

ADDIS ABABA UNIVERSITY
SCHOOL OF GRADUATE STUDIES
DEPARTMENT OF SOCIOLOGY

**ASSESSING THE IMPACTS OF AFFORESTATION/REFORESTATION
ON THE LIVELIHOODS OF LOCAL PEOPLE: THE CASE OF HUMBO
WOREDA, WOLAITA ZONE**

BY: FEKADU ISRAEL

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WOLAITA ZONE**

**A THESIS SUBMITTED TO THE DEPARTMENT OF SOCIOLOGY IN PARTIAL
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ARTS IN SOCIOLOGY**

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This is to certify that the thesis prepared by Fekadu Israel, entitled: *Assessing the Impacts of Afforestation/Reforestation on the Livelihoods of Local People: The Case of Humbo Woreda, Wolaita zone* and submitted in partial fulfillment of the requirements for the degree of Master of Arts in sociology complies with the regulation of the university and meets the accepted standards with respect to originality and quality.

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ABBREVIATIONS

A/R- Afforestation and Reforestation

CDM- Clean Development Mechanism

CIFOR- Center for International Forestry Research

ETB- Ethiopian Birr

FAO- Food and Agricultural Organization

FDPC- Forest Development and Protection Cooperative

FGD- Focus Group Discussion

GHG- Green House Gas

PDD - Project Design Document

UNFCCC- United Nations Framework Convention on Climate Change

WVA- World Vision Australia

WVE- World Vision Ethiopia

ABSTRACT

The emergence of markets for ecosystem services and the implementation of A/R CDM projects across the developing world in recent time have changed the nature of dependence of rural people on forest resources. It is, therefore, timely to investigate the livelihood impacts of carbon forestry activities that are implemented on communal forest land. The main objective of this study was to disclose the impacts of Humbo A/R CDM project on the livelihoods of local people. The study employed mixed methods research. Three out of seven Forest Development and Protection Cooperatives (FDPCs) were purposively selected. 132 households were selected from three FDPCs for household survey using systematic random sampling technique. In addition, four key informant interviews and three focus group discussions were conducted to investigate community level impacts of the project. Findings indicate that the project caused a significant reduction in the households' dependence on the forest land for fuel-wood, fodder and grazing area which in turn forced 24.2% of the households to purchase fuel-wood, 39.4 % to purchase fodder and 62.9 % to reduce their livestock possessions. Although 68.9 % of the respondents reported to have benefited from the created job opportunities, and 37.1 % received skill trainings in income generating activities, only 22% of the respondents attributed the improvement of their households' income to benefits associated with the project. The protection of the forest land came up with negative livelihood outcomes particularly for households which previously highly depended on the forestland and for those living in close proximity of the protected forest due to its discouraging effect on crop and livestock production. At community level, the project achieved positive outcomes such as formation of FDPCs and strengthening their institutional capacity, building physical assets though some were not in line with priority needs of the communities, improved microclimatic conditions and increased savings of FDPCs. Whereas, weakening of informal institutions for joint ownership of livestock (Kottaa), share breeding of livestock (Ulo Kotta) and exchange of draught oxen (Booraa Gatuwaa) were worth mentioning negative outcomes. Finally, with regard to the attitude of the respondents towards the protected forest, among several variables, only educational status, size of farmland and the distance of the households from the forestland were found to statistically significantly predict the attitude of the respondents towards the forest. As sustainability of the forest depends on the positive valuation of the forest by surrounding inhabitants, fencing the forest area to reduce human-wildlife conflict; developing frameworks for access to microcredit services in each FDPCs and letting the community decide over the utilization of carbon revenue are, therefore, recommended measures to achieve positive livelihood impact at household level and thereby to ensure the sustainability of the forest management.

Key Words: Afforestation/reforestation, Clean Development Mechanism, coping strategies, Ethiopia, Humbo, livelihood, local people, protected forest.

CHAPTER ONE: INTRODUCTION

1.1. Background of the Study

Since 1990s, evermore than usual, forest resources have attracted the attention and interest of global communities for important functions of supporting human economy and welfare and controlling global ecosystem. World Bank (2008) indicated that forests contribute to the livelihoods of more than 1.6 billion people around the world. For millions of people living in poverty around the world, forests not only provide food, fuel for cooking and heating, medicine, shelter and clothing, but they also function as “safety nets” during emergencies (FAO 2013). In this regard, studies (e.g. Byron and Arnold 1997, Yemiru et al. 2010, FAO 2013) indicated that forest products and cash incomes generated from them facilitate adaptation of rural households to stresses and shocks such as drought, livestock loss, crop failure, illness and death of family members and so forth.

