Environmental Investment in Community Forest Management (CFM): A Case Study of Mid-Hill Nepal

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Abstract

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The environmental investment of a local community is an important financial aspect of community forest management (CFM) and governance. In Nepal, it is identified as the cost paid by the local community for its property rights, participation in forest management, and creation of opportunities for gaining alternative income, employment, and wood fuel as a source of energy. The increase in forest management and protection activities by local communities is reflected in an upward trend in investment. An objective of the government's community forestry management policy is to mobilize the local community in order to control the illegal access and "free ride" by members and nonmembers in the forest and to improve the socioeconomic level of the poor community.

This study is an empirical investigation of a local community's participation in community forest management and conservation in Mid-Hill Nepal through the use of descriptive statistics based on primary data sources. The results of this study show that the poor members of the community more than their wealthy counterparts invest in forest management and conservation. However, the return on investment—in economic benefits and forest products—is greater for the wealthy members.

Environmental Investment in Community Forest Management (CFM): A Case Study of Mid-Hill Nepal

The main objective of this study is to estimate the level of environmental investing by the local community in community forest management (CFM) in Nepal. Specific objectives in support of that goal are to assess the nature, characteristics, and size of environmental investments in community forestry; to examine the impact of different income groups on environmental investing; to ascertain the socioeconomic effects such investing has on the community forest user group (CFUG) institution and its governance; to identify significant issues; and provide policy suggestions.

This paper is organized into three sections. The first section introduces the concept of environmental investing in community forest management in Nepal, where the socioeconomically marginal, or low-income, group has invested in CFM. The second section explains the statistical method and source of data used in this study. The third section presents the case study of environmental investment in community forest management in Nepal.

The environmental investment of a local community is an important financial aspect of CFM and its governance. In Nepal, it is identified as the cost paid by the local community for its property rights, its participation in forest management, and the creation of opportunities for gaining alternative income, employment, and wood fuel as a source of energy. The increase in forest management and protection activities by local communities is reflected in an upward trend in investment. The investment grows annually in the community forest (CF) with respect to the growth of trees, their density, and their coverage, and it includes required regulations and risk management. Most individual members of a community forest user group (CFUG) regularly deposit, on average, US$2 per month in the Community Forestry Fund (CFF). They also provide mandatory labor endowments in tree management (nursery management, seeding, plantation cutting, and so on), and help to regulate the access of members and nonmembers to the forest during the day and night (KCF 2010).

In Nepal, many people participate in raising funds for environmental investment. Approximately 0.4 million members of CFUGs invest annually in community forestry by paying member fees and making labor commitments through the CFF, although the fund has various other resources, such as revenue from the sale of forest products and royalties and the financial support of local and national governments. However, the most

socioeconomically marginal and low-income group in the CFUG pays the highest cost for membership, although the government of Nepal portrays the community forest management program as a means of reducing poverty. The government has failed in its attempts to lower the cost of membership and to make an effective poverty reduction policy.

Environmental investment on the part of the socioeconomically marginal group within CFUG may be a critical issue in the course of poverty reduction, since the National Plan (2002–2010) and the Poverty Reduction Strategy Paper perceive the decentralization of local resource management as instrumental to poverty reduction. Community forestry, however, has proved to be a successful management system for forest conservation and utilization in the developing country of Nepal for the past 28 years (NPC 2010). In terms of CFM economics and ecological institutional economics, this issue presents some interesting questions concerning the role of impoverished people regarding the nature and size of their environmental investing, their perspectives and behaviors, the ways in which they could manage resources, and their effect on the CFUG institution and its governance. Until now, no literature has covered these issues and their socioeconomic implications.

Method

The study followed a descriptive and explorative research design to answer the following research questions regarding a group of impoverished people:

- What will be the nature and size of their environmental investments?
- What will be their perspectives and behaviors in relation to forestry management?
- How might the members manage their resources for investing in community forestry?
- What effects will they have on the CFUG institution and its governance?
- What might be the socioeconomic implications of their investments?

In the study, the socioeconomic characteristics of CFM user groups, the rate of the membership fee, the people's time allocations, and the institutional structure and practices were quantitatively described. In addition, through statistical tools and econometric models, study researchers explored the nature and size of environmental investment by the low-income group.

Source of Data

The case study of Kafle Community Forest (KCF), located in Lamatar, Lalitpur, is the basis for this paper. The KCF is the primary source of the data, which were collected from a household survey, observations of the KCF, and KCF meetings and in-depth interviews with the sample households. Supplemental materials include the minutes of the KCF executive body and General Assembly, the records of membership forms, the application forms and letters to the District Office and the Village Development Committee, the time log table, labor-contribution log table, fuel-distribution log table, and the reports and policies of Ministry, District of Forest, and Village Development.

Population and Sample

The household population figures came from the report of the District Forest Office, Village Development Committee, KCF records, and the ward population of the Central Bureau of Statistics (CBS). The stakeholders owning KCF came from 63 households. Out of 63 KCF households, 48 were selected randomly. This number accounts for approximately 70 percent of the population. Thus, the study sample consisted of these 48 KCF households.

