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Local livelihoods, Community Forestry and The REDD+.

A case study of a REDD+ pilot project in Ludikhola
watershed, Nepal.

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**LOCAL LIVELIHOODS, COMMUNITY
FORESTRY AND THE REDD+**
**A case study of a REDD+ pilot project, Ludikhola watershed,
Nepal.**

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Declaration

I, Yubraj Bhusal, declare that this thesis is a result of my research investigations and findings. Sources of information other than my own have been acknowledged and a reference list has been appended. This work has not been previously submitted to any other university for award of any type of academic degree.

Signature.....

Date.....

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Abstract

REDD+ mechanism is considered as a critical step towards curbing greenhouse gas emission and also to store carbon in the forest of developing countries. Nepal's community forests are benefiting a large number of local people and sequestering carbon. For the successful implementation of REDD+ activities in community forests, future REDD+ mechanism should be compatible to community forest institutions, able to support local people's livelihoods and reduce carbon emissions. This research analyzes REDD+ mechanism and local livelihoods in the context of community forestry by taking a case of Ludikhola watershed, a REDD+ pilot project area, Nepal. Both qualitative and quantitative research methods were employed including household surveys, interviews with key persons, focus group discussions and literature review.

The study found that people in the study area were mostly poor with per capita income less than US\$ 2.2 a day. Various socio-economic characteristics such as land holdings, annual incomes, and education levels were significantly different based on ethnicity, well beings and locations. Households' diversification index of income showed that a majority of the households had diverse sources of incomes. Compared to less poor households, the poor depend more on agriculture and off-farm activities. Whereas more wealthy households have higher incomes from remittances and non-farm activities. A few households were found to be involved in the commercial farming due to limited productive farming lands and irrigation facilities. Though households' need of the forest products was not entirely fulfilled by the community forest, they depend on the community forest for firewood, timber and leaf litter. Carbon stock was found to be gradually increasing every year as a result of various forest conservation measures implemented by forest users. The pilot project distributed total amount of US\$ 79,866.00 to three studied CFUGs with strict criteria of utilization of the funds benefiting mostly poor and *dalit* households.

More than 85% of the HHs expressed that they have a fear of unequal distribution of payments, more conflicts in the village and more corruption under the future REDD+ activities. Contestations between CFUGs and forest officials was observed regarding carbon rights as both forest users and the government are integral actors of future REDD+ mechanism. Involvement of local people in the community based MRV mechanism looked cost efficient; however, to be continued in future REDD+ mechanism, performance based payments to forest users must surpass the associated costs of carbon management, provide additional benefits to local people for protecting forests and implement activities to reduce forest dependency. Considering future REDD+ mechanism, a few limitations were observed in terms of the 'design principles' such as congruence, monitoring resources and conflict resolution. Those limitations are needed to be resolved in order to sustainably implement REDD+ activities in the community forests of Nepal.

Table of Contents

Abstract	i
Table of Contents	ii
1. INTRODUCTION	1
1.1. Introduction	1
1.2. General Background.....	2
1.2.1. Forest management in Nepal	3
1.2.2. Community Forest Management (CFM) in Nepal.....	5
1.2.3. Livelihood dependence of the Forest	8
1.2.4. Deforestation and Degradation in Nepal.....	9
1.2.5. Evolution of REDD+ in Nepal.....	10
1.3. Problem Statement and Justification	10
1.3.1. Objectives and Research Questions	12
1.4. Structure of the Report	13
2. THEORY AND LITERATURE.....	14
2.1. Forest and livelihoods	14
2.1.1. Forest dependence.....	14
2.1.2. The Sustainable Livelihood Approach (SLA)	15
2.1.3. Contexts and Conditions	19
2.2. Institutions.....	20
2.2.1. Community forestry and Design Principles	22
2.3. The Structure Process Model	24
2.3.1. Description of basic components of SPM.....	24
3. MATERIALS AND METHODS	28
3.1. Study design	28
3.2. Research Quality	29
3.2.1. Reliability and Replication	29
3.2.2. Validity	30
3.3. Methods of data collection	31
3.3.1. Sampling and Questionnaire Survey.....	31
3.3.2. Semi-Structured Interviews	32
3.3.3. Group discussions and Participant Observation	32

3.3.4.	Secondary Sources	33
3.4.	Data Analysis	33
3.4.1.	Analysis of qualitative data.....	33
3.4.2.	Analysis of quantitative data.....	33
3.5.	Limitation in field work	35
4.	STUDY AREA	37
4.1.	Study area selection.....	38
4.1.1.	Selection of CFUGs and households	38
4.1.2.	Study area description.....	39
4.2.	Households' demographic characteristics	40
5.	LOCAL LIVELIHOODS	42
5.1.	Assets and capitals	42
5.1.1.	Physical Assets.....	45
5.1.2.	Human capital	49
5.1.3.	Natural Capital	52
5.1.4.	Social Capital	54
5.1.5.	Financial capital	59
5.2.	Livelihood activities.....	61
5.2.1.	Agriculture and off-farm activities	62
5.2.2.	Forestry	64
5.2.3.	Business and employment.....	65
5.2.4.	Remittances.....	66
5.2.5.	Diversification.....	67
5.3.	Livelihood outcomes	67
5.3.1.	Total incomes.....	68
5.3.2.	On-farm and off-farm incomes	70
5.3.3.	Forest incomes	72
5.3.4.	Non-farm incomes	74
5.3.5.	Remittances.....	74
5.4.	Contexts and conditions	75
5.5.	Vulnerability contexts	77
6.	REDD+ PILOT PROJECT, ITS OUTCOMES AND FIT IN THE COMMUNITY FORESTRY	81
6.1.	Organizations	81

6.1.1.	Resources and plans of the organizations	84
6.1.2.	Activities and horizontal interplay of the organizations	84
6.1.3.	Outcomes of the REDD+ activities	89
6.2.	REDD+ sustainability in the community forestry	94
6.2.1.	Reduction of deforestation and degradation	94
6.2.2.	Carbon tenure.....	96
6.2.3.	Payment and benefit sharing mechanism.....	96
6.2.4.	Community based MRV mechanism	97
6.2.5.	Potential conflicts.....	99
6.2.6.	REDD+ pilot project as long enduring institution in the CF.....	99
7.	CONCLUSION	105
	References.....	108

List of Figures

Figure 1: Sustainable livelihoods framework: a checklist	17
Figure 2: The structure-process model	25
Figure 3: Maps of REDD Pilot Project Sites and Ludikhola watershed, Nepal.	37
Figure 4: Consumer/Worker ratio against Age of the Household heads.	52
Figure 5: Income distribution of HHs in Ludikhola watershed, Nepal 2013.....	69
Figure 6: REDD+ MRV and payment systems under pilot project, Nepal.	86

List of Tables

Table 1: Physiographic Zones of Nepal.....	3
Table 2: Features of various forest categories in Nepal.....	4
Table 3: Features of PF and PPF in Nepal	6
Table 4: Objectives and linked theories and approaches	14
Table 5: Design Principles	23
Table 6: Valuation of local products in Ludikhola watershed, Nepal 2013.	35
Table 7: Description of the CFUGs in Ludikhola watershed, Nepal 2013.....	39
Table 8: Respondents' demographic characteristics in Ludikhola watershed, Nepal 2013.	40
Table 9: Types of Capital available to HHs in Ludikhola watershed, Nepal 2013.	42
Table 10: Socio-economic characteristics by location in Ludikhola watershed, Nepal 2013.	43
Table 11: Socio-economic characteristics by income levels in Ludikhola watershed, Nepal 2013.....	44
Table 12: Socio-economic characteristics by ethnicity in Ludikhola watershed, Nepal 2013.....	44
Table 13: Physical assets holding in Ludikhola watershed, Nepal 2013.....	45
Table 14: Physical assets holding by locations in Ludikhola watershed, Nepal 2013.	46
Table 15: Physical assets holding by income levels in Ludikhola watershed, Nepal 2013.....	46

Table 16: Physical assets holding by ethnicity in Ludikhola watershed, Nepal 2013.....	47
Table 17: Factors related to human capital by location in Ludikhola watershed, Nepal 2013.	50
Table 18: Factors related to human capital by income levels in Ludikhola watershed, Nepal 2013.....	50
Table 19: Factors related to human capital by ethnicity in Ludikhola watershed, Nepal 2013.	51
Table 20: Landholdings of the HHs by location in Ludikhola watershed, Nepal 2013.....	53
Table 21: Landholdings of the HHs by wealth groups in Ludikhola watershed, Nepal 2013.	53
Table 22: Landholdings of the HHs by ethnicity in Ludikhola watershed, Nepal 2013.	53
Table 23: Ethnicity by location in the Ludikhola watershed, Nepal 2013.....	55
Table 24: Ethnicity by wealth groups in the Ludikhola watershed, Nepal 2013.	55
Table 25: Various social relationship importance to HHs by location in Ludikhola watershed, Nepal 2013	56
Table 26: Various social relationship importance to HHs by wealth ranking in Ludikhola watershed, Nepal 2013.....	57
Table 27: Various social relationship importance to HHs by ethnicity in Ludikhola watershed, Nepal 2013.....	58
Table 28: Access to credits and loans in Ludikhola watershed, Nepal 2013.....	60
Table 29: Major Crops' production in Ludikhola watershed, Nepal 2013.....	62
Table 30: Livestock types hold HHs in Ludikhola watershed, Nepal 2013.	63
Table 31: Average annual Income sources of the HHs in Ludikhola, Nepal 2013.	68
Table 32: Annual HH income and socio-economic characteristics in Ludikhola watershed, Nepal 2013.....	70
Table 33: Income sources by location in Ludikhola watershed, Nepal 2013.....	71
Table 34: Income sources by wealth groups in Ludikhola, Nepal 2013.....	71
Table 35: Income sources by ethnicity in Ludikhola, Nepal 2013.	72
Table 36: Organizations involved in the CF - before and with REDD+, in Ludikhola watershed, Nepal 2013.....	82
Table 37: A summary of activities implemented through the pilot project, Nepal 2013.....	87
Table 38: Seed grant payment criteria in the REDD+ pilot project, Nepal 2013.	88
Table 39: Carbon changes and stock in the CFUGs of Ludikhola watershed, Nepal 2013.....	89
Table 40: Payments to CFUGs from seed grant in Ludikhola watershed, Nepal 2014.	91
Table 41: Utilization of seed grant by CFUGs in Ludikhola watershed, Nepal 2013.	91
Table 42: Socio-economic indicators and benefited local people from the pilot project in Ludikhola watershed, Nepal 2013.	93
Table 43: Annual demand and supply situation of forest products in the study areas, Nepal 2013. ^b	94
Table 44: A comparison of forest conservation activities in Ludikhola watershed, Nepal 2013.....	95
Table 45: Responses of HHs on compensation measures in Ludikhola watershed, Nepal 2013.	100
Table 46: HHs' views regarding compensation in Ludikhola watershed, Nepal 2013.	100

Table 47: Local people's perceptions toward REDD+ activities in Ludikhola watershed , Nepal 2013.	101
Table 48: Design principles in the CFs, Nepal 2013.	104

List of Appendices

Appendix 1: Ranking of Households	vii
Appendix 2: Correlation matrix	viii
Appendix 3: CFUGs' networks before REDD+ pilot project in Nepal.....	ix
Appendix 4: Questionnaires for household survey.....	x

1. INTRODUCTION

1.1. Introduction

Deforestation and land degradation together, at present, are contributing about 20% of the global emission of green house gases (GHG) (IPCC 2007). To address this, Reducing Emission from Deforestation and Forest Degradation, Conservation of existing forest carbon and Enhancement of forest carbon through sustainable forest management (REDD+) mechanisms and policies have been proposed as critical steps towards curbing greenhouse gas emission and also to store carbon in the form of biomass in forests. Hence, reduction of carbon dioxide from land use and forestry sector in international climate change negotiations (UNFCCC 2010) have been proposed and negotiated as a cost effective and efficient climate change mitigation strategy. Ongoing negotiations of REDD+ provides a framework for the payment or compensation mechanism for developing countries from developed nations, provided that participating developing countries implement REDD+ activities i.e. net reductions in the deforestation and forest degradation rate. However, payment mechanisms largely depend on global, national and local level REDD+ governance and are yet to be finalized. Amid ongoing negotiations about REDD+ governance structure, besides conferences of parties (CoP) to United Nations Framework Convention on Climate Change (UNFCCC), pilot projects on various aspects of REDD+ covering ranges of local, sub-national to national levels have been implemented in order to provide a strong empirical basis for national REDD+ policies and also comprehend government initiatives.

Among several REDD+ pilot projects existing in Nepal (REDD-Cell 2011), the REDD+ pilot project entitled "Design and establishment of a Governance and Payment Systems for Community Forest Management under REDD+" was launched in 2009 by joint consortium of International Centre for Integrated Mountain Development (ICIMOD), Asia Network for Sustainable Agriculture and Bio-resources (ANSAB) and Federation of Community Forest Users', Nepal (FECOFUN). This pilot covers three watersheds with area 27,789 ha, in three different districts (i.e. Gorkha, Dolakha and Chitwan) involving about 18,000 households in over 100 Community forest user groups (CFUGs) (Bushley & Khanal 2012). Among the pilot areas, Ludikhola watershed was selected as a study area for this research with an attempt to analyze REDD+ in the context of community forestry of Nepal. The objectives of this study were to explore local and community level livelihood contexts, analyze implementing

organizations' structure and processes, document benefits incurred through REDD+ by households and also to examine projects likely impacts and then lastly offer some future recommendations. In doing so, both qualitative and quantitative research methods were employed.

1.2. General Background

Emission reduction from forestry and land use sector was first introduced formally in the Bali action plan, 2007 and after that there has been a great advancement in its methodological, regulatory and economical aspects. From a mere "RED" it became "REDD" and now REDD+ having the ultimate goal of reducing net carbon emission from the forestry and land use sector. However, considering the heterogeneity among and within developing countries on forest management models, forest tenure, forest cover area and forest conditions, and existing and potential deforestation rates, architecture and local strategies of REDD+ mechanism may vary considerably at local and national level. Arguments are made that countries having large forest cover and higher potential to be deforested and degraded due to development activities or industrialization may get a higher global priority than small countries like Nepal (Khatri 2012) as the first countries may contribute more to great emission cuts.

Despite a small global forest coverage proportion, however, Community Forests (CFs) in Nepal are being managed sustainably for community needs with establishing strong institutions (Pokharel et al. 2007). The CFs mostly in the hilly regions of Nepal, have successfully restored denuded areas and now are contributing to the reduction of some carbon emission. Hence, Nepal have a potential to involve and thus receive benefits from REDD+ support. However, it can be argued that in Nepal, policies and strategies to bring CF under a REDD+ framework and receive payments may not be simple considering the very small areas of individual CFs. In addition, REDD+ policies has brought to the attention of a large number of scholars and international communities and many of them raise methodological, economic, policies and social issues such as reference levels, permanence, externalities, leakages, viability, benefits and rights of indigenous and local communities on which the success of REDD+ largely depends (Guéneau & Tozzi 2008; Humphreys 2008; Karsenty 2008). Debate is also going between policy makers and scientific communities about the local, national and international governance structure of REDD+ (Vatn & Vedeld 2013) in determining more implementable REDD+ activities with effective carbon reduction.

1.2.1. Forest management in Nepal

Nepal lies between China in the North and India in the South, mostly covered by hills, mountains and the Himalayas. Out of 14.7 million ha, hills and mountains including Mt. Everest in Nepal cover more than 80%. The remaining lands are valleys, plain *Terai and the Bhabar* (GoN/MFSC 2002; HMG 1989). Owing to high variations in topography, Nepal has been divided into 5 physiographic Zones (HMG 1989) and presented in Table 1.

Table 1: Physiographic Zones of Nepal

Zone	Area	Elevation Range (MSL) in Meters	General Characteristics	Resident Households ^{a1}	Vegetations and Forest Cover	Dominant Forest Tenure
High Himal	23%	4000 - 8848	Rocky, glaciers, meadow lands, Himalayas	6%	Alpine and Tundra. About 3% of total forest	Protection Forest
High Mountains	20%	1000 - 4000	Populated mountains, valley lands		Conifers. 30% of total forest	Community Forest
Middle Mountains	30%	200 - 3000	Ridges and valleys, terraces, medium hills	47%	Conifers, hardwood and mix forests. 33% of total forest.	Community Forest and Leasehold forests
Siwaliks	13%	120 - 2000	Lowest ridges, very susceptible to erosion and landslides, dun valleys	47%	Hardwoods, chir pine and hardwoods. 26% of total forest	Community Forest and Government Managed forest
Terai	14%	100 - 300	Plain land, highly productive soil,		Hardwoods, 8% of total forest but very valuable.	Protection Forest, Government Managed forest, Bufferzone CF and collaborative forest.

^aSource: (CBS 2012)

The available more recent forest inventory and physiographic data show that Nepal Comprises around 29% of forest, 10.6 % of shrub, 12% of grassland, 21% of farmland and 7% of uncultivated lands (GoN 1999; GoN/MFSC 2002).

Nepal's forest is legally divided into National Forest and Private Forest. National forests include five categories: (i) Community Forest (CF); (ii) Government Managed Forest (GMF);

¹ For Demographic purpose, CBS has been using three ecological zones i.e. Mountain; Hills and Terai and data is gathered based on political boundaries of districts. Hence, there may be some overlaps between High Mountains and Middle mountains; and also between Siwaliks and Middle Mountain.

(iii) Leasehold Forest (LF); (iv) Religious Forest (RF); and (v) Protected Forest (PF). Various categories of the forests, their coverage, tenure and other features are presented in Table 2.

Table 2: Features of various forest categories in Nepal

Category	Coverage (%)	Tenure		Features
		Land	Forest	
CF	25	GoN	CFUGs	<ul style="list-style-type: none"> ▪ Forest management, utilization, and protection carried out by CFUGs based on Operational Plan (OP) for each CF, which is guided by CF operation guidelines prepared by government^a.
LF	10 ^b	GoN	UGs	<ul style="list-style-type: none"> ▪ Rights over land and forest are granted to UGs or Leaseholder for specific years. ▪ Most successful type is 'Pro-poor LF' in which usually degraded forest are allocated to the poorest household groups and outsiders are excluded. ▪ Covers 0.63% of total forest.^c
RF		GoN	UGs	<ul style="list-style-type: none"> ▪ Religious groups, once registered to District Forest Office, are handed over patches of forests. ▪ Very small proportion of total forest ▪ outsiders are excluded
GMF	45	GoN	GoN	<ul style="list-style-type: none"> ▪ Government has all rights over resources and manages according to Management Plans.
PF	20	GoN	GoN	<ul style="list-style-type: none"> ▪ Solely for the protection purposes. ▪ forest utilization is not allowed by any authority ▪ However, in Buffer Zone Community Forests (BZCF) surrounded to PF, users have regulated access to forest resources.

GoN: Government of Nepal; CFUGs: Community Forest User Groups; UGs: User Groups;

^asee chapter 1.2.2 for details; ^b it also includes private forests.

Sources: Forest Act 1993 and Regulations; DoF 2010; Forest Policy 2000; ^c(FAO 2012: P.210).

According to the Forest Act, 1993:

- *"Community Forest" means a National Forest handed over to an users' group for its development, conservation and utilization for the collective interests.*
- *"Government Managed Forest" means a National Forest to be managed by Government of Nepal.*
- *"Leasehold Forest" means National Forest handed over as a Leasehold Forest to any institution established under prevailing laws, industry based on Forest Products or community.*
- *"Religious Forest" means a National Forest handed over to any religious body, group or community for its development, conservation and utilization.*

- *"Protected Forest" means National Forest declared by Government of Nepal as a Protected Forest, considering it to be of special environmental, scientific or cultural importance.*

1.2.2. Community Forest Management (CFM) in Nepal

Nepal's CFM has a history of some 35 years. CFM emerged as a consequence of a realization that the government alone was not able to halt the deforestation; and local people were heavily dependent on nearby forests for their livelihoods (Hobley et al. 1996). After promulgation of the Private Forest Nationalization Act, 1957, which provided a legal ground for the government to have full authority over all forests, widespread deforestation and degradation occurred between the period 1950s and 70s because local people were excluded from using forest resources (Acharya 2002; Hobley et al. 1996; Kanel 2005). The National Forestry Plan in 1976, which envisioned a regulatory mechanism of local people's participation in managing national forests especially in the hills (Acharya 2002), provided grounds to amend the Forest Act 1961 in 1977 to ensure local involvement in forest management. This amended act provisioned to hand over patches of government forest to former local "politico-administrative" unit called "*panchayat*" (Kanel 2005), this implied a devolution of power and authority and then decentralization of forest management started in Nepal, especially in degraded forests. Accordingly, Panchayat Forest Rules and Panchayat Protected Forest Rules, 1978 were formulated and provided a legal mechanism to hand over certain patches of government forest to local Panchayats as "Panchayat Forest (PF)" and "Panchayat Protected Forest (PPF)" (Table 3). It also paved way for donors to implement participatory forest management programs in hilly areas (Hobley et al. 1996). While PF and PPF were progressive moves towards decentralization of forest management, local community users were still not directly involved in the management of forests as forests were handed over to the Panchayats. However, it is believed that despite these legislations, forests far from Kathmandu, the capital city, were being used by local people for their needs of forest products (Hobley et al. 1996). Similarly, Panchayats could not see any initial benefits, as the provision was to hand over only degraded forests. There were further no incentives for long-term protection and management given to Panchayat leaders, who used to be elected for 5 years at the time (Kanel 2005).

Table 3: Features of PF and PPF in Nepal

	Land Right vested in	Revenue sharing		Maximum Forest area (ha.)	Forest handover conditions
		Panchayat	Government		
PF	Government	100%	0	125	Only degraded
PPF	Government	25%	75%	500	Only degraded

Source: Kanel, 2005

The development of CF did not only benefit from enabling and progressive forest policies and institutional reforms, but also there were direct linkages with national politics and other supporting line agencies and their regulations. PF and PPF were furthermore instruments used by the government to attract citizens' belief in and support towards the Panchayat system under Nepal's feudal monarchy, which last until 1990 (Ojha et al. 2009). Moreover, it was only in 1976 when the Department of Forest (DoF) was formed and took control of the whole national forest. However, given relatively more forests in remote areas and substantially less number of staff as most of them were concentrated in central areas, DoF had only protective forest management objectives during that time (Hobley et al. 1996). While many international donors started plantation projects in hilly areas with the participation of local people with the supportive role from DoF staffs, many national development plans and forestry policies started to address decentralization and realized local users participation in management, conservation and utilization of forest (Hobley et al. 1996). Consequently, the Decentralization Act, 1982 and its regulation 1984 (later replaced by the Decentralization Act, 1992) provided provision to devolve power of planning from the central government to local level Panchyats and district offices.

Progressive legislative transformation, realization of local peoples involvement for successful management of forest resources and pressure from international development organizations led to the development of a Master Plan for Forestry Sector (MPFS) for the period of 1986 to 2010. MPFS was a long-term strategic document for the management of forestry resources, ever formulated in Nepal and recognizing and prioritizing local forest users direct involvement in forest management by forming "user groups". While, MPFS was being finalized, there was a strong movement by people to reinstate a multi-party system in Nepal and hence, subsequent activities and interventions of government to successfully implement MPFS, especially enacting legislation to promote Community Forestry program became easier (Ojha et al. 2009). The main priority of MPFS was to implement CF programs so that

peoples' need of forest products could be fulfilled and forest stocks could be enhanced sustainably with the active participation of local people. Salient features of MPFS related to CFM in Nepal (HMG 1989) :

- Natural forest management and enhancement of degraded forests as Community forestry, which was priority program.
- According to ability and willingness of local communities, hill forests could be handed over to them.
- Roles of DOF staff to be more as advisers and extensionists to facilitate community users rather than being manager of the forest.

However, as MPFS was only a guiding instrument in order to successfully implement its recommendations, government of Nepal enacted the Forest Act 1993 and Forest Regulation 1995 after wide consultations and participation of DoF, NGOs, bilateral organizations, INGOs, local people and other institutions (Kanel 2005). These legislations have been regulating CFs up to present day and are prioritizing the CFs in order to provide all rights to manage, conserve and utilize CF to Community Forest User Groups (CFUGs). After that, modern form of forest management started to operate and CF program expanded rapidly in hilly region of Nepal.

Prominent provisions of the Forest Act and Regulation concerning CF are:

- CFUGs should be registered with DFO and can act as an autonomous, self-governed and independent body with its own constitution.
- According to the willingness and ability of CFUGs, nearby forest may be handed over as CFs to them by DFO for the management, protection and utilization, irrespective of size of forest and households.
- CFUGs are to prepare Operational Plans (OP) for CF management, while DFO provides technical assistance whenever necessary.
- OP and Constitution of CFUGs should be renewed.
- CFUGs fund can be used for development work and forest development activities according to provisions made in OP.
- Use right of forest lies in CFUGs, while the government holds land rights.
- CFUGs can impose fines for illegal activities inside CF and also plant income generating but short-term plants inside forests.

- CFUGs can neither sell CF land nor harvest whole forests.
- The household is the unit for membership while outsiders are excluded from access.
- Political boundaries will not affect the CFUGs.
- If DFO finds CFUGs not operating according to rules and regulations, DFO has the right to take back CF and also if necessary, re-hand over to CFUGs.

While the Forest Act 1993 and the Forest Regulations 1995 remains the main legal instruments governing CF operation in Nepal, various guidelines and policies have been enforced by DoF such as: CF operational guideline of 1992 (revised 2001), CF Directives 1996 and CF policy, 2000. With those legislations, DoF has been facilitating and enabling process of CF from time to time. At present, CF is directly benefitting about 1.45 million (35% of Nepal's population) comprising of 17,685 Community Forest user groups (CFUGs) across all over the country (DoF 2013). So far, Nepal's CF is seen by many as a successful and widely adapted decentralized forest management model (Ojha et al. 2009).

During the three and a half decades of its implementation, not only CF policies and practices have been modified incorporating lessons learned and adapted to make more people friendly, but also the extensive involvement of many stakeholders such as Community Forestry User Groups (CFUGs) and their network, bureaucrats, I/NGOs, donors and other community based organizations have now broadened the scope and meaning of CF. Therefore, CF is now more appropriately developed as an 'extensive system', and no longer a mere program or project of the government (Pokharel et al. 2007). Studies also show that CFUGs are not only managing and developing forest resources but they also use revenues generated from forest resources for local development activities, complementing other government development works. This supports the idea that CF now more precisely can be seen as a more resilient 'complex adaptive system' linking forest resources, communities and other range of stakeholders from the local to national levels. Learning from CF success in local populations active participation in forest management, other form of participatory forest management programs are also being undertaken i.e. pro-poor leasehold forests, community conservations, buffer-zone community forests and collaborative forest management (Kanel 2005).

1.2.3. Livelihood dependence of the Forest

Forest resources provide various direct and indirect benefits to human beings. These benefits includes, among others, environmental services, food supplements, fuel-wood for cooking and heating, raw medicines, forage for livestock, construction materials, income generating

activities, employment opportunities etc. However, not all populations get the same or equal benefits from the forests. The same forest can be a source of valuable timber for the urban population and timber traders, whereas, environmentalists may see the same forest as valuable for environmental services. But for the rural people who live adjacent to forests and practice agriculture, forest plays vital role in their life, mainly for substantial subsistence needs.

In Nepal, out of 26 million people living in 5 million households (HHs), about 17% live in urban areas (municipalities). Only 26% of them use firewood for cooking, whereas, 83% HHs live in rural areas and firewood is usual source of fuel for cooking for about 73% HHs (CBS 2012). Similarly, about 25% citizens are living below the poverty line. Approximately 55% people have agriculture as their main occupation, even though 84% of population have less than 1 ha of arable land (CBS 2011). This evidence supports that a big proportion of rural people of Nepal largely depend on forest for livestock forage, grazing livestock, firewood for cooking, leaf litter, medicinal plants and poles and timber.

1.2.4. Deforestation and Degradation in Nepal.

Despite great inconsistencies in defining forest and methodologies adopted to measure forest resources, the forest in 1999 was 29% of the total area of Nepal, while it was 38.1% in 1979. The shrub cover was 10.6%, while it was 4.7% in 1979 (Acharya et al. 2011). While the total forested area decreased from 42.8% to 39.6% between 1979 and 1999, there was a substantial decrease in forest cover i.e. by about 24% and at the same time shrub cover was increased by 126%. Given that since 1999, there has not been carried out any national level forest inventories, the actual forest status at present is not available in Nepal. However, since the intervention of the CF program forests in the hilly region of Nepal has been increased substantially.

The extent of the forest area is found to be directly linked with forest ownership, targeted forest products, conservation and management strategies followed by government. The evolution of forest management practices in Nepal has been categorized into three phases i.e. Privatization (until 1957), nationalization (1957 - 1970s), and decentralization or CF (from the late 1970s onwards) (Acharya 2002; Hobley 1996). Before the enactment of the Private Forest Nationalization Act in 1957, Nepal's forests were either open access or had been granted as patches of forests to local elites by the rulers. As agricultural production depends directly on the adjoining forest and also for people to practice shifting cultivation, forestland

has always very central. However, after the promulgation of the Act, government took the responsibility to manage forest resources stating that local people were over exploiting the forests and hence, deforestation and degradation occurred. However, instead of halting deforestation and degradation of the forest, the regulatory intervention triggered more degradation. This happened because the government had not established an able department to monitor and manage forests. It also happened because forest depended people did not stop using forest products. Moreover, people perceived government interventions as imposed on them and started more forest harvesting illegally without taking further considerations into account. And this continued up until the mid 1970s.

1.2.5. Evolution of REDD+ in Nepal

Nepal is a signatory nation to United Nation Framework Convention on Climate Change (UNFCCC) and has been participating in all conferences of parties under this convention. The Ministry of Environment (MoE) has prepared and submitted Nepal's Initial National Communication to UNFCCC in 2004; and in 2010 it also submitted a National Adaptation Plan of Actions (NAPA). At present, the MoE is preparing a Second National Communication Report. However, in Nepal, preparedness for the REDD+ process from the government started only after the establishment of a REDD-forestry and Climate change Cell (REDD-Cell) under the Ministry of Forest and Soil Conservation in 2009. After that, the government of Nepal is moving forward in formulating national policy measures and architecture in order to effectively implement REDD+ activities. Similarly, experiences from Pilot projects are increasingly made available. The REDD-Cell has developed and approved a Readiness Preparation Proposal (R-PP) from Forest Carbon Partnership Facility (FCPF) in 2010 for the period of 2010-2013. Apart from R-PP implementation, REDD-Cell is also coordinating activities with both local and global partners involved in Pilot projects in Nepal so as to accumulate local experiences in the Policy formulation measures for the REDD+.