The existence of strong linkage between forest resources and livelihoods of rural people in developing countries is loudly pronounced in literature (e.g. Gibson, McKean and Ostrom 2000, Homewood 2005, Timko, Weaber and Kozak 2010, Yasuoka et al. 2012). For instance, it has been estimated that over two third of the Africa’s 600 million people rely on forest products either in the form of subsistence uses or as a source of cash income (CIFOR 2005). If we consider its contribution to domestic energy alone, wood is the primary energy source of at least 70% of households in Africa (CIFOR 2005). From this, it is clear that the importance of forests and woodlands sounds loud in the developing countries where highest percentage of people is poor and rural based.

In Ethiopia, forest resources play a significant role in the country's economy, particularly in the livelihood of rural people, as important sources of energy, food, employment, medicine, fodder and income (Alemayehu 2010, Yemiru et al. 2010, Aynalem 2012). For instance, according to a recent report by Hilawe et al. (2011), biomass energy (consisting of wood, charcoal and agricultural residues) provides 87.9% of the total energy consumed in the country. Apart from depending on forests and woodlands for domestic energy, studies (such as Kasahun 2008, Alemayehu 2010, Yemiru et al. 2010) undertaken in various parts of the country indicated that rural households engage in commercial supply of wood, charcoal, and other timber and non-timber forest products to urban areas to generate cash income thereby to support their livelihood. Therefore, this informs that any conservation measure on forests need to take into account the undeniable linkage between forest resources and the livelihoods of poor people living in and around forests.

Besides the significant role forests play as livelihood assets to rural people, currently their importance is further emphasized due to their key role in controlling and maintaining the stability, functioning, and sustainability of global ecosystems (Streck et al. 2008, World Bank 2008) in the face of frighteningly changing global climate. Forests serve as the world's most important terrestrial storehouses of carbon. However, in order to serve this function, the mature forests should be left intact (Streck et al. 2008). Therefore, these competing livelihood and conservational demands to forest resources have recently underlined the need to sustainably manage the forest resources in order to balance their utilization for both of the demands.

Most of the developed-countries' governments have now committed to increased funding for carbon sequestration and protection of forest biodiversity in order to reduce emissions

of green house gases (World Bank 2008). Particularly, under Clean Development Mechanism of Kyoto protocol on Green House Gas (GHG) emission, investing in land and forest resources of developing countries has received the attention of industrialized countries. Having twin objectives of reducing green house gasses and promoting sustainable development in host countries, the Clean Development Mechanism (CDM) projects are being implemented in non-industrialized countries since 2005 (Maraseni, Cockfield and Apan 2005, Streck et al. 2008, UNFCCC 2010). In line with this, in 2006, Afforestation and Reforestation (A/R CDM) project has started its implementation in Humbo *Woreda* of Southern Ethiopia (WVE 2006, Brown et al. 2010).

Initiated by World Vision Australia and World Vision Ethiopia, the initiative introduced a farmer-managed natural regeneration technique to restore the degraded natural forest and thereby to generate carbon credits. Consequently, the forestland that had long been an open access resource has become enclosed and protected (Aynalem 2012). Since the time of its introduction, the project managed to restore 2,728 ha of degraded forest and thereby contributed to the reduction of green house gases from the atmosphere (Brown et al. 2010). However, the project initiators hesitated a lot to investigate and disclose about another equally important goal of the initiative (i.e. its effect on the livelihoods of surrounding communities who used to depend on the forest land in one way or another). In line with this, therefore, the current study was conducted on Humbo A/R CDM Project in order to investigate the impact of the project on the livelihoods of local people involved in regeneration and protection activities.

1.2. Statement of the Problem

Benefits derived from natural resources are among the fundamental incentives for the rural communities to manage the resource base sustainably. If a given natural resource has nothing to do with the immediate needs of people in charge of its management, it is hardly possible to ensure the active participation of the stakeholder communities in its development. Therefore, access to forest products and/or consumption of other returns associated with protection and conservation of the rehabilitated forests and the positive valuation of such returns by the surrounding communities are indispensable for their sustainable management.

As defined in Kyoto Protocol to UNFCCC (UN 1998), CDM has two objectives, namely contributing to the sustainable development of non-industrialized countries and assisting industrialized countries in achieving compliance with their quantified emission reduction commitments. However, there is widespread debate in academic literature with regard to the CDM projects' commitment to achieve their sustainable development goal in host countries. Winkler, Davidson and Mwakasonda (2011) indicated that much of the attention has been given to emission reduction than that of sustainable development even in the very outlining of modalities and procedures for the CDM Projects. In a similar vein, by assessing the potential contribution of some CDM projects, Sutter and Parreno (2007) concluded that the trade-off is in favor of cost efficient emission reduction objective than that of contributing to local livelihoods. Taking the other side of the argument, World Bank Carbon Finance Unit (2011) asserted that A/R CDM projects alleviate poverty and promote the socioeconomic development of rural areas of the host countries.

