Meeting	1	27	6
Plantation	0	12	3
training	0	15	3
cleaning	0	45	6
patrolling	0	48	14
administrative	0	16	2

Source: Field Survey, 2013

This labor endowment is a big investment in KCF conservation, utilization and management, although their marginal productivity of labor is nearly zero because of zero opportunity cost. Market wage rate of labor in urban labor market is NRs 500 per day for 8 hours working days. In terms of money, every stakeholder invests annually NRs 16,000 in KCF. In total, it will be NRS 1,08,000 per annum. The low-income group shares NRs 75,600. This amount is greater than of the richer.

In addition, member of user groups pays NRs 200 per year as environmental investment for KCFUG's governance and management. Total member fee per year is NRs 12600. This nominal amount is deposited in KCF fund.

#### 4.3.5. Environmental Investment

In the success story of KCF, there is an investment of local community. Such investment is not yet accounted significantly. It is in the form of labor endowment and membership fee of local community. Labor endowment is

days labor endowment, nearly 44 percent is allocated only in patrolling. Aggregately, all member households contribute 2016 days contribution in which 70 percent low income group family's labor contribution is higher than high income group family because of resource demands, higher livelihood dependency and alternative income sources.

#### **4.3.6. Social Protection of the poor**

Social protection is an important measure to improve the socio-economic level of the poor so that the poor can improve their livelihood and reduce poverty level. Community Forest Management (CFM) has CFM fund which is used only for community development and infrastructure. However, rarely its use can be found in social protection of the poor.

KCF provides cash and non-cash transfer to individual members. In non-cash transfer, the user's group distributes forest products (grass, fodder and forest products) only for fuel energy and foods for livestock. Cash earnings opportunity is provided indirectly. In case of cash transfer, there is no provision to cash returns to individual members of CFM, instead of investing in community and infrastructure. However, the poor individual member just sacrifice labor in CFM's conversation and governance, instead of wage earning from labor. Therefore, KFC's impact on social protection is found negative.

#### **5. Conclusion**

Collective Governance of local community in the form of community forestry management is a key policy instrument adopted by the government of Nepal to protect forestry for livelihood objectives. The governance is acknowledged as a successful story in forestry management in terms of forestry rehabilitation and participations of local community.

In KCF, the poor households are more dependent on the community forest for NTFP. Share of forest products is approximately 45 percent. They contribute more labor endowments in forest management and conservation. In the participation of local community, forestry conservation dominates in different layers of forestry governance. In addition, member household draws income benefits from KCF more than income of agriculture and service sectors.

The study finds labor endowment of poor households as environmental investment in KCF governance and management more than rich households because the poor has not ability to pay money against labor endowment. Each poor household contributes 32 working days in KCF for conservation and management activities (meeting, plantation, training, cleaning, patrolling and administrative activities). In terms of wage, the study estimates NRs 16,000 per person. In

aggregate figure, it would be NRS 1, 08,000 per annum. The low-income group shares NRs 75,600. This amount is greater than of the richer.

In conclusion, local community household invest directly and indirectly in community forestry management. In KCF, there is a large environmental investment of local member households. Low income groups invest NRs 16000 per annum in the form of labor endowment. Large number of low-income groups (poor members) investment is greater than minor rich income groups. Therefore, the poor invest more in community forestry management. Its impact can be found negative on social protection of the poor.

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