1.3. Problem Statement and Justification

REDD+ policies and strategies have to be adaptable to all the different national contexts without compromising the main goal i.e. to achieve net reduction of GHG emission without compromising needs and rights of local people. Better informed implications of REDD+ at national and local level can be obtained from scientific and credible analysis through actual implementation of REDD+ and it may be less reliable to understand and predict the outcomes only on the basis of existing discourses. However, piloting REDD+ projects can provide

better inferences for the most comprehensive REDD+ policies and strategies to be adopted by governments. Owing to existing complexities and heterogeneity, the overall national REDD+ architecture and leadership for future may not be so easy to predict in Nepal. Particularly mismatching interests of actors involved i.e. Government, Civil societies, multilateral and bilateral co-operations, communities and households over the use of the forest resources decide a meaningful implementation of REDD+. Existing independent REDD+ pilot projects at ground levels are initiated by NGOs and INGOs and involve local communities without direct involvement of government agencies. In fact, only a handful of organizations with donor support have been engaged and implementing these projects at local, regional and national level addressing various aspects of REDD+. The expectation from these projects is that they will provide and reflect action-based learning from the bottom level, and to reflect that towards making people friendly national policy measures of REDD+ in Nepal.

However, there are sustainability issues – how to achieve a sustainable REDD+ mechanism especially incorporating lesson learnt from donor dependent programs/projects and operated by NGOs and INGOs. In addition, it is very crucial to understand the interest of those organizations, their structures and also expertise they hold, so that recommendation made by them can be calibrate against creating more livelihood opportunities under REDD+ and hence creating more resilient communities with cumulative benefits to the country. Although these pilot projects would hold a potential to equip and assist in formulating National Policies, some difficult to answer questions can be found in this contexts such as studies have revealed, even such widely perceived successful program of CF, more benefits and forest products are appropriated by less poor or more better off members of community than poor households (Adhikari et al. 2004). It can be argued how far such mechanisms would reflect only of donor's interest or will be in favor of national requirements? Concern over effective participation of all local people and addressing their rights over resources? Whether implementation of REDD+ would be donor oriented or there will be national financial mechanisms? What are actually the impacts of the process of channeling money and donor support through NGOs at regional and local level? In this context, this research aims to explore local and community level contexts in which pilot project are running and try to figure out how this is functioning and where it could lead the overall REDD+ national policies.

1.3.1. Objectives and Research Questions

General objective of this research is to investigate how REDD+ pilot program has been implemented and contributing to sustainable livelihood pathways to community forest users in Nepal.

Specific Objectives:

1 To analyze and document present livelihood strategies of local population.

- What kinds of and how much assets do local people have?
- How are households' dependencies in, access to and distribution process of forest resources?
- How is the existing situation of access to land/ tenure rights?
- How are individual households being classified into various social and economic classes and its impact on their resource accessibility?
- What are the existing formal and informal institutions at community level?
- What are the short and long term drivers of change in local peoples' livelihoods?

2 To investigate local implementing organizations of REDD+ pilot Project and examine compatibility of future REDD+ in the community forests.

- Which stakeholders are involved in REDD+ pilot projects?
- What are the implementing organization's Plans?
- What are the outcomes of implementing organization?
- What are resource, values and attitude competences of implementing organization?
- How organizations are interacting with local government and other sector institutions?
- What pilot projects' activities mean for local people?
- What is the relationship between local people and the implementing organization?
- Are the pilot project's activities been able to address the causes of deforestation and degradation without compromising local forest user's rights?
- Whether existing CF institutions and organizational structures compatible with REDD+?
- Are community level carbon measuring, recording and reporting measures possible to implement by local people?
- What can be seen as urgent and important challenges for implementing REDD+ at local level?

1.4. Structure of the Report

This thesis starts with the general background and introduction of community forestry and REDD+ in Nepal. First chapter also includes problem statements and objectives of the study. Various theories and frameworks utilized in the study are presented in chapter two. After that, in chapter three, details of research design, research methods, methodology, data analysis process and steps considered for the quality control of this research are presented. Location maps, study area selection criteria and description of study area is presented in chapter four. This chapter also includes demographic characteristics of the households in the study area.

Findings from the study are presented in chapter five and six. Objective one i.e. livelihood analysis and associated research questions are analyzed in the chapter five. In the first section of chapter six, results are presented for the pilot project implementing organizations, their activities and outcomes at local people. This is followed by analysis of compatibility of REDD+ mechanism in community forestry. Conclusion of the research is provided in the final chapter of this report

2. THEORY AND LITERATURE

This research utilizes various existing and emerging concepts and theories. Similarly, the methodology of this research, research questions posed and also outcomes from it are not unaffected by established theories and working models; and frameworks based on those theories. One single theoretical approach may not be sufficient to address all research questions posed in this research because the REDD+ has the potential to affect important resource use practices, existing forest institutions, organizations and their working principles. In short, this research will be guided by theories describing resource use and linkages between community and forestry resources focusing on institutions, rural livelihoods, and policy contexts. Table 4 depicts research objectives and the related theory and approaches. However, because of interlinked research questions, theories and approaches may not be so distinctive for each of the objective:

Table 4: Objectives and linked theories and approaches

Objectives	Theory/approach
To analyze and document present livelihood strategies of local population	Sustainable Livelihood Approach
To investigate Local Implementing Organizations of REDD+ pilot Project	Structure Process Model
To examine REDD+ as long enduring institution in CF	Ostrom's Design Principles

2.1. Forest and livelihoods

2.1.1. Forest dependence

People living in the villages and surrounded by forests have many forms of dependencies on forest and its resources. Peasants and rural communities rely on the forest for a range of products and services i.e. fuel wood for cooking, fodder for livestock, wood for agricultural implements, poles/timber for construction, wild fruits and medicines as supplementary diets and so on. It has been estimated that US \$ 130 billion per year worth of livelihood benefits to local people in developing countries is provided by forests (Emerton 2011). Similarly, average household in developing countries are found to be getting almost US \$ 700 worth of income from forest, that is playing vital roles in rural livelihoods by providing '*safety nets*', '*support of current consumption*' and '*a pathway out of poverty*' (Vedeld et al. 2004). Hence,

although some of the rural households may have substantial earnings from other sources than forestry such as on-farm, off-farm activities, remittances, business/trade or salary from jobs etc, the contribution of forest, directly and indirectly, to rural households' daily life is very crucial for their livelihoods.

However, existing legislative measures, customary rights and forest management interventions both restrict and enhance people's access and use of forest products. Who are getting what benefits and how from the forest is not always easy to discern and it largely depends on "*participation in forest output activity*", "*role in livelihood systems*", "*impact of reduced access to forests*" and "*likely future importance of forest outputs*" (Byron & Arnold 1997). Moreover, societal systems, being dynamic and complex, have the potential to ultimately influence forest resource management and use patterns. This may also be true when there will be REDD+ interventions impacting forest and forest dependent communities. In order to get financial support, states or communities participating in REDD+ program have to carry out activities that will result in carbon sequestration in the form of forest and also reduction in emission from forestry sector. This will happen, most probably, by limiting access to and the use of forest products and through changing their livelihood strategies through the promotion of various activities such as alternative sources of energy, employment opportunities, better social services, community development activities etc.

2.1.2. The Sustainable Livelihood Approach (SLA)

In this context, livelihood analysis can unravel the local contexts on which people are living and it provides a starting point for analyses of REDD+ opportunities and constraints at local level. For this, though may not be so easy given the available ranges of definitions in literatures (Ellis 2000), defining and knowing the meaning of the livelihood is crucial. One comprehensive definition has given by Scoones (1998:5), largely drawing from Chambers and Conway (1992):

“A livelihood comprises the capabilities, assets (including both material and social resources) and activities required for a means of living. A livelihood is sustainable when it can cope with and recover from stresses and shocks, maintain or enhance its capabilities and assets, while not undermining the natural resource base.”

From the above definition the meaning of livelihood may seem rather simple and straightforward, however, assessing and analyzing local livelihoods on the real ground contexts may not be that easy.

Ontological positions of researchers and approaches/frameworks used by them can involve different interpretations of the same things or events such as in seeing functioning of peoples' daily life, connection to and importance of natural resources, consideration of legislations and customs, social dynamics and so on. However, despite some critics along the time period, many development agencies and researchers have employed the SLA equally since Chamber's work in 1992 (Scoones 2009) to explore livelihood at community level. The main thrust of the SLA is to see and find out in which contexts and conditions, and by having what kind of assets, livelihood strategies produce different outcomes (Figure 2.1). Moreover, the analysis of institutions, which limits or extends accessibility to livelihood resources and outcomes, is also included, though not in detail, in the SLA. One practical challenge facing by the SLA followers is to achieve stable, durable and robust *sustainable* livelihoods under shocks and uncertainties in long term (Scoones 2009).

These analyses and explorations are very important for the SLA research and provides both a baseline and a guidance to answer research questions for REDD+. It will directly and indirectly impact rural people's livelihoods. Moreover, in the case of CF, communities and rural users are functioning groups at the local level and have both implementing responsibilities and stakes in terms of benefits and costs incurred by implementing REDD+ activities at the ground level.

A full execution of the SLA analysis is beyond the scope of this research. For our research propose, a particular focus is on exploring available assets and capitals, institutional structures and access to capitals, which are fundamental elements in defining livelihood pathways of rural people along with the direct bearings to the REDD+ activities at the local level.

The key aspect of the SLA is to analyze outcomes based on the activities performed by households considering available assets and capitals. Similarly, various contexts such as policy context, vulnerability context etc. impacts and determines which livelihood strategy to be adopted by households. The following section provides more description of all concepts of the SLA.

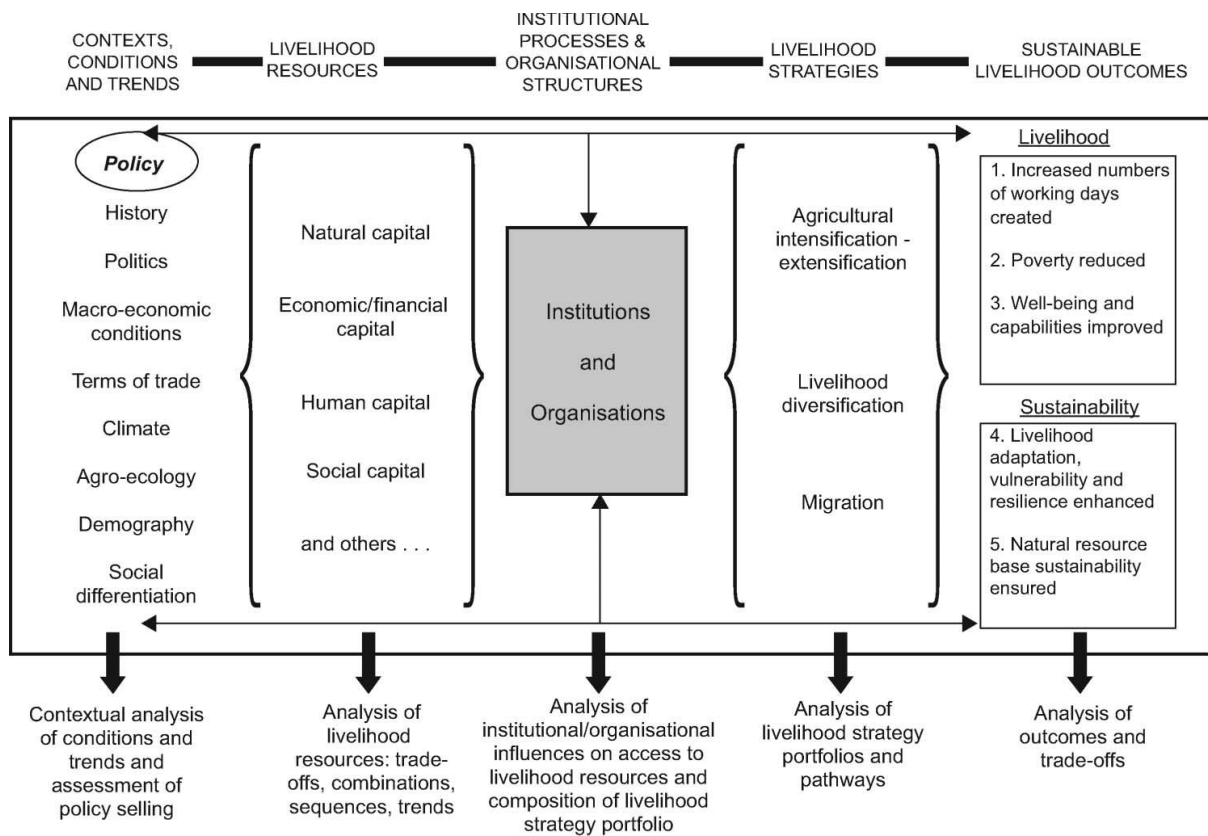


Figure 1: Sustainable livelihoods framework: a checklist

Source: Scoones (1998:4)

2.1.2.1. Assets and Capitals

The most basic elements of survival for any households are assets or capitals they have. The more of those assets one household holds, the more robust livelihood is normally expected to have by that household. Capitals are categorized into five different forms:

*"Capital includes the land, water and biological resources that are utilized by people to generate means of survival. **Natural capital** includes land, water and biological resources that are utilized by people to generate means of survival. **Physical capital** comprises capital that is created by economic production processes and includes buildings, irrigation canals, roads, tools, machines, and so on. **Human Capital** refers to the labour available to the household: its education, skills, and health. **Financial capital** refers to stocks of money to which the household has access. And **social capital** attempts to capture community and wider social claims on which individuals and households can draw by virtue of their belonging to social groups of varying degree of inclusiveness in society at large"*(Ellis 2000:8-10).

REDD+ implementation at the community level will have direct or indirect consequences on the availability, accessibility and distribution of the capitals to the rural households, who depends on forest for their livelihoods. Halting deforestation and degradation results limited access on the forest resources but at the same time may increase forest growing stock i.e. natural capital. Similarly, emission trading might attract some external funding, which can be used for local development activities. New social institutions organizations compatible to the REDD+ policy will emerge and also local people may get some form of technical skills for alternative livelihood strategy. However, without actual implementation of the REDD+ activities at the ground level, we cannot predict whether the REDD+ will enhance or suppress the available assets and capitals to those households.

2.1.2.2. Livelihood strategies and Activities

Households are required to mobilize and utilize their assets and capitals for creating outcomes. Use or mobilization of resources requires some activities so that households could get their desired outcome. These activities are normally diversified and also crucial for coping with or adapting to natural and social shocks and uncertainties that households face (Ellis 2000). Households usually do not rely on only one type of livelihood strategy. Rural households perform various activities related to natural resources (i.e. forests, farming, livestock husbandry etc) or non-natural resources (i.e. jobs and services, wage labour, remittances, business, trading etc.). However, the combination of activities carried out by every households varies considerably. For example, households, whose partial livelihoods depend on CF, may have farming and livestock keeping as main source of income and some of the family member may go for non-farm and off-farm jobs.

In order to make relatively more robust livelihood, households may not always follow the same activities repeatedly, but also they may choose to make some form of strategies in order to cope or adapt with the changes or uncertainties they face along with time. Households broadly may opt three different types of livelihood strategies as put forward by Scoones (1998). They are agricultural intensification or extensification, livelihood diversification, and migration.

2.1.2.3. Outcomes

Activities related to livelihood strategy chosen by household yield or result something, which is outcome and achieving a sustainable rural livelihood is the ultimate goal. The SLA

approach categorizes those outcomes into two broad categories i.e. one related to well being or living of household through cash income and through various products; and other related to the sustainability of the system itself. Some of those outcomes involve increases in employment, decreasing poverty rate, creation of food security, creation of community-managed forests, protection area establishments etc.

2.1.3. Contexts and Conditions

Previous sections described the fundamental requisites i.e. proper livelihood strategies, utilization of various assets and performing related activities for any households to sustain their livelihoods. However, livelihood pathways of households are also exposed to, embedded in, and influenced by both local and national contexts and conditions (Ellis 2000). Those contexts make a ceiling for a livelihood framework and broadly come under the headings of Policy setting, institutional contexts and organizational structures. Likewise, livelihood resources, livelihood pathways and sustainability of livelihood are exposed to various risks or shocks i.e. vulnerability issues.

Vulnerability has been interpreted, defined and understood in various ways across different fields of studies including climate change, natural hazard, rural livelihood and development (O'Brien et al. 2007). Vulnerability in SLA literature refers to a situation in which a household or individual's livelihood is threatened by and unable to cope with the factors such as risk of an adverse event, shocks, stress and seasonality (Chambers 1989; Ellis 2000). Those factors responsible for vulnerability include natural hazards, pests outbreak, diseases, war, environmental changes, inflation, climate change, erratic rainfall etc. However, risk management, coping strategy and adaptive capacity of the households determine the level of vulnerability of that household (Ellis 2000). While managing risks beforehand and embracing adaptation strategies comes up-front and include assets modification, income diversification, creating seed banks, early warning systems, insurance of crops and livestock, better reciprocity and sanitation etc, coping strategy comes in the aftermath of shocks and it may include migration, sales of assets, seeking new income sources etc.

Given the variation in availability of the livelihood resources and choices of different livelihood strategies among users in the same CF, not all users are equally exposed to and impacted by factors leading to vulnerability. As vulnerability is linked with poverty, relatively poor members of CF are more vulnerable than wealthier members. One important activity i.e. reducing degradation of REDD+ can hinder rural households from collecting

firewood and fodder from forest. That may erode availability of natural asset for the users who entirely depend on forest firewood for cooking and fodder for their animals and may make them more vulnerable user. However, provision of alternative source of energy for those household from REDD+ activities may to some extent help those households to be less vulnerable.

Similarly, policy context and governance structure form a ceiling under which whole livelihood options and pathways are available. Though individual households may not have direct control over policy and governance structure, both local and macro policy have overarching mechanism to control livelihood pathways (Ellis 2000). Policy setting may put restrictions for certain groups and may provide prioritization for other groups on the access to assets and activities. Policy changes over time and space; forest management policies of Nepal had undergone many changes over time and rights over forest resources and forest management responsibilities has now been transferred to local forest users from government. This change on the one hand increased forest cover in the hilly region and on the other hand established systematic utilization of forest resources and help improve livelihoods of rural people.

However, issues related to good governance both in CF management and local government bodies including participation, transparency, decision making process, equity etc are very critical. They are very critical because they decide authority and power structures and form a frame condition for livelihood pathways, accessibility of assets, coping and adaptation strategies, economics, legislation and administration. vulnerability context is also linked with policy setting as policy, if crafted in a biased way, may benefit more and make one group resilient based on ethnicity, region, class or political ideology by making other group more vulnerable.

Moreover, institutional settings and organizational structure are also important factor in the analysis livelihoods and are described in following sections.

2.2. Institutions

Communities and environment in general and, forest in particular, influence each other. Any change made in forest governance has direct consequences to communities living adjacent to

that forest area. Actors² involved in the management of forest, carrying out any kind of activities in the forest and benefit sharing gained from forest are guided and controlled by global, national, regional and community level conventions, rules, decision making process, norms, values etc. In literature and from theoretical perspective such rules, conventions, norms and values, which are collectively articulated in legislative and/or constitutive measures, are termed institutions (Hodgson 2006; Jordan & O'Riordan 1995; Young 2002). However, not all the arrangements made formally on paper are followed on ground. But, in practice, it is quite normal to see some behavioral practices i.e. *de facto*, which are not mentioned formal agreements but being followed at ground level in decision making process (Young 2002).

In CF, forest users are collectively managing forests with a strong institutional setup. Among others, the most important institutions include - Operational Plan (OP) and Constitution³ of CFUGs, networks from districts to national level (FECOFUN), the Forest laws, regulations and policies, community level socio-economic networks, government and donor funded programs etc. Moreover, resource users or managers equally follow operational rules or practices, which are called *de facto* practices. Analyzing that institutional setup along with *de facto* practices can be the basis for understanding the linkages between local livelihoods and community forestry. Such linkages have to be taken into consideration while implementing the REDD+ activities so that REDD+ will in harmony with the basic necessity of local livelihoods.

Institutions are dynamic in space and time, and hence these institutional setups change continuously. So, both written institutions and *de facto* practices actually elucidate the actual condition of resource management practices. Only then potential influences and consequences of the REDD+ can be well understood and also explore weak and strong institutions to be affected by the REDD+ mechanism. REDD+ is not only part of the UNFCCC, but can also be considered as a new institutional setup in the forest governance. Moreover, Nepal will definitely have to amend prevailing Forest legislations and to some extent move forward in restructuring existing CF related institutions so as to better match with the requirement of the REDD+ mechanism.

² Actors constitutes ranges of stakeholders from individuals to organizations involved in the process/system under considerations such as INGOs, Bureaucrats, Politicians, NGOs, Community Groups and Households.

³ According to the Forest law, CFUGs are autonomous body, having their own constitution, and have to be registered with District Forest Office and OP is management plan for CF for specified time period. All forest management, utilization, protection activities and group functioning process are stipulated in OP and constitution

In order to address aforementioned concerns of REDD+ over CF, this research will rely on the institutional structures prescribed for the long enduring Common Pool Resources proposed by Ostrom (1990) as “Design Principles”.

2.2.1. Community forestry and Design Principles

Common Pool Resources (CPRs) are distinguished by their characteristics of “Excludability” and “Subtractability” (Ostrom et al. 1994). Such attributes of CPR are present in CFs and hence, this research sees CFs as a form of CPR. Similarly, much successful empirical and illustrative findings are readily available to support CF successes in managing forests sustainably for rural people's needs (Acharya 2002; Adhikari et al. 2004; Gautam & Shivakoti 2005; Hobley 1996; Kanel 2005; Ojha et al. 2009; Pokharel et al. 2007). However, attempts to see whether CF would be sustainable in long term when REDD+ program is launched in Nepal remains very unclear.

The scientific community and development professionals do agree that there is no panacea or blue print solution for any environmental problems or managing public resources and CPRs, that range from community to global levels (Young 2002). A fit for all strategy to sustainably manage social-ecological resources is also almost impossible given the uncertainties of changes and complexities of the systems (Adger 2000; Anderies et al. 2004; Berkes et al. 2003). The Design principles proposed by Ostrom (1990) show what commonalities that many successful CPR share and also, in this research, may provide guidelines to see whether and how much CF can be long enduring CPR under REDD+ mechanism. Furthermore, Ostrom considers these design principles as robust institutions for the management of CPRs.

However, Ostrom's design principles, as built on the 'functionalist' and 'normative' approach, lack in incorporating social theorists perspectives regarding societies, institutions and CPR management. From the social theorists perspective, Cleaver (2000) and (2001), based on empirical studies in Tanzania and Zimbabwe, has raised many questions and critiques over Ostrom's design principles and CPR institutions' 'crafting' processes. She outlines that design principle not only take 'social capital' as static and granted raw material to produce the 'formal institution' but also claims that design principles entirely threw out the 'informal institution' and their importance in managing collective resources. Furthermore, Cleaver (2000) writes that institutions in CPRs are not 'embedded' but are 'embodiments' of social process. Therefore, design principles only are not sufficient to address complexities and heterogeneity in societies. In order to address those concerns, Cleaver (2000) has proposed

"Institutional Bricolage" as an embedded approach by which institutions in CPRs are actually 'crafted' by allowing complexities, exploring origin of collective actions and examining agent and structures.

Despite many critiques, a large number of scholars have tested those design principles at community levels for various resource types such as fishery, forestry, irrigation or pastoralism and found them to be very robust and applicable (Cox et al. 2010). Following Table 5 provides design principles and their descriptions as proposed and modified by Cox et al. (2010).

Table 5: Design Principles

Principles	Description
1A	User boundaries: Clear boundaries between legitimate users and nonusers must be defined.
1B	Resource boundaries: Clear boundaries are present that define a resource system and separate it from the larger biophysical environment.
2A	Congruence with local conditions: Appropriation and provision rules are congruent with local social and environmental conditions.
2B	Appropriation and provision: The benefits obtained by users from a CPR, as determined by appropriation rules, are proportional to the amount of inputs required in the form of labor, material, or money, as determined by provision rules.
3	Collective-choice arrangements: Most individuals affected by the operational rules can participate in modifying the operational rules.
4A	Monitoring the resource: Monitors who are accountable to the users monitor the appropriation and provision levels of the users.
4B	Monitoring the resource: Monitors who are accountable to the users monitor the condition of the resource.
5	Graduated sanctions: Appropriators who violate operational rules are likely to be assessed graduated sanctions (depending on the seriousness and the context of the offence) by other appropriators, by officials accountable to the appropriators, or by both.
6	Conflict-resolution mechanisms: Appropriators and their officials have rapid access to low-cost local arenas to resolve conflicts among appropriators or between appropriators and officials.
7	Minimal recognition of rights to organize: The rights of appropriators to devise their own institutions are not challenged by external governmental authorities.
8	Nested enterprises: Appropriation, provision, monitoring, enforcement, conflict resolution, and governance activities are organized in multiple layers of nested enterprises.

Source: Cox et al. (2010); Ostrom (1990)

Having institutions proposed along with their design principles does not guarantee a CPR system will be sustainable from generation to generation. There are many “threats” for the

sustainability of any resource regimes of CPR, which might make that system a failure in short or long terms (Ostrom 1999). She, however, further provides three methods that can be helpful for CPRs while coping with those threats. Three 'coping methods' are: (1) establishment of the association or federations of communities, (2) rigorous research on design and operating principles, and (3) local governance education at schools and universities.

Those 'threats' and 'coping methods' have connections with both institutions and organizations or stakeholders involved or evolved in managing CPRs. In CF governance and more when REDD+ initiatives are implemented, many heterogeneous stakeholders are involved at various levels and at different time periods. In the case of CF, analyzing both institutional robustness using design principles and those stakeholders and organizations in terms of their role, capabilities and robustness is very important. Such analysis can be performed by using 'The Structure Process Model' developed by Vedeld (2002).

2.3. The Structure Process Model

Integrating REDD+ in existing governance structure, and/or perform structural changes to incorporate REDD+ could be more easy to explore by seeing existing forest management practices by some working models. To analyze comprehensively the local participation, processes and Institutions involved in managing natural resources, The Structure Process Model (SPM) (Figure 2) can be very useful, which is an organizational agency based model and developed by Vedeld (2002).

2.3.1. Description of basic components of SPM

2.3.1.1. Physical Structure

Physical properties of CF i.e. area, biomass, plant diversity, soil, accessibility, distance to market etc. are linked with deforestation, forest protection, and of households' use of forest products. The REDD+ activities are also influenced by those properties when trying to reduce the deforestation and degradation process. As CFUGs and other actors act on finite forest area, there can be limitation who, how and when participated in the CF.

2.3.1.2. Actor Structure

There are already many stakeholders participating in CF throughout its development. In the commencing decades of CF, many donor organizations were actively involved in the planning process and with the government officials on the ground level, NGO workers

empowered the local people as CFUGs. In recent years, donors have less to do with handing over process of patches of forests to communities because most of the accessible forest nearby villages is already under the management regime of CF. However, there are unresolved, but still serious issues within the CF regime including transparency, participation, deforestation, equity, gender balance (Kanel 2005; Ojha et al. 2009) as a consequence of actor's interests, life-modes or political influences. Moreover, for the benefit of rural people and to halt deforestation and degradation in CF, a REDD+ strategy may not only be built on available actors, but could also attract or influence new actors.

A structure-process model for environmental policy analysis of organizations

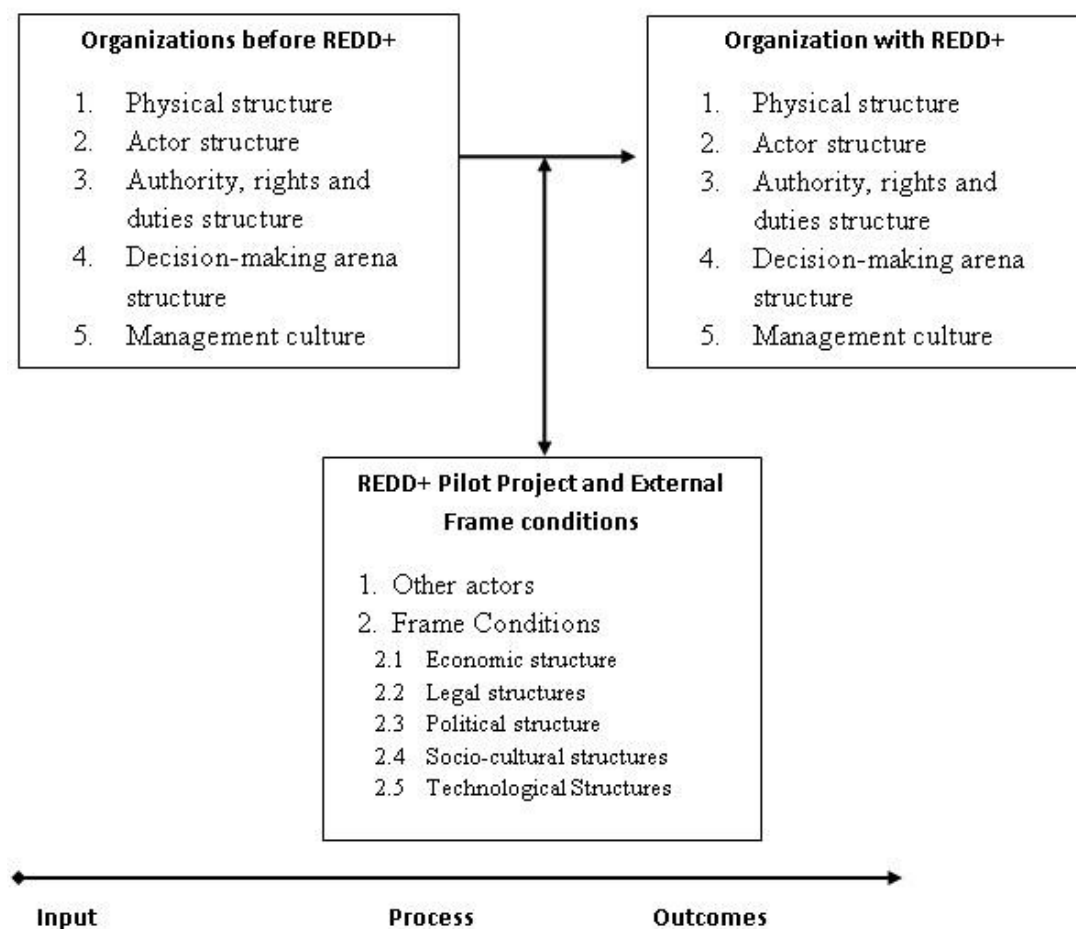


Figure 2: The structure-process model

Source: Vedeld (2002)

2.3.1.3. Authority, rights and duties structure

Participating actors in such programs as REDD+ and their access, power and authority levels genuinely determine success or failure of those programs as these have direct bearing on the active local participation, sustainable management of resources and maintaining robust

institutions (Vedeld 2002). Likewise, successful implementation of REDD+ with local people's participation requires a clear provision and distribution of forest, land and carbon rights to the communities who are managing forest resources. Moreover, authorities or actors involved in resource management such as private actors, civil society, CFUGs and their federations, government officials etc have to have clear roles and responsibilities so that those organizations will have participation, rights, and contribution in the management of programs.

2.3.1.4. Decision-making arena structure

It is crucial to identify and address whose voices are heard at which decision making level? How much power is devolved to the local people and by which mechanism? Whether local people and all other relevant stakeholders have *free, prior and informed consent* from the planning i.e. preparation of REDD+ readiness proposal to strategy, policy, and program formulation; and their implementation and monitoring process. Given that REDD+ came as a response to the global climate change agenda, its mechanisms so far are quite top-down (from global to national level). However, work of reducing emission from forestry sector has to be performed at local levels with direct involvement of local people depending on same forests for their livelihoods. Therefore, at the national REDD+ program level, a bottom-up process of decision-making is very crucial. Furthermore, it is very common for decision makers or dominant leaders to have different identities and roles in many but interlinked organization and institutions and hence may influence in various ways in different forums (Vedeld 2002).