In spite of the widespread debate over the potential of CDM projects to achieve their sustainable development goals, as CDM pipeline shows, the number of A/R CDM project is rapidly increasing. The available scanty study on potential benefit of A/R CDM projects in Africa (e.g. Jindal, Swallow and Kerr 2008) indicates that, in short run, the projects are less likely to benefit local communities and may even harm them by restricting access to natural resources and competing for scarce groundwater. In Ethiopia, too, studies on A/R CDM projects are very scanty. The available published study (e.g. Brown et al. 2010) indicated that Humbo A/R CDM project has managed to restore 2,728 hectares of degraded forest through strategic replanting and protection and thereby managed to generate revenues from carbon sale. However, it did not touch the impact of the intervention on the livelihoods of stakeholder households.

In a midterm evaluation report of the Humbo A/R CDM project, World Vision Australia (2011) reported protection and enhancement of biodiversity, reduced water and wind erosion, increased water supply, and returning of wild animals as major outcomes of the project. The report claims the establishment of local cooperatives, securing of user rights to cooperatives, and financial inflows from the sale of carbon stocks as social and economic benefits of the regeneration and protection of the degraded forest. However, the midterm evaluation report did not disclose how the surrounding communities cope with the loss of forest products caused by the sudden restrictions imposed by the project. Neither did it assess the impacts of the benefits claimed to be associated with the project on the livelihood assets of the households and communities participating in it.

Aynalem (2012) comprehensively revealed various factors influencing local people's access to the forest products and their bargaining power over the carbon revenue. In the

study, Aynalem (2012) indicated that the decision to bring Humbo forestland under protection was made by political elites called up on by the project initiators. However, the impacts of the protection of the forestland and of the benefits claimed to be associated with the project on the livelihood assets of the surrounding households, their livelihood strategies and livelihood outcomes were not investigated in this study too.

Decisions taken far from the site of local rural resources can have major impacts on the associated rural livelihoods (Dev et al. 2003, Homewood 2005). The costs incurred or the benefits enjoyed by a given community in turn significantly influences the way that community views and manages the natural resource under consideration. If the A/R project is perceived as being a barrier to local livelihoods, it may create an incentive for illegal harvesting and clearing of the forest and thereby threatening the sustainability of the forest and the permanence of carbon sequestration.

Although the livelihood of local people affected by Humbo A/R project is an issue deserving investigation, the existing published studies overlooked it. Therefore, this study was conducted to fill the identified knowledge gap concerning the impacts of Humbo A/R CDM project on the livelihoods of local people and their attitude towards the protected forest.

1.3. Objectives of the Study

1.3.1. General objective

The general objective of this study is to investigate the impacts of Humbo A/R CDM Project on the livelihoods of local people and their corresponding attitude towards the protected forest

1.3.2. Specific objectives

The specific objectives of this study are:

- To identify major changes in the households' access to the forestland and their responses.
- To describe the household level livelihood impacts of regeneration of the forest and other benefits associated with the A/R project.
- To describe the impacts of A/R project on community level assets of the concerned communities.
- To examine the relationships between certain demographic, socio-economic and geographic characteristics of the households/household heads and the household heads attitude towards the protected forest.

1.4. Hypotheses

From the literature reviewed and personal experiences and observations of the researcher on similar project, the following hypotheses were formulated concerning certain demographic, socio-economic and geographic characteristics of households/household heads and their attitude towards the protected forest.

1. Younger and more educated people are likely to have more favorable attitude towards the protected forest than older and less educated people.
2. People living near the protected forest are likely to have more unfavorable attitude towards the protected forest than people living far away from it.
3. People possessing smaller agricultural land are likely to have more unfavorable attitude towards the protected forest than those possessing larger land size.

4. There is a statistically significant difference in attitude towards the protected forest among people collecting fuel-wood and animal feed from different sources.

1.5. Scope of the Study

Since the project initiators and the purchasers of carbon stock periodically measure the contribution of the project to green house gas emission reduction, this study has solely focused on the impacts of the project on livelihoods of surrounding households and communities and the attitude of the household heads towards the protected forest. In investigating the project's impacts on the livelihoods of concerned households and communities, this study emphasized solely on its impact on livelihood assets, livelihood strategies and livelihood outcomes. The other aspects of livelihood such as transforming structures and vulnerability contexts that influence access to the forest resource and other benefits associated to the project were not given attention in this study for the existing literature adequately exposed them. Geographically, the study was confined to three FDPCs located in three adjoining *Kebele* Administrations of Humbo *Woreda*.