Data Collection Method

The primary data sources of this study are the CF, the CFUG, household characteristics, and environmental investments. The data were collected from a household survey and group discussions with the Kafle CFUG. The Village Forest Range Post and the Executive Committee of the KCF user group (KCFUG) were both consulted before the survey.

The survey for this study was conducted by coding households during April and May 2010. The questionnaire used in the survey was divided into three sections: basic information about the household's socioeconomic situation, information about the household's participation in the KCF program, and information about the extent of the household's dependency on KCF

The study collected secondary sources for supplementary data concerning membership fees, labor time endowments, regulation, managerial activity, patrolling, and so on. The data set was collected from the minutes of KCF meetings and record books of members' labor and fees.

Statistical Tools

As stated previously, under the broad objective of estimating the level of environmental investment by the local community in CFM in Nepal, the study was undertaken to achieve four in-depth, specific objectives. The first objective was to assess the nature, characteristics, and size of environmental investment in community forestry. The second objective was to examine the impact of different income groups on environmental investing. The focus of the third objective was on ascertaining the socioeconomic effects on the CFUG institution and its governance. Finally, the fourth objective was to identify significant issues and provide policy suggestions.

In order to achieve the stated specific objectives, the study used descriptive statistical tools, particularly Arithmetic Means and Standard Deviation to present and analyze the nature, characteristics, and size of environmental investments in the community forest. In addition, similar statistical tools were applied to assess the impact of different income groups on environmental investment and their socioeconomic effect on CFUG.

Literature Review

Although the author is unaware of any literature that specifically covers the objectives and issues examined in this study, especially the socioeconomic implications, there is literature on related aspects of forestry and local communities. Much of this relevant literature can be divided into two categories. The first category covers the overall topic of community forestry. The second category could include some of the issues that relate to or are intertwined with community forestry: property rights, poverty, and the management of community forests.

Community Forestry

Klooster and Masera (2000) describe community forestry as the regime, or system, by which a local community manages forestry. Hardin (1968) and Ostrom et al. (2001) discuss the property rights of local communities within the regime. Taylor (1993) complements these views by arguing that local people are genuinely in control of the management of forest resources. Poenberger and McGean (1996), Messerschmidt (1993), and Utting (1994) find a similar approach in common resources management. However, Hardin (1968) observes a difference between common resource management and community forest management because of the issue of property rights. He refers to the tragedy of commons management, which comes from the overexploitation in forestry and

fishery, and misuse of water, public land, and air through *free riding* (situations in which those who benefit from a resource either do not cover a fair share of the costs or who consume more than their fair share of the resource). The absence of property rights leads to the depletion of natural resources inherent to forestry, fishery, water, public land, and the air.

There are multiple examples of institutional literature on common resource management that address the issue of free riding. The school of property rights argues that property rights should be given to local communities as an alternative measure meant to address the free-riding problem and to avert the tragedy of the commons. Hardin (1968) and Demsetz (1967), all advocate for this school of thought, although other voices argue for an emphasis on public regulation or volunteerism. In recent years, collectivism and institutional management are quite popular terms within the sphere of CFM.

Property Rights, Poverty, and Community Forest Management

The literature on common resource management cites poverty as a driver of free riding in open resource regimes and common resource management, and cites poverty as negatively correlating to the depletion of common resources.

The endorsement of property rights within common resource management presents an alternative opportunity for local communities to participate in forestry management and poverty reduction. The studies of Ostrom et al. (2001; 1994), Baland and Platteau (1996), and Bromley (1984; 1992) have revealed the role of property rights and collective action in the management of common property resources and the local community's level of participation. Moser (1996) saw the significance of recognizing property rights and the collective action taken by the local community to improve its capacity to earn and consume as ways to meet minimum living standards. A better quality of life could be achieved through collective behavior and supplementary income. Gibbs and Bromley (1989) and Chi (1999) further explain three primary objectives of CFM: improving the livelihood and security of the local people; enhancing environmental conservation; and empowering the local people. Thus, members of the local community, particularly the poorer ones, are passionate about becoming members of the CFM. Membership helps villagers earn supplementary income, engage in forest conservation, and gain socioeconomic empowerment.

In addition, some authorities argue in accordance with Chi (1999) that CFM has a higher rate of efficiency in resource management due to greater local knowledge, lower transaction costs, and better decision-making. They also believe that cost-effective local management and local knowledge of ecological dynamics supplement such programs.

Income expectation is the main determinant of massive local community participation in CFM practices and experiences. The Ministry of Finance (2011) notes that 0.4 million Nepalese actively participate in CFM as a means of acquiring an alternative income source. Bista (2011) and Pokharel (2008) have found similar results. CFM would be a great shock to local systems in terms of property rights, collective action, and community forest management. However, much of the existing literature mentions the local poor communities' sacrifice of labor, time, and financial resources as forms of environmental investment.