2.3.1.5. Management culture

Established and deep-rooted practices over management of CF can't be neglected, as there might be both "positive" and "negative" cultures prevalent when implementing new programs such as REDD+. REDD+ will not only provide monetary benefits, it will also put more responsibility to change forest management strategies so as to reduce deforestation and degradation. Similarly, co-benefits⁴ are also expected from the REDD+ mechanism, so that equity, accountability and transparency in allocating those benefits to right-holders may require better management culture than which is now inside CF.

⁴ Co-benefits are those services and benefits that forest can provide other than carbon benefits while implementing REDD+ activities and includes, among others, ecosystem services, livelihood generation activities, direct benefits in the form of fuelwood, fodder, NTFPs and so on.

2.3.1.6. External frame conditions

REDD+ implementing organizations and institutions are dynamic and have both vertical and horizontal inter-linkages over time with national, regional, and local level of overarching governance structures and process (Bushley & Khatri 2011). There are many rules and regulations concerning forest, governance, decentralization, environment and one may have conflicting clauses over certain issues. For example, the Forest Act of 1993 gives full rights and authority of CF to CFUGs while the Local self governance Act of 1998 provides some right over forest resources to VDC, which is the lowest level of local government (Belbase & Regmi 2002). Similarly, the socio-economic, technological and political sphere has direct and indirect impacts in shaping any strategy, programs, and successful implementation of those activities. Active Participation from local users; and harmony and cooperation from other stakeholders in REDD+ activities is a prerequisite in order to achieve additionality from REDD+, however, whose participation, how strong, when and where is dependent on various overarching structure and process.

Despite that all CFs existing in Nepal are operating under the same laws, rules and regulations, each and every CF and CFUG has its own type of variations within in terms of - socio-economic conditions, heterogeneity among users; size and location of forest; flora, fauna, wood and non timber forest products; traditional and *de facto* practices etc. Considering the fact that CFs being on common ground but with differentiated identities, Ostrom's design principles (See Ostrom, 1990 for elaboration), though being empirically tested, may not be able to capture all the dynamism (Vedeld 2002) potentially to be created by REDD+ at national, regional and local level.

3. MATERIALS AND METHODS

This study is designed as a case study and it uses a mixed method of research - both qualitative and quantitative methods for both in data collection and analysis. REDD+ pilot project implemented in Ludikhola Watershed in Gorkha District of Nepal is a case study for this research. Three CFUGs, which are located in Ludikhola watershed of Gorkha District of Nepal, were selected for sample collection of the study. Qualitative data were collected through approaches including participant observation and interviews. Interviews were conducted with key persons, representatives from various organizations involved in REDD+ pilot project and CF and government officials. Quantitative data were collected by executing a household survey with a total of 50 households, representing at least 10% HHs from each CF.

3.1. Study design

Research questions posed in this study presume an analysis of REDD+ pilot project's implications to local livelihood conditions, existing organizations and institutions, which directly affect the local households. Though, there is a physical boundary of the watershed, livelihood and social issues present in the area and the REDD+ implementation issues are usually not confined and decided at the local level only. That is why a case study design, which is effective in getting answers of interrogative questions very comprehensively (Yin 2003), is chosen over available other research designs including, exploratory design, experimental design and survey design. Moreover, a Case study research can be performed with both quantitative and qualitative evidences (Yin 2003 pp. 15)

Quantitative and qualitative methods both have their advantages and limitation (see Bryman 2012 for details). This research involves exploration of CFUGs' livelihoods, institutions, organization in the context of REDD+ intervention and neither quantitative nor qualitative methods alone is sufficient to fully perform such analysis. That makes choosing mixed methods more attractive for this research. Despite some arguments against mixed method research, the approaches used in mixed methods research, including "*Triangulation, Offset, Completeness, Process, Credibility*" and others make it more attractive in social research (Bryman 2012, pp. 633).

3.2. Research Quality

This research, on the one hand forms major part of the MS degree, and on the other hand the outcomes from this research are expected to provide background to, if not influence, both the local and national level REDD+ policy formulation and implementation in the CFs of Nepal. This is because the case selected for this study represents middle hills region of Nepal, where CFs are widespread and successful. Hence, particular attention has been given at every stage of this research including proposal development, field work, data analysis and report writing in order not to compromise the credibility of the work. Moreover, findings of this research may be useful to analyze participatory forest management systems and may not be limited or separated by geography. Because it deals with the form of forest management system rather than the physical setting or the geography of the area.

Much social research involves quantification of human behaviour by employing some measures (Drost 2011). For both study design and methods selected for any research, it is necessary to check against criteria that determine the overall quality of that study. These criteria in social research are: *reliability*, *replication* and *validity* (Bryman 2012).

3.2.1. Reliability and Replication

Reliability is connected with quantitative method. In this study, quantitative method is used to analyze livelihoods of the households. In order to make measures used to quantify people's assets and activities and defining rankings of households, this research builds on various sources which are already been accepted in the area. For example, household sample is drawn from population register, questionnaires were tested before the actual survey among others. Questionnaires were tested in Kayar Khola watershed area, one of the REDD+ pilot project sites, and modification or adjustments were performed in the questionnaires before executing the actual survey in the field. Physical assets were quantified from a range of available sources with each households including number and condition of houses, categories of private land available, household goods available etc. Likewise, income sources were collected from on-farm and off-farm activities, employments, wages and remittances. Natural capital, in the study area, mainly consists of CF and forest products including water resources at the village.

Second criterion is *Replicability*. Though *replicability* of any research is very important in quantitative research, it is hardly used in social research (Bryman 2012). *Replicability* means that any study carried out by one researcher should be possible to replicate by others. This is

a social research and uses mixed methods, and involves analysis based on all measures including questionnaires, interviews, participant observation and group discussions. That blending in analysis may create difficulties in replicating the findings and hence, in this research, the criterion of *replicability* may not be the accurate criterion to judge the quality of this research and its finding.

3.2.2. Validity

Final, but in many ways, the most important criterion is *Validity* for social science research. *Validity* is concerned with the integrity of the conclusions drawn from the research and questions whether researchers are measuring what they intend to measure (Bryman 2012; Drost 2011). For example collecting information only from questionnaire survey and limited interviews would be more biased sometimes and to avoid this, all available sources were used to verify the information collected first hand. These included information on overall livelihood strategies, village development works, REDD+ pilot project related participation and perceptions of the rural people, visit and meeting made by organizations' representatives, referring meeting minutes, CF transaction records, REDD network minutes and records etc. Similarly, responses recorded in Likert scale were re-grouped into two groups. This was done in order to perform Fisher Exact tests to see the relationships between variables as responses in each groups were not fitting the requirement of the Chi Square Test and sample was also relatively small. Further elaboration of *validity* into *Construct, Internal and External validity* is necessary to fully describe *validity* in detail.

Construct validity, as Yin (2003, pp. 34) says, is to do with "*establishing correct operational measures for the concepts being studied*". On this research, efforts to respect *construct validity* were followed during the data collection and composition period. Most importantly, evidences collected to answer the research questions were verified through the sources such as consulting key informants, cross checking responses, observing behaviours and group discussions. This was possible through multiple visit for the data collection and interviews. Each time researcher not only did the intended talk (participating in the meeting of REDD network or interviewing key informants), but also revisited the CFUGs and attended meetings, group discussions, and other operations by them so as to validate the collected data again and again.

Whereas, *Internal validity* is concerned with causality of inferences or conclusions made in the study. Though this research is more of explorative nature, causal relationships such as

whether REDD+ pilot is benefitting livelihoods? Whether Forest products collection contributes to degradation of CF? and so on will be analysed on the basis of the best available evidence, documentation and concepts. Quantification of the myriads of causes and associated effects may not be possible through this study, however, relationship among REDD+, local livelihoods and institutional setups has been presented analytically.

Finally, *External Validity* concerns about whether findings from the study are applicable to other levels or contexts than the study context (Bryman 2012). In this research, attempts has been made in order not only to explore existing REDD+ pilot activities and livelihoods but also to provide recommendations for national level REDD+ policy formulation. Given that REDD+ is still in the process of actual implementation, prior knowledge from pilots can be helpful in deciding proper REDD+ policies beneficial to rural livelihoods.

3.3. Methods of data collection

Data were collected from both primary and secondary sources by employing both quantitative and qualitative methods. Primary data were collected by executing semi-structured questionnaires, household surveys and key informant interviews. Secondary sources included various published and unpublished research articles, books, project reports and documents, forestry related rules and regulations from various sources.

3.3.1. Sampling and Questionnaire Survey

Within the watershed, 3 CFUGs representing all socio-economic class and ethnic groups present in the watershed were selected for the questionnaire survey. Within these CFUGs, 10% households from each CF were chosen by following a random sampling for the purpose of the Questionnaire survey. As a provision mentioned in the CF constitution, membership of the CF could only be given to the household who is either resident or has cultivated land within that area, that means any households who were living in the area in hired apartments or houses were excluded from the CF memberships and hence were not included in the questionnaire survey. Before carrying out the questionnaire survey, meeting with forest user committee was held with each CFUG. This meeting was to give introduction and explanation of the research and its objectives. In order to keep anonymity of the respondent households, each respondent was given a number instead of recording their name.

Survey questionnaires (annex 1) used in this study were substantially based on and prepared by the POVUS-REDD⁵ Project were employed. Household questionnaire survey was carried out in order to explore available livelihood strategies of the local people, socio-economic conditions, their attitudes towards REDD+ and CF dependence of the local people. Questions included in the questionnaire were mainly of close ended types and only few questions were of open ended so as to incorporate deeper views of the respondent. Questionnaires were modified and updated in order to fit with the local contexts and also to get responses and answers to the questions posed under the objectives of this study.

3.3.2. Semi-Structured Interviews

Primarily, semi-structure interviews to get answers to the questions under the objective 3 were performed with REDD+ theme leaders from each involved organizations and also with representatives from local government and non-governmental bodies. Representatives and leaders were from Project Management Unit of REDD+, Field technician of the project, Federation of Community Forest Users, Nepal (FECOFUN), District Forest Office and the District Soil conservation office, Asia Network for Bioresources (ANSAB), Forest Action and the REDD-Cell. Moreover, semi-structured interviews with key respondents from the communities were conducted in order to get general contextual overviews regarding livelihoods, REDD+ implementation and also to triangulate information collected from household survey. Key respondents were at least 2 from each CF and included CFUG's president, secretary, local political leaders, teachers or local social worker. Checklist for semi-Structure interview is attached as Annex 2.

3.3.3. Group discussions and Participant Observation

Form each CF at least one general group discussion and other focus group discussion including or women, minorities and poor were organized. Those group discussion were helpful to get response for the issues from the perspective of particular group and also to validate Households' responses. Moreover, regular community meetings, group discussions and household livelihood generating activities were observed very closely during the field work of this study.

⁵ Poverty and sustainable development impacts of REDD architecture; Options for equity, growth and the environment (POVUS -REDD) is a project implemented in Brazil, Ghana, Tanzania, Uganda and Vietnam and led by International Institute for Environment Development (IIED) in a partnership with several other organizations.

3.3.4. Secondary Sources

Throughout the research work i.e. from writing proposal to report, available literature related to REDD+, livelihoods, CF and Nepal's forest along with accompanying theories were considered as important sources of information. Not the least, this literature was the main guide for the work. Published and unpublished literatures were collected from various sources such as referred journals, books, organizations' publications, reports and minutes as long as they were available. Similarly, documents describing the REDD+ background and also reflecting before REDD+ pilot situations were valuable to compare existing contexts of REDD+ implementation and also cases of CFs before REDD+. Moreover, theoretical literature were reviewed before starting field work in order to formulate valid and answerable research questions. References have been included in the reference section of this report.

3.4. Data Analysis

Analysis of the data follows both qualitative and quantitative ways. Quantifiable measures from questionnaire survey were analyzed using appropriate statistical methods. Qualitative information was analyzed qualitatively considering theoretical frameworks and approaches including, the SLA, Design principles, Institutions and the SPM.

3.4.1. Analysis of qualitative data

Information recorded from various sources including interviews, CFUG's records, REDD+ coordinating committee, group discussions, and field observations was analyzed through qualitative process. Records were kept for each interview, Xerox of records and notes were prepared for the group discussions, which was relevant to the research objectives. Views and perceptions regarding REDD+ project implementing organization and its relationship with the local people could be explained well through qualitative process. Similarly, linkages between and sustainability of the REDD+ strategy and CFs could not be established through quantification only.

3.4.2. Analysis of quantitative data

Data which were possible to quantify were analyzed by using descriptive or inferential statistics. Household questionnaire survey form had questions which were already been coded. Coding made easy and more accuracy to record responses in the form. Those coded responses were fed into the SPSS and Microsoft Excel program for further analysis. That included analysis of annual income from various sources and various assets owned by each households. Similarly, averages and rankings were done for the level of education, age group,

ethnicity. This started with first stratifying households into three ranks according to their income and landholding sizes. However, income from on-farm activities were not considered for this ranking as size of the landholding was considered positive proportionate with the on-farm income.

3.4.2.1. Ranking of the households

First step of the quantitative analysis consisted of stratifying households into two stakeholders groups: Poor HHs and relatively less poor HHs based on their sizes of income and landholdings. Annual income for each households was collected with executing questionnaire survey and included sources such as business, remittance, salary or pension. However, income from sell of agricultural products or on-farm income was not included for the purpose of ranking. Instead, area of lands that each household owns was taken into consideration.

Income was then grouped with the interval of NRs. 25000 and assigned number and labeled as Ranking 1 (R1). Land holdings were collected for various parcels and categorized into *baari land*, *khet land*⁶ and *homeland*. Information from the field revealed that the *khet and homeland* worth five times higher than that of *bari land*. Accordingly, *baari land* was converted into *khet land* and ranked from 1 to 9 with the interval of 5 *ropani*⁷. This was ranking 2 (R2). After that, R1 and R2 were added for each households and resulting number was used to categorize households. Poor households were those who got number 8 or below, above 8 were classified as less poor households. Appendix 1 provides full details of this.

3.4.2.2. Income calculation

Income sources of the households include on-farm income, off-farm income, business, salary and pension, and remittance. Total annual income for each household was determined by using simple descriptive statistics such as sum, mean and standard deviation.

Total forest environmental income for each HHs was calculated from both secondary and primary sources. During field survey, forest produce collected from the forest were only recorded. But, HHs were fulfilling their requirement from other sources mainly from private forested lands. Based on the HHs size and livestock units, utilization of fodder and fire woods were determined. It was estimated that an average annual consumption of firewood was 3500

⁶ *Baari land* is the patch of farmland which is characterized by no irrigation facility, sloppy and hence has got less productivity relative to *khet land*. Whereas, *khet land* is irrigated, terraced, more productive. Furthermore, *homeland* is the land around the home of the household and used for cultivation for the purpose similar of the *khet land*.

⁷ *Ropani* is the standard unit of measuring land in Nepal. One ropani of land is equal to 508.5 m² or 0.05 ha.

Kg (US\$ 163) and fodder accounted to 200 head loads (US\$ 116). Thus obtained quantity of firewood is in line with the estimation done by Aryal et al. (2009); Fox (1984).

3.4.2.3. Unit Conversions

Various local measurement units were available in the study site. For the purpose of this report, all of the measurements were converted into metric system of measurement. The measurement used by local people for the land was *ropani*. One *ropani* of land is equivalent to 508.5 m² or 0.05 ha. National currency for the study site is Nepali rupees (NRs) and at the time of data collection, 1 US\$ was equivalent to 86.8 NRs. Table 6 summarizes valuation of various livestock, agricultural and forest products as observed in the study areas.

Table 6: Valuation of local products in Ludikhola watershed, Nepal 2013.

Particular	Unit	Price (NRs.)	Particular	Unit	Price
Cattle	1	20,000	Goat	1	10,000
Buffalo	1	50,000	Goat meat	Kg	400
Poultry	1	700	Chicken	Kg	200
Milk	Liter	35	Pig	1	20,000
Pork	Kg	200	Egg	1	6
Rice	Kg	30	Wheat	Kg	25
Potato	Kg	20	Millet	Kg	30
Maize	Kg	25	Mustard	Kg	20
Timber	Cft	600	Fodder	Head load	50
Fire wood	Kg	4			

3.5. Limitation in field work

The REDD+ scheme, so far, is yet to be formally ratified by the global community and at the same time there are many unresolved issues and concerns over its implementation at the local level. Most of those issues are already existing in natural resource management including CFs. In this context, this research, being a master thesis, has a small potential through the research questions posed, but cannot cover the whole repertoire of the issues and concerns concerning REDD+.

Taking case of only one REDD+ pilot project for this research was due to the limited availability of time and resources. That limitation was also the reason behind collecting sample from only one watershed. Moreover, the number of the questions in the questionnaire were large and it took more than an hour for executing each individual household survey.

However, all of those questions were needed to be included in the questionnaire in order to get all the information required to fulfill the demand of objective.

While conducting interviews, it was not that easy to get appointments on favorable time with the representatives of organizations within timeframe of this research field work. The most challenging task was to get access to the official records, publications and minutes of REDD+ network's meetings as it was difficult to convince them about research work. Most of them were having fear that the researcher might not only be the student but had been working with other organizations and exposing those information to them would be risky for them. However, later they all were ready to provide all the information once they were convinced that accessing those materials was only for the research purpose and anonymity will always be kept.

As this study is based on the assessment of CFs within one REDD+ pilot project, conclusions drawn in this research have to be cautiously linked or applied in other forms of forest management prevailing in Nepal

4. STUDY AREA

The study area is located in about 140 km South West from Kathmandu, the capital city of Nepal. A nearby urban area from the study site is Gorkha municipality, district headquarter of the Gorkha district. Study area's location in Nepal's map is presented in Figure 3.

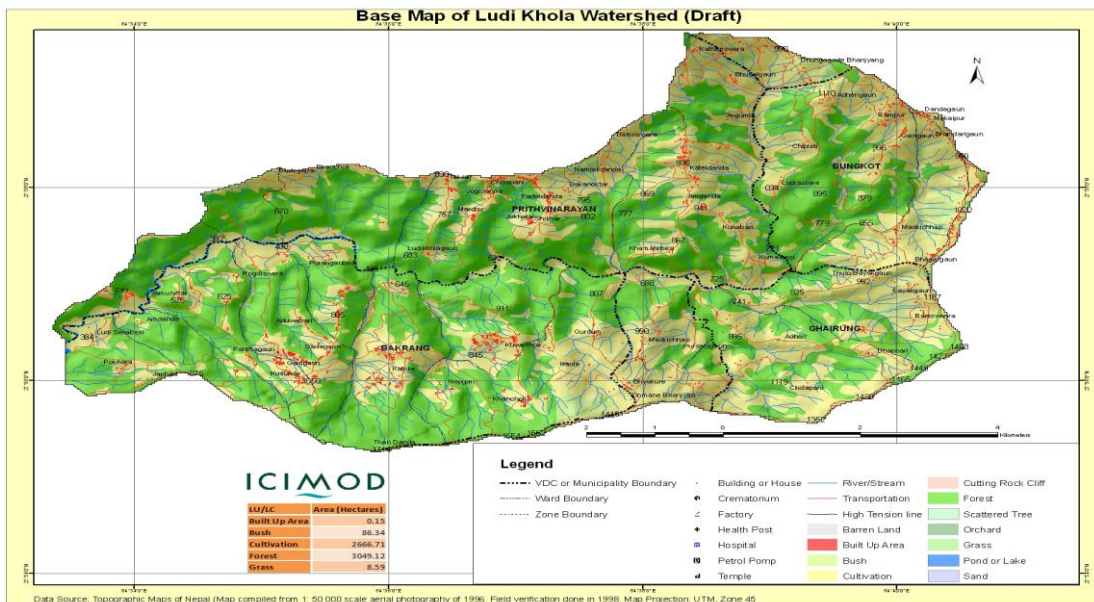
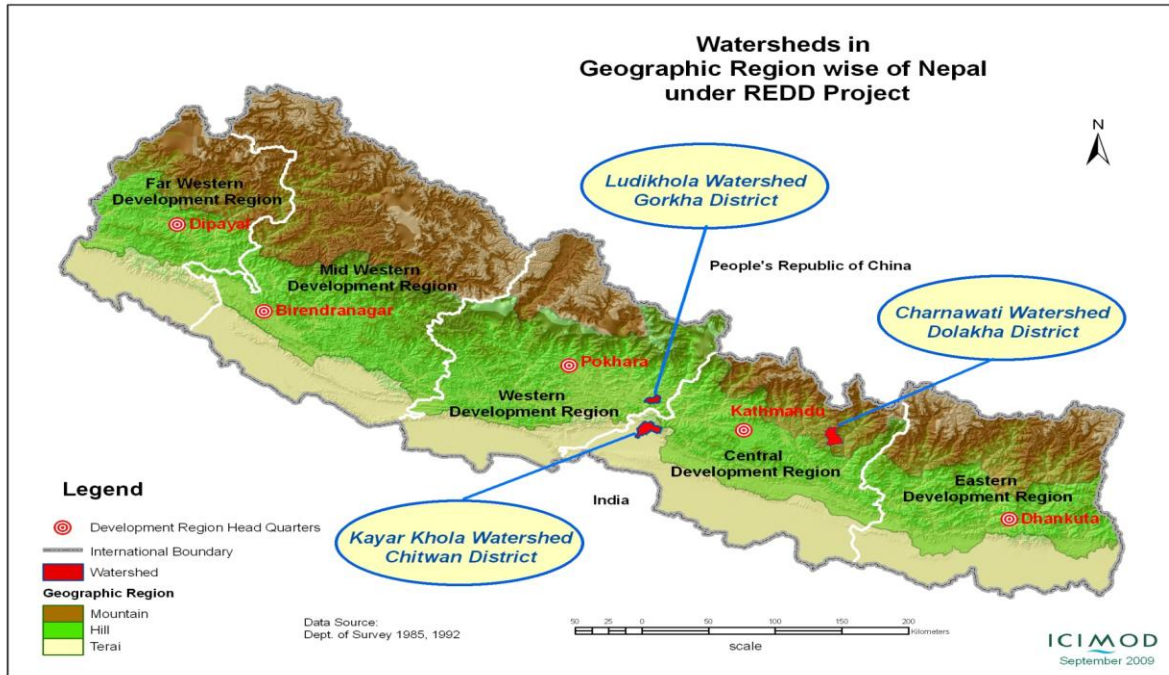


Figure 3: Maps of REDD Pilot Project Sites and Ludikhola watershed, Nepal.

Source: (Karky 2009)

Following sections provide detail description of the study area along with the criteria used for selecting the site for the study and demographic characteristics of sampled HHs.

4.1. Study area selection

Ludikhola watershed is situated in Gorkha district of the western development region of Nepal. This study area was chosen because of the number of reasons including:

- It is one of the three watersheds⁸ where REDD+ pilot project entitled "Design and establishment of a Governance and Payment Systems for Community Forest Management under REDD+" has been implemented since 2009 by a joint consortium of International Centre for Integrated Mountain Development (ICIMOD), Asia Network for Sustainable Agriculture and Bio-resources (ANSAB) and Federation of Community Forest Users', Nepal (FECOFUN) with financial support from Norwegian Agency for Development Cooperation (NORAD).
- Ludikhola watershed represents the middle hill region of Nepal, where CF program has been implemented extensively.
- About 70% households livelihood depends on subsistence agriculture and dependency on CF is high (ANSAB 2010b).
- This REDD+ pilot is the first of its kind implemented project in Nepal (REDD-Cell 2011).

4.1.1. Selection of CFUGs and households

Number of criteria were used to select CFs inside the watershed for this study. On the basis of these characteristics three CFUGs were selected for this study. Those criteria are mentioned below:

- CFUGs must be the part of the REDD+ pilot project area.
- Age of the CFUGs: handing over of that CF to CFUG was at least 10 years before the start of this study.
- At least Two of them share a common boundary.
- CFUGs should represent more heterogenous groups in respect to caste, ethnicity, economic condition and occupations.

⁸ Three watersheds where REDD+ pilot project entitled "Design and establishment of a Governance and Payment systems for Community forest management under REDD+" has been implemented are: 1. Ludikhola Watershed of Gorkha District, 2. Charnawati Watershed of Dolakha District and 3. Kayarkhola Watershed of Chitwan District of Nepal.

Three CFUGs included in this study are: 1) Shikhardanda Ludi Pakha CFUG, Gorkha Municipality 11, Gorkha (CFUG1), 2) Mahalaxmi CFUG, Gorkha Municipality 10, Gorkha (CFUG2) and 3) Birechowk Deurali CFUG, Gorkha Municipality 9, Gorkha (CFUG3). While CFUG2 shares boundary with the CFUG3 on its North, CFUG1 lies separate and is relatively far from District headquarter too. The detail description of general characteristics of the CFUGs is presented in the Table 7.

Table 7: Description of the CFUGs in Ludikhola watershed, Nepal 2013.

CFUGs	Area of CF (ha.)	No. of HHs	No. of Women	No. of Men	CFUG registration date	Market distance ⁹ (km.)
CFUG1	32.68	183	461	427	2000	10
CFUG2	58	130	255	230	1994	7
CFUG3	83	158	447	462	1992	5

Sources: All the information presented in this table were collected from the Constitution and Operational Plans (OP) of respective CFUGs.

4.1.2. Study area description

4.1.2.1. Location and physiography

The watershed covers an area of 5,750 hectares within Latitude N 27⁰55'02.85''- N 27⁰59'43.88'', and Longitude E 84⁰33'23.13''- E 84⁰40'41.87'' (ANSAB et al. 2012). It takes about 5 hours drive to reach the boundary of the watershed. Location map of the study area is presented in Figure 3.1 and 3.2. The landscape has a rugged terrain having altitude range from 318 m to 1714 m. Of the total area of watershed, about 80% area is covered with forest, approximately 10% area has been cultivated and remaining area is covered with water bodies and bared soil (ibid). Demographic characteristics

There are altogether 31 CFUGs registered in the Ludikhola at present, and all of those CFUGs are REDD+ pilot project sites. A total number of 4,110 Households (HH) made up of 23,685 number of individuals are living in the watershed (ANSAB 2010b). The watershed is characterized by social diversity and consists of ethnic and caste groups including *Magar*, *Gurung*, *Tamang*, *Dalit*, *Brahmin*, and *Chhetri*.

4.1.2.2. Vegetation, Climate and topography

The vegetation of the watershed area is composed of sub-tropical broad lived forest according to the broader climatological categorization of the forest. Dominant tree species includes, *Rhododendron sp.*, *Quercus sp.*, *Schima wallichii*, *Catanopsis sp.*, Pine and *Shorea robusta*

⁹ Market distance is the average distance to the closest market i.e. Gorkha Municipality center from CFUG members' residence.

(ANSAB *et al.* 2012). Basal area for the trees are 18 m² and 23 m² per hectare in sparse and dense forest respectively in the study area (ANSAB 2010a).

There is variation in climate; at lower altitude climate is sub-tropical and at higher altitude the climate is temperate in the study area. Average annual rainfall ranges from 1,972 to 2,000 mm and average daily temperature is 14.5⁰ C (Lamichhane & Awasthi 2009). Similarly, micro-climatic condition also changes frequently and varies in different places such as along the riverside and where facing of hills, that impacts on the composition of vegetations, crops and water sources. Average topography of the watershed is mostly hilly with 61.43% is steep sloping land (30-60% slope), and the remaining 39.57% have less than 30% slope (ibid).

4.2. Households' demographic characteristics

Households in the study area were heterogeneous. Despite united as a CFUG, diversities were found among respondents by various socio-economic factors including HH members, land ownership, ethnicity, income levels and education levels. Table 8 summarizes various demographic characteristics of the surveyed HH heads in three CFUGs.

Table 8: Respondents' demographic characteristics in Ludikhola watershed, Nepal 2013.

	HH size	Sex of the HH head (%)		Education level (%)			Age	Ethnicity (%)		
		Male	Female	No formal	Primary	Secondary		Brahmin/Chhetri	Indigenous	Dalit
CFUG1	6	69.2	30.8	53.8	30.8	15.4	53	23.1	65.4	11.5
CFUG2	9	62.5	37.5	62.5	37.5	0	54	25	62.5	12.5
CFUG3	7	81.3	18.8	50	43.8	6.3	53	25	25	50
Total	7	72	28	54	36	10	53	24	52	24

Mean age of the HH heads was 53 years with an average family size of 7 people. Majority of the HHs were living in an extended family type, where grandparents, parents and grandchildren live together under a same roof. Of total 72% HHs were found to be headed by father. More than 50% of the respondents did not have any formal education. All respondents were following Hindu religion. Based on Hindu religion and local culture HHs had several castes and ethnicities by birth. However, three ethnic groups i.e. *Brahmin/Chhetri*,

Indigenous and *Dalits* covers all the castes. Culturally *Brahmins* have higher position in the society and *Dalits* are considered as under-privileged 'lower castes'. Indigenous HHs fall in between *Brahmins* and *Dalits*. While 52% respondents belong to Indigenous groups, 24% were *Brahmins/Chhetries* and *Dalits* were also 24%.

Within a HH, roles played and responsibilities taken by various members of the family were mostly culturally predefined. Father is the head of the family and responsible for cash income generation, making decisions in the family and representing HH in the community. The mother is responsible for all households level activities including cooking, feeding animals and taking care of children. Exceptions, however, to this was also found in some instances such as women headed households whose husbands were abroad or who were widowed. Similarly, quite a few educated ladies were employed at schools, NGOs or government services. In those cases too, women were still responsible for household level activities. Though more than 50% of the HH heads were illiterate, young members and children of the families were found to be attending schools regularly.

5. LOCAL LIVELIHOODS

This chapter provides insights into the general livelihoods among households in the study area. The presentation of the livelihood analysis follows the SLA framework. Before discussing various livelihood activities and outcomes, calculation and analysis of available assets base, performing activities and the existing contexts and conditions will be presented. Analyses will compare and contrast on the basis of wealth ranking, ethnicity and location. This chapter will provide an understanding about how HHs are living in the areas and what matters the most to them if some changes in the resource access and use pattern emerges such as REDD+.

5.1. Assets and capitals

Assets constitute all the resources or capitals that HHs in the study area own or have access to. This may range from owning an axe to holding many acres of lands to being a influential villager or political leader. Those resources include private, common pools and public resources. A summary of the assets available to HHs in the study area is presented in Table 9.

Table 9: Types of Capital available to HHs in Ludikhola watershed, Nepal 2013.

Capitals	Features
Physical	<ul style="list-style-type: none"> • All HHs had a House for living, Mobile phones and radios for communication. • <i>Brahmins</i> own more physical assets. • Infrastructures were available and accessible to all HHs. • Farming and forestry tools and technologies were traditional types.
Human	<ul style="list-style-type: none"> • Half of the HH heads did not acquire any formal education. • 80% have agricultural and forestry skills • CWR is 0.8.
Natural	<ul style="list-style-type: none"> • CF for forestry products. • Private lands for farming. • <i>Khet</i> lands more productive.
Social	<ul style="list-style-type: none"> • Mostly Hindu religion followed. • Ethnic group variations. • Living happily in the area. • Belong to CFUG and other interest based groups.
Financial	<ul style="list-style-type: none"> • Formal and informal mechanism of monetary transactions. • Reciprocity

It is important to know the ownership, access and utilization process of the resources in the community. Similarly, finding criteria influencing access to and use of the resources is crucial for better understanding of the asset base in the study area.