1.6. Significance of the Study

A study on the impacts of A/R CDM project on the livelihoods of forest dependent local people and their corresponding attitude towards the protected forest is very important for it adds to the limited empirical evidence on the various aspects of interactions between rural people and forests protected for the purpose of carbon sequestration. In this regard, this study fills literature gap concerning coping strategies adopted by households to make up the loss of forest products during regeneration and protection of forests meant for carbon sequestration. By doing so, the study findings may attract policy intervention by

government as well as the stakeholder non-governmental organizations of the project. Furthermore, it may come up with some lessons that can be considered when the project is replicated in other parts of the country.

By disclosing the impact of A/R CDM project on the livelihoods of people affected by the project, the findings of this study may fill the gap of literature on the issue. Therefore, by revealing the positive and negative impacts of the project activities on the livelihood assets, livelihood strategies and livelihood outcomes of the households, the findings of this study may be utilized to balance attention given to carbon sequestration and socio-economic development of concerned communities.

Disclosing the attitude of the community members towards the protected forest may also influence the project initiators to take in to consideration the interest of some social groups whose attitude is not favorable towards the regenerated forest if any. In this regard, the project initiators and the local management of the forest may use the findings of this study to take some measures in order to enhance the sense of ownership among the households thereby to ensure the sustainability of forest management and carbon sequestration.

1.7. Conceptualization and Operationalization

1.7.1. Defining concepts

In this sub-section, some concepts that can have different meaning in different contexts have been defined in order to make their usage unambiguous for the reader. However, there are also several additional concepts, particularly related to livelihood, that haven't been defined in this section. They are left to be discussed in chapter two simultaneously

with the theoretical and conceptual framework in order to avoid redundancy (i.e. since their usage is similar in both the theoretical framework as well as in this study).

Attitude towards protected forest: refers to the positive or negative valuation of the protected forest by the surrounding inhabitants.

Coping strategies: -refer to the mechanisms adopted by households to make up the loss of various forest products.

Forest products: refer to various goods and services generated from forest.

Household: Constitutes of a person or group of persons, irrespective of whether related or not who normally live together in the same housing unit and who have common cooking arrangements (CSA 2012).

Head of Household: is a person who economically supports or manages the household or for reasons of age or respect, is considered as head by members of the household or declares himself as head of a household (CSA 2012)

Household size: refers to the total number of members in a given household

Local people: refers to people involved in the regeneration and protection activity of Humbo forest.

Member of Household: refers to a person comprising a given household.

1.7.2. Variables and their levels of measurement

In this sub-section the researcher discusses the independent and dependent variables; the indicators used to measure the variables and their level of measurement as indicated in the table below.