Nepal: Significant Geographic, Demographic, and Socioeconomic Background

Nepal is a small Himalayan country of 147,181 sq. km. About 885 km long, it has an average width of 193 km and is located between China to the north and India on the other three sides. The latitude is 26^{o} 22' N and 30^{o} 27' N and the longitude is 80^{o} 04' E and 88^{o} 12' (CBS 2009). Nepal occupies 0.3% of the Asian landmass and 0.03% of the world landmass (CBS 2009).

The country has a population of 28 million people (CBS 2007) and is noted for its geographic and ecological diversity. It spreads from lowlands of 60 meters above sea level to an altitude in the highland areas of 8,848 meters above sea level (ADB 2004). Between the lowland and highland areas are the Terai Plain (plain land) and Inner Terai, the Siwalik Hills, the Mahabharata Range Hills, and the Mountain Regions, which include the Middle, High, and Himalayan Mountain Regions.

The country's forests are richly diverse. Researchers have recognized thirty-five forest types (forestry studies of the Forest Development Master Plan 1980; Stainton 1972). Yet, from the perspective of ownership jurisdiction, forests were classified into only two forms: Public and Private (HMGN 1964). National forest statistics show that in 2002, 99.9% of the forests were designated as public forests, and 0.1% were private. Recently, this classification has been broadly divided into two main groups with subcategories: state owned—protected forests and religious forests; and people owned—community forests, leasehold forests, and industrial forests (HMGN 1986, 1993, 2005).

Knowledge of the socioeconomic background of Nepal is essential to understanding community forestry. The GNP per capita of this landlocked country is approximately US$642 (WB 2012) and its economic growth is less than 3% (MOF 2010).

Community Forestry in Nepal

Community forestry is a successful management system in developing countries**.** In Nepal, community forestry is a well-established practice, with 28 years of growth behind it (Chomitz 2006; MOF 2011). This management system has enabled *vertical and horizontal replicate growth* all over the country. Currently, the system is available in 1.35 million hectares of forestland, and it contributed to the return to 40% forestland coverage in 2010, up from 29% in 1992 (NPC 2010). Thus, this devolution of forest authority has been recognized as an effective and successful conservation policy effort and module.

CFM experienced a major evolution in Nepal, when, before the 1950s, ethnic and tribal communities initiated an approach that included property rights and community ownership. This type of community ownership was the traditional practice of the ethnic and tribal communities all over the country (Hobley and Shah 1996), but it became ineffective after the implementation of a nationalization policy to privatize forests in 1957. Subsequently, local communities lost their stake in the conservation, utilization, and management of forests in the country. However, the regulation of public authority (through the District Forest Office) could not stop the free riding of local communities, despite higher regulation costs. A higher rate of deforestation reduced tree density and coverage. In 1970, the government of Nepal again endorsed the use of community forestry policy and programs, devolving property rights in forestry to local communities. The policy seems to have been effective at both reducing the costs and increasing tree density and coverage.

CFM has four major components: (1) the local community's governance regime to conserve, utilize, and manage the forest; (2) the negligible costs of forest governance and the user group's fund; (3) the distribution of non-timber forest products (NTFP) for livelihood energy; and (4) the conservation of the forest and its local biodiversity. In addition, all members should pay annual member fees and contribute their labor to the forest governance. Furthermore, the community's governance encourages the poor to be involved in such practices for their own socioeconomic empowerment. Women are preferred in the governance roles. Thus, the local community is completely responsible for forest governance, management, and distribution.

The CF policy of 1993 established an objective to conserve forests and to address the poverty of local communities in the Mid Hill, where approximately 60% of the population is impoverished. The collective action of CFM could be a chance for the poor to become socioeconomically empowered. Simultaneously, the policy encourages active participation by local communities to manage forest resources and thus to fulfill their basic needs for forest products. In order to achieve these objectives, the users' group is legally recognized as a social institution formed to properly govern the community forest, to create an environment of collective action, and to implement the operational plan. In addition, the group is a self-governing autonomous body with the right to formulate rules, regulations, and programs. It has been given the authority to operate the fund and to generate revenues for the fund. Forest user groups can implement income-generating activities within a forest, such as the promotion of non-timber forest products and the establishment of forest-based micro-enterprises.

Community Forestry and Local Community Participation (User Groups and Households)

It is estimated that potentially 1,876,300 hectares of forested land and 1,585,800 hectares of nonforested land in Nepal can be developed as community forests. In addition, 2,313,100 hectares of Nepal's current national forests can also be considered potential community forests. As of March 2010, His Majesty's Government (HMGN) has handed over to more than 15,000 CFUGs a total of about 0.65 million hectares of state-managed forests for their development, conservation, management, and sustainable use. Through this process, about one million people directly benefit from being members of the forest user groups