Hence, in order to present results categorically, the first factor is location. As the study area is spread over three CFUGs, various socio-economic characteristics, ecology, infrastructures in each CFUG may have implications on livelihood activities, resource use pattern and livelihood outcomes of the HHs. Among others, mean land ownership per HH and mean HH size was found to be statistically different among CFUGs ($P < 0.05$) (Table 10).

Table 10: Socio-economic characteristics by location in Ludikhola watershed, Nepal 2013.

Socio-economic characteristics	CFUG1	CFUG2	CFUG3	Total
Mean age of the HH head (yrs)	53	54	53	53
Ethnicity (<i>Brahmin</i>) (%)	23	25	25	24
Ethnicity (Indigenous) (%)	65	62	25	52
Ethnicity (<i>Dalit</i>) (%)	12	13	60	24
Primary level education of HH head (%)	46	37	49	46
Mean land owned (ha)*	0.34	0.63	0.5	0.43
Mean annual income (US\$)	6335	5614	4973	5784
Mean HH size (number)*	6	9	7	7
Female as HH head (%)	31	38	19	28
Married HH head (%)	89	87	81	86

* Indicates significantly different among CFUGs ($P < 0.05$), $N = 50$.

Second factor is wealth ranking i.e. poor and less poor HHs because wealth rankings provide overall welfare situations in the area. We avoided to use term 'rich' in wealth ranking because mean per capita income in the study area was only US\$ 2.2 per day. Area of farm land owned and annual cash incomes from various sources are considered as two major criteria that HHs believe to be determining whether a HH is poor or less poor. Similarly, as can be seen from Table 5-2, mean land ownership and mean annual income between CFUGs were different. Hence, HHs were divided into poor and less poor based on annual income and land ownership. This classification provided guidelines and formed a basis to categorically present and analyze other assets available to the poor and less poor HHs in the study area.

Statistically significant variations ($P < 0.05$) were found between poor and less poor HHs in terms of representation of *Brahmin* and *Dalit* HHs, education, mean land ownerships and mean annual incomes (Table 11).

Table 11: Socio-economic characteristics by income levels in Ludikhola watershed, Nepal 2013.

Socio-economic characteristics	Poor	Less poor	Total
Mean age of the HH head (yrs)	54	52	53
Ethnicity (<i>Brahmin</i>) (%)*	12	36	24
Ethnicity (Indigenous) (%)	56	48	52
Ethnicity (<i>Dalit</i>) (%)*	32	16	24
Primary level education of HH head (%)*	32	60	46
Mean land owned (ha)*	0.33	0.54	0.43
Mean annual income (US\$)*	2994	8574	5784
Mean HH size (number)	7	7	7
Female as HH head (%)	24	32	28
Married HH head (%)	80	92	86

* Indicates significantly different between poor and less poor ($P < 0.05$), $N = 50$.

The last but important factor used to categorize HHs was ethnicity. Even though the main religion in the study area is Hindu, caste or ethnicity was main social identity of the HHs. By birth, according to Hindu culture, every person get surname from parents and that surname is linked with social ranking in the community and hence, deciding power relations to some extent within the community. Numerous castes recorded in the study area are categorized into *Brahmin/Chhetri*, Indigenous and *Dalit* ethnic groups. Differences were found among ethnic groups in various socio-economic characteristics in the study area (Table 12). Mean annual income and a mean land owned were found to be significantly different among ethnic groups ($P < 0.05$).

Table 12: Socio-economic characteristics by ethnicity in Ludikhola watershed, Nepal 2013.

Socio-economic characteristics	Brahmins	Indigenous	Dalits	Total
Mean age of the HH head (yrs)	51	53	55	53
Primary level education of HH head (%)	64	42	25	46
Mean land owned (ha)*	0.65	0.41	0.27	0.43
Mean annual income (US\$)*	9278	4909	4200	5784
Mean HH size (number)	6	7	7	7
Female as HH head (%)	41	23	25	28
Married HH head (%)	92	92	67	86

* Indicates significantly different among ethnic groups ($P < 0.05$), $N = 50$.

5.1.1. Physical Assets

Physical assets include both assets owned by HHs and available in the community. Physical assets owned by HHs include number of houses, radios, televisions, phones, motorbikes, tractors, oxen and mills owned by each HH. In addition to these assets, HHs use various services provided by physical structures available in the community on a daily basis. Broadly those structures are categorized into i) Tools and technology and ii) Infrastructures.

5.1.1.1. Physical assets owned by HHs

Physical assets under this category includes all the physical assets owned by HHs and access controlled by belonging HHs. Table 13 shows that all surveyed HHs had at least one house for living, one mobile phone to talk and a radio for entertainment. Two or more houses were owned by only a few percentage (8%) of total HHs. Expensive physical assets such as tractor and rice mills were owned by a few HHs in the study area.

Table 13: Physical assets holding in Ludikhola watershed, Nepal 2013.

	House*			Radio*		Motor bike*	Rice/ wheat mill	Phone/ Mobile*		TV*	Oxen*	Tractor *
	1	2	3	1	2	1	1	1	> 1	1	2	1
HH (%)	92	6	2	96	4	34	2	36	64	78	40	12

* Indicates sample mean within the variable is significantly different ($P < 0.05$), N = 50.

From the total physical assets owned by all HHs in the study area, a mean holding of the majority of the assets were found to be statistically significant. Hence further analyses of the physical assets based on location, income levels and ethnicity is performed. Variations, found by income groups, ethnicity and location on the number of assets owned by HHs, are described below.

Based on location, HHs in the CFUG1 were better off than other CFUGs in terms of number more houses, radio, mobile and Television owned (Table 14). Similarly, only single rice mill recorded was also available in the CFUG1. CFUG2 had the least motorbikes but the most Oxen in the study area. HHs in the CFUG3 were found to be owning significantly more numbers of motorbikes than CFUG1 and CFUG2 ($P < 0.05$). However, number of tractors were less in CFUG3.

Table 14: Physical assets holding by locations in Ludikhola watershed, Nepal 2013.

Location	House			Radio		Motor bike*	Rice/wheat mill	Phone/Mobile		TV	Oxen	Tractor
	1	2	3	1	2	1	1	1	>1	1	2	1
CFUG1 (%)	96	0	4	92	8	23	4	31	69	85	46	15
CFUG2 (%)	75	25	0	100	0	13	0	50	50	62	62	13
CFUG3 (%)	94	6	0	100	0	63	0	37	63	75	19	7

* Indicates significantly different among CFUGs ($P < 0.05$), $N = 50$.

For the poor, they have less number of houses, motorbikes, mobile phones, TVs and tractors (Table 15). Though poor HHs had significantly less motorbikes than less poor HHs ($P < 0.05$), significantly more Oxen were owned by poor HHs ($P < 0.05$). Despite holding larger areas of farm lands, only 20% of the less poor HHs were rearing Oxen. On the contrary, 60 % of the poor HHs had oxen. Only one HH falling under the category of poor owned a tractor.

Table 15: Physical assets holding by income levels in Ludikhola watershed, Nepal 2013.

Income Groups	House			Radio		Motor bike*	Rice/wheat mill	Phone/Mobile *		TV*	Oxen*	Tractor
	1	2	3	1	2	1	1	1	> 1	1	2	1
Poor HH (%)	96	4	0	96	4	12	0	52	48	64	60	4
Less poor HH (%)	88	8	4	96	4	56	4	20	80	92	20	20

* Indicates significantly different between poor and less poor ($P < 0.05$), $N = 50$.

Based on ethnicity, significant differences were found among ethnic groups in terms of ownership or holdings of houses, mobile phones, TVs and Oxen ($P < 0.05$) (Table 16). Compared to Indigenous and *Dalit* HHs, *Brahmins* own more houses, motorbikes, radios, TVs, and the only rice mill. In terms of tractor ownership, indigenous HHs were ahead of other ethnic groups. But not a single *Dalit* HH own a tractor. *Dalits* were nearer to Indigenous groups while it came to the number of oxen ownership.

Table 16: Physical assets holding by ethnicity in Ludikhola watershed, Nepal 2013.

Ethnicity	House*			Radio		Motor bike	Rice/ wheat mill	Phone/ Mobile*		TV*	Oxen*	Tractor
	1	2	3	1	2	1	1	1	>1	1	2	1
Brahmin (%)	75	16	9	92	8	58	8	67	33	100	8	8
Indigenous (%)	96	4	0	96	4	27	0	39	61	81	53	19
Dalit (%)	100	0	0	100	0	25	0	67	33	50	42	0

* Indicates significantly different among ethnic groups ($P < 0.05$), $N = 50$.

5.1.1.2. Physical assets in the community

HHs have access to various communal physical assets and they are using them on a daily basis. Unlike privately owned physical assets, every HHs residing in the area have equal access to these resources. Similarly, CFUGs were found to be more or less alike in terms of communal physical assets available in the area. Hence, summary of those assets is presented here under the headings of A) Infrastructures and B) Tools and technologies.

A) Infrastructures

Infrastructure is considered as a backbone for the development of the area and constitutes road, irrigation and drinking water facilities, schools, health services, electricity and communication. For individual HHs, relative importance of one infrastructure type over another depends on their livelihood pathways.

In the study area, road connections were available. Both black topped roads and village roads are connecting at least some part of all CFs and villages. Roads are used not only for travels by peoples, but also to take village products to the nearest markets. Tap water was available to the majority of the HHs from various sources with varying quantities. Irrigation facilities were only available in the *Khet* lands. Other agricultural lands depend on rain water for the irrigation. Village level health service was provided by public health posts in the area. Health posts and sub-health posts were located within each village but there was not a single doctor. All the health services are provided by health technicians and trained nurses only. For the major treatments, local people have to go to either district hospital in the Gorkha municipality or even to the capital city for more serious cases, which takes around 5 hours by public transport. Still, the main cooking sources were fire woods followed by gas. While mobile

network was the main communication means, internet connections were very limited and, if available, was expensive with very poor bandwidth.

Both government and private schools were in easily accessible distance in all villages. Most of the government schools use the Nepali language for teaching whereas English medium was common in private schools. Due to high fees charged by private schools, relatively poor households were not able to send their children to the private schools for education.

B) Tools and Technology

Traditional types of farming practices were dominant in the study area. Agricultural implements were relatively traditional and included oxen ploughs, spades, hand hoes, sickles, axes etc. Oxen plough was still a common practice for the *bari* land. However, tractors are also used to plough some *khet* lands and harvest paddy fields. Households said that they use chemical fertilizer for the vegetable, cash crops and

other crops grown in the *Khet* land. However in *bari* land, farmyard manure and animal dung mixed with plant residues are also used in combination with chemical fertilizers. Seed storage facility in the study area was not available and households were facing various challenges if they want to use seed storage facility from nearby city areas (Box 1). There were privately owned mills to process crops and mustard seeds. Those mills used to charge about NRs. 1.5 per kg as a processing charge of crops.

As a result of road connections, villagers used tractors or transport vans for the transportation of the agricultural products. Similarly, the use of motor bike are very common to carry small

Box 1. Need of seed storage facility

We do not have any seed storage house or facility in our village . We just store seeds of the crops in our own ways. That is why we depend on the District Agriculture Office or local markets for various seeds of vegetables and cereals. However, we started to use a private cold store available in another district (Bharatpur of Chitwan) to store seed potatoes with the help of one of our neighbour by providing some charge. Unfortunately, a tractor full loads of potatoes got crashed and many of our neighbours had to bear that loss. However, we again sent sacks of potatoes to the cold store. We were shocked later when we returned out sacks with at least 5 kg less potatoes in each sack.

Either cold storage owner or our contacting neighbour took our potatoes. If we had our own cold storage we would not have to bear this loss and also would not need to blame our neighbour. Similarly, we are losing good value of the products during off season as we can't store products for late season sale.

--- Respondent No. 2

loads. However, due to steep slopes in the forest, forest products had to be carried by themselves as there was not access to modern forest harvesting equipments.

5.1.2. Human capital

Human capital and labour have direct link with the livelihood activities opted by HHs. Outcomes from those livelihood activities and capital owned by HHs are influenced by a number of factors including number of labour force and their skills, education level and number of dependent family member. Those factors have been analysed and presented here.

The main occupation, farming, was found to be directly linked with the acquired skills or trainings by HHs. Dominant skills reported was agricultural and forestry to the 80% of the total HHs. The remaining 20% recorded other skills such as general electrical and electricity trainings, mobile repairing skill, earthenware pottery, house constructing, and driving. HH size is important factor when it comes to agriculture. More members in the family means more labour available to work in the farms. Mean HH size 7 in the study area. During cropping season, 60% of the HHs mentioned that, they work in each other's farm. Only 8% of the total HHs said they hire labours.

Education level determines quality and skilled human capital. Level of education of the people determines who is eligible to take which positions on the services. For example, to take employment at both government and private offices, at least primary level of education is required. Only 46% of the surveyed HHs hold at least primary level of formal education. Hence, a few HH heads were working for government or private offices. Various characteristics of the HHs linked with human capital and labour sources in the study area are described below based on locations, wealth ranking and ethnicity.

Based on location, the mean age of the HH head was almost same (Table 17). Significant difference was observed in mean HH size among CFUGs ($P < 0.05$). While mean HH size in CFUG1 was 6, that was 9 for CFUG3. Similarly, source of farm labour was found to be statistically different among CFUGs ($P < 0.05$). None of HHs from CFUG2 hired a farm labour. Exchanging labour during farming season was a common practice in all the CFUGs. Labour exchange in CFUG1 was more than other CFUGs. In CFUG2, primary level education of HH head was less than other CFUGs.

Table 17: Factors related to human capital by location in Ludikhola watershed, Nepal 2013.

Socio-economic characteristics	CFUG1	CFUG2	CFUG3	Total
Mean age of the HH head (yrs)	53	54	53	53
Primary level education of HH head (%)	46	37	49	46
Mean HH size (number)*	6	9	7	7
Female as HH head (%)	31	38	19	28
Married HH head (%)	89	87	81	86
Farm labour hired (%)*	11	0	6	8
Farm labour exchanged (%)*	77	63	31	60

* Indicates significantly different among CFUGs ($P < 0.05$), $N = 50$.

When compared between poor and less poor HHs, the poor had significantly less HH heads who were educated at least at primary levels ($P < 0.05$) (Table 18). Poor HHs had less female HH head, less number of married HH head and less hired farm labour than less poor HHs. Average HH size was same for both poor and less poor HHs.

Table 18: Factors related to human capital by income levels in Ludikhola watershed, Nepal 2013.

Socio-economic characteristics	Poor	Less poor	Total
Mean age of the HH head (yrs)	54	52	53
Primary level education of HH head (%)*	32	60	46
Mean HH size (number)	7	7	7
Female as HH head (%)	24	32	28
Married HH head (%)	80	92	86
Farm labour hired (%)	4	12	8
Farm labour exchanged (%)	52	68	60

* Indicates significantly different between poor and less poor ($P < 0.05$), $N = 50$.

When it comes to ethnicity, the *Brahmins* had more HHs having primary level education, more female HH heads and more married HH heads than other ethnic groups (Table 19). While mean age of the HH head was highest in *dalit* respondents, mean HH size was least in *Brahmin* HHs. Ethnic groups were significantly different in terms of farm labour used ($P < 0.05$). Exchanging farm labour was a dominant form of a labour source. Not a single *dalit* HHs were hiring farm labour.

Table 19: Factors related to human capital by ethnicity in Ludikhola watershed, Nepal 2013.

Socio-economic characteristics	Brahmins	Indigenous	Dalits	Total
Mean age of the HH head (yrs)	51	53	55	53
Primary level education of HH head (%)	64	42	25	46
Mean HH size (number)	6	7	7	7
Female as HH head (%)	41	23	25	28
Married HH head (%)	92	92	67	86
Farm labour hired (%)*	25	4	0	8
Farm labour exchanged (%)*	75	69	25	60

* Indicates significantly different among ethnic groups ($P < 0.05$), $N = 50$.

Moreover, based on the age, HH members were categorized into two groups: 1) Working group and 2) Dependent group or consumers in order to understand how farm labour or working hands are distributed in the study area. Members aged between 25 and 60 are normally considered economically active. Dependents are children below 15 years of age and elders above 60 years.

Now we discuss labour force intensity and scenario in the study area considering economically active and inactive HH members, and age of the HH heads. The average Consumer/worker ratio (CWR) was 0.797 in the study area. This suggest that on an average the number of dependents are less than the number of working people in the HHs. Hence, farm hands are available abundantly in the study area.

In order to see the relationship between CWR and age of the HH heads, we ran a regression. Quadratic significant relationship was found between age of the household head and CWR ($p < 0.01$, $R\ sq.\ adj = 0.13$), Figure 4 shows the plot. A number of conclusions are drawn from this. As seen in Figure 1, the CWR is higher when HH heads' age is between 31 and 40 years, and CWR value reaches peak when HH heads are more than 60 years of age. Between 40 and 60 years of age, number of children increases and they depend on the working groups for their living. It means human capital or labour availability is linked with the age of the HH head.

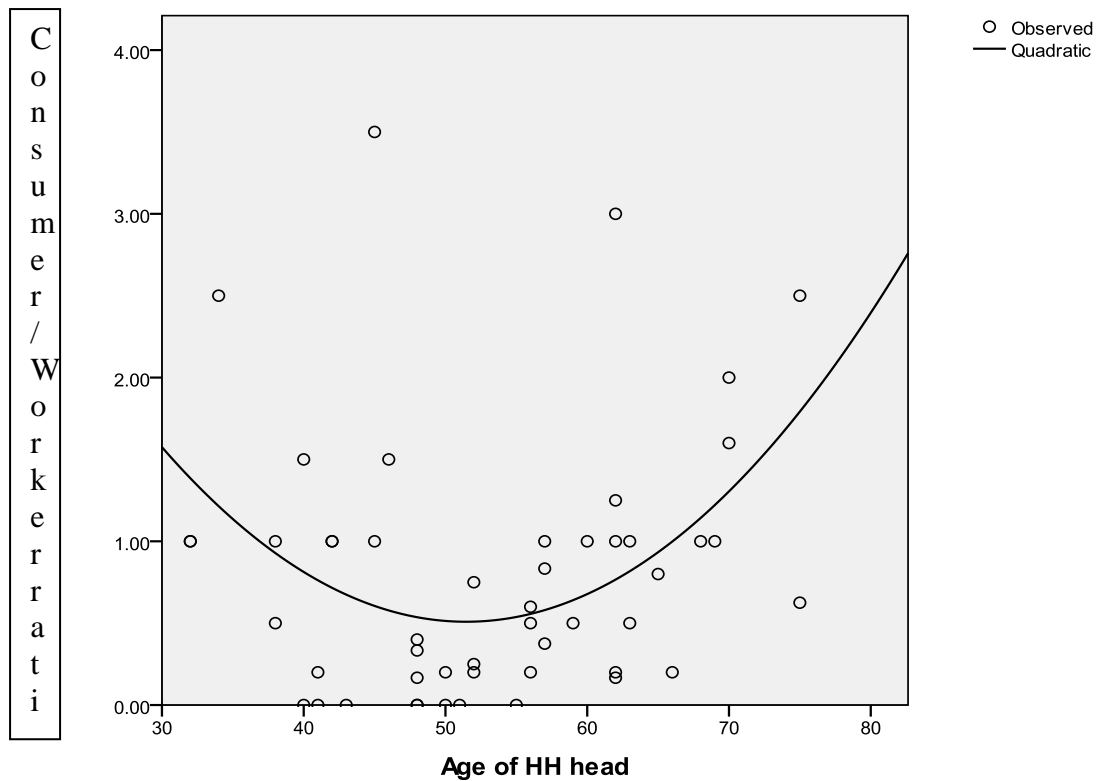


Figure 4: Consumer/Worker ratio against Age of the Household heads.

5.1.3. Natural Capital

Natural capital available to the local HHs has been further divided into two groups i.e. Private agriculture land and community land and resources.

5.1.3.1. Private Land

All households interviewed own some form of land. Within the private lands, this study only recorded lands used for agriculture. Farming lands were then categorized into *bari* land and *khet* land on the basis of their productivity, location and present market value. *Bari* lands are those agricultural lands where irrigation facility is not available and not suitable for the paddy cultivation and hence, having less market value. Whereas *Khet lands* are relatively plain fields, irrigated and more productive with higher market value. All forms of land were revealed to be permanent agriculture land (i.e. were under the practice of the agriculture at least before 10 years from now). Average landholding size of the area was 0.44 ha equivalent

of *khet* land per households. So, all recorded lands were converted into equivalent *khetland*¹⁰ and presented in Table 20, 21 and 22 based on location, wealth groups and ethnicity.

Based on locations, average land holding was significantly different ($P < 0.05$). Average landholding per HH was higher in CFUG2, but variation among HHs in terms of land sizes owned was higher in the CFUG3 (Table 20).

Table 20: Landholdings of the HHs by location in Ludikhola watershed, Nepal 2013.

Location	Average Landholding (ha.) per HH*
CFUG1	0.34 (0.23)
CFUG2	0.64 (0.24)
CFUG3	0.51 (0.38)

* Indicates significantly different among CFUGs ($P < 0.05$). Figures in parentheses are standard deviations. N = 50.

The average landholding size between poor and relatively poor was found to be statistically different ($P < 0.05$) (Table 21).

Table 21: Landholdings of the HHs by wealth groups in Ludikhola watershed, Nepal 2013.

Wealth ranking	Average Landholding (ha.) per HH*
Poor	0.33 (0.2)
Less poor	0.55 (0.34)

* Indicates significantly different between poor and less poor ($P < 0.05$). Figures in parentheses are standard deviations. N = 50.

Statistically significant differences were found in terms of average landholding based on ethnicity ($P < 0.05$). *Brahmins* were owning more lands than Indigenous and *Dalit* HHs (Table 22). The standard deviation in land holding for *dalit* HHs is almost equal to the average landholding by *Dalit* HHs. This shows that some of the dalit HHs had significantly less farm lands.

Table 22: Landholdings of the HHs by ethnicity in Ludikhola watershed, Nepal 2013.

Ethnicity	Average Landholding (ha.) per HH*
Brahmins	0.67 (0.34)
Indigenous	0.41 (0.27)
Dalits	0.27 (0.23)

* Indicates significantly different among ethnic groups ($P < 0.05$). Figures in parentheses are standard deviations. N = 50.

¹⁰ Based on the locally prevalent land valuation, 1 *ropani* of *khetland* costs on an average NRs 1.5 million, which is almost 5 times higher than the cost of *bariland*. This calculation was used to convert *bariland* into *khetland*.

5.1.3.2. Community land

CFUGs are only entitled to manage CFs and utilize the CF products as they have a usufruct right, while formal land rights entirely remain with the government. Due to this, HHs were using CF area for the collection of fodder, fuel wood, timber, some NTFPs and animal grazing. They are not allowed to buy or sell the CF land nor construct any private structure within the CF area. In the study area, no incident of encroachment or conversion of forest land to the agricultural land was observed. However, it is allowed to allocate certain part of the CF bare land to the poorest HHs in order for them to grow cash crops and hence support their livelihoods. But none of the studied CFUGs were actually implementing this provision. During focus group discussion, a number of reasons for not implementing that provision was recorded. Poor HHs mentioned that they do not have required skills, resources and productive bare land in the CF area. When asked to CFUG committee members, they said they are planning to provide bare lands to poor HHs in near future provided that they get appropriate technical and financial support from forest officials or other sources. However, the first step for this was not found in CFUG1, which is to prepare updated list of wealth rankings of the member HHs within CFUGs.

Based on the location, CFUGs showed both similarities and differences in terms of per hectare communal land per HH and other forest resources. The CFs had a similarity in species composition, age of the forest and location. They were, however, different in terms of number of forest area available to each HHs, forest aspect or facing and distance to the forest from HHs' residents. CFUG1 had the least CF area per HHs i.e. 0.18 ha., while CFUG3 has the highest i.e. 0.52 ha. HHs of CFUG2 and 3 were in close proximity to their CFs as compared to CFUG1, where majority of the HH reside relatively far from the CF.

5.1.4. Social Capital

The area enjoys very diverse ethnic groups representing *Brahmins, Chhetries, Indigenous castes and Dalits*. A majority of the households (52 %) are Indigenous castes and includes *Magar, Kumal, Newar and Gurung*. Whereas *Brahmins and Dalits* each formed 24 % of the total HHs.

Though statistically significant difference was not found in terms of ethnicity based on location, some differences can be seen in Table 23. CFUG1 represents significant number of

the *Kumal* ethnic group, who are "under-represented minor groups" in Nepal. Whereas, CFUG2 is dominated by *Magar* communities and CFUG3 with *Dalit* HHs domination.

Table 23: Ethnicity by location in the Ludikhola watershed, Nepal 2013.

Location	Ethnicity			Total
	Brahmin/Chhetri	Indigenous	Dalits	
CFUG1 (%)	50	65	25	52
CFUG2 (%)	17	20	8	16
CFUG3 (%)	33	15	67	32
Total (%)	100	100	100	100

N = 50.

Based on wealth groups, there was statistically significant difference in terms of ethnic groups between poor and less poor HHs ($P < 0.05$) (Table 24). Poor HH included less *Brahmin* and more *Dalit* HHs.

Table 24: Ethnicity by wealth groups in the Ludikhola watershed, Nepal 2013.

Wealth groups	Ethnicity*			Total
	Brahmin/Chhetri	Indigenous	Dalits	
Poor HH (%)	25	54	67	50
Less poor HH (%)	75	46	33	50
Total	100	100	100	100

* Indicates significantly different between poor and less poor ($P < 0.05$). N = 50.

Despite different ethnic groups, people responded to be living in a good harmony. The reciprocity among HHs was very good. There were no unpleasant incidents recorded based on the ethnicity in the area. From the responses of the HHs, all of them said that they like their place of living and only 8% of them mentioned that they feel their village to be less comfortable and safe.

Responses of the HHs regarding various types of social relationships were recorded and ranked into 'fair' and 'very good' category. Cross tabulation of various social relationships with locations, economic status and ethnicity of the HHs was performed for Chi Square and Fisher's Exact test and results are presented below.

While majority (65.4%) of the HHs in the CFUG1 replied their place to be high in comfort and safety level, respondents from CFUG3 said the opposite (Table 26). This opposite response came from CFUG3 because their CFUG is in close proximity to the district headquarter. Locals believe that many strangers are now living there and also are speculated

to be involved in looting HHs, vandalism and physical violence. However, in all CFUGs, responses regarding relationship with neighbours was mostly of 'very good'. Many respondents from CFUG2 mentioned that their relationship with NGO workers, VDC and government official is not that good because, in their thinking, they get less support as compared to neighbour CFUGs. Grievances with officials of forest department were heard from CFUG1 committee member especially during Operational plan (OP) renewal of CF. During renewal of the OP, they have to carry out forest inventory and socio-economic analysis of the members. For this, they have to either hire forest technicians or take help from forest officials. The fee for this, as committee members said, was more than NRs. 50,000, which is more than what they actually save from CFUG internal sources.

Table 25: Various social relationship importance to HHs by location in Ludikhola watershed, Nepal 2013¹¹ .

Social Relationships		Location		
		CFUG1 (%)	CFUG2 (%)	CFUG3 (%)
Comfort and safety	Ok	34.6	50	75
	High	65.4	50	25
Relationship with neighbour	Fair	19.2	25	25
	Very good	80.8	75	75
Relat. with other communities	Fair	20	50	31.3
	Very good	80	50	68.8
Rela. with NGO workers	Fair	36.8	62.5	50
	Very good	63.2	37.5	50
Rela. with VDC	Fair	47.6	62.5	56.3
	Very good	52.4	37.5	43.8
Rela. with Government officials	Fair	34.8	62.5	56.3
	Very good	65.2	37.5	43.8
Rela. with CFUG's committee	Fair	26.9	37.5	25
	Very good	73.1	62.5	75

Moreover, some respondents also linked less support from outside sources to the less capacity of their 'female' president in coordination and getting support. Many of the relationships with outsiders were recorded as being very good for CFUG1 and CFUG3 HHs. However, many HHs from CFUG1 were accusing their president for not being transparent regarding fund mobilization and being biased based on the political ideology. Many HHs from CFUG3 were found to be reluctant while talking to outsiders such as the researcher himself. After building some rapport, they expressed their grievances by saying: " *Everyday a new person or groups*

¹¹ Test of significance was not possible to run because observations of 5 or more were not present in all cells, which is required to run the Chi square test. Similarly, Fisher's exact test is not applicable for 2 X 3 table.

come here and ask many questions to us. However, none of them is actually supporting us and helping resolve our concerns".

Now let us discuss social relationships of poor and less poor HHs. Poor HHs were earning less and also had to accept dominance of the more wealthier HHs in the study area because they have to depend on wealthier HHs for work and other things. Therefore 68% of the total poor HHs replied that they feel less comfort and safe in the village (Table 26).

Table 26: Various social relationship importance to HHs by wealth ranking in Ludikhola watershed, Nepal 2013.

Social Relationships		Wealth ranking	
		Poor (%)	Less poor (%)
Comfort and safety*	Ok	68	32
	High	32	68
Relationship with neighbour*	Fair	36	8
	Very good	64	92
Relat. with other communities*	Fair	41.7	16
	Very good	58.3	84
Rela. with NGO workers*	Fair	61.9	31.8
	Very good	38.1	68.2
Rela. with VDC	Fair	68.2	39.1
	Very good	31.8	60.9
Rela. with Government officials*	Fair	62.5	30.4
	Very good	37.5	69.6
Rela. with CFUG's committee	Fair	40	16
	Very good	60	84

* Indicates significant difference between compared groups of households ($P < 0.05$).

The relationships among neighbours in general looked very good. However, as compared to wealthier households, poor households felt that they were having only "fair relationships" with their neighbours. It is because poor HHs can't provide financial or material supports to other HHs and also have less involvement in farm labour exchange. Relationships with other community people, VDC and NGO workers was not found significantly different between wealth groups. It was found during field survey that many of the HHs had some kind of attachments with neighbour community people. Gatherings and helping during marriages and festivals were very common. Financial, human or moral support to each other village people was observed in the field visit. Though many poor households responded that they were having only fair relationships with forest government officials, a statistically significant number of less poor HHs said that they were having very good relationships with government

officials. Poor HHs said that because they have less education and less knowledge about government system, they either have to provide bribe to the government officials in order to get their work done or waste a significant amount of time. However, a majority of the respondents were happy with the CFUGs committee and were having good relationship with the respective CFUG committee. And the same was the case with the FCTF coordinating committee.

Table 27 provides various social relationships and their importance based on ethnicity of the HHs. It is not surprise to get more responses from *Brahmin* HHs regarding more safe and comfort in the village because culturally based on Hindu religion they are privileged groups in terms of social security and hierarchy.

Table 27: Various social relationship importance to HHs by ethnicity in Ludikhola watershed, Nepal 2013.