Figure 1: The relationship between the independent and dependent variables

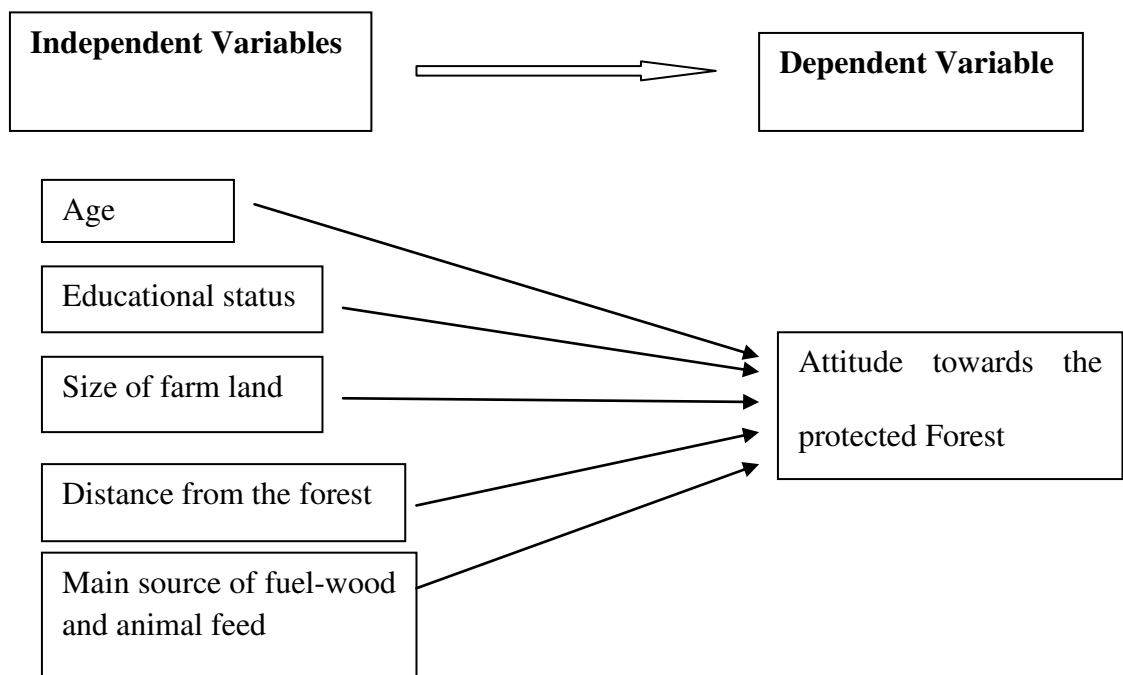


Table 1. Variables and their levels of measurements

Variables	Operationalization/indicators	Level of Measurement
Independent Variables (i.e. Demographic, Socio-economic and Geographic characteristics of Households)		
Age of the respondent	Number of years a respondent lived	Ratio scale
Level of education	Number of grades attended by the respondent	Interval /ratio
Distance from the forest	Actual distance of respondent's house from the forestland in Kms as reported by the respondent	Interval/Ratio
Size of agricultural land holding	Size of land (in hectares) possessed/owned by the respondent as reported by the respondent	Interval/Ratio
Sources of firewood for cooking	Main source of firewood for the household based on the respondents perception	Nominal Scale
Source of fodder	Main source of fodder for the household based on the respondent's perception	Nominal scale
Dependent Variable		
Attitude towards the protected forest	Based on total test scores on certain statements reflecting the attitude of the respondent (Likert-scale to measure attitude)	Interval/ratio level

1.8. Organization of the Paper

This research paper has been divided into five chapters. The first chapter deals with the introductory part which states the background of the study, statement of the research problem, research objectives and hypothesis, and significance of the study. In the second chapter, the researcher presents sustainable livelihood framework as a theoretical framework of this study. Furthermore, the chapter attempted to review empirical literature on the role of forests in the livelihood of rural people, impacts of A/R projects

on the livelihood of rural households and coping strategies adopted by rural households when access to forest product is denied. The third chapter deals with the description of the study area and the methods that were employed to conduct the study. The fourth chapter presents the findings in line with the specific objectives of the study. The final chapter provides conclusions and recommendations based on the finding of this study.

CHAPTER TWO: LITERATURE REVIEW

2.1. Introduction

This chapter deals with review of literature related to forest resources and livelihoods of rural people. In this regard, both theoretical and empirical literature has been reviewed. The first sub-section of the chapter provides a review of theoretical literature in livelihood studies. In the second sub-section, empirical literature related to the importance of forest resources to the livelihoods of rural people, the emergence and operation of Afforestation and Reforestation Clean Development Mechanism (A/R CDM) projects, the impacts of A/R CDM projects on the livelihoods of forest dependent people, and coping strategies rural households devise when restrictions are imposed on access to forests have been reviewed and presented.

2.2. Theoretical and Conceptual Framework

In this sub section, the researcher discusses the theoretical framework of sustainable livelihood approach and concepts that are central to it.

Since the emergence of the sustainable livelihoods definition proposed by Chambers and Conway (1992), widely differing models and frameworks for livelihood analysis have been created by a number of organizations and authors and have been adapted to fulfill variety of purposes. For the present study, the sustainable livelihood framework that has been forwarded by the British Department for International Development (DFID) towards the end of 1990s was selected. It is a widely used framework for analyzing livelihoods and it improves our understanding of livelihoods, particularly the livelihoods of the poor (DFID 1999).