The Case of Kafle Community Forest

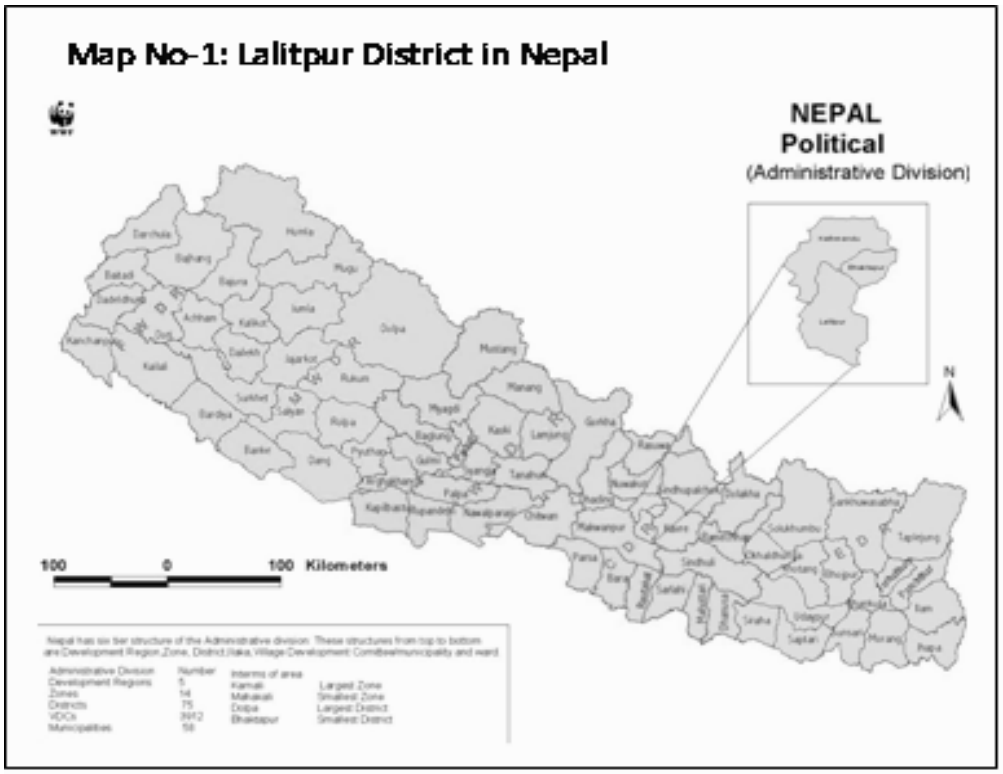
Each local community may have its own motives for developing a community forest. In the case of the KCF, there were only two motivations: to stop the tragedy of commons caused by free riding and to maintain sustainability of NTFPs (such as firewood, leaf litter, and grass) and water. The local community materialized its motives by establishing the KCF in accordance with the Forest Act of 1993. Approximately 63 households became members of the user group of forestry management. After a two-year-long process, KCF obtained legal status in 1994, when the District Forest Office handed over the Kafle National Forest to the community. The ownership and property rights of Kafle forest were transferred to the KCF user group.

Location of KCF

KCF manages a block of 96 hectares, involving 63 households of the Village Development Committee (VDC). The forest is located in Mathilo Khoriya Dada in the East, Gomati Khola in the North, Chisapani Peepal Tree to Bhihawar in the South, and from the main road to Khatri Bhajho in the West. The altitude of KCF ranges from 1,540 meters to 1,970 meters. To facilitate forest management and utilization, KCF is arranged in five blocks, such as A, B, C, D, and E, with areas of 20, 31, 27, 6, and 10 hectares respectively. The forest is dominated by mixed-type regenerated trees (District Forest Office 2002).

KCF in Lamatar Village is one of 162 CFUGs managing approximately 65% (9,923 hectares) of the community forest in Lalitpur District (Figure 1). The district is small; it is one of 75 districts lying in the central development region of Nepal.