Social Relationships		Ethnicity	
		Brahmins (%)	Others ^a (%)
Comfort and safety*	OK	25	57.9
	High	75	42.1
Relationship with neighbour*	Fair	0	28.9
	Very good	100	71.1
Relat. with other communities*	Fair	0	37.8
	Very good	100	62.2
Rela. with NGO workers*	Fair	9.1	59.4
	Very good	90.9	40.6
Rela. with VDC*	Fair	16.7	66.7
	Very good	83.3	33.3
Rela. with Government officials	Fair	25	54.3
	Very good	75	45.7
Rela. with CFUG's committee	Fair	8.3	34.2
	Very good	91.7	65.8

* Indicates significantly difference between compared groups of households ($P < 0.05$).

^aOthers includes Indigenous and Dalit HHs.

Responses about the relationships with neighbours and other community people were found to be statistically significant between Brahmins and other ethnic groups ($P < 0.05$). Especially Indigenous HHs were very close to the same ethnic groups from surrounding communities because of strong culturally created bonds. For example it is common practice for brother and sister's children to marry each other. While, majority of the *Brahmin* HHs said that their

relationship with VDC, NGO workers and government workers was very good, indigenous and *dalit* HHs responded the opposite relationships. It is because *brahmin* being so called "higher class HHs" and powerful person in the community, external agencies can't neglect them in VDC level development works.

There is a clear sexual division of labour within HHs. The household head is the person in the family who is responsible for most socio-economic decisions. The study found that 26% of the household heads were female and 74% were male. Many female members in the households were solely responsible for cooking, house caring and looking after of children. Male members were mostly engaged in cash income generating activities such as labour, government employee, other jobs, trading, running business etc. In the context of Nepal, a large percentage of women are suppressed to some extent due to confinement within household works, limited education opportunities and restrictions in leading societal activities. That 26% of the female HH head could be significant in different ways. Females were heading households not because of losing male head partner as only 14% of the household heads were widowed and most of them were male. This representation may be linked with number of reasons including absence of male household members in the home or that they were abroad. The fact that CFUG2 is chaired by a women indicates that not all women in the community are confined to household activities.

5.1.5. Financial capital

In the study area both formal and informal types of financial institutions and activities were available for debit/credit management (Table 28). These institutions were providing services like savings, remittances, debt, loans, mortgages and so on. Several national level banks have had their branches in the nearest market, which is the headquarter of the District. Similarly, micro-financial institutions, locally known as co-operatives, were available in each village. Moreover, informal ways of funds transfers or providing loans from individual person were also recorded.

Financial institutions available in the district headquarter were providing various forms of services to the villagers. Especially, more wealthier HHs were found to be utilizing those services frequently. Occasionally, other households were also using financial services from the banks available in the district headquarters. These households includes CFUG's and households getting salary, allowances or pensions from the government and collecting

remittances. Senior and other citizens, who are eligible for some kind of government allowances, salary or pensions, have to have a bank account to get their allowances directly credited to their accounts. There was a compulsory provision for CFUG or other organizations to have an account in the bank and operate financial activities through the bank, though they were allowed to have a limited amount of cash with them for immediate and daily uses. As there was not a single branch of any bank within the village, micro-financial institutions were providing some services in the villages.

Table 28: Access to credits and loans in Ludikhola watershed, Nepal 2013.

Credit and loan sources	Cap amount per HH	Benefited HHs	Remarks
Formal Institutions	Based on Collateral	Less poor, remitters, and pensioners.	Banks and co-operatives.
Informal Institutions	Personal judgment and agreement	All HHs	High interests.
CFUG Fund	Normally US\$ 35 per HH	Mostly poor HHs and Dalits	Influential HHs were found to be using funds without interests.
Seed Grant	Either US\$ 35 per HH or equivalent livestock	Mostly poor HHs and Dalits	

Micro-finance institutions or co-operatives are member based financial institutions running from a certain amount of monthly savings from members and providing services to the members. Members of those cooperatives are required to deposit a fix amount of money each month. As these cooperatives were owned by members, loans and other services were also confined to them. Members do not require to produce any kind of collateral in order to get loans from these institutions. Similarly, there were large numbers of mother's groups within the village and they were performing the same function as cooperatives. Each month, members of the mothers groups deposit small, but equal amounts of money. Fund from all deposits were available to withdraw for members usually on a rotational basis with a small or no interest rate according to the agreed rules of the group. These kind of groups and institutions were very effective, efficient and attractive as a financial mechanism and for the economy of the villages as members were able to get easy access to money and could invest as a seed money to generate incomes. Moreover, women were seemed to be more independent due to the facilities and practices of this kind. Funds through the pilot project and also of the CFUGs fund were available for relatively poor households but with some interests. Households did not have to produce any collateral to access those funds, but the

share for each individual household was not very high (an average of US\$ 35) and was available only for some months. Still this fund was very productive for some households (Box 2).

Another type but equally prevalent system of monetary exchange is through informal financial practices. In case of emergency or for urgent requirement of relatively less amount of money, it is common among households to lend or borrow money from each other. For a short period of time it could be free of interest and they make verbal agreements only. However, for longer periods, interests are incurred while borrowing money from another person. Especially, elites or richer households provide loans to the relatively poorer households. Those are available immediately. However, taking cash loans

from the persons within the village was found to be very unattractive as interest rate would go as high as 60% annually. They also have to sign a contract mentioning amount, interest, deadlines and consequences of not paying by the deadlines. In general, there is a system of access to financial capital, though mainly small funds available for especially poor HHs. It seems all ethnic groups have access.

5.2. Livelihood activities

In the study area, all HHs surveyed were involved in agriculture with varying level of dependency. For a majority of the HHs, agricultural was the main occupation. Agricultural and livestock related activities produce on-farm and off-farm incomes. Incomes from other sources including business, trading, employment, pensions etc. were providing substantial support to the livelihoods of many HHs. These livelihood pathways are categorized into agriculture, forestry, remittances, business and trading. The following sections provide detailed description of the livelihood generating activities present in the study area.

Box. 2. A success story

Thanks to the CFUG committee and the pilot project for providing me interest free loan from the seed money value of NRs 3000 in order to buy a goat. Within one and half year from that day, I now have managed not only to return that money, but also I sold a goat with NRs 10000 last month. I have 2 mother goats and 3 kids from them.

Though my husband works as carpenter, his income is very seasonal. But now from these goats I am able to cover personal expenses of mine and children. I hope, very soon I will also have some cash deposits with me.

--- Respondent No 22.

5.2.1. Agriculture and off-farm activities

Agriculture comprises activities such as cultivating crops, livestock husbandry, working as wage labour in the farm lands and trading of agricultural and livestock products. It was common practice to grow some form of agricultural crops and rear livestock in the study area. About 66% of the HHs responded that they have agriculture as their main occupation. Incomes from the agricultural activities contribute to the main source of livelihood for them. For the remaining 34% households, agriculture was supplementing their other livelihood activities.

Rice, maize, wheat and millets are main subsistence crops grown in the study area. Some cash crops and vegetables including potatoes, mustard, cabbage, cauliflower, broccoli, beans, peas, garlic, ginger and so on are also cultivated. Table 29 provides details about major crops, cultivated areas and annual production.

Table 29: Major Crops' production in Ludikhola watershed, Nepal 2013.

	Rice	Maize	Wheat	Millet	Potatoes	Mustard
Average Cultivated area per HH (Ha.)	0.35	0.2	0.03	1.36	0.07	0.01
Average annual production per HH (Kg.)	2,556.3	674.56	129.3	124.42	446	10.5
Average sales annually per HH (Kg.)	992	188.84	89.6	18.4	350	0

If we exclude a few number of wealthy HHs (6%), agricultural products are mainly consumed by HHs. As seen in the Table 29, HHs were able to produce surplus rice, maize and potatoes and sold in the market or within the village. Some HHs reported that they cultivate seasonal vegetables, which can be easily sold in the Gorkha municipality.

Like farming, mostly subsistence type of livestock husbandry was observed except for a few poultry farms located in CFUG2. HHs were rearing livestock for the purpose of household consumption, farm yard manure and farm energy for ploughing. There were only two HHs, who did not have any livestock at home. All other had at least one cattle, buffalo, goat, pig or poultry. Different livestock owned by HHs is presented in Table 30.

Table 30: Livestock types hold HHs in Ludikhola watershed, Npeal 2013.

Livestock	Cattles	Buffaloes	Goats	Pigs	Poultry
HHs	30 (%)	38 (%)	88 (%)	36 (%)	60 (%)

From livestock, HHs were getting various products. Farm yard manure was produced from all form of livestock. Buffaloes and Cattles were mainly kept for the milk as ritually most of the HHs in the study area do not eat meat from them due to religion belief.

Goats and poultry are main sources of meat products in the area. A majority of the HHs (88%) were keeping goats. However, there was not a single HH having livestock husbandry as main occupation and producing significant level of livestock products. An exception to this was the existence of two poultry farms producing commercially important levels of chicken and eggs. Poultry farming was gaining attention particularly in CFUG2. Particular companies provide all requirements for farming such as chicks, diets for the poultry along with the commitment of buying chicken from farmers. Households only had to provide labour and land. It is believed that due to having relatively lower temperate climate, chicken produced in this area were resistant to diseases. Because of the better quality, chicken are exported even to the Tibet.

Ploughing of the farm lands are performed by either oxen or tractor. It has become a common practice to use tractor for ploughing the fields where roads are connected. Tractors are also the main means of transportation of farm products. However, it is still not possible to use tractor in the farmlands lying in the hilly and sloppy areas, where only ox ploughing is common. Normally one could assume that the more farmland you own, the more probable it would be that you have oxen to plough. However, the result from this study shows an opposite scenario. Poor HHs, who had less land than less poor HHs, were keeping more oxen. Poorer HHs work on the farm as agricultural workers and some of them use their oxen to plough *bari* lands. Beside wage labour hired in the farming, exchange of labour was also common practice in the study area. Locally termed as "*parima lagauni*", neighbours help each other to cultivate crops during cropping season. In this system, it is not required to pay for work in the fields, instead, HHs repay by providing labour in exchange.

Beside hiring out labour, some HH members were found to be involved in various off-farm activities. A couple of HHs mentioned that they were getting incomes from trading agricultural products such as rice, maize, vegetables, poultry and animals. Those traders were

collecting products from the village and selling them to the nearby market. Even, some elders were found to be involved in making various bamboo products and generating some incomes by selling those products. CFUG1 has a significant number of *Kumal* HHs, who are traditionally considered as having skills to make earthen pots. However, none of the young members in the field were found to be following their traditional work except a few elders.

5.2.2. Forestry

Forest is an integral part of the livelihood activities of the HHs living in the study area. Registered CFUG utilizes forest products from the allocated CF and involve in respective CFUG activities. In addition to the CF, many HHs were planting trees around their farm land and in other areas through agro-forestry activities. There is a direct dependency on the forest for many HHs. Especially HHs whose livelihood depends on agriculture and livestock husbandry directly depend on the CF. However, not all activities and practices are beneficial to the CF (Box. 3). Similarly fund held by CFUG is collected as a result of CF and provides various benefits to the HHs.

Box. 3. Forest and Farmland

Khet lands lie between forests and Ludikhola river. They are considered as relatively more productive. Reason behind this is that during the rainy season the nutrients from the forest above flow down to the *khets* and they increase the productivity of the low lying farm lands.

Occasionally it has been observed that people deliberately burn the patch of the forest so that ashes could go to the field and make soil properties good for the cultivation.

--- Respondent No 28.

Households collect timber, poles, fire woods, NTFPs and fodder from the forest. A utilization and distribution plan of forest products is written in the OPs of each CFUG. Group discussions and close observation revealed that more wealthier households were more interested in the timber, whereas poor households needed firewood and fodder the most from the forest on a daily basis. Charcoal collection from the CF was not recorded in the area. There were only two remaining blacksmiths and they buy charcoal from other households or produce themselves.

Some households mentioned that they occasionally collect mushrooms from the forest. Though grazing is entirely banned in the CFs, goat grazing was found to be a very common practice.

However, accessibility to the forest was a big concern in CFUG1. A majority of the households live along the side of the road and the forest lies on the other side of a small mountain. That is why relatively a few households used to go to collect firewood or fodder on a daily basis. Instead, all HHs extract forest products when there is harvesting time and season. Surprisingly, there was less interest, knowledge or concern towards CF as many households were involved on trading or non-farm activities. Box no. 4 provides examples of changes brought by the road connection.

CFUG's fund includes income from the various sources including sales of the forest produce, government support, support from various organizations, FCTF support and fines are collected. Funds of the CFUG were used for

various activities including providing loans to the HHs, construction of roads and social development activities. HHs were fully dependent on the CF for timber and poles, but they collect fodder and fire wood from both CF and their own forest areas. However, collection of the food materials and NTFPs from the CFs were very limited as valuable products were not available.

5.2.3. Business and employment

Trade, business and employment are important livelihood activities for many HHs in the study area. Most of the HHs in the study area are living in rural environment, and some are residing along the road connecting district headquarter. These HHs living along the road were found to be involved in various small scale business and trading. Employment such as in teaching, government services and private sectors also were recorded. However, jobs in the study area were very limited.

Box. 4. An effect of road construction

Main road linking district headquarter and other cities of the country passes through this area (CFUG1 settlement area). After construction of this road, this settlement started to grow and now, once Kumal dominated place, is settling many other caste households.

Our community was illiterate and only following our traditional work of making earthen pots, many of the households were not aware of the future benefits and value increase of the lands. We started to sell lands at very low prices and we spent all the money for household consumption only. This trend continued and people completely stopped their identity of making earthen pots.

As a result, now we are still poor and other new settlers are becoming more dominant in the area.

--- Respondent No 11.

Large industries or factories were not available in the study area. There was one production firm, that was a brick factory located in CFUG1. This factory was privately owned and providing part time works for some inhabitants. Small scale cottage industries were also available in the areas producing furniture and iron frames used in the local level constructions, mainly in building houses. One workshop for metal work and two furniture industries were available in the study area, employing some local people.

There were a plenty of shops, which were selling groceries, clothing, animal products and fertilizers. Some small restaurants were serving foods. Leaving out a couple of bigger stores, majority of the shops were run by HH members and turnovers were just enough for the living. Many of the HHs owning such shops responded that the sales sometimes were not even sufficient to cover their annual needs. One music instrument shop was recorded in the study area. That shop was run by taking loan from CFUG2 fund and the owner was a poor *Dalit*. The owner was skilled to make traditional Nepali music instrument called *madals*. The tractor was the only valuable asset for one poor HH and their livelihood was mostly dependent on income from hiring out the tractor.

Employment in private sector or services was very limited if available at all. Very few HH members were in government services including teaching in public schools. Private schools were providing employment to some residents. Driving profession was recorded as main income source for one HH in CFUG2 and other in CFUG3. However, it was seen that many of the young HH members were taking employment in nearby city areas or in the capital city. They were generating cash incomes to the families. Pensioners getting pensions form the Government of Nepal were also very limited.

At the village level some of the HHs were found to be involved in small village level contracts constructing village roads, selling fire woods to brick factory, building small houses etc. However, most profitable profession was involving in real estate business. In this profession people were acting as agents while trading lands or houses, but some of them were buying lands and selling plots from that lands.

5.2.4. Remittances

Remittance is the second largest source of the cash income in the village. Finding youths in the village was very difficult during HH survey. Youths, who are economically active were either gone to pursue further study in the capital city, working in nearby cities or were

abroad. Employment, especially in the Gulf countries, was the main source of most of the remittances in the area. Youths mainly from less poor HHs were abroad.

Similarly, employment in India was the second most important source of remittances. For generations, especially indigenous household's male members are serving Indian security forces and also take on some other jobs. CFUG2 represented most of those cases. Households in the study are were getting remittances either in the form of monthly salary or as pensions. Many respondents mentioned that, in addition to cash, they get various types of electronic appliances such as mobile phones, TVs, computers and home appliances from relatives who are abroad.

5.2.5. Diversification

Field observations and analysis of livelihood activities showed that households had diversified ways and sources of livelihoods activities. Heterogeneous HHs had diversified livelihood sources and were not dependent completely on one source of income for living. They were involved in more than one income generating activities, though with varying level of dependence. Incomes from Agriculture, forestry, business, trading, employment and remittances on previous year were recorded for all HHs. Calculation of Simpson's diversification index (DI) as performed by Vedeld et al. (2007) produced DI ranging between 0.18 and 0.70 with DI for total income being 0.71. A majority i.e. 78% of the households' DI of income fall between 0.4 and 0.7. This indicates that a majority of the households had diverse sources of income and they do not depend entirely on one source.

5.3. Livelihood outcomes

Results presented so far reflect that HHs in the study area were heterogeneous. They have differences in access to assets, in activities, ethnicity, religion and profession. Relative importance of various livelihood generating activities were also different among HHs. Variability was also found in the total annual income among HHs. Based on livelihood activities, HHs income is categorized into on-farm incomes, off-farm incomes, non-farm incomes, forestry income and remittances. While on-farm incomes come from agricultural activities, working as a wage labour in agricultural activities produces off-farm incomes. Incomes from trading, employments and business are non-farm incomes.

The fundamental requirement of any HH would be to achieve a livelihood in such a way that would not be compromised by anything. To achieve this, HHs have to use their assets by carrying out certain activity under the existing political and economic contexts and conditions. Households were asked about their perceptions of whether their annual income is sufficient to cover what they think as being basic necessities. Of total, 62% HHs responded their income to be sufficient and 32 % told that they have reasonably managed households' annual needs. Only 6 % households mentioned that their income is insufficient to fulfill the family needs.

5.3.1. Total incomes

The average annual HH income ranges from US\$ 1,268 to US\$ 28,908 with an average of US\$ 5,454 (Table 31). People in the area are poor and have income less than 2.2US\$/day on an average and 30% HHs have less than 1 US\$ per capita. One sample t-test gave significant result for all the income sources and total incomes too. Incomes from all the livelihood activities were contributing at different levels to individual HHs' total incomes. People in general depend on agriculture, remittances and non-farm activities.

Table 31: Average annual Income sources of the HHs in Ludikhola, Nepal 2013.

	On-farm activities*	Off-farm activities*	Non-farm activities*	Forest activities*	Remittances*	Total*
Mean annual income (US\$)	2,229.1 (3,177)	671.1 (874.4)	993.5 (1,922.9)	396.1 (123.1)	1,473.5 (1,911)	5784 (4976.7)
Contribution to HHs' mean annual income (%)	38.6	11.6	17.3	7	25.5	100

* indicates mean is significantly different within the income sources ($p < 0.01$), Standard deviation in brackets. N=50.

In figure, small differences in total income by locations were observed. As seen in Table 33, mean total income was higher in CFUG1 (US\$ 6335) than in CFUG2 (US\$ 5614) and CFUG3 (US\$ 4974).

Compared to less poor HHs, the poor depend more on agriculture and off-farm activities. More wealthy have higher income from remittances and non-farm activities. Further analysis of income data revealed that upper 25% HHs had more income than the total income from rest 75% HHs (figure 5).

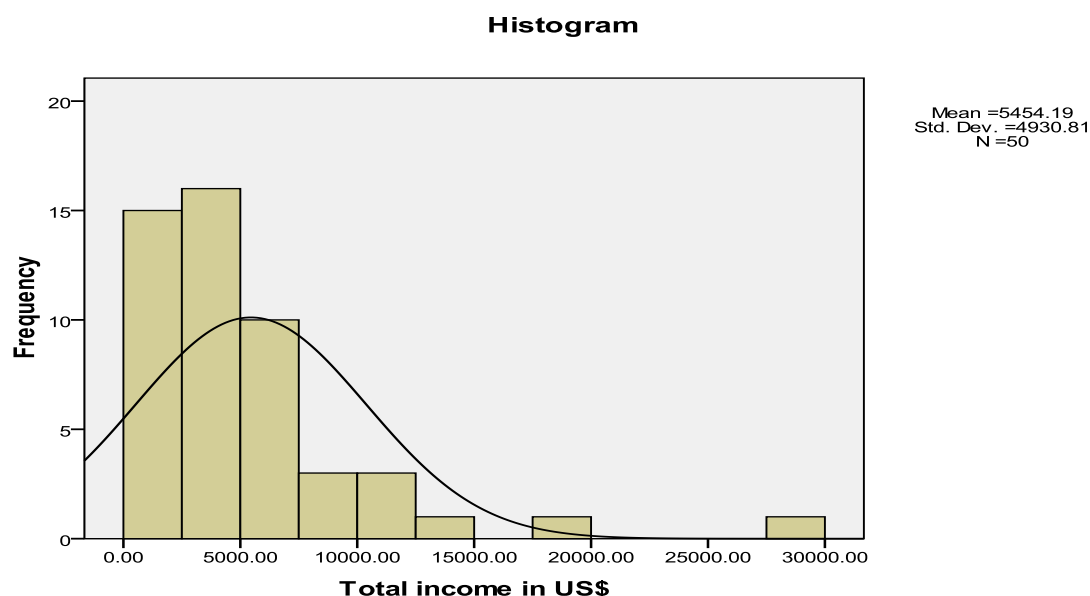


Figure 5: Income distribution of HHs in Ludikhola watershed, Nepal 2013.

It is important to find out socio-economic factors influencing the total livelihood incomes of the HHs because livelihoods depend on the total income. For this multiple regression was run for total annual income with ethnicity, land ownership, location, education level, sex of the HH head and family size (Table 32) because livelihood theories consider them to be influential factors contributing to total incomes.

The linear regression model was statistically significant ($p < 0.05$). Regression analysis showed that annual income of the HHs depend on various socio-economic characteristics. Combined effects of land ownership, ethnicity, location, sex, age and education were influencing HH's annual income, though none of the individual factors are significant. From further analysis of the individual variables with total annual income, it is revealed that many of the predicting variables were significantly correlated to each other ($P < 0.05$). As a result of that multi-collinearity effect occurred. Annex 2 provides a correlation matrix of all predicting and dependent variables. Significant correlations exist between total income and ethnicity, total income and land ownership, total income and education, age of the HH heads and education, education and HH size, land ownership and ethnicity, HH size and age, HH size and education, and HH size and sex of the respondents.

Table 32: Annual HH income and socio-economic characteristics in Ludikhola watershed, Nepal 2013.

Variables	Coefficient			Sig.
	estimates	Std. Error	t-value	
(Constant)	8712.464	4763.230		0.074
Name of CFUG	-942.003	821.719	-0.171	0.258
Sex of Respondent	-2048.690	1544.999	-0.187	0.192
Ethnicity	-1151.495	1166.391	-0.162	0.329
Education HH head	1292.957	1081.994	0.175	0.239
Household size	-58.428	257.664	-0.035	0.822
totland	239.759	139.497	0.291	0.093

N=50; R square adj. = 0.16; F = 2.55; p = 0.03

ANOVA tests were performed comparing individual income sources with locations, wealth groups and ethnicity. The results of ANOVA tests and descriptive analysis are presented in Tables 32, 33 and 34. Following sections discuss in detail under the income sources headings: on-farm and off-farm incomes, forest incomes, non-farm incomes and remittances.

5.3.2. On-farm and off-farm incomes

On-farm incomes provided 38.9%, whereas contribution of off-farm or agricultural wage labour incomes was 11.6% to the total income of the HHs (Table 31). A total mean annual on-farm income was US\$ 2249 per HHs, of which farming contributed US\$ 1273 and livestock US\$ 976. The mean off-farm income was US\$ 671 per HH in the last year.

A comparison among CFUGs showed that HHs from CFUG2 were earning slightly higher incomes from the agricultural activities, but not at the statistically significant level. The share of on-farm and off-farm incomes together to the total income in CFUG2 was 61.5%, which is higher than in CFUG1 (about 48%) and CFUG3 (49 %) (Table 33). The off-farm income in CFUG2 is US\$ 1125, which is higher than other CFUGs and contributes 20.6% to the total income. Whereas, the lower contribution from off-farm income (US\$ 415) and its share (8.4 %) to the total income was found in CFUG3.

Table 33: Income sources by location in Ludikhola watershed, Nepal 2013.

Income sources	CFUG1(N=26)		CFUG2(N=8)		CFUG3(N=16)	
	Income US\$	%	Income US\$	%	Income US\$	%
On-farm	2363.2 (4230.6)	37.3	2322.4 (1870.4)	41.4	2028.8 (1438.8)	40.8
Off-farm	690.4 (952.2)	10.9	1125 (1167.5)	20.1	414.9 (412.4)	8.4
Forestry	392 (148.2)	6.2	439.3 (100.5)	7.8	381.2 (83.3)	7.6
Non-farm	1309 (2481.2)	20.6	349.1 (986)	6.2	802.5 (962.1)	16.2
Remittances	1580.6 (2071.8)	25	1377.9 (1578)	24.5	1347 (1892.1)	27
Total	6335 (6267)	100	5613.7 (2746.3)	100	4973.8 (3269.8)	100

* indicates significantly difference by location ($p < 0.05$), Standard deviation in brackets. N=50.

If we look at distribution of income by wealth groups, we see that poor people have much high share of income from agriculture (80%) i.e. incomes from both on-farm and off-farm sources (Table 34). The less poor have only 40% income in total from agriculture. While on-farm income was more for less poor HHs, poor HHs were found to be earning significantly higher off-farm incomes than the less poor HHs ($P < 0.05$). About 38% of the total income of poor HHs was coming from off-farm income sources, whereas the contribution of off-farm income to the less poor HHs was only 4%. This is because poor households largely depend on agricultural wage labour for their livelihoods. Because of relatively lower education and very little land, poor households have to depend on off-farm works. While remittances provided 20.4% to the less poor HHs total income, poor HHs got significantly less amount of remittances (US\$ 13.9) contributing only 0.4% to their total income.

Table 34: Income sources by wealth groups in Ludikhola, Nepal 2013.

Income sources	Poor (N=25)		Less poor (N=25)	
	Income US\$	%	Income US\$	%
On-farm	1,382.4 (990.8)	46.1	3,117 (4,295.8)	36.4
Off -farm*	1007.4 (994.2)	33.7	334.9 (580.6)	4
Forestry*	356.2 (79.2)	12	436 (146.2)	5
Remittances*	13.9 (34.9)	0.4	2,933 (1,738)	34.2
Non-farm*	234.4 (469.2)	7.8	1752.5 (2475.5)	20.4
Total	2994.3 (1457)	100	8573.6 (5677)	100

* indicates significantly difference between income groups ($p < 0.05$), Standard deviation in brackets. N=50.

Table 35 shows that *Brahmin* HHs got 56% of the total incomes from agricultural activities, which is higher than about 47% to other ethnic groups. Particularly, on-farm income was significantly different among ethnic groups ($p < 0.05$). This shows that much of the on-farm incomes were going to the higher caste HHs even if its importance is higher for lower caste people.

Table 35: Income sources by ethnicity in Ludikhola, Nepal 2013.

Income sources	Brahmin (N=12)		Indigenous (N=26)		Dalits (N=12)	
	Income US\$	%	Income US\$	%	Income US\$	%
On-farm*	4207.2 (5926.6)	45.3	1718.4 (1241.4)	35.1	1443.8 (1281.8)	34.4
Off-farm	1017.4 (1411.2)	11	574.2 (700)	11.7	534.9 (357.4)	12.7
Forestry	423 (131.2)	4.7	398.3 (133.5)	8.1	344.2 (66.3)	8.2
Non-farm	1534.9 (2399.2)	16.5	719.1 (1629)	14.7	1046.5 (2045.1)	25
Remittances	2075.6 (2193.8)	22.5	1491.9 (1918)	30.4	831 (1502.1)	19.7
Total	9278 (7846)	100	4902 (3004.3)	100	4200.8 (3216.8)	100

* indicates significantly difference between ethnic groups ($p < 0.05$), Standard deviation in brackets. N=50.

5.3.3. Forest incomes

In the study area, forest environmental incomes contributed about 7% to the total HHs' annual income. An average income per HH from the forest was found to be US\$ 396 per year. This income share is lower compared to Vedeld et al. (2004) analysis because in this study, incomes sources mainly included fuel wood, fodder and timber. If we calculate forest income from those three products only in Vedeld et al. (2004), the outcome matches with this study. Similarly, lower income from the forest might be linked to various factors. Dependency of HHs for food in the forest was not observed in this area. Timber collection was limited because there were very limited number of trees which were mature enough to produce high valued timber. Valuation of forest products in the study area, which was taken for the analysis of this study, was lower than in the nearest market. Moreover, there were no availability of highly valuable NTFPs potential to substantially generate income.

However, above mentioned forestry contribution to the households' annual income excludes valuation of funds utilized in community development works and loans. Similarly, indirect

environmental services provided by the forest were not calculated. If we take into consideration of all funds utilized and environmental services, CF income could further have been much more higher. However, CF was providing less than 20% of the required amount of the fuel wood and fodder. HHs were getting remaining quantity from their own forested areas.

The conservation of the forest as CFs is also linked to the livelihood outcomes in the area. The group discussion revealed that the CFs area was almost cleared before 1967. They also said that forest regenerated naturally after that. However, and due to open access, forest was open for everybody leading to very degraded conditions. This trend changed when CFUGs officially took control over the forest and made a management plan, which includes the management, conservation and utilization plan of the forest with the help of forest officials. Since then, HHs are learning and they are developing better forest governance. This could provide a platform from where they could know what is actually good governance and also raise a voice at the national level processes. This also raises awareness among users about how to claim and know their rights and responsibilities as a citizen. Sustainable harvesting of forest products ultimately helps maintaining and conserving forests for the long term.

Location wise, little variations were observed in the share and amount of forestry incomes. Compared to CFUG1 and CFUG3, both forestry income (US\$ 439) and its contribution (7.8%) to the total were higher in CFUG2.

By wealth groups, there was significantly different forestry incomes between poor and less poor HHs ($p < 0.05$). Less poor HHs got an average of US\$ 436 from the forest, which contributed only 5% to their annual income (Table 34). Despite earning slightly lower total incomes than less poor HHs, forest income shared 12% of the total income of poor HHs. Higher contribution of forest incomes for poor HHs indicates that forestry resources were more important in maintaining their livelihoods. However, less amounts may be linked with the fact that annually harvested timber was mostly collected by less poor HHs. Timber in the CFUGs is distributed based on pre-determined requirements of the HHs. Poor HHs can't afford constructing new houses or structures and do not require timber.

Contribution of forest income to the HHs annual income was found to be different among ethnic groups. The amount of forest income was high for *Brahmin* HHs (US\$ 423) despite it contributed only 4% to their total income as compared to about 8% for indigenous and *Dalit* HHs (Table 35).

5.3.4. Non-farm incomes

Income from non-farm sources including business, trade and employment contributed 17% to the total income in the area. An average income from non-farm sources per HH was US\$ 984. Only 40% of the total HHs were found to be earning more than US\$ 100 a year from non-farm income sources. There were quite a few HHs who were actually getting significantly more income from business and trading. Due to that, considering income from business and trading for the average income of the total households may not actually represent and depict the overall income situation in the area.

Variations in non-farm incomes based on location were observed. HHs belonging to CFUG1 earned about 21% of the total income from non-farm income sources, which was almost three times of CFUG2 and two times of CFUG1 HHs' non-farm income. The non-farm incomes and contribution to the total income in CFUG2 was the least (6.2%) (Table 33). Non-farm income in CFUG1 is US\$ 1309, which is higher than other CFUGs and contributes 20.6% to the total income.