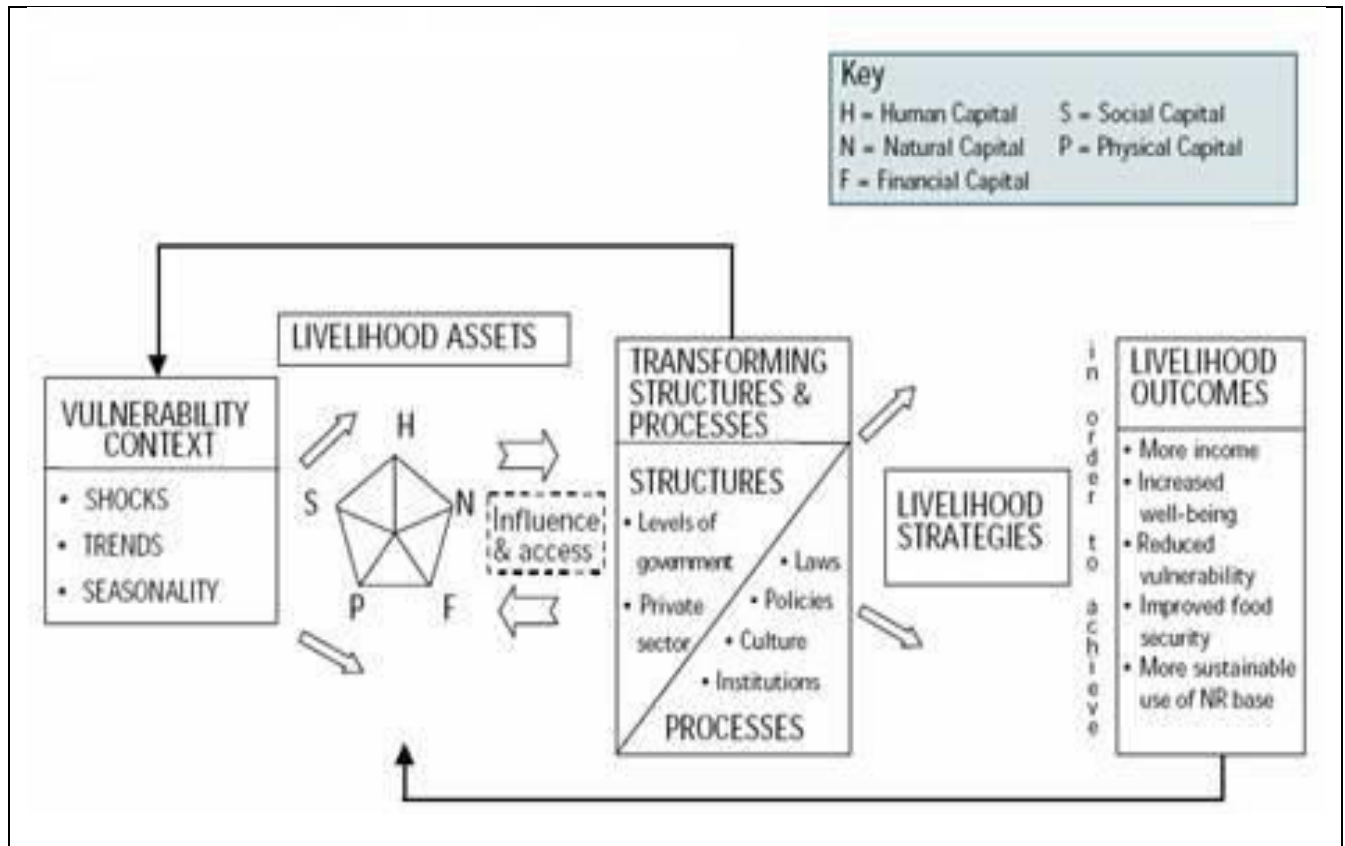
DFID (1999) adapts a version of Chambers and Conway's definition of livelihoods:

A livelihood comprises the capabilities, assets and activities required for a means of living. A livelihood is sustainable when it can cope with and recover from stresses and shocks and maintains or enhances its capabilities and assets both now and in the future, while not undermining the natural resource base. (Chambers and Conway 1992 cited in DFID 1999)

In any analysis of livelihood the very important question to be addressed is, therefore, given a particular context (policy setting, politics, history, agro ecology and socio-economic conditions and so forth), what combination of livelihood assets result in the ability to follow what combination of livelihood strategies to obtain what livelihood outcomes? (Ellis 2000).

Sustainable Livelihoods Framework is one of the most widely used livelihoods frameworks perhaps for it adequately answers the above question. The framework summarizes the main components of livelihoods and complex relationships among the components such as transforming structures and processes, vulnerability contexts, livelihood assets, livelihood strategies and livelihood outcomes. The framework is used not only to present the main factors that affect people's livelihoods, and typical relationships among them but also it can be used in assessing the contribution to livelihood sustainability made by the existing activities (DFID 1999). Therefore, the framework has been selected and used in the present study with the later view in mind (i.e. to assess the livelihood contribution of Humbo A/R CDM Project). But, before presenting the adapted framework, it is important to provide an overview of the key elements of the DFID's basic livelihood framework and how they influence one another.