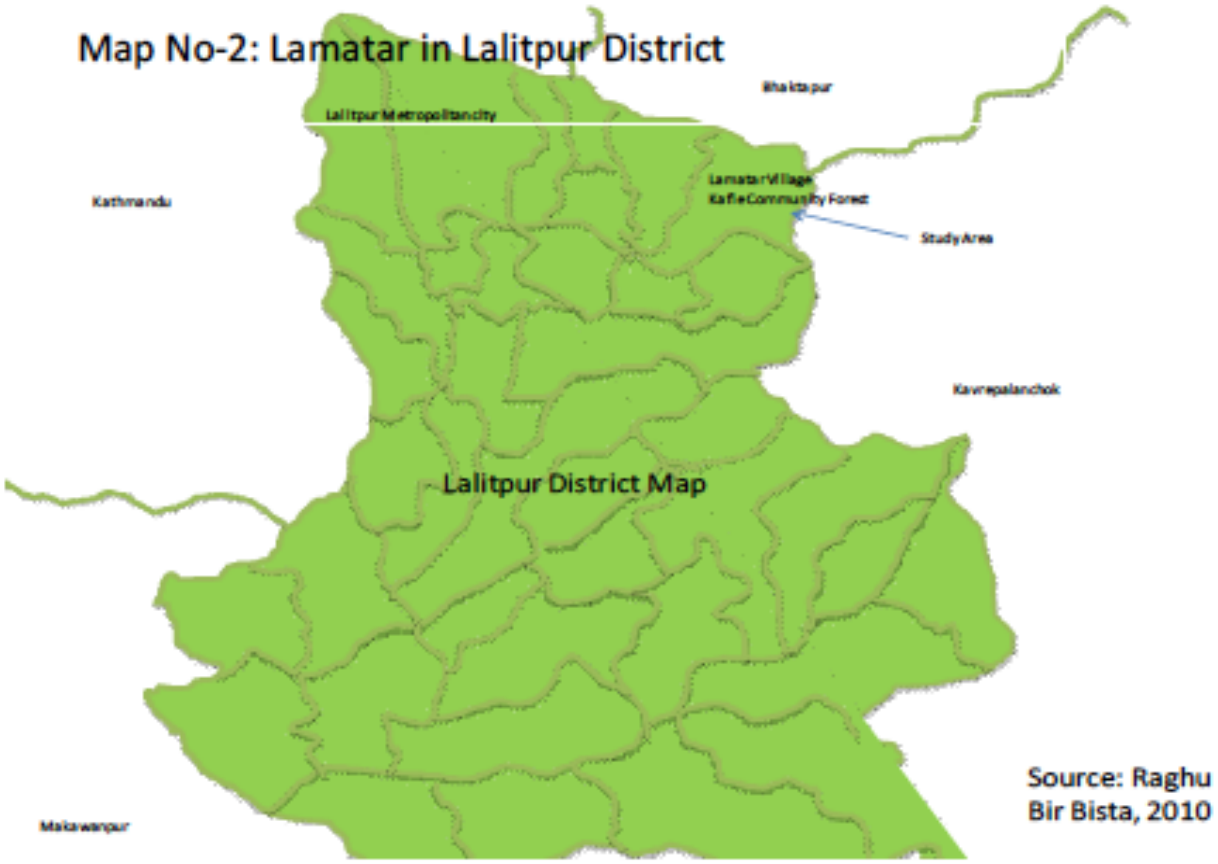
Figure 1: Lalitpur District in Nepal



Source: The WWF.

Justification of the Selection. This study focuses on Kafle Community Forest in Lalitpur District (Figure 2) for the following reasons: (1) the hilly CF possesses deforestation characteristics similar to those of many hilly forested areas worldwide, but has now implemented a successful "avoided deforestation" management program; (2) it has been selected for policy intervention programs; (3) it is one of the oldest community forests that has instituted best practices in community forest norms, values, and systems; (4) the area can be a source of reliable information regarding the socioeconomic characteristics of the households and forests; and (5) the area is easily accessible.

Figure 2: Lamatar in Lalitpur District



Characteristics of KCF

A reaction to forest-use experiences of the 1980s precipitated changes in the 1990s and the establishment of the KCF. Significant institutional and management procedures were implemented to run the KCF.

Institutional Characteristics. The concept of collectivism emerged on the community level as a means of promoting forest conservation after the Kafle forest experienced over-extraction and free riding under open access and a public regime of the 1980s. Those practices had serious consequences: a scarcity of important forest products—firewood, leaf litter, grass, water resources, and so on. As a result, the livelihoods of this forest-dependent community suffered. In 1993, the community collectively decided to set up the Kafle Community Forest User-Group (KCFUG) in accordance with the Forest Act of 1993. Under this common property rights regime (CPRR), the community became the owner of the Kafle forest for conservation, management, and utilization. The institution functions democratically through a General Assembly and Executive Body. All general members of KCF belong to the General Assembly. The group's major work is to reach collective decisions on policy, budget, and the election of the executive body according to the *KCF Working Plan* (KCF 2007). The Executive Body is a governing body of 11 members from the General Assembly. It executes the decisions of the General Assembly and holds monthly meetings. Its major work is to protect the forest and see to the proper utilization of forest products as well as other functional activities.

All the households near KCF identify as upper caste Brahmin but are heterogeneous in terms of socioeconomic level and status, despite being upper caste Brahmin. The majority of households have less than 12 months of food sufficiency. KCF is used for the livelihood objectives of the local people (KCF 2007).

Self and Collective Governance. KCFUG operates under a self-governance system. The members of KCFUG work together collectively to make and execute policy decisions, and thus foster transparency and effective community participation. In 2005, they prepared the Operating Plan of KCF for the next five years. Collective action is a golden rule in forest management; practicing it under the KCF plan has led to protection of the forest through patrols to stop illegal extraction and to oversight to ensure the proper distribution of livelihood forest products. Forest protection also includes the prohibition of domestic animal grazing, poaching of wild animals and plants, and illegal cutting, mining, and encroachment. Violation of these prohibitions will incur fines and punishments. Regarding the distribution of NTFP, the rules allow the extraction on a yearly basis of about 1,000 kg of green fuel wood, 500 kg of dry fuel wood, 500 kg of grass fodder, 1,000 kg of leaf litter, and 500 kg of nigalo (a kind of bamboo) every year. On special occasions, such as a marriage, religious ceremony, or funeral, any member is allowed to extract 350 kg of fuel wood for the same price. This plan was put in place for only 96 hectares of KCF.