Non-farm income difference between poor and less poor HHs was statistically significant ($p < 0.05$). Less poor HHs earned substantially higher non-farm incomes compared to the poor. Less poor HHs' annual non-farm income is US\$ 1752 contributed 20.4% to the total incomes, which is about eight times more non-farm income of poor HHs (Table 34). Annual non-farm income share is 7.8% in poor HHs' total income.

Though statistically not significant, some variation in non-farm incomes by ethnic groups can be seen in Table 35. While the non-farm income (US\$ 1535) of *Brahmin/chhetri* HHs is higher than other ethnic groups, *Dalits* have the highest share (25%) of non-farm income to the total incomes.

5.3.5. Remittances

Many key informants and HHs mentioned that significant amount of cash income was coming from the remittances in recent years. Analysis of the data also showed strong evidence for this, because 25% of the total incomes of the HHs were contributed by remittances. An average annual income from the remittances was US\$ 1460 per HH.

Though no big differences was observed in the contribution to total income and amount of remittances between locations, remittance could be one of the most important factor for rural

livelihoods as there was a strong correlation of being less poor with the amount of remittances. Because remittance income was significantly different by wealth groups ($p < 0.05$). While poor HHs got less than 1% of their total income from remittances, share of remittances is 34% in the total income of less poor HHs (Table 34).

Similarly, there was a strong correlation between ethnic groups and remittances. Though in figures *Brahmins* earned higher remittances (US\$ 2076), the contribution of remittances to the total income (about 31%) of indigenous HHs was found to be the highest (Table 35). This may be because higher caste youths are either employed in higher earning positions or were earning well abroad. Whereas, indigenous HHs were mostly found to be employed in India and there they get relatively less salary. However, pensions coming from the Indian government is much higher than the pension from Nepal government. While remittances shared about 20% in the total incomes of *Dalits*, the amount of remittances was the lowest (US\$ 831) by ethnicity.

5.4. Contexts and conditions

Institutional, organizational, political and policy contexts influence the power balance in the communities and affect access to the assets and choice of livelihood activities. These contexts and condition were mostly of similar in all three CFUG locations as CFUGs have to operate under the same regulatory mechanisms. From the livelihood outcome analysis, we saw that on-farm and off-farm incomes together outweigh all other income sources in the area. But, it is equally important to note that remittances are the second most important source of the income. Similarly it is worth mentioning that despite the low contribution of the forest toward households' livelihoods, the development and joining CFUGs has brought various benefits to the communities. Hence, this section provides some insights into the changes brought into households occupation and how CF and CFUGs are providing better contexts and conditions to improve local institutions and welfare of the residents.

Group discussions and grey literature revealed that the main occupation of the households has been agriculture for generations. Only a limited number of HHs from indigenous groups used to take employments in India. However, from the last three decades, agriculture is facing various challenges and if continued would threaten food security. Diversified occupation such as employment, trade, business, working abroad etc. are becoming more attractive and providing handsome incomes to the households. As a result of this, farming hands or wage

labour in the area is becoming very limited for those who still wants to do farming. Extensive area of the productive *keht* lands are now divided into pieces to construct houses. It was observed, mainly in the CFUG1, that existing settlement area used to be very productive *khet* lands in the area (Box 4).

It was reported that an influential amount of the remittances inflow started less than a decade from now. This trend was linked to the number of factors including local unemployment, the Maoist insurgency, limited agricultural productivity, population increase, high human resource demand in the middle-east etc.

Despite changes in the priorities of the households livelihood pathways, management of the CF by forming CFUGs has brought all households under the same roof. CFUG is a registered organization and provides a forum through which various day to day decisions are made in the community. Those decisions are not necessarily only related to the CF management, but also are linked with the local development through road construction, school buildings or other community services. It is binding the village HHs together in a forum and cultivating collective decision making practices. CFUGs non-monetary benefits outweigh monetary benefits, which provides a rationale for them to keep managing CFs. Non-monetary benefits from the conservation of CFs and being member of the CFUGs includes leadership development, collective decision making practices, environmental benefits, carbon storage, reduction of soil erosion and so on. In the village there were various interest groups such as saving groups, mother groups, irrigation groups, ethnicity based groups etc. Unlike them, CFUG is the only one group which includes all the village residents and provide equal opportunity to take the leadership and influence decisions. However, the level of participation among users varies considerably for various reasons. A limited number of CFUG committee member were found to be very active on a daily basis and were also influential in decision making.

Leadership in the local CFUG also opens the ground to take part in the district level decision making platforms. CFUG president is automatic member of the district level FECOFUN branch. It is possible to reach and be a national level committee member of the FECOFUN through election, however, none was there at national level from the study area. Similarly, it was found that the leaders of village level collective groups such as irrigation group, development groups and political parties were also in the CFUG committee. As local level

government body representing VDC, DDC have not been elected for long time now, bureaucrats were working together with the village leaders by making a working committee.

Devolving forest governance also sets an example for other government services and could benefit and involve local people in decision making process of the country policy process. For instance, the REDD+ pilot project is taking advantage of existing CFUGs in the area. Institutions and organization developed for the REDD+ project are largely based on the CF institutions and extensively adapts them. The locally functioning unit of the REDD+ pilot project is the individual CFUG. FECOFUN is one of the partner organization of the project. In addition, the REDD+ pilot project has established other sub- regional institutions i.e. Forest Carbon Trust Fund (FCTF) coordinating committee, which bridges CFUGs and district level FECOFUN and other organizations. FCTF members in the interview mentioned that after the REDD+ project termination, if government does not formulate REDD+ mechanisms, they have now developed capacity to be able to trade carbon credits themselves.

5.5. Vulnerability contexts

HHs in the study area are exposed to various external factors, which may create shocks, risks or uncertainties to their livelihoods. Capacity to cope with those external shocks and manage risks are two important factors making HHs less vulnerable. Option for proper coping strategies of any HH varies according to the livelihood pathways, assets base and income level. Usually access to more capitals, higher incomes and diversified livelihood pathways together enhance coping capacity of the HHs.

There was statistically significant correlation between household ranking and ethnicity ($r = -0.289$; $p < 0.05$). *Dalit* households were relatively poorer than Indigenous and Indigenous households were relatively poorer than *Brahmin/Chhetri* households. This could be linked with the long-term of marginalization of *Dalits* in Nepali communities because of being lower caste. However some of the *Dalits* falling under the less poor category may indicate that the trend is slowly changing over time. Agricultural and forestry activities were major sources of incomes to the poorest HHs. This leaves less options for the diversification and hence may risk the livelihoods of the poor HHs. Gap between the poorest and the richest HHs in the study area was very wide as total annual income ranges from \$1500 to \$29000 per HHs.

Various factors were limiting agricultural production in the study area. Except for some HHs, agriculture was mostly of subsistence type in the study area. Especially, farming in the *bari* land was constrained by various factors. Production from the *bari* land was very low compared to *keht* lands mainly due to no irrigation facility. Rainfall is the only available source of irrigation, hence there is a limited choice of crops that can be grown. This increases farming costs and ultimately makes *bari* land less attractive for cropping. However, no HH wants to keep that land fallow and especially for poor HHs cultivating *bari* land is the only option as *keht* lands are expensive to buy. Cultivation of the *bari* land also increases soil erosion in the area. Cultivating *keht* lands is usually profitable and many HHs cultivate cash crops too. However, various factors such as seed availability (box 1), fertilizer, labour and capital availability and climatic factors determine level of agricultural outcomes. Many HHs mentioned that cultivating farm land is becoming very difficult due to labour shortages. Most of the young members are now either abroad or taking jobs in city areas. Similarly, limitation in the availability of fertilizers was also observed in the field. Though government provides some quantity of subsidized chemical fertilizer, villagers have to depend on markets in order to get enough fertilizer. Chemical fertilizer and seeds from the market are much more expensive and consequently production cost of the agricultural produce becomes higher. Which increases vulnerability especially for the poor HHs.

Agricultural land conversion and fragmentation were two important factors limiting productive land in the study area. Dividing lands into smaller areas is common practice in the area as property rights are inherited to the sons equally. Borders between lands are elevated and not cultivated. Conversion of agricultural land, especially productive *keht* lands, into settlement area is becoming very common in the areas. In the short term, this may provide huge profits to the owners but in the long run this may create food shortages.

Serious crop failures or livestock casualties were not reported by any HH. A severe natural hazard was reported for the year 1997 when a small river changed the channel. That flooded many acres of the *keht* lands. However, through the embankments and other physical structures river was channeled to the original route and HHs started to cultivate these *keht* lands after few years.

All HHs reported that they have access to tap water for drinking. Water collection tanks of CFUG1 and CFUG3 are located on the higher elevation than the villages . Those elevated water tanks do not require any form of energy or motor to collect and distribute water.

However, CFUG2 uses electric an electric engine to collect and distribute water in the area as water collection tanks are located on the downside of the village. As they require electric motors to distribute water, sometimes when there is load shading, water supply is disturbed. During winter, HHs get water supply on alternate day because of many hours of load shedding and drying of the water sources.

Some form of natural process and human activities, which created problems in the CFs, were recorded in the study area. Large cover of regeneration and poles of the *Shorea robusta* species in CFUG1 forest was destroyed five years ago by unknown pathogens. HHs mentioned that *Shorea* regenerations died and poles defoliated. They mentioned that even experts could not recognize the actual problem. Fortunately, the effect of that pathogen did not go very far and remaining forests remain unaffected. HHs in the CFUG2 said that there was bush fire which engulfed some patches of their forest in 2009. After that incident, HHs got various trainings from forest officials and applied various measures including fire line creation, patrolling, and awareness raising. With these efforts, no incidence of fire was recorded in 4 years. However, in the name of new road expansion, clearance of forest and erosion of the sloppy lands were quite common problems occurring in the study area.

HHs were coping with various shocks and managing risks. HHs income do not entirely depend on the working groups only. Many old age HH members were found to be frequently involved in the income generating activities such as making household agricultural implements, weaving bamboo products and working in the farm. From those incomes, HHs were getting extra support to their livelihoods. With the proper management of the CF, HHs were able to get systematic access to the forest products. Membership in the CFUG is bringing all HHs together. This togetherness forms the base for other collective activities. Some of those activities are linked with the coping strategies in the area. Loans or support from CFUG funds are used mostly by poor HHs in income generating activities such as keeping goats, pig rearing or poultry farming.

Strong bonds and social relations were observed helping people who are suffered in the study area. In all locations, it is common practice to join hands during marriages, festivals, deaths etc. If we compare ethnic groups, people from same ethnic group were more close to each other than they were with people from other ethnic groups. However, when needed to build homes or construct village roads, most HHs provide free labour support. Usually poor people get paid considering the fact that providing free labour support creates extra burden to them.

Shortage of labour force and costs associated with farm labour during farming season were managed by a novel practice called '*parima lagauni*'. This practice is a kind of reciprocity in which HHs share labours in each other's farm lands during cropping seasons. They do not have to pay cash to anybody but return with the same labour hours. Similarly, HHs did not have to suffer when there is small shortage of cash. It was common to borrow or lend small amounts of money whenever needed. Moreover, health facilities for minor treatments were available in walking distance and various basic medicines were available free of cost to all citizens. Due to rapid expansion of the mobile network coverage, communicating over mobile phone has become one of the basic necessity in the rural areas too.

Poor people, mostly of *Dalits*, were getting extra supports to their livelihoods from various governmental and non-governmental sources. For example, total 17 poor HHs in the study area got either cash or livestock from the REDD+ seed grant. However, key informants were concerned more about post-REDD+ pilot project situation. Present REDD+ pilot formally ended on August, 2013. But, created institutions and networks by pilot project are now more vulnerable because they are neither recognized by the government nor included in forest policies and regulations.

6. REDD+ PILOT PROJECT, ITS OUTCOMES AND FIT IN THE COMMUNITY FORESTRY

This chapter examines the structures of REDD+ implementation and their implications at the local level studying if the community forestry can be seen as a well-established local institution including forest-dependent communities and their networks. First, I will introduce organizations involved in the pilot project with their plans, activities and interaction to other organizations. After that, local people's perceptions about the pilot project's implemented activities and the organizations' interests in future REDD+ strategies in Nepal will be discussed briefly. The final section first analyses REDD+ activities and then discusses if institutions are compatible to the Ostrom's design principles of CPRs in general in the Ludikhola watershed, Nepal.

6.1. Organizations

Large number of governmental and non-governmental organizations ranging from local, national to international levels were involved in development of the community forestry in Nepal. Many of them are still working in the forestry sector of Nepal (see chapter 1). Along with the implementation of the CF program in Nepal, many issues were evolved and yet to be resolved including equity, transparency, inclusiveness and good governance (Kanel 2005; Ojha et al. 2009). Despite these issues, the number of CFUGs registered and the forest area handed over to them is steadily increasing. As a result, FECOFUN has become one of the biggest organizations in terms of membership in Nepal. Similarly, donors' and civil societies' focus is shifting from facilitating the handing over of the forest to CFUGs to addressing issues aforementioned and also to formulate strategies, policies and implementation of the REDD+. The Nepalese government has established a coordinating REDD-Cell in 2009 to oversee Nepal's overall REDD+ initiatives and the REDD-Cell represents the country at international forums of REDD+ in addition to the Community Forest Division (CFD), which is responsible for the CF program. On the other hand, the ministry of the Environment is the focal point for all climate change related policies in Nepal. Considering those shifts in national level forest governance and prevalence of less coordinated various REDD+ related projects at the local level, an overview of the organizations involved in the CF before and after the REDD+ initiatives is presented in the Table 36.

Table 36: Organizations involved in the CF - before and with REDD+, in Ludikhola watershed, Nepal 2013.

Organizations		Operation	Roles and responsibilities
Before REDD+	With REDD+		
CFUGs	CFUGs	Local	Manage CFs, members in watershed REDD network, ultimate beneficiaries of carbon trading.
FECOFUN	FECOFUN	Local, regional and national	Advocacy, representation of CFUGs, one of pilot project implementing organization.
	ANSAB and ICIMOD	Local, regional and national	FCTF, FCTF advisory and coordinating committees, REDD networks.
	REDD-Cell	National	Oversee overall REDD+ strategies in Nepal
DoF	DoF	Local, regional and national	Technical support and handing over of CF
VDC, DDC	VDC, DDC	Local and regional	Involved in district coordination committee.
Civil societies	Civil societies	Local, regional and national	Indirect involvement and members in coordinating committees
Researchers academicians	Researchers academicians	Local, regional and national	Policy input

Source: Developed from author's own experience in the CF.

Having presented an overview of the various organizations involved in the process of CF program, the focus onward will be on the organizations which implemented the REDD+ pilot project in Ludikhola watershed, Nepal.

The International Centre for Integrated Mountain Development (ICIMOD) is a "*regional intergovernmental learning and knowledge sharing centre*" with its office in Kathmandu, Nepal (ICIMOD 2013a). ICIMOD was responsible for coordination of the REDD pilot project and report back to the Norwegian Agency for Development Cooperation's (NORAD) Climate and Forest Initiatives regarding all the project related activities. In addition, it provided technical support to other implementing partner organizations - Asia Network for

Sustainable Agriculture and Bio-resources (ANSAB) and Federation of Community Forest Users', Nepal (FECOFUN).

ANSAB is a non- governmental organization based in Kathmandu, Nepal and working in various regions of south Asia. ANSAB is involved in several projects focusing on natural resource management, biodiversity conservation and livelihood empowerments. For the pilot project, ANSAB was responsible for all technical works from the field to national levels related to the project. ANSAB also provides technical support to the FECOFUN regarding REDD issues. FECOFUN is a representative organization of all the CFUGs existing in Nepal. FECOFUN assists mainly in coordinating CFUGs and partner implementing organizations. Another important responsibility of the FECOFUN includes the formation of watershed level REDD coordinating committees and mobilization of local resource persons. Moreover, FECOFUN, at national level, is a member of the group responsible for making operational guidelines regarding both the Forest Carbon Trust Fund (FCTF) and payment mechanism within the pilot project.

Technically speaking, ICIMOD and ANSAB together were solely responsible for whole planning and technical framework of the pilot project. For this, they formed a Project Management Unit (PMU) based in the ANSAB's office premises in Kathmandu in 2010 to look after the project. PMU operates on behalf of ICIMOD and coordinated by appointing officer from the ICIMOD specifically for the REDD+ pilot project and included focal persons from other two partners i.e. ANSAB and FECOFUN. PMU oversaw all the pilot project activities, carbon recording and made recommendations to FCTF advisory committee for the payment. In addition, it acted as a focal point for communication, coordination and support to partner organizations, civil societies and government stakeholders.

In the study area, one field level forest technician was working under the PMU. The ground staff was responsible for facilitating and performing both technical and non-technical field level works in the pilot sites. On the other hand, several technical staff, who were not related to PMU, were working for FECOFUN based in the central office in Kathmandu. From the interviews, it was reported that they were actually working for some other project. However, during watershed level FCTF advisory committee's meeting, some of the same staff were also attending.

6.1.1. Resources and plans of the organizations

The main aim of the pilot project was to demonstrate the way how REDD+ activities can be implemented with the establishment of equitable REDD payment mechanism in Nepal's CFs (ICIMOD 2013b). The main feature of the project was to actually implement a potential 'performance based payment mechanism' in a small proportion of the Nepal's CFs.

The overall plan of the organization involved in the REDD+ pilot project was to successfully implement the pilot project entitled '*Design and setting up a governance and payment system for Nepal's community forest management under the REDD+ mechanism*'. The pilot project was financially supported by NORAD's Climate and Forest Initiative from 2009 to 2013. The total budget for the project was about US\$ 1.7 million (ICIMOD 2013b). Out of the total budget, US\$ 285,000.00 was set aside as a '*seed grant*' and distributed to the CFUGs in three consecutive years from 2011.

Considering the fact that Nepal is still in the readiness phase of the REDD+ process and has decided to purpose the one year extension for this phase (Khatri & Paudel 2013; REDD-Cell 2013), the project's outcomes are far ahead of government's initiatives regarding REDD+ implementation in Nepal. A REDD-CELL officer said that "*the pilot project implementing organizations do not have any authority to formulate REDD+ regulatory mechanisms in Nepal. But, outcomes from the pilot project and institutions created by the project can, to some extent, guide the responsible authorities to better craft the regulatory mechanisms.*"

6.1.2. Activities and horizontal interplay of the organizations

Responsibility for the management of the CFs in Nepal lies within CFUGs and is facilitated by the Department of Forest (DoF). CFUGs and DoF, however, are assisted both financially and technically by various national and international organizations including developed countries. District FECOFUN chairperson believes from his experience that "*the roles played by environmental agencies, political parties and local governance bodies are also equally influential in many instances.*" Processes and activities of the PMU and its inter-linkages with other local level of organizations is explained by grouping into two groups i.e. Institutional development and Activities.

6.1.2.1. Institutional development

In the process of implementation of the pilot project, a few entirely new arrays of institutions were developed based on the integrity of and building on the already available CF institutions. Figure 6 summarizes the institutional development for Monitoring, Reporting

and Verification (MRV) and payment mechanism under the pilot project. Before discussing the watershed level institutions, the scope of this study, the general overview and introduction of central level institutional development is provided.

Since the pilot project sites were located in three different districts, a 'National FCTF advisory committee' was formed at the central level. The national advisory committee was the highest level of authority to make guidelines and operationalise FCTF. The committee was an independent body of ten members representing pilot project partner organizations, various civil societies and the government authorities. Important roles and responsibilities of the committee included review of carbon data, verification reports, planned activities and claimed invoices from three watershed REDD networks and provide decisions on the seed grant distribution based on the guidelines. An operational guideline of FCTF was formed. The guideline provided the basis for FCTF operation at the watershed level and put provision to verify the outcomes independently.

Analysing the national FCTF activities and observing their various meetings and knowledge sharing platforms, it was observed that the participation of various governmental and non-governmental organizations started the new level of understanding of actually implemented REDD+ pilot activities. It formed a potential framework of the future REDD+ mechanisms in Nepal.

In the study area, there was a watershed level FCTF advisory committee and a watershed REDD network. Watershed FCTF advisory committee was a five member committee with the representatives from District FECOFUN, District Forest Office (DFO), project field staff, watershed REDD network and District Soil Conservation Office (DSCO). However during meetings, representatives from central FECOFUN, representatives from selected CFUGs, ethnic group representatives, women group representative, District Development Committee (DDC), representatives from PMU, journalists and researchers were observed. FCTF advisory committee did not have a designated office but the REDD network had an office in the Gorkha municipality.

Watershed REDD network was formed representing members from all CFUGs- mostly chair persons of the CFUGs. By provision, the committee members can't be from other organizations except CFUG representatives, but during meetings, representatives from other

organizations such as DFO staffs, PMU staffs and interest based groups were also observed in the field.

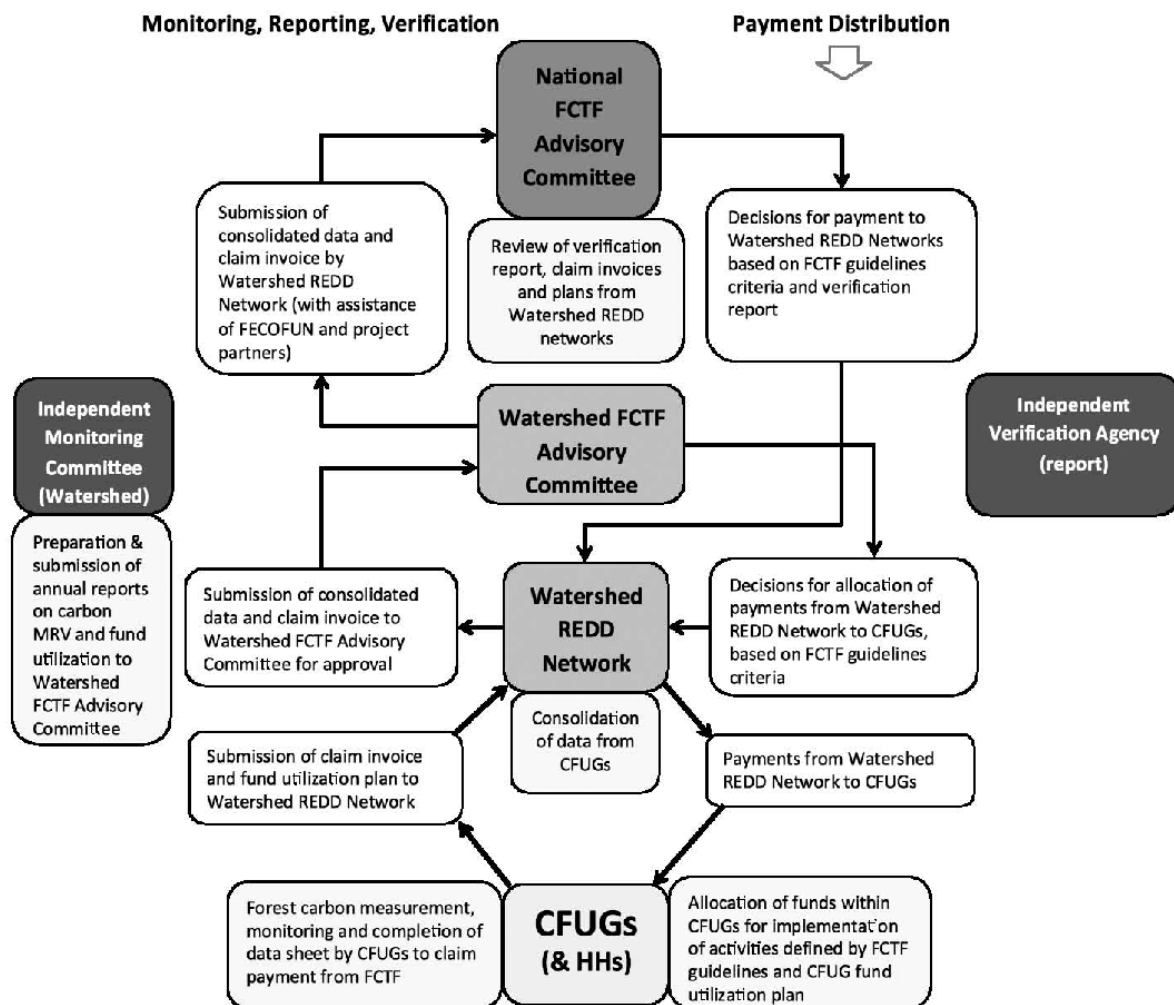


Figure 6: REDD+ MRV and payment systems under pilot project, Nepal.

Source: Adapted from Bushley and Khanal (2012).

Since this study was carried out during the final stage of the pilot project, the main concern observed of both advisory committees and REDD networks was to find the ways how existing institutions may be operationalized after the pilot project. Some of the representatives were also discussing the possibility to enter into the 'carbon market' themselves if the government do not formulate required regulatory mechanisms on time or neglects the developed institutions in future REDD+ strategies. However, the question of their existence beyond the pilot project was in question due to financial constraints and no clearly defined responsibilities.

6.1.2.2. Activities

Implementing organizations performed various activities in the Ludikhola watershed. Important activities are listed in Table 37. Among them, some of the activities such as technical guidelines, FCTF operation guidelines and MRV mechanism were developed for the entire project sites.

Table 37: A summary of activities implemented through the pilot project, Nepal 2013.

Activities	Year	Outputs
Payment mechanism	2011, 2012 & 2013	Payment criteria developed. US\$ 79,866.00 distributed to 31 CFUGs in Ludikhola watershed.
Technical guidelines	2012	Forestry inventory guidelines. Carbon measurement guidelines.
Forest inventory	2010, 2011, 2012 & 2013	Forest inventory reports including carbon stocks.
MRV	2011, 2012 & 2013	FCTF operation guideline developed. Some of the CFUG members were involved in the monitoring and reporting of the respective CFUGs with the help of technical staffs.
Inventory trainings	2010 & 2011	CFUG members were trained to do basic forest inventory.
Alternative energy	2011, 2012 & 2013	Biogas plants for supplementary to firewood . Improved stoves installed to efficiently utilize firewood and to reduce smokes at home.
REDD awareness raising	2011, 2012 & 2013	Several trainings, workshops, media programs etc were used. Only 60% of the total HHs were aware that there is a link between deforestation and global warming.
Empowerment	2011, 2012 & 2013	Target groups such as poor, <i>Dalits</i> and women empowerment activities.

A payment mechanism was set up by the pilot project with the establishment of the FCTF. The total fund assigned for the FCTF was US\$ 376,373.0. From this fund, each year the sum of US\$ 95,000.0 was distributed to the project areas as a 'seed grant' or 'carbon payment' for consecutive three years from 2011(ICIMOD 2013b). The project staff did not disclose the exact amount of the seed grant they have kept after payments to the CFUGs and administration costs, however it was reported that the remaining amount is kept by the PMU for the FCTF operation beyond the project duration.

Since the payment criteria were based on the socio-economic status of local people and the carbon stock enhancement, the pilot project did not generate any Certified Emission Reduction (CERs) credits. From the FCTF Operational Guideline, it can be seen that the more weight was given to social safeguards (60%) than the carbon enhancement or

performance based forest management (40%). However, a flat annual amount of US\$ 100 was provided to all CFUGs each year and the remaining amount was calculated after this flat amount. Further elaboration about payment criteria is presented in the following Table 38.

Table 38: Seed grant payment criteria in the REDD+ pilot project, Nepal 2013.

Payments	Criteria	Weight (%)	Total weight (%)
Based on performance	Carbon Stock	24	40
	Carbon increment	16	
Based on Socio-economy	Indigenous HHs	10	60
	Dalit HHs	15	
	Sex ratio	15	
	Poor HHs	20	

Source: (Skutsch et al. 2012)

Reply from the project staffs to the question why performance based forest management got less priority, was that "*to develop an effective and equitable benefit sharing mechanism*". In the study area, there were clearly various arguments regarding this provision. As not all CFUG members were enough aware about the payment mechanism, CFUG executive committee members' views were taken for this. Compared to CFUG2 and CFUG3, committee members of the CFUG1 were not very happy with the provision as they got relatively lower amounts of seed grant in terms of social criteria. This is because, the members of dalits, poors and women in the CFUG1 were lower.

In addition to the carbon payment activities, various capacity building and awareness raising activities were performed by the pilot project. Capacity building training are mostly of technical forest inventory techniques and included forest sampling, GPS survey and use of various forest sampling instruments. Those trainings were provided by both skilled PMU staffs and hired technicians to local staffs and representatives/participants from CFUGs. Awareness raising activities about REDD+ and forest management were performed through various local level workshops, interactions, FM radio advertisements and programs etc. Empowerment and income generation activities were mainly offered to target groups such as Dalits, women, and indigenous HHs and included candle making trainings, mushroom farming, sewing trainings, improved stove making trainings, leaf plates making and fixed share in the carbon payments.

6.1.3. Outcomes of the REDD+ activities

Based on the pilot project activities, this section shows the outcomes or impacts observed in the study area in terms of CF management, institutional developments and awareness raising. Though overall findings from the project would be an important input for the development of national REDD+ strategies, a focus of this section is to examine what those activities brought about changes at the local level for local people.

6.1.3.1. CF management

Individual CFUG participating in the pilot project did not have new rules or regulations for the management and utilization of the CFs. They were functioning in the same way as they used to perform before the pilot project i.e. based on the respective CFUG constitution and CF Operational plan (CFOP). Close to 97% of the total HHs responded that they did not feel any changes in the CF rules and regulations during the pilot project period. The only difference observed was in the forest inventory since carbon measurement was performed by the pilot project implementing organizations and included in the recently renewed CFOPs of CFUGs.

From the reports published by the pilot project data centre, carbon stock from year 2010 to 2012 is extracted and presented in the Table 39. The table shows that all CFs' carbon stock was increasing every year.

Table 39: Carbon changes and stock in the CFUGs of Ludikhola watershed, Nepal 2013.

CFUGs	CF area per HHs (ha.)	Carbon stock (tC) per hectare			Total Carbon stock (tC) increment between 2010 and 2012	
		2010	2011	2012	Per hectare	% of 2010
CFUG1	0.18	5817.13	5963.02	6062.88	245.75	4.2
CFUG2	0.45	12452.98	12766.21	12972.20	519.22	4.1
CFUG3	0.52	17343.18	17783.11	18028.80	685.62	3.9

Source: (ANSAB et al. 2012)

During three consecutive years of measurements, carbon stock figures indicated that the carbon stock is gradually increasing every year. Carbon stock per hectare in the CFUG3 was higher than other CFUGs with the CFUG1 having the least i.e. 185.5 tC (Table 39). This can be linked to less harvests compared to the growth of the forest in the area. However, carbon

data presented in the Table 39 shows that the CF area per HHs was highly negatively correlated (Pearson's $r = -0.87$) to percentage of carbon change. This finding may indicate that the CFs with less area per HHs were relatively more protection oriented and CFs with more area per HHs were harvesting relatively more forest product.

In order to understand the forest management closely, local peoples' perceptions regarding access to, coverage and utilization of the forest products in the study areas were recorded. While 86% of the total HHs replied that the access to the forest resources was either the same or had been reduced, the remaining 14% HHs mentioned that access to firewood has increased in recent years. There was a subjective reason behind HHs perception of the increased firewood. Most of them responded that the forest condition is improved in recent years, hence, they have more firewood produced in the CFs as a result of management carried out by the CFUGs themselves. For those HHs who responded that the forest products are decreasing, the reasons behind the decrease were 1) There is specified period of the year when the specified quantities of the firewood could be collected, which was restricting HHs for collecting firewood whenever they want and how much they want, 2) no new or updated forest product harvesting mechanisms were created by the pilot project. This is in line with the fact that about 78% of total HHs mentioned increasing access to and use of timber and poles. Majority of remaining HHs who opposed the increase in timber and pole quantities, were poor HHs. Poor HHs were getting a little access because timber and poles are distributed to the member HHs based on their requirements, needs and allocated harvestable quantity of the CFs. Poor HHs do not require timbers and poles as it is not easy for them to build new structures. Moreover, it was not allowed to sell timber collected from the CFs.