Figure 2. DFID's Basic Sustainable Livelihood Framework



Source: DFID Sustainable livelihood guidance Sheet (1999)

2.2.1. Vulnerability contexts

Vulnerability context refers to trends (such as population trends, resource trends, national/international economic trends, trends in governance, and technological trends), shocks (such as human health shocks, natural shocks, economic shocks, conflict, crop/livestock health shocks) and seasonality (of prices, production, and employment opportunities) that influence the availability of various livelihood assets and people's access to them. Local people exercise limited or no control over these factors (Ellis 2000, Neefjes 2000, DFID 1999). Although individuals or local people exercise limited control

over vulnerability contexts, as it was indicated in Figure 1, people can influence some of them through policies and institutions.

2.2.2. Livelihood Assets

A pentagon of livelihood assets is central to the framework that can be utilized for achieving the outcomes of livelihood strategies. They refer to the resources upon which people draw in order to carry out their livelihood activities. The framework identifies five types of capitals (such as human, social, financial, physical and natural capitals) upon which livelihoods are built (DFID 1999, Neefjes 2000).

Human capital represents skills, knowledge, ability and potential to labor and good health that in combination with other assets enable people to engage in different livelihood activities and achieve their livelihood objectives. It is a very indispensable category of livelihood asset in order to make use of any of the other four types of assets. It increases with good health services, and investments on education and training. Therefore, it is necessary, though not sufficient, in order to achieve positive livelihood outcomes (DFID 1999, Ellis 2000).

Social capital represents the social resources upon which people draw in pursuit of their livelihood objectives. In this regard, vertical as well as horizontal social networks and interconnections, memberships of formal and informal groups, relationships of trust, reciprocity and exchange and access to wider institutions of society are of paramount importance. They play significant role in enabling people to work together, extending people's access to and influence over other institutions, reduce transaction costs and

reinforce adherence to mutually agreed or commonly accepted rules, norms and sanctions (DFID 1999).

Physical capital represents the basic infrastructure and producer goods that people use to function more productively and support their livelihoods. In this regard, affordable transport; schools, secure shelter and buildings; adequate water supply and sanitation; affordable energy; and access to information (communications) are essential infrastructures for sustainable livelihoods (DFID 1999). Neefjes (2000) adds pasture planted with monoculture grass to this category. However, other producer goods owned at individual/household level are also important physical capitals for they enable individuals or households pursue various livelihood strategies and also contribute to the functioning of other livelihood capitals.

Financial capital refers to the financial resources that are available to people in pursuit of their livelihood strategies and outcomes. It comprises savings (that can be held in several forms: cash, bank deposits or liquid assets such as livestock and jewellery), access to credit services and inflows of money such as pensions, or other transfers from the state, and remittances (DFID 1999, Neefjes 2000). Since it is the most versatile among the five categories of assets, it can be easily converted in to other type of capital and even can be used for direct achievement of livelihood outcomes. Unfortunately, this asset is the one that is least available to poor people (DFID 1999, Ellis 2000).

Natural capital represents natural resource stocks from which resources useful for livelihoods are derived. In this regard, atmosphere, trees, land, rivers, wells and so forth are important natural capitals. Beyond providing a livelihood base to those who derive all or

part of their livelihoods from natural resource-based activities (farming, fishing, gathering in forests, mineral extraction, etc.), they provide environmental services that are indispensable for continued functioning of complex ecosystem (DFID 1999) which in turn affects their livelihood capitals in many ways.

2.2.3. Transforming structures and processes

The transforming structures and processes represent institutions, organizations, policies and legislations that determine access to the five different types of capitals, terms of exchange between the different types of capital and the economic and other returns from livelihood strategies. They significantly facilitate or hamper access to assets, development of livelihood strategies and even livelihood outcomes (DFID 1999). The feedback arrow from transforming structures and processes to vulnerability context in figure 1 suggests the possibility that policy changes and collective actions of governments can influence non-natural trends and shocks though people cannot directly influence those contexts (Neefjes 2000).

2.2.4. Livelihood strategies

Livelihood strategies are the combination of activities that people choose to undertake in order to achieve their livelihood goals (DFID 1999). While discussing the strategies, Ellis (2000) indicated that livelihood strategies are composed of a variety of natural resource based and non natural-resource based activities that ultimately have effects on livelihood security and environmental sustainability. Therefore, given the influences of the vulnerability context, transforming structures and processes and assets in their disposal, rural households pursue one or combinations of these livelihood strategies.