Forest Management. Forest management, including cutting, cleaning, thinning, pruning, and planting, is a part of the collective action. The KCF land is divided into five blocks created for these activities with the support of nongovernmental and community-based organizations (NGOs and CBOs) and the District Office of Forestry. By using modern scientific techniques of forest management, the KCF governing body established a demonstration plot of 0.08625 hectares in 2002, and later extended it to 1.64 hectares. The plot was planted with 787 seedlings and 46-plot size NTFPs such as *Chialune, Jingaine, Hinguwa, Angari, Bakle, Laligurans, Lakuri, Saru* and so on (Figure 3). KCF had further extended the size of the model plot by planting different medicinal plants and other NTFPs. In addition, the group plans to develop the whole of Kafle Community Forest as a model community forest.

Figure 3: Kafle Community Forest

Household Characteristics of Stakeholders

It is useful to have a clear picture of the participating households in order to acquire a better understanding of how the people manage the KCF. Of significance to forestry management in particular is an accounting of the general resources that are available to the participating households and of how the people manage those resources, as well as an understanding of the attitudes and behaviors toward individual situations and forestry protection.

Households' Resource Endowments. There are two major resource endowments: land and livestock (Figure 4). Each household holds an average of 0.2 hectare in irrigated land and an average of 0.17 hectare in marginal land. Livestock resource endowments are conventional, which indicates the low number of potential resource endowments available to the households.

Figure 4: Households' 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 2010, Table No-1.

Household Size and Composition. The poor households generally have large families. However, the local average family size of 4.85 is less than the national average of 5.4 (CBS 2010). Furthermore, the wealthier families are smaller than those of the poorer and medium income groups (Figure 5). The outlier number is nine family members. So, smaller families may contribute less labor. Whether headed by males or females, the family composition of households is similar.

Figure 5: Household Composition and Demography

Household (HH)	Mean	Standard Deviation	Minimum	Maximum
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 2010, Table No-2.

Household Economic Conditions. In accordance with the World Bank's estimates of the earnings per-day poverty reference line, 67.38% of the Kafle area households are poor (Figures 6 and 7), despite their higher than average literacy level. This estimate is also supplemented by a low food-sufficiency measurement. People living in this level of absolute poverty need alternative resources in order to establish sufficient livelihoods.

Figure 6: 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
Percentage	32.62	67.38

Source: Field Survey 2010, Table No-3.

Figure 7: Household Socioeconomic Condition

HH Categories	**No. of HH**	**Average**	**Average Food Sufficiency**	
		Size of HH	12 month	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
Gender				
Male	45	2.37	12	26
Female	3	2.45	3	6

Source: Field Survey 2010, Table No-4.

Perspective and Behavior of the Poor Households. The rate of household participation in forest protection is 85.3%, followed by forest management at 84%, development activities at 82%, resource utilization at 76.6%, decision making at 73.0%, and training at 55.99%

(Figure 8). These measured values indicate that households participate effectively in both their labor contributions and attendance.

Figure 8: Household Participation in Percentages

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 2010, Table No-5.

Livelihood Resource Management in Poor Households. In Nepal, the community forest is perceived as an alternative resource for improving the livelihoods of the local poor people (Ninth Plan 1997). Each member of the KCF annually extracts an average of 16.4 bhari (656 kg) of firewood, 4.4 bhari (176 kg) of grass and 7.6 bhari (304 kg) of leaf litter. However, there are extreme extractions: 100 bhari (4000 kg) of firewood, 40 bhari (1600 kg) of grass, and 50 bhari (2000 kg) of leaf litter (Figure 9). A member can extract additional forest products for a nominal charge. The cost of firewood extraction is higher than that of leaf litter, grass, and so on. However, an additional time allocation is not required to extract these products. Members claim 70% less energy expenditure from firewood than from other fuel sources.

Figure 9: 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 2010, Table No-6.

Similarly, the availability of water resources is a positive externality for the community. It is supplied to all member households at no cost.

The KCF annual revenue from the sale of timber and NTFPs is Nepalese rupees (NPR) 182, 797.9 (US$2405). The average share of KCF income per member is higher than that

of workers in the service and agriculture sectors (Figure 10). Thus, it appears that KCF supports the livelihoods of its member households.

Figure 10: Annual Income of Sample Households from Different Sources (NPR)

Income Source	Minimum	Maximum	Mean	Standard Deviation
Service	0	726,000	179,958.3	133,483.1
Agriculture	-1000	268,800	41,122.55	46,675.5
CF	73,000	328,500	182,797.9	52,003.4
Total	72,000	1,323,300	403,878.8	232,161.9

Source: Field Survey 2010, Table No-7.

The Nature and Characteristics of Environmental Investment. An important element in the success story of KCF is the investment of the local community. Such investment, which has two main parts—the labor endowment and the membership fees of the local community—, has not yet been accounted for significantly. The members' labor is allocated to various activities, including meetings, plantation work, training, cleaning, patrolling, and administrative duties.

In KCF, approximately 63 family households are members of user groups. In other words, they are stakeholders. Every stakeholder member contributes 32 working days annually, which are reserved for meetings, plantation work, training, cleaning, patrolling, and administrative activities (Figure 11). Out of the total number of working days committed to labor, nearly 44% is allocated specifically to patrolling. Aggregately, all member households contribute 2,016 days to the KCF; 70% of the low-income family groups' labor contribution is higher than that of the high-income family groups. This is because the resources and income derived from KCF meet more of the low-income groups' livelihood needs.