Of total HHs, 96% responded that they are satisfied with the CF management practices. The remaining 4% were not satisfied and mentioned that they had relatively less access to the forest products. More than 95% of the respondents replied that they did not observe any significant changes in the rules or practices of forest conservation, management and utilization. However, most of them mentioned that 'some amount of money is coming to the CFUG fund and a few poor HHs are getting financial support from that fund'. From this, it can be concluded from the local peoples' perspective that the pilot project provided some sort of financial support to some groups of local people without imposing new rules or altering existing forest management practices.

6.1.3.2. Benefit sharing and institutional development

CFUGs were possessing two different type of funds with the pilot project payments of seed money (Table 40) as they have CFUG funds from various other sources. As the sources of the two different funds are different, the utilization and management of those funds was also different. CFUGs, as autonomous organizations registered with the DFO, have their own agreed plan to utilize funds and accordingly they are managing funds.

Table 40: Payments to CFUGs from seed grant in Ludikhola watershed, Nepal 2014.

	CFUG1	CFUG2	CFUG3
Payments in 2011 (US\$)	825.00	595.00	1,130.00
Payments in 2012 (US\$)	837.00	612.00	1,170.00
Payments in 2013 (US\$)	854.00	680.00	1,219.00

For the pilot project payments of the seed grant, CFUGs had to strictly follow the pilot project guidelines while managing and distributing the payment amount as presented in the Table 41. CFUGs were placing more weight on socio-economic criteria for the seed grant distribution with the target to make 'equity' in REDD+ benefit sharing. CFUGs had to spend the payments in forest inventory or poor, *dalits* and women empowerment activities. They were not allowed to spend on community development activities or benefitting less poor and upper caste HHs.

Table 41: Utilization of seed grant by CFUGs in Ludikhola watershed, Nepal 2013.

Activities	Allocated %
Support to the Poorest HHs	45
Forest management	25
Awareness raising	14
Carbon measurement	8
CFUG operational activities	8

Source: CFUG records.

The payment of seed grant followed the establishment of the local level networks by the pilot project in the study area. Especially, watershed REDD Networks were entirely new among CF networks. There was a REDD network office in the Ludikhola watershed. The operation cost of the office came from the pilot project's seed grant. They used to keep some cuts from the allocated seed grant before distributing to each CFUG. Participating CFUGs' representatives were the members of watershed REDD network. The network was bridging CFUGs to national FCTF advisory committee. The network was responsible to compile socio-economic data from all CFUGs and present in the watershed FCTF advisory committee

in order to forward them to national FCTF advisory committee. The national FCTF advisory committee, after consultation with PMU, allocates a share of seed grant to each watershed REDD networks based on the FCTF guidelines. Finally, the watershed REDD network distributes seed money to all CFUGs, usually in two installments.

The watershed FCTF advisory committee constituted 5 members, of which 2 members from government agency, 2 members from CFUG networks and 1 member from project staffs. Based on expertise, 3 of them were equipped with technical knowledge (members from the ministry of forest and a project staff). In order to include respective interest groups' concerns in pilot project activities, various interest groups' representatives were observed during discussions of the watershed FCTF advisory committee.

6.1.3.3. Empowerment and awareness

While 58% of the total HHs responded that they were involved in at least one of the REDD+ awareness or empowerment or forest inventory activities conducted by the pilot project. Forest inventory trainings to local peoples seem to be cost efficient and effective for the project as local people do most of the work. There is no need to hire permanent staff, human resources from outside and pay full time salaries, which is more expensive. From the discussion with the local persons who were involved in the forest inventory, it was observed that they were involved in the temporary plot establishment, tree diameter and height measurements and forest cover estimations by using simple tools such as measuring tapes, GPS and height measuring instruments. Their participation could not be observed in the process of permanent plot establishment, data recording and analysis of the collected data and production of the biomass or carbon quantities. Without these measurement it is not possible to claim any kind of carbon benefits or to produce credible forest inventory outputs. Similarly, crafting their own CFOPs and deciding annual harvesting quantities of the forest product is not possible. Which means, CFUGs may have to rely on external technicians for the actual forest inventory.

The selection of candidates for the various trainings was not found inclusive and unanimous. When comes to the selection of the participants for forestry related trainings, workshops or tours, 88% of total HHs said that CFUG committee decides. Decisions from committees were regarded as benefiting largely to the committee members themselves or to their close ones than representing all the HHs equally. Whereas 6% of the total HHs mentioned that the training participants are selected by the organizers, usually NGOs. While speaking to a pilot

project staff, he said that sometimes they choose participants themselves for the follow up trainings only, but in general "we do not influence CFUGs in the selection of the participants". Table 42 shows the number of benefited people from various socio-economic activities performed by the pilot project.

Pilot projects' awareness raising activities were not found to be reaching all HHs in the study areas. Approximately 60% of the HHs were aware about effects of forest degradation the global warming and mentioned that they know their respective CFUG is a part of the pilot project. Some of them said that they are aware because of the media rather than from the project activities. In fact, only 40% of the respondents said that they took part in pilot project's awareness raising activities or other trainings. Except for a couple of key informants, HHs did not know that in the future, they will be able to get money from REDD+ mechanism provided that they use less forest products, conserve forest and reduce forest degradation.

Table 42: Socio-economic indicators and benefited local people from the pilot project in Ludikhola watershed, Nepal 2013.

Socio-economic indicators	CFUGs	Benefited people (No.)			
		Indigenous	Dalits	Others	Total
Employment in the pilot project activities	CFUG1	1	0	1	11
	CFUG2	2	1	0	
	CFUG3	3	1	2	
Self employment created by the pilot project	CFUG1	0	1	0	10
	CFUG2	2	1	0	
	CFUG3	2	3	1	
Improved stoves due to pilot project	CFUG1	19	8	17	145
	CFUG2	27	7	1	
	CFUG3	10	18	38	
Support to bio-gas plant constructions ^a	CFUG1	2	0	4	28
	CFUG2	4	2	2	
	CFUG3	1	3	10	
Total		73	45	76	194

^a Support of 6000 NRs for each biogas plant construction from the project.

Use of alternative energy and improved ways of utilizing firewood were effective for some HHs. One respondent shared her bad experience regarding improved stoves. According to her, the person, who built improved stove at her home, did not make stoves properly and she believes that new stove is consuming more firewood and produces more smokes when used. This was possible to happen because the person who was responsible to make stoves used to

get fixed amount in return and to earn more that person was always in hurry to make many stoves a day. However, petroleum gas was the second most important cooking energy source for the HHs. Using petroleum gas for cooking in other ways was increasing GHG production in the atmosphere.

6.2. REDD+ sustainability in the community forestry

6.2.1. Reduction of deforestation and degradation

Information of demand and supply situation of the forest products in three CFUGs are presented in Table 43. In general, the demand of the forest products in the study area was higher than the CFs' production. Particularly, high deficit of the required quantity of firewood is potential to impact future deforestation and forest degradation activities in the study area as firewood are widely used as cooking energy source in the study area.

The table shows that AAH surplus timber and poles were available only in the CFUG3. Nonetheless, committee members from CFUG3 mentioned that they never harvested timber equal to AAH timber mentioned in their CFOP. CFs were divided into various blocks and users perform forest thinning, pruning and cleaning based on the CFOP. Usual practice in all CFUGs, as mentioned by CFUG committee members, is to extract firewood, timber and poles mostly from dead, decayed, deformed and dying trees. Carbon stock increment in all CFs as seen in Table 4 also supports user committees' saying.

Table 43: Annual demand and supply situation of forest products in the study areas, Nepal 2013.^b

Forest products	CFUGs	Demand	Supply		Surplus (Deficit) from CF
			From CF	Private forest and other sources	
Timber and Poles (Cft.)	CFUG1	1790	1100	690	(38.5%)
	CFUG2	500	300	200	(40%)
	CFUG3	4325	6352	1297.5	46.8%
Firewood (Kg.)	CFUG1	537000	207000	300000	(61.4%)
	CFUG2	201000	51000	150000	(74.6%)
	CFUG3	178140	126931	89070	(28.7%)
Fodder and Leaf litter (Kg.)	CFUG1	NA	NA	NA	NA
	CFUG2	210000	150000	90000	(28.5%)
	CFUG3	434400	152040	282360	(65%)

^b All information were extracted from respective CF's CFOPs.

CFUGs have provisions of various forest conservation activities, which are potential to reduce deforestation and degradation in the CFs. All CFUGs have some measures to control harvest of forest products, limit farming in the forest, place guards to control illegal use of the forest. Almost 94% of the total HHs surveyed were satisfied with the existing conservation measures. The remaining 6% HHs were not satisfied with the conservation measures because they felt that either conservation measures was restricting their access to the forest, or unequal benefit distribution or not controlling illegal use of the forest products. Conservation activities are summarised and presented in Table 44.

Table 44: A comparison of forest conservation activities in Ludikhola watershed, Nepal 2013.

Conservation activities	CFUG1	CFUG2	CFUG3
Forest guard	Yes	No	No
Rotational forest guard by users	No	Yes	Yes
Fire lines in the CF	No	Yes	Yes
Grazing and browsing allowed	No	No	No
Annual forest cleaning	Yes	Yes	Yes
Construction allowed in the CF	No	No	No
Provision of Fines	Yes	Yes	Yes
Provision of rewards for informants	Yes	Yes	Yes
Dead and fallen branches collection allowed	Yes	Yes	Yes
Fence bordering CF area	No	No	No
CF area encroachment observed	No	No	No
Harvesting of good quality trees allowed	No	No	No
Plantation in 5 years	No	No	No
Forest blocks created for rotational harvesting	Yes	Yes	Yes
Roads constructed recently through CF area	Yes	No	No
Incidents of small fires in 5 years	Yes	Yes	Yes

However, contradictions were observed between provision and practice regarding forest product utilization. According to the forest rules and regulations, CFUGs are allowed to harvest forest products not exceeding AAH quantity. CFUGs were found to be following more protection oriented forest management strategies, which were not even closely fulfilling HHs' demands of forest products. At present, the protection oriented forest management strategy has shown an annual increment of carbon and other forest products. At least for the recent future, HHs from CFUG1 and CFUG2 do not seem to be getting adequate carbon benefits and forest products together. Either they have to follow existing forest utilization practice to obtain carbon benefits or harvest AAH quantity of forest products and do not get carbon benefits.

In the long run, however, if their forest stock increases sharply and they start planting bare

lands, they may be able to fulfil HHs demands of forest products and claim extra benefits from carbon credits. Another strategy would be to reduce HHs demands of forest products or dependency on forest by alternative measures such as alternative energy promotion, technology development by which less forest products is required, change livelihood activities, employment generations etc.

6.2.2. Carbon tenure

The REDD+ process in Nepal is yet to prescribe the authority, roles and responsibilities regarding REDD+ mechanisms and carbon rights. Particularly, a successful implementation of the REDD+ in community forests, to a large extent, depends on a secured carbon tenure. Since both forest users and the government are integral actors of future REDD+ mechanisms, contestations between CFUGs and DoF is going on regarding carbon rights. Nepal's more than two decades old forest acts and regulations do not have any provision of 'sequestered carbon' as a forest product because 'carbon' as a commodity and its market potentials are relatively new concepts. Hence, the ownership of the carbon stored in the CF will determine the flow of carbon benefits. If the government holds the carbon rights, it would be easy to implement activities as DoF is able to fulfil the technical demands of REDD+ implementation. In this case, the active and supportive participation of the CFUGs in the REDD+ process will be in question.

Field observations showed that the local people were less aware about carbon rights. Less awareness is particularly linked to the pilot project's payment criteria. Because the payment mechanism developed by the pilot project gives a 40% weight to carbon increment, as if the rights over 'carbon' is secured in the regulatory mechanism and given to the CFUGs.

6.2.3. Payment and benefit sharing mechanism

No matter which criteria will be put while crafting future payment mechanism in Nepal, potential carbon benefit sharing mechanism will have direct implications on the CFUG funds and their mobilization practices. CF rules and regulations have set up strict provisions of how to utilize CFUG funds. CFUG funds have to be utilized on the basis of various criteria: at least 25% on forest development activities, at least 35% on income generation activities of women, poor, and Dalit peoples; and remaining fund on CFUG operation and other social development activities. This fund utilization system gives the CFUG committees more grounds to play as compared to utilization criteria developed by pilot project (Table 41).

Group discussions revealed that transparency of funds was in question in all CFUGs. They mentioned that only affluent households and CFUG's committee distribute funds based on their judgment and hardly seek unanimous decision from user's assembly.

However, the poor and dalits in the studied CFUGs mentioned that they are getting benefits from the CF funds in recent years. The benefits included free goats and pigs distribution, interest free loans for fixed duration and various empowerment activities. However, records of those benefit sharing was not transparent and readily available in designated formats in CFUG1 and CFUG2. User committees could not show any credible and systematic records of providing CF funds to those target groups as prescribed in the rules except for some pilot project activities. They were keeping details of pilot project payment distribution and activities (as shown in the Table 42) because it was a mandatory provision in order to claim next year's payment. Under REDD+, CFUGs have to measure 'carbon' annually, which potentially will require more investments than performing forest inventory in 5 or 10 years as prescribed by CF rules. In this situation, CFUGs have to invest much higher share of their funds in the forest management. Ultimately, not only playing grounds of user committees decreases, but also socio-economic development activities may get lower priorities.

Local people's expectations from the REDD+ activities are many. They believe that future REDD+ activities would be similar to the pilot project i.e. they will get incomes from the conserved carbon in a very straight forward way and the incomes are guaranteed. However, local people's beliefs are completely misleading because entering into REDD+ mechanism is not that easy and straightforward. There is no possibility to get financial support from doing business as usual. Similarly, it is not always possible to have increment in the carbon storage due to high demand of forest products in the CFUGs. Which is a basic requirement of the HHs from the forest.

Not all the Dalits or poors were getting benefits from the CF or carbon payment. Many of the Dalit HHs complained that why they did not get any support from carbon payment when those supports are especially targeted to them. On this issue, CFUG committee members defended by saying that the carbon payment supports are limited and they have to provide supports to selective HHs who need the support most.

6.2.4. Community based MRV mechanism

In the study area, a few local people were actually involved in the carbon measurement but

the whole MRV process was technically and financially supported by the pilot project. Pilot project proponents suggested that they have shown that it is possible to involve local peoples in the MRV process. However, they can't answer whether this process is possible to continue in the actual REDD+ process as we are yet to know who will bear MRV associated costs at local level. Community based monitoring and reporting systems in environment services and natural resources are seen as very cost effective and reliable in the long run (Fry 2011).

Since field observations showed that the local people were only trained to carry out limited field level measurements, CFUGs have to depend on external support for the carbon measurement, forest inventory and producing reports based on the measurement. Though project reports claim that local people can carry out carbon measurements themselves, only with the available expertise, it may not be technically possible. CFUGs are responsible for preparing their CFOPs but studies CFUGs' CFOPs were prepared with the technical support from the government forest officials. In CFOPs, all forest management activities have to be written including calculation of demand and annual allowable harvesting (AAH) quantities of timber, poles, firewood and fodder. In addition to those information, MRV of carbon will be added. Which means users have to perform extra technical works in new REDD+ mechanism.

Field discussions revealed some interesting but important practices at the local level, which, if accumulated, are potential to impact various outputs. A tendency of not harvesting a single forest product from the recognized permanent sample plot was observed in CFUG2. This kind of incidences may create doubt when relying on the measurements carried out by the CFUGs themselves. One project staff shared in some instances unrealistic measurements. Diameters of the same trees in 2012 were found to be lower than 2011. This may indicate that not all field level inventory staffs were trained enough to perform measurement tasks in the study areas. Hence, in the actual REDD+ activities, appropriate less costly methods are needed to check field level works.

Similarly, the MRV process can involve local people in various stages under the coordination of another technically equipped body. We saw that in all meetings of the watershed REDD networks and watershed FCTF advisory committee, participating members were getting meeting allowances. This practice indicates there will be an additional operation costs if followed the existing MRV process in future REDD+ framework in Nepal. Will carbon credits be high enough to cover those costs and provide extra income to the CFUGs? After

the pilot project, how REDD networks will operate is a big question as they won't get operation budget from other sources.

6.2.5. Potential conflicts

Strict criteria placed on the carbon fund utilization, on the one hand may seem very attractive with respect to 'equity' in benefit sharing mechanism. But, on the other hand, it has some other limitations. Firstly, it will not be easy to monitor each CFUGs whether they are strictly following the payment distribution criteria. Secondly, it is not sure how long the HHs who do not get benefits from the carbon payments, will be supportive of the REDD+ activities. From the three studied CFUGs, two CFUGs were chaired by *Brahmins*, who are not eligible to get any kind of direct benefits from the existing payments. In the long run it may create conflicts within CFUG HHs.

Conflict may arise if when REDD+ activities prevent or try to deviate control over resource use from the community users to the government. Group discussions showed that local people are in favour of REDD+ activities if they get extra benefits from it. Most of the respondents opposed the REDD+ activities that are potential to limit or restrict the use of forest products because they believe that they should be able to utilize forest products on the sustainable basis to fulfil their daily needs of forest products as they largely have been concentrated on the protection of the forest than utilizing or benefiting from the forest so far. As seen in the Table 43, though demand of forest product is high in the CFUGs, they agreed on to harvest forest products not exceeding annual forest growth.

The most prominent conflicting area is carbon tenure rights. Communities want 100% rights over the carbon and associated benefits.

6.2.6. REDD+ pilot project as long enduring institution in the CF

When asked whether they think they would stop harvesting wood resources from the forest if they get compensation for their loss of income, HHs' responses were mixed with a majority agreed with the compensations measures (Table 45). In addition to the compensation measures presented in the table, HHs suggested some other measures such as alternative energy sources and good access to them and allowing users to collect dry woods and bushes. They believe that collecting those forest products not only ease HHs' energy requirements but also reduces that chance of forest fires.

Table 45: Responses of HHs on compensation measures in Ludikhola watershed, Nepal 2013.

Types of compensation	Disagree	Disagree somewhat	Agree somewhat	Agree
By payments	33%	37%	22%	8%
By increased employment opportunities	9%	12%	59%	20%
By alternative sources of livelihoods	8%	10%	57%	25%
By better social services in my community	9%	19%	54%	18%

The reasons behind the HHs' supportive views to the compensation measures are presented in Table 46. From the table, HHs believe that with the compensation measures they will get improved environmental conditions, more forest stocks and alternative energy sources.

Table 46: HHs' views regarding compensation in Ludikhola watershed, Nepal 2013.

Response	Disagree	Disagree somewhat	Agree somewhat	Agree
The compensation will make me equally well or better off	12%	56%	29%	3%
Forest protection is important	0	3%	74%	23%
It will improve our environmental conditions	0	0	79%	21%
I need more income	8%	61%	28%	3%
It will improve the conditions of our village/community	11%	71%	14%	4%
Compensation will promote alternative energy	0	0	44%	56%

However, those HHs who disagreed the ideas of compensation mentioned that their livelihoods depends too much on the forest (93%), money can't compensate for reduced use of the forest (93%) and the compensation will not be enough (81%).

HHs showed their concerns regarding future reducing deforestation and forest degradation programs. A summary of those concerns and HHs perceptions are summarized in the Table 47.

Table 47: Local people's perceptions toward REDD+ activities in Ludikhola watershed , Nepal 2013.

Responses	Disagree	Disagree somewhat	Agree somewhat	Agree
The overall income situation in the village/community will be better	15%	70%	12%	3%
It will result in corruption	0	9%	88%	3%
Unequal distribution of payments	0	24%	67%	9%
Payments will go only to land owners	7%	43%	43%	7%
There will be less conflicts in the village/community	3%	76%	18%	3%
It will increase privatization of land	7%	41%	48%	4%

On the basis of results and discussions, this section discusses Ostrom's design principles by taking the case of community forest management and the pilot project activities observed in the study areas.

6.2.6.1. User and Resource boundaries

Clear boundaries exist between members and non members of the CFUGs. Various criteria are established to select HH as a member of the CFUG. Members have rights to collectively manage and utilize forest products. In the pilot project, all credits to the conserved carbon was given to the forest users. However, carbon rights are yet to be defined by the government.

Community forest areas were separated by natural boundaries since none of the studied CFs were enclosed by any fences. Forest management activities were guided by respective CFOPs. All CFUGs have their forest resource and area maps. Annual carbon measurement were carried through standard methods from both permanent and temporary sample plots.

As a result, it can be said that existing pilot project activities in the CFs of Nepal fulfill the first design principle.

6.2.6.2. Congruence

In the studies CFUGs, the more protection oriented CF management was found, which was restricting the quantity of forest products utilized by HHs from the forest. HHs' total demands of forest product was not possible to fulfil from the CF as CFOPs shows that the AAH of forest is low compared to the needs of the HHs. Despite the provision of equal distribution of forest products, some poor and Dalit HHs were getting less quantity of timber. However, the poor and dalits were benefited by equitable carbon payments.

CFUG committee members are obliged to work voluntarily since there is no provision to pay CFUG committee members for managing CFs. However, they sometimes get allowances while taking part in the trainings or other activities organized by pilot projects. While carbon payments are made through strict criteria, CFUG funds mobilization criteria gives more flexibility to decide investment areas by CFUG committees.

About 50% of the HHs mentioned that the CF conservation measures have changed the way how they utilize forest products. HHs were ready to follow measures to reduce deforestation and forest degradation if they get appropriate compensation or alternative source of forgone resource use. However, most of them were not willing to completely stop using firewood and timber from their CFs.

6.2.6.3. Collective-choice arrangements

There is a mandatory provision to have at least an annual assembly of HHs to make or change operational rules. CFUG committee members were more functional and influential in decision making. Tole¹² meetings and annual assembly have 60% and 40% influence respectively on the rule that govern use and management of the CFs.

No differences were observed between CFUGs regarding collective choice arrangements as their CFOPs were almost similar with respect to the mentioned provisions. Majority (close to 88%) of HHs responded that CFUGs themselves can manage a program against deforestation in the community well compared to other agencies such as government officials, village leaders or NGOs. At the same time all HHs opined that they should get appropriate technical and financial supports from other agencies.

6.2.6.4. Monitoring users and resources

The general assembly has the responsibility to monitor CFUG committees. But, for the operational level decisions regarding user monitoring, CFUG committee make decision. DFO has the right to dissolve any CFUGs and withdraw handed CF area if users do not follow the rules and regulations properly.

Forest monitoring is carried out by respective CFUGs. They must monitor and measure CF resources by following the national CF operation guidelines and renew their CFOPs and constitution. The renewal usually happens in every 10 years and they get technical supports

¹² A tole is a geographical area separated by grouping HHs residing in the area. Based on the location of resident areas of the HHs, CFUGs can have several toles.

from DFO. In addition to renewal, CFUGs have to submit annual progress to the respective DFO. CFs were divided into several blocks so that they could manage the forest properly. DFO staffs visit CFUGs mostly when major harvesting is needed. Various activities potential to help reduce deforestation and forest degradation are present in the study areas.

REDD payment mechanism takes into account ethnicity, wealth and gender of the HHs. Annual carbon monitoring were carried out during pilot project period with the involvement of some local people. CFUG representatives were involved in the district level MRV process.

6.2.6.5. *Graduated sanctions*

Almost all HHs were aware that their CFUG has various forest conservation measures including a list of activities that are banned in the CFs. The list includes clear written provisions of illegal activities and respective fines in all CFOPs. DFO have right to dissolve CFUG if they do not follow existing forest rules and regulations. CFUG committee was making more decisions and users had grievances on that but they hardly raise those issues during annual assembly.

Some elite members were getting more benefits but CFUG committee was not able to restrict that. For example in CFUG1 and CFUG2, records showed that they were finding very difficult to return interest and principle amounts on time from some influential CFUG members.

6.2.6.6. *Conflict resolution*

Close to 80% HHs mentioned that they follow all CF management rules and regulations as agreed during general assembly and written in CFOPs. Hence, no serious conflicts were recorded in the study areas. However, there were many grievances. Remaining 20% of total HHs mentioned that they usually follow the rules but sometimes they break it when they urgently needed some firewood or forage. Hence, some of the users had some issues with the CF rules and regulations.

If conflict occurs in resource use, users have to resolve themselves. In order to resolve bigger issues such as forest encroachments, DFO is responsible to resolve. However, no serious conflicts were recorded in all CFUGs. Potential conflicts under REDD+ are needed to be resolved by higher authorities before implementation of the REDD+ activities.

6.2.6.7. Rights to organization

CFUG networks have a few new additions in the form of watershed REDD networks as the pilot project was implemented on the available CF institution. No other influence or modification to the CFUG institutions was recorded in the study area.

However, some of the HHs had a fear that by seeing recent involvement of various agencies in the CFs, there is high potentiality that the government will take over the management rights. Compatibility of the REDD+ networks in the existing CF institutions is needed as CFUGs managing CFs in Nepal have their own organizational structure connecting Households to the national level umbrella organization FECOFUN (Annex 3)

Finally, we summarize seven out of eight design principles proposed by Ostrom and compare their availability in all CFUGs. The principle eight (Nested organizations) is not presented in the table as it has to do with higher level of authorities than CFUGs.

Table 48: Design principles in the CFs, Nepal 2013.

Principles	Indicators in the community forestry		
	CFUG1	CFUG2	CFUG3
1A: User boundaries	Exist	Exist	Exist
1B: Resource boundaries	Exist	Exist	Exist
2A: Congruence with local conditions	Exist with limitations	Exist with limitations	Exist with limitations
2B: Appropriation and provision	Exist with limitations	Exist with limitations	Exist with limitations
3: Collective-choice arrangements	Exist	Exist	Exist
4A: Monitoring users	Exist	Exist	Exist
4B: Monitoring resources	Exist with limitations	Exist with limitations	Exist
5: Graduated sanctions	Exist	Exist	Exist
6: Conflict resolution	Exist with limitations	Exist with limitations	Exist with limitations
7: Rights to organization	Exist	Exist	Exist

7. CONCLUSION

In Ludikhola watershed, households were mostly poor and various socio-economic characteristics such as land holdings, annual incomes, and education levels were significantly different by ethnic groups, well being rankings, and locations. So were various capitals and access to assets. Households' diversification index of income indicated that a majority of the households had diverse sources of income and they do not depend entirely on one income source. Compared to less poor households, the poor depend more on agriculture and off-farm activities. Whereas, more wealthy households have higher incomes from remittances and non-farm activities. Few households were found to be involved in the commercial farming due to limited productive lands per household and farming in the *bari* land was constrained by various factors. Contribution of forest incomes to the households' annual income was found to be different among ethnic groups.

Local people depend on the community forests mainly for firewood, timber and leaf litter, though community forest's annual increment was not sufficient to fulfill their annual need of forest products. Forest management was observed to be more protection oriented with strict measures of forest conservation, forest harvesting and forest product distribution. As a result, carbon stock was found to be gradually increasing every year in all community forests. Higher contribution of forest incomes for poor households indicates that forests are more important in maintaining their livelihoods. However, less amounts may be linked with the fact that annually harvested timber was mostly collected by less poor HHs. Larger contribution of forest incomes to the total incomes and negligible share of remittance of poor and *Dalit* households show that protection oriented forest management and future conservation activities under REDD+ will impact more to *Dalit* and poor households. However, poor people, mostly of *Dalits*, were getting extra supports to their livelihoods from various governmental and non-governmental sources.

The pilot project distributed total amount of US\$ 79,866.00 to three studied CFUGs with strict criteria of utilization of the funds benefiting mostly poor and *dalit* households. In the process of implementation of the pilot project, a few entirely new arrays of institutions were developed based on the integrity of and building on the already available community forest institutions and forest users' networks. Pilot project was able to deliver various socio-economic development services at the local level. Capacity building trainings were mostly of technical forest inventory techniques and included forest sampling, GPS survey and use of

various forest sampling instruments. The pilot project showed the evidences that local people can be employed and involved in local level forest measurements. Involvement of local people in the community based MRV mechanism was cost efficient; however, to be continued in future REDD+ mechanism, performance based payments to CFUGs must surpass the associated costs of carbon management in addition to additional benefits to local people for protecting forests and reducing forest dependency.

Pilot projects' awareness raising activities were found to be reaching not to all HHs in the study areas. Local people believe that the future REDD+ activities will be similar to the pilot project i.e. they will get incomes from the conserved carbon in a very straight forward way and the incomes are guaranteed. However, local people's beliefs are misleading because entering into the REDD+ mechanism is not that easy and straightforward. When participate in the actual REDD+ mechanism, they may not get financial support by doing business as usual, unlike pilot project's payments because getting regular increments of carbon stock will be challenged by high demand of forest products in the study area. Moreover, it will not be easy to continue secured benefits to all *dalit* and poor people in the future REDD+ benefit sharing because future carbon payments may not be high enough to support all *dalits* or poor. Similarly, there is no guarantee that more wealthier and upper caste HHs, who, in many cases, are holding influential positions in the CFUGs' committees, will distribute benefits in a fair way as brahmins and indigenous households were excluded from past REDD+ benefits.

Contestations between CFUGs and forest officials was observed regarding carbon rights as both forest users and the government are integral actors of future REDD+ mechanisms. Households responded that CFUGs themselves can manage a program against deforestation in the community in a better way than other agencies such as government officials, village leaders or NGOs provided that that they get appropriate technical and financial supports from other agencies. Local people expressed that, if external agencies become influential, they have a fear of unequal distribution of payments, more conflicts and more corruption under the future REDD+ activities. Local people were not ready to accept any kind of activities which are potential to limit or restrict their access to the forest resources. Most of them were not willing to completely stop using firewood and timber from their CFs. However, HHs showed their interest toward the payments, accessible alternative energy sources and community development activities so that their demand of the forest products will decrease automatically and they may continue to protect the forest.

Lesson learned from the pilot project and existing management of community forests showed that local people are managing forests in a sustainable way. Sustainable in terms of availability of the 'Design principles' and fulfilling some local demands of the forest products without degrading forest conditions. However, considering future REDD+ mechanism, a few limitations were observed in terms of the 'design principles' such as congruence, monitoring resources and conflict resolution. Those limitations are needed to be resolved in order to sustainably implement REDD+ activities in the community forests of Nepal. Monitoring of local people's carbon measurements, reducing deforestation and degradation activities, benefit sharing mechanism and CFUG funds mobilization by neutral third party would be required for the successful implementation of the REDD+ at local level.

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Appendix 1: Ranking of Households

Annual Income (NRs)	Ranking 1 (R1)	Land holding (ropani)	Ranking 2 (R2)	R1 + R2
<25000	1	< 4.9	1	2 (P)
25000 - 50000	2	5-9.9	2	4 (P)
50001 - 75000	3	10-14.9	3	6 (P)
75001 - 100000	4	15-19.9	4	8 (P)
100001 - 125000	5	20-24.9	5	10 (LP)
125001 - 150000	6	25-25.9	6	12 (LP)
150001 - 175000	7	30-34.9	7	14 (LP)
175001 - 200000	8	34.9-39.9	8	16 (LP)
>200000	9	>40	9	18 (LP)

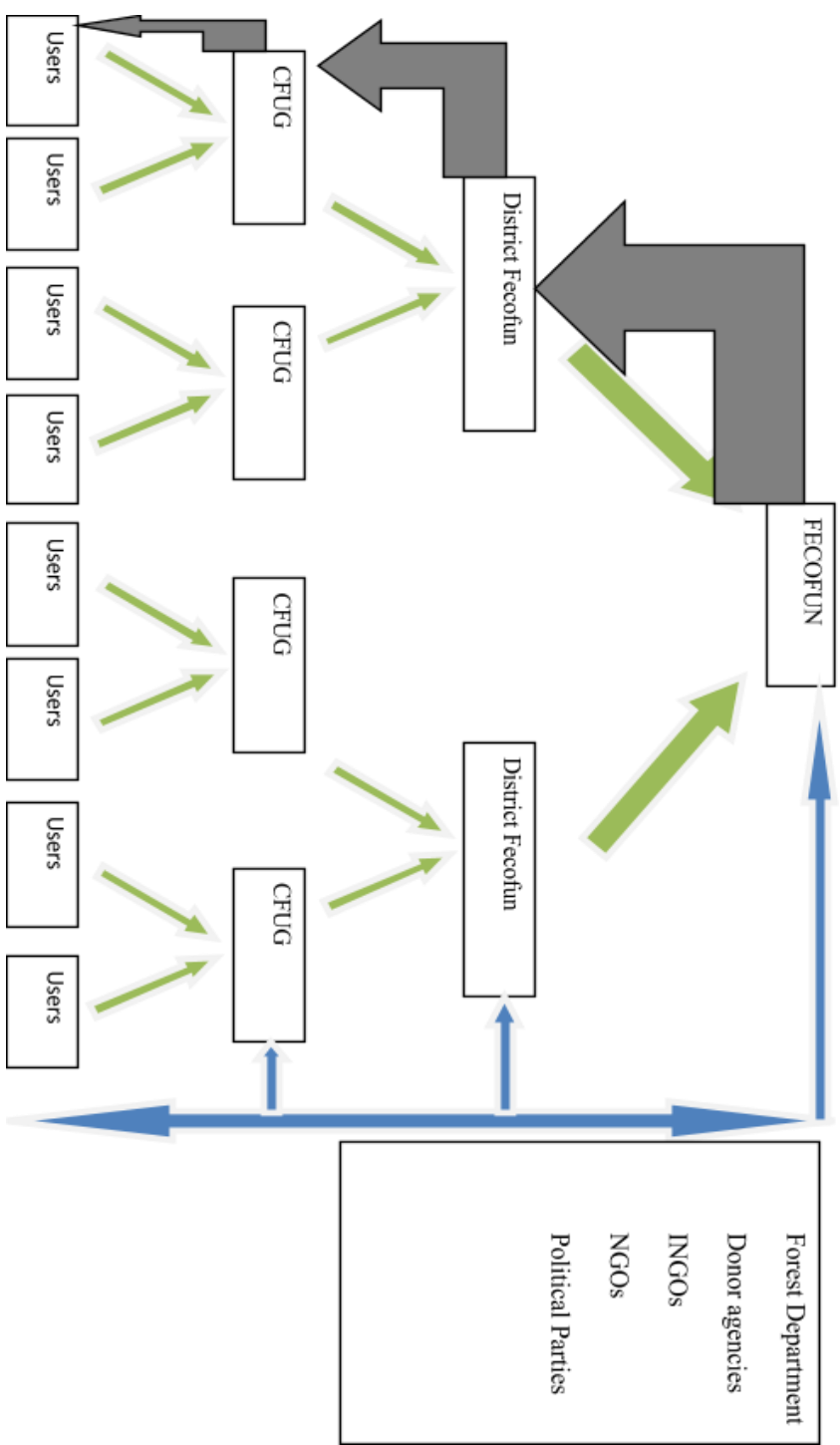
R1 + R2 = < 5 or 5 : Poor (P) , R1 + R2 = > 8: Relatively Less Poor (LP).

Source: Modified from (Khanal 2012)

Appendix 2: Correlation matrix

Correlations									
		Name of CFUG	Sex of Respondent	Ethnicity	Age of HH head	Education HH head	totland	Household size	Total annual income per HH in US\$
Name of CFUG	Pearson Correlation	1	-.110	.226	-.005	-.047	.269	.194	-.124
	Sig. (2-tailed)		.449	.115	.973	.747	.059	.178	.391
Sex of Respondent	Pearson Correlation	-.110	1	-.129	-.463**	.077	-.058	-.349*	-.138
	Sig. (2-tailed)	.449		.373	.001	.593	.689	.013	.338
Ethnicity	Pearson Correlation	.226	-.129	1	.139	-.259	-.451**	.108	-.357*
	Sig. (2-tailed)	.115	.373		.337	.069	.001	.454	.011
Age of HH head	Pearson Correlation	-.005	-.463**	.139	1	-.368**	.039	.585**	-.010
	Sig. (2-tailed)	.973	.001	.337		.009	.787	.000	.944
Education HH head	Pearson Correlation	-.047	.077	-.259	-.368**	1	.236	-.326*	.291*
	Sig. (2-tailed)	.747	.593	.069	.009		.100	.021	.041
totland	Pearson Correlation	.269	-.058	-.451**	.039	.236	1	.161	.364**
	Sig. (2-tailed)	.059	.689	.001	.787	.100		.263	.009
Household size	Pearson Correlation	.194	-.349*	.108	.585**	-.326*	.161	1	-.031
	Sig. (2-tailed)	.178	.013	.454	.000	.021	.263		.833
Total annual income per HH in US\$	Pearson Correlation	-.124	-.138	-.357*	-.010	.291*	.364**	-.031	1
	Sig. (2-tailed)	.391	.338	.011	.944	.041	.009	.833	
**. Correlation is significant at the 0.01 level (2-tailed).									
*. Correlation is significant at the 0.05 level (2-tailed).									

Appendix 3: CFUGs' networks before REDD+ pilot project in Nepal.



Appendix 4: Questionnaires for household survey

QUESTIONNAIRE FOR THE HOUSEHOLD SURVEY

1.Questionnaire number:	2.Country:	
3.CFUG:	4.Name of household head:	
5.Date:	6.Pilot/study area:	
	Starting time:	Finishing time:

SECTION A: Household structure and livelihood assessment

The aim of this section is to map out household characteristics, assets and ownership.

I. HOUSEHOLD CHARACTERISTICS AND COMPOSITION

		A1 ¹⁾	A2 ²⁾	A3	A4a ³⁾	A4b ⁴⁾	A5 ⁵⁾	A6
ID	Position in HH	Sex	Marital status	Age (yrs.)	Education (years)	Other skills training	Main occupation	How long have you lived here (no of yrs.)
1	Head of HH							
2	Spouse							

1) Codes: 1=male; 2=female

2) Codes: 1= single; 2=married; 3=divorced; 4=separated; 5=widowed; 6=cohabiting

3) Codes: 1= no formal education; 2=primary; 3=secondary; 4=higher education (college, university or similar)

4) Codes= 1=agricultural management skills; 2=forest management skills; 3=other

5) Codes: 1=agriculture; 2=forestry/forest use (NTFPs); 3=hunting; 4=fishing; 5=other

A7. Please indicate the number of permanent household members:

	Sex	Age group
--	-----	-----------

		0 to 15	16 to 45	46 to 60	Above 60
1	Male				
2	Female				

II. SOCIAL ASSETS

A8. Do you consider your village/community a good place to live?

Code: 1=Yes; 2=It is OK; 3=No

A9. On a scale how comfortable and safe do you feel in your village/community?

1 Very low	2 Low	3 Fair	4 High	5 Very high

A10. How do you rate your household's relationship with the following?

No		1 Very bad	2 Bad	3 Fair	4 Good	5 Very good
1	Neighbors					
2	People from other communities					
3	NGO workers					
4	VDC					
5	Forest government officials					
6	CFUG'S Committee					
7	FCTF coordinating committee					

A11. Does any member of your household belong to the following groups?

No	Groups	Member ¹⁾	Function in the group ²⁾
1	Farm groups		
2	Village committee		
3	Local NGOs		

4	Traditional council		
5	Local political group		
6	Religious group		
7	REDD network		
8.	Savings group		
9.	Other: _____		

1) Code: 1=belong; 2=do not belong; 9=does not exist

2) Code: 1= leader; 2=ordinary member

A12. Has the household's income over the past 12 months been sufficient to cover what you consider to be the needs of your household?

Codes: 1=yes; 2=reasonably; 3=no

A13. Has your household faced any major income shortfalls or unexpectedly large expenditures during the past 12 months?

Codes: 1=Yes; 2=No (If 'no', go to Section B)

A13a. If 'yes', please complete the table

No	Serious event	How severe ¹⁾ ?	How did you cope with the income loss or costs? <i>Please indicate the most important strategy</i>
1	Serious crop failure		
2	Death/serious illness in family (productive age-group/adult)		
3	Loss of land		
4	Major livestock loss (drought, disease, etc.)		
5	Loss of waged employment		
6	Climate/drought/floods		
7	Price changes on products and consumer goods		

8	Protected area establishment		
9	Other: _____		

1) Codes: 1=somewhat severe; 2= severe; 3= very severe; 9= not relevant

III. LAND

A14. Please indicate the size of farmland (in hectares) that currently has been in **use** (last 12 months).

	Area used (ha)	Ownership (tenure) ¹⁾	Rented ²⁾	Land conversion type ³⁾
'Parcel 1'				
'Parcel 2'				
'Parcel 3'				
'Parcel 4'				
'Parcel 5'				
'Parcel 6'				
Total				

1) Codes: 1= private; 2= state (ordinary); 3= state (JFM); 4= state (CBFM); 5= state (individual); 6=common property;7= open access

2) Codes:1=not rented; 2= rented from state; 3=rented from non-state, e.g. community or individuals,

3) Codes: 1= permanent agriculture land (cleared more than 10 years ago); 2= land cleared in shifting cultivation areas; 3= cleared forest last 10 years to become permanent agricultural land; 4= other.

IV. ASSETS AND SAVINGS

Habitation		
A15	Housing contract <i>Code: 1=owner; 2=tenant; 3=free; 4=not owner; but exclusive use rights</i>	
A16	Material used in construction of walls of the main house? <i>Code: 1= cement bricks 2= mud bricks; 3= wood; 4=sticks with mud plastering ; 5=mat/leaves; 6=other. If 'other', please specify here:</i>	
A17	Material used for roofing the main house	

	<i>Code: 1= tiles; 2=iron sheet;3=thatch/mat/leaves; 4= other</i> <i>If 'other', please specify here:</i>	
A18	What is the main source of potable water used by the household <i>Code: 1=personal tap; 2=public tap; 3=improved well/spring; 4=traditional well</i> <i>5=surface water (river/lake/pond, etc.); 6= other</i> <i>If 'other', please specify here:</i>	

A19	What is the most important source(s) of energy for cooking? ¹⁾ Please rank your answer in the order of importance ²⁾	Rank 1 ²⁾	Rank 2	Rank 3

1) *Code: 1=firewood collected from REDD pilot forest; 2= firewood collected from other forested landscapes; 3=bought firewood ; 4=kerosene;5=gas;6=charcoal;7=biogas; 8= electricity*

A20. Please indicate the number of implements and other large household items that are owned or rented by the household.

No	Assets	Quantity ¹⁾	Owned ²⁾	Rented ³⁾
1	House(s) (for living in)			
2	TV			
3	Radio			
4	Telephone			
5	Motorbike			
6	Generator			
7	Rice/wheat/corn mill			
Agricultural implements and draft animals				
8	Hoes			
9	Cutlass			
10	Pangas			
11	Axes			
12	Buffalo/Oxen			

13	Horse			
14	Tractor			

- 1) Measure in number. If the HH does not have access to the item, write 0.
- 2) Code: 1=owned; 2= not owned
- 3) Code: 1=rented; 2=not rented

SECTION B: Resource use, income and constraints

I. AGRICULTURAL PRODUCTION FOR THE PAST 12 MONTHS

B1. List the most important crops that your household has produced, consumed and/or sold the last 12 months.

No	Crop type ¹⁾	Area (Ha.)	Labour ²⁾	Total output(kg) ³⁾	Sold (kg) ³⁾
1					
2					
3					
4					
5					
6					
7					
8					

- 1) Codes: 1= Rice, 2= Maize, 3= Millet, 4= Wheat
- 2) Codes: 1= household; 2= hired; 3=both. Please use the number for the dominant category. If one category clearly dominates, do not use 'both'.
- 3) Please convert local units (e.g. bushels of corn, sacks of potatoes, etc.) into kg when entering data to database.

B2. Do you have any problem(s) that limit your agricultural production?

Codes: 1=Yes; 2 =No (If 'no', go to B3)

B2a. If 'yes', what do you consider to be the most important problem limiting your agricultural production? _____

B3. Have you had any conflicts over access to land for agriculture in the last five years?

Codes: 1=Yes; 2=No (If 'no', go to B5)

B3a. If 'yes', how would you describe the seriousness of these conflicts?

1 Very low	2 Low	3 Intermediate	4 High	5 Very high
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II. LIVESTOCK PRODUCTION FOR THE PAST 12 MONTHS

B4. What is the number of livestock and livestock products that your household has sold, bought, slaughtered or lost during **the last 12 months**? What is the present number of livestock?

No	Livestock	No	Product produced	Sold (incl. barter) ¹⁾	For own use	Total number owned
1	Cattle	1	Live animal (no)			
		2	Milk (liters)			
2	Buffalo	3	Live animal (no)			
		4	Milk (liters)			
3	Goat	5	Live animal (no)			
		6	Meat (kg)			
4	Sheep	7	Live animal (no)			
		8	Meat (kg)			
5	Pig	9	Live animal (no)			
		10	Meat (kg)			
6	Poultry	11	Live animal (no)			
		12	Egg (kg)			
		13	Meat (kg)			
7	Fish	14	Fish (kg)			

1) Please indicate sold live animals in numbers and sold meat from slaughtered animals in kg – please convert local measuring units into kilos and liters as appropriate when entering into database.

B5. Do you have any problem(s) that limit your livestock production?

Codes: 1=Yes; 2=No (If 'no', go to B9)

B6a. If 'yes', what do you consider to be the most important problem limiting your livestock production? _____

B7. What do you consider to be the most important suggestion to improve your livestock production? _____

III. FOREST RESOURCE USE

B8. What is the importance of the following forest products that the members of your household have collected from the forest both for own use and sale over the last month? Where and how is it collected?

	Main forest products	Collected where		Collected by whom		Time taken to reach item area	Own use (kg)	For sale (kg)
		Forest type ¹⁾	Ownership ²⁾	Labour ³⁾	Sex/age group ⁴⁾			
1	Firewood							
2	Poles & timber							
3	Charcoal							

When coding, use the number for the dominant category. Hence, if one category clearly dominates, do not use 'mix'/'both'.

- 1) Codes: 1= primary forest; 2= secondary forest; 3= mix
- 2) Codes: 1= private; 2= state (CBFM); 3= open access; 4= mix
- 3) Codes: 1= household; 2= hired; 3= both
- 4) Codes: 1= men; 2= women; 3= children; 4= mix

B9. How would you rate your access to and use of forest products (firewood , poles & timber, charcoal) today compared to three years ago?

	1 Much reduced	2 Reduced	3 The same	4 Increased	5 Much increased
Firewood					
Poles & Timber					
Charcoal					

B9a. If 'much reduced' or 'reduced', what do you consider to be the most important factor(s) limiting your access to and use of these forest products today? If more than one, please rank up to the three most important factors.

1	
---	--

2	
3	

B9b. If ‘increased’ or ‘much increased’, what do you consider the most important factor(s) for increasing your access to and use of these forest products today? If more than one, please rank up to the three most important factors.

1	
2	
3	

B10. How important are the other forest products, i. e. non-timber forest products (NTPF) that the members of your household collect from the forest both for own use and sale?

No	Other forest products	1 Do not collect	2 Somewhat important	3 Important	4 Very important
1	Fodder (collected or grazed)				
2	Bamboo				
3	Rattan				
4	Medicinal plants				
5	Wild fruits and leaves				
6	Mushroom				
7	Other-----				

B11. If you sell any of the above products (question B12), how much income does your household make on average in a month (in NRs.):

B12. How satisfied are you with how the forests of your community are managed?

1 Very dissatisfied	2 Somewhat dissatisfied	4 Somewhat satisfied	4 Very satisfied

B13. How would you rank your relationship with other forest users in terms of access to and use of forest resources (firewood , poles & timber, charcoal)?

1 Very bad	2 Bad	3 Fair	4 Good	5 Very good

If 'Fair', 'Good' or 'Very good, go to B17

B13a. If 'bad' or 'very bad', why is it so? Please rank

No	Response	1 Disagree	2 Disagree somewhat	3 Agree somewhat	4 Agree
1	No cooperation				
2	Poor communication and dialogue				
3	Ethnic conflicts				
4	Unequal distribution of rights and benefits				
5	Others (specify)				

B14. Has your household planted any woodlots or trees on the farm over the past 5 years?

Codes: 1=Yes; 2=No (If 'no', go to B18)

B14a. If 'yes', what are the main purpose(s) of the trees planted? You may emphasize more than one purpose

	Purpose	Ranking ¹⁾
1	For own use	
2	For commercial use	
3	Carbon sequestration	
4	Other environmental services If 'other', please specify here:	

1) Indicate importance by ranking the purpose(s): 1,2,3...

B15. Did your household clear any forest during the past five years?

Codes: 1=Yes; 2=No (If 'no', go to B16)

B15a. If 'yes' to B18, how much forest was cleared on average per year: _____ (ha)

B15b. If 'yes' to B18, answer also the following questions concerning cleared forests over the last five years

		Rank 1 ¹⁾	Rank 2	Rank 3
1	What was the cleared forest (land) used for? <i>Codes: 1=cropping; 2=tree plantation; 3=pasture; 4=other</i>			
2	What type of forest did you clear? <i>Codes: 1= primary forest; 2=secondary forest; 3=mix</i>			
3	What was the ownership status of the forest cleared <i>Codes: 1=private; 2= state (ordinary); 3= state (JFM); 4= state (CBFM); 5= state (individual); 6=common property; 7= open access</i>			

1) Ranking using row 1 as example: If e.g., 'pasture' is the most important use of cleared forests, write '3' in the column 'Rank 1'. Similarly, if 'cropping' is the second most important use of cleared forests, write '1' in column 'Rank 2', etc. Do similar for rows 2 and 3

B16. How much land used by your household has been abandoned on average over the last 5 years?(Left to fallow or converted to natural re-vegetation). Please denote as ha per year

B17. Has the household received any cash or in kind payment or compensation related to the following forest services over the past 12 months?

No	Principal purpose	Received ¹⁾	If 'yes', please indicate the amount received (NRs.)
1	Tourism		
2	Carbon projects		
3	Water catchment projects		
4	Tree planting		

5	Timber traders		
6	Other, please specify here:		

1) Code: 1=Yes; 2=No

B18. What is the average income from paid work that the household members together receive in a month (in NRs): _____

NOTE: Payments already covered in B17 must not be included here

B19. Are you or any other member(s) of the household involved in any type of business, and if so, what is the **net income** related to that business **per month**?

NOTE: Income directly from crops (B1), livestock (B5), forest products (B8, B14) or income covered above in questions B20; B21 and B22 must not be included here

NOTE: If the household is involved in different types of business fill in one column for each business.

	Business 1	Business 2	Business 3
1. What is your type of business? ¹⁾			
2. Net income (in NRs.)			

1) Codes: 1=shop/trade; 2=agricultural processing; 3=handicraft; 4=carpentry; 5=other forest based; 6=transport (car, boat, ...); 7=lodging/restaurant; 8=brewing; 9=brick making; 10=landlord/real estate; 13=herbalist/traditional healer; 12=quarrying; 13=fishing outside of the forest; 14: Other

B20. What is the average income received from income transfers (state support; remittances etc.) the household members together receive in a month (in NRs.):

_____ *NOTE: Must not overlap any income already covered in questions B17-B19.*

SECTION C: Property rights, use rights and management

I. COMMUNITY FORESTS

C1. Are there any community forest(s) in your village/community?

Codes: 1=Yes; 2=No (If 'no', go to Section D)

C2. Do you have access to resources in the community forest(s)?

Codes: 1=Yes; 2=No (If 'no', go to Section D)

C2a. Are you a member of CFUG?

Codes: 1=Yes; 2=No

C2b. Do you have individual use rights or use rights in common?

Codes: 1=Individual; 2=Common; 3=Both

Use the number for the dominant category. If one category clearly dominates, do not use 'both'.

C2c. Are your user rights limited to particular resources in the community forest(s)?

Codes: 1=Yes; 2=No (If 'no', go to C3)

C2d. If 'yes', which are the most important forest resources you can use? _____

C3. Do you have any influence on the rules that govern use and management of the community forest(s)? You may tick more than one alternative.

1 Yes, during tole meetings	2 Yes, during other meetings	3 Yes, through general discussions in my community	4 No, we have not taken part at all	5 I do not know

C4. How satisfied are you with the rules that govern use and management of the community forest(s)?

1 Very dissatisfied	2 Somewhat dissatisfied	3 Somewhat satisfied	4 Very satisfied

(Note: Dependent on responses to C4, you proceed by going to C4a or C4b)

C4a. If 'somewhat dissatisfied' or 'very dissatisfied' with the rules, why is it so?

No		1 Dis-agree	2 Disagree somewhat	3 Agree somewhat	4 Agree
1	My/our interests are not taken into account				
2	Unclear boundaries/outsidere are intruding				
3	Unequal distribution of use and benefits				
4	Too strong limitation on access to resources				
5	Rules are not followed				
6	The local community is not enough involved in making rules				
7	Conflict resolution mechanisms are inappropriate				
8	Too weak enforcement of rules/sanctions				
9	Creates opportunities for corruption				
10	Bad management/lack of coordination				
11	Other (specify)				

C4b. If 'somewhat satisfied' or 'very satisfied' with the rules, why is it so?

No		1 Dis-agree	2 Disagree somewhat	3 Agree somewhat	4 Agree
1	My/our interests are well taken into account				
2	Clear boundaries/outsidere are kept out				
3	Equal distribution of use and benefits				

4	Good access to resources				
5	Rules are followed				
6	The local community is involved in making rules				
7	Conflict resolution mechanisms are appropriate				
8	Proper enforcement of rules/sanctions				
9	Good management and coordination				
10	Other (specify)				

C5. Do you feel bound by the rules that govern use and management of the community forest(s)?

1 I feel bound by them and follow them always	2 I feel quite bound by them and follow them mostly	3 I feel somewhat bound by them and follow them sometimes	4 I don't feel bound by them and do usually not follow them	5 Not relevant to me

C6. Have there been any changes in the rules that govern use and management of the community forest(s) in the last three years (Since REDD+ pilot started)? Codes: 1=Yes; 2=No; 3=Not aware

C6a. If 'yes', have the changes influenced your use of community owned forest(s)?

1 It has worsened my livelihood a lot	2 It has worsened my livelihood to some extent	3 It did not have any effect on my livelihood	4 It has improved my livelihood to some extent	5 It has improved my livelihood a lot

C7 How is your relationship with the local committee managing the community forest(s)?

1 Very bad	2 Bad	3 Fair	4 Good	5 Very good	6 Not relevant

SECTION D: REDD Analysis

D1. Are you aware of the role forests play in climate change?

Codes: 1=Yes; 2=No (If 'no', go to E2)

D1a. If 'yes', what relationships between deforestation and climate change do you find especially important? _____

D2 Have you ever heard about REDD or Carbon trading?

D3 Do you know that your CFUG is part of REDD Pilot project?

D4 Have you got any informational training related to REDD?

D5 Could you tell us the process of selecting candidates for those trainings ?

1. From General meeting 2. User committee decides 3. NGO person decide 4. other

D6 Have you got any financial or other material support for your household from this project? if yes, how much and when?

D6a if no, why do you think you have not gotten any?

D7 Are you aware that number of organizations are involved in REDD Project at your area?

D7a. If yes, could you give us the name of those organizations if you remember?

D8 Could you tell us if those same organization were working here before three years?

D9. Are there any forests in your community that are protected by the state/public authorities?

Codes: 1=Yes; 2=No (If 'no', go to question D3)

D10. If 'yes', how do you feel about this protection?

1 Against	2 Somewhat against	3 Somewhat supportive	4 Supportive

D10a. If 'against' or 'somewhat against', why is it so?

No	Response	1 Disagree	2 Disagree somewhat	3 Agree somewhat	4 Agree
1	It restricts my access to forests				
2	No compensation for losses				
3	No access to benefits from tourists				
4	Other (please specify)				

D10b. If 'supportive' or 'somewhat supportive', why is it so?

No	Response	1 Disagree	2 Disagree somewhat	3 Agree somewhat	4 Agree
1	Protection is important				
2	Protection increases long-term access to forests resources				
3	Receive compensation for reduced use				
4	Secures access to income from tourists				
5	Other (please specify)				

D11. Does your community have any locally developed conservation measures for the forest?

Codes: 1=Yes; 2=No (If 'no', go to D6)

D11a. If 'yes', what are these measures?

No	Response ¹⁾
1	Controlling harvest of forest products
2	Limiting farm land in the forest
3	Protecting some areas in the forest
4	Placing guards to control illegal use of the forest
5	Other (please specify):

1) Codes: 1=Yes; 2=No

D12. How satisfied are you with these locally developed conservation measures?

1 Very dissatisfied	2 Somewhat dissatisfied	3 Somewhat satisfied	4 Very satisfied

D13. If 'very dissatisfied' or 'somewhat dissatisfied', why is it so?

No	Response	1 Disagree	2 Disagree somewhat	3 Agree somewhat	4 Agree
1	It restricts my access to the forest				

2	Unequal distribution of benefits				
3	Increased illegal use of forests				
4	Other (please specify)				

D13b. If 'somewhat satisfied' or 'very satisfied', why is it so?

No		1 Disagree	2 Disagree somewhat	3 Agree somewhat	4 Agree
1	Increases long-term access to forests resources				
2	Equal distribution of benefits				
3	Reduced illegal use of forests				
4	Other (please specify)				

D14. Have these conservation measures affected the way you use forests resources?

1 Not at all	2 Not so much	3 Quite a lot	4 Very much

D15. Are there any sacred forest(s) in your community?

Codes: 1=Yes; 2=No (If 'no', go to Section E)

D16. Are the sacred forests sacred to you as well?

Codes: 1=Yes; 2=No (If 'no', go to Section E)

D17. In what ways is this/are these forest(s) important to you?

D18. Does the fact that some forest(s) are sacred to you influence your view about forests in general?

Codes: 1=Yes; 2=No (If 'no', go to Section E)

D18a. If ‘yes’, explain in what ways this influences your views about forests more generally.

D19. Do you think you would stop clearing forest land for agriculture/stop harvesting wood resources from the forest (firewood , poles/timber and/or wood for charcoal production) if you get compensation for your loss of income? Please evaluate the below options.

No	Types of compensation	1 Disagree	2 Disagree somewhat	3 Agree somewhat	4 Agree
1	By payments				
2	By increased employment opportunities				
3	By alternative sources of livelihoods				
4	By better social services in my community				
5	Other (specify)				

(Note: Dependent on the responses to D19, please proceed to D19a, D19b or D20)

D19a. If you cannot be motivated by the above options to stop clearing forests/stop harvesting wood resources from the forest (the respondent has answered ‘disagree’ or ‘somewhat disagree’ **to all options** 1-4 in question E2), why is it so?

No		1 Disagree	2 Disagree somewhat	3 Agree somewhat	4 Agree
1	My livelihood depends too much on the forest				
2	The forest has a strong cultural value to me and it is wrong to accept compensation to stop present use				
3	Money cannot compensate for reduced use of the forest				
4	I do not think I will be compensated enough				
5	Other (please specify):				

D19b. If you can be motivated by some of the above options to stop clearing forests/stop harvesting wood resources (the respondent has answered 'strongly agree' or 'agree' to **at least one** of the options in question D19), why is it so?

No	Response	1 Disagree	2 Disagree somewhat	3 Agree somewhat	4 Agree
1	The compensation will make me equally well or better off				
2	Forest protection is important				
3	It will improve our environmental conditions				
4	I need more income				
5	It will improve the conditions of our village/community				
6	Other (please specify)				

D19c. What commitments could you make to avoid deforestation in your community if compensated for that specific activity? (This question is only relevant for those answering question D19b)

No	Response	1 Disagree	2 Disagree somewhat	3 Agree somewhat	4 Agree
1	Stop expansion of farming activity in forests				
2	Reduce wildfires in forest				
3	Stop harvesting firewood				
4	Stop harvesting poles/timber				
5	Stop producing charcoal				
6	Other (please specify)				

D20. Could the following manage a program against deforestation in your community well?

No	Response	1 Disagree	2 Disagree somewhat	3 Agree somewhat	4 Agree
1	Government officials (DFO)				
2	The village leader(s)				

3	Specially elected village committee				
4	NGOs				
5	FCTF Advisory committee				
6	CFUG itself				
7	Other (please specify)				

D21. What kind of issues do you think could be associated with such a program?

No	Response	1 Disagree	2 Disagree somewhat	3 Agree somewhat	4 Agree
1	The overall income situation in the village/community will be better				
2	It will result in corruption				
3	Unequal distribution of payments				
4	Payments will go only to land owners				
5	There will be less conflicts in the village/community				
6	It will increase privatization of land				
7	Other (specify)				

D22. If you foresee any problems, how do you think they could be best handled?

Section E: Communication and collaboration (For KEY persons)

E1. Which governmental institution, NGOs or other Organizations do you belong to?

E2. Which governmental institution, NGOs or other Organizations do you collaborate with?

E3. Do you find your collaboration with this/these governmental institution, NGOs or other Organizations to be productive?

Disagree	Disagree somewhat	Agree somewhat	Agree
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E3a. Please elaborate:

E4. What type of structure do you believe the current decision making process has regarding REDD+?

Top- Down	Collaborative	Bottom - up	Other:
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E5. Do you find the decision making process transparent?

Disagree	Disagree somewhat	Agree somewhat	Agree
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E6. Do feel that the local populous is an integrated actor in the formation of plans and the general decision making process in regard to REDD+?

Disagree	Disagree somewhat	Agree somewhat	Agree
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E7. What perception do you have personally of the REDD project?

Negative	Somewhat negative	Somewhat Positive	Positive
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F7a. Please elaborate: _____

E8. What perception do you believe the affected local populous has towards the REDD project?

Negative	Somewhat negative	Somewhat Positive	Positive
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E8a. Please elaborate: _____

E9. Can you note in which aspects of the REDD+ mechanism which you find lacking or in need of re-working? _____

E10. What type of information (if any) do you believe is still needed in order for REDD+ to be successful? _____

E11. Do you believe performance-based payments though REDD could be a major incentive for implementing a more coherent strategy to tackle deforestation? Please, explain why. (i.e., performance-based payments would occur after REDD activities reduce deforestation, and monitoring has occurred)



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