Figure 11: Daytime Allocation per Capita per Annum (Days)

Activities	Minimum	Maximum	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 2010, Table No-8.

Effect of Environmental Investment in CFUG Institution and Governance. The labor endowment is a big investment in KCF conservation, utilization, and management, although the members' marginal productivity of labor is nearly zero because of zero opportunity cost. The market wage rate in the urban labor market is NPR 500 (US$6.57) per day for an eight-hour working day. In terms of money, every KCF stakeholder annually invests NPR 16,000 (US$210) in KCF. In total, it will be about NPR 128,000 (US$1421) per annum. The low-income group shares NPR 75,600 (US$994). This amount is greater than that of the wealthier stakeholders. [Editor's note: Conversion rates have changed since these figures were first determined.]

In addition, members of the user groups pay NPR 200 (US$2.67) per year as an environmental investment toward KCFUG's sustainable governance and management. The total member fee per year is NPR 12,600 (US$165). This nominal amount is deposited in the KCF fund. The effect of the environmental investment in the CFUG institution and its governance is significantly positive: the group has created a strong institution and effective governance that supports forest conservation while also helping to reduce poverty.

Socio-Implication of Environmental Investment: The major objectives of the Community Forest Management policy and program are achieved by establishing the property rights and decision-making participation of the poor. These objectives are also four arguments that can be made in support of practicing CFM: poverty reduction, forest conservation, collectivism, and conservation (which has the least transaction cost). If we consider these arguments as indicators and measures of effective management, a strong institution, and good governance, CFM seems to be a successful model of forest conservation.

In this successful story of CFM, there is an excessive environmental investment by the poor community of stakeholders in forest governance, management, and institutional responsibility, since most of the stakeholders who perform this work are from low-income groups. In KCF, those member households from low-income groups that have inferior assets and lower levels of education and skills also have inferior surplus labor; in other terms, they have zero marginal cost because of a lower opportunity cost, although they desire to use their "inferior" surplus labor to achieve alternative incomes. However, they lack access to a well-developed labor and commodity market, enterprise development, information network, and even a reliable roadway network. Their leisure time is often just time wasted. In this situation, KCF has provided alternative opportunities through forest conservation and management. To some extent, surplus labor has increased productivity and production. Its positive externality can be found in CFM, constructive activities, network development, community development, and capacity building. In KCF areas, construction of a well, temple, school, and health post have been undertaken, and work on

road extensions and improvements is underway. Ultimately, the environmental investment has had positive socioeconomic effects on the local society.

Conclusion

Collective governance by the local community in the form of CFM is a key policy instrument adopted by the government of Nepal in order to protect forestry for livelihood objectives. This system of governance is acknowledged to be a successful enterprise in forestry management in terms of forest rehabilitation and the participation of the local community.

In KCF, poor households are more dependent on the CF for NTFP. Their share of forest products is approximately 45 percent. They contribute more labor hours to forest management and conservation. Participation in forestry conservation dominates the amount of time spent by the local community in the different layers of forestry governance. In addition, member households draw income benefits from KCF worth more than the income earned from the agriculture and service sectors.

As revealed in the study, poor households provide labor as a form of environmental investment in KCF governance and management more often than do rich households because the poor do not have the ability to pay money against labor endowments. Each low-income household contributes 32 working days in the KCF for conservation and management activities (meeting, planting, training, cleaning, patrolling, and administrative activities). In terms of their wages, the study estimates NPR 16,000 (US$210) per person. As an aggregate figure, this would amount to NPR 128,000 (US$1421) per annum. The low-income group shares NPR 75,600 (US$994), which is a larger amount than that received by the wealthy households.

In conclusion, local community households invest directly and indirectly in CFM. In KCF, local member households make a large environmental investment. Low-income groups invest NPR 16,000 (US$210) per annum in the form of labor endowment. The aggregate investment in KCF by the large low-income groups is greater than that of the minor high-income groups. Therefore, the poor invest more in community forest management.

Such investment has a positive impact on CF management and governance for forest conservation. In addition, the investment has increased productivity and labor in both conservation and community development. Therefore, the environmental investment of the poor households is significantly positive for sustainable forest management and in the reduction of greenhouse gas emissions, although the size of the environmental investment is small. Thus, the poor community is contributing a small monetary value of labor at a local level to the global climate-change mitigation efforts.

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Acronyms and Abbreviations

CBO	community-based organization
CBS	Central Bureau of Statistics
CF	community forest
CFF	Community Forestry Fund
CFM	community forestry management
CFUG	community forest user group
CPRR	common property right regime
HMGN	His Majesty's Government of Nepal
KCF	Kafle Community Forest
KCFUG	Kafle Community Forest User Group
NGO	non-governmental organization
NPR	Nepalese rupee
NTFP	non-timber forest products
VDC	Village Development Committee

References

Asian Development Bank (ADB). 2004. *Country Environment Analysis for Nepal*. Kathmandu: Asian Development Bank.

Baland, J. M., and J. P. Platteu. 1996. *Halting Degradation of Natural Resources: Is There a Role for Rural Communities?* New York: United Nations Food and Agricultural Organization; Oxford University Press; and Clarendon Press.

Bista, Raghu. 2011. *Global Role of Nepalese Forestry: A Case of REDD.* Germany: Lambert.

Bromley, Daniel W., and Devendra P. Chapagain. 1984. "The Village Against the Center: Resource Depletion in South Asia." *American Journal of Agricultural Economics,* 66(5).

Bromley, Daniel W., et al. 1992. *Making the Commons Work: Theory, Practice and Policy.* San Francisco: ICS Press.

Central Bureau of Statistics (CBS). 2007. *Statistical Year Book of Nepal 2007.* Kathmandu: CBS.

———. 2009. *Statistical Year Book of Nepal 2009*. Kathmandu: CBS.

———. 2010. *Statistical Year Book 2010*. Kathmandu: CBS.

Chomitz, K. M. 2006. *At Loggerheads? Agricultural Expansion, Poverty Reduction, and Environment in the Tropical Forests.* World Bank Policy Research Report. Washington, DC: The International Bank for Reconstruction and Development / The World Bank.

Chi, A. M. 1999. "Co-Management of Forest in Cameroon. The Compatibility of Government Policies with Indigenous Practices." PhD Thesis.

Demsetz, H. 1967. "Toward a Theory of Property Rights." *The American Economic Review* 57(2): 347–359.

Gibbs, J. N., and D. W. Bromley. 1989. "Institutional Arrangements for Management of Rural Resources: Common Property Regimes." In *Common Property Resources: Ecology and Community Based Sustainable Development* edited by F. Berkes. London: Belhaven Press.

Hardin, G. 1968. "The Tragedy of the Commons." *Science* 162: 1243–1248.

His Majesty's Government of Nepal (HMGN). 1964. *Forest Act, 1964*. Kathmandu: His Majesty's Government of Nepal.

———. 1980. *Master Plan for Forest Management*. Kathmandu: His Majesty's Government of Nepal.

———. 1986. *Forest Act, 1986*. Kathmandu: His Majesty's Government of Nepal.

———. 1993. *Forest Act, 1993*. Kathmandu: His Majesty's Government of Nepal.

———. 2005. *Forest Act, 2005*. Kathmandu: His Majesty's Government of Nepal.

Hobley, M., and K. Shah. 1996. *What Makes a Local Organization Robust? Evidence from India and Nepal*. London, UK: Overseas Development Institute.

Kafle Community Forest. 2007. *Kafle Community Forest Working Plan*. Lalitpur, Nepal: Kafle Community Forest User Group.

Klooster, Daniel, and Omar Masera. 2000. "Community Forest Management in Mexico: Carbon Mitigation and Biodiversity Conservation through Rural Development." *Global Environmental Change* 10: 259–272.

Messerschmidt, D.A., ed. 1993. *Common Forest Resource Management: Annotated Bibliography of Asia, Africa, and Latin America.* Rome: Food and Agricultural Organization of the United Nations.

Ministry of Finance (MOF). 2007. *Economic Survey*. Kathamndu: Ministry of Finance.

———. 2010. *Economic Survey*. Kathamndu: Ministry of Finance.

———. 2011. *Economic Survey.* Kathmandu: Ministry of Finance.

National Planning Commission (NPC). 2010. *Interim Plan.* Kathamndu: National Planning Commission.

Moser, C. O. N. 1996. *Confronting Crisis: A Comparative Study of Household Responses to Poverty and Vulnerability in Four Poor Urban Communities.* Environmentally Sustainable Development Series and Monograph Series No. 8. Washington, DC: The World Bank.

Ostrom, E., T. Dietz, N. Dolsak, P. C. Stern, S. Stonich, and E. U. Weber. 2001. *The Drama of the Commons.* Washington, DC: National Academy Press.

Ostrom, E., R. Gardner, and J. M. Walker. 1994. *Rules, Games, and Common-Pool Resources.* Ann Arbor: The University of Michigan Press.

Pokharel, Ridish K. 2008. "Nepal's Community Forestry Funds: Do They Benefit the Poor?" Working Paper No 31-08 South Asian Network for Development and Environmental Economics (SANDEE).

Poenberger, M., and B. McGean. 1996. *Village Voices, Forest Choices: Joint Forest Management in India.* Delhi: Oxford University Press.

Stainton, J. D. A. 1972. *Forests of Nepal.* London: John Murray.

Taylor, George F. 1993. “Forests and Forestry in the Nepal Himalaya. Reflections from the Banks of the River Niger, Downstream from Timbuktu.” Mimeograph for USAID, Nepal.

Utting, P. 1994. Social and Political Dimensions of Environmental Protection in Central America. *Development and Change* 25: 231–259.

World Bank (WB). 2012. The World Bank Group Data Bank. Available from http://data.worldbank.org/country/nepal

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