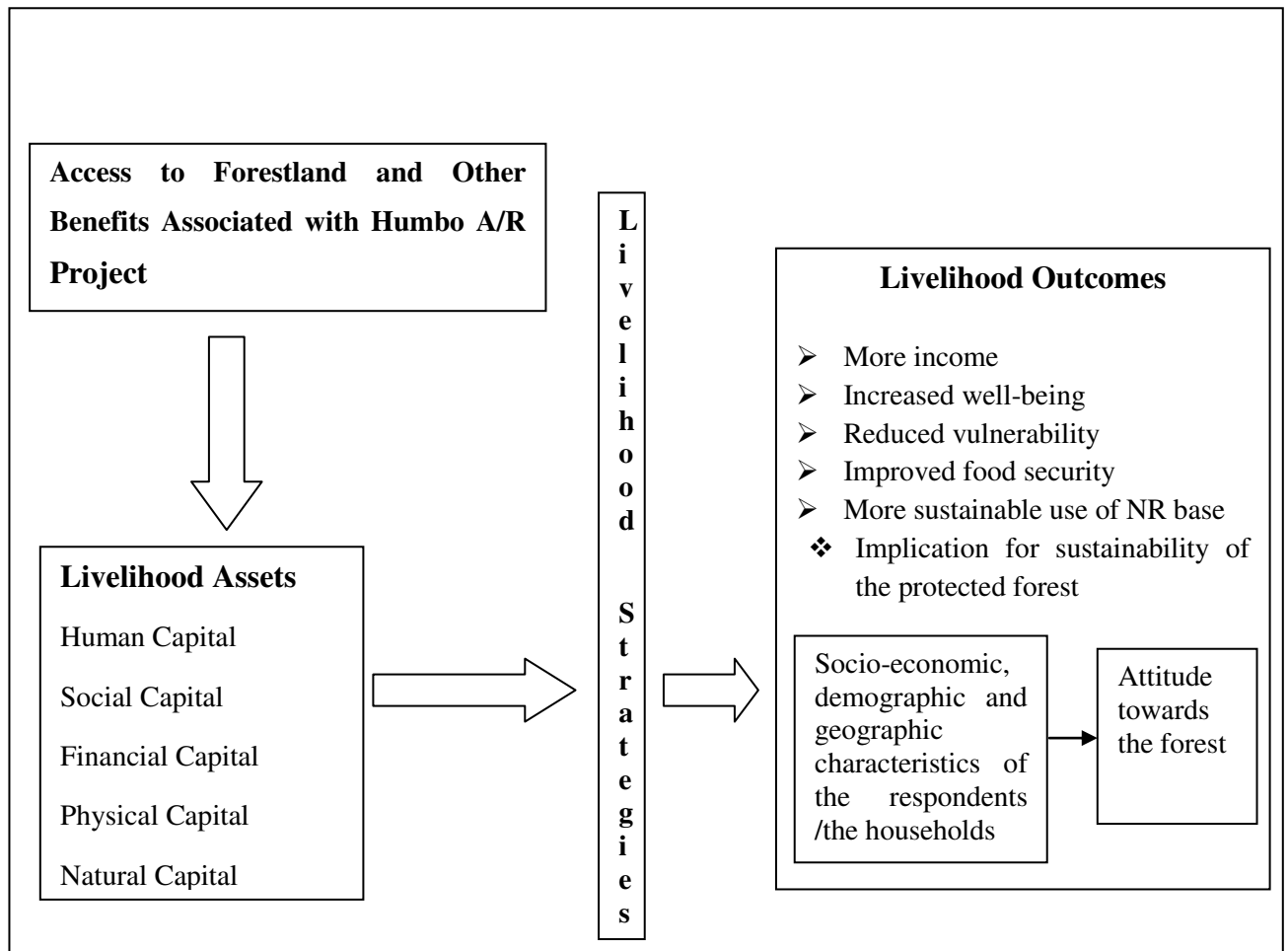
2.2.5. Livelihood outcomes

Livelihood outcomes are the overall aims of certain social actors. They are the achievements of livelihood strategies, such as more income, increased well-being, reduced vulnerability, improved food security and a more sustainable use of natural resources (DFID 1999, Ellis 2000, Neefjes 2000). Apart from being influenced by livelihood strategies pursued by households, in some cases they may directly be influenced by transforming structures and processes as shown in figure 1.

In a nutshell, the framework shows that accessing the asset categories and combining them to achieve livelihood outcomes is influenced by the prevailing transforming structures and institutions and the vulnerability contexts in which a household finds itself. It also shows the backward influence of livelihood outcomes on livelihood assets.

However, DFID (1999) explicitly indicates the possibility of making minor changes to the framework as well as focusing on any part of the framework, while keeping the wider picture in mind. Accordingly, the following very minor change has been made on the framework in order to meet the needs of the present study (i.e. to study the impacts of Humbo A/R CDM project on local people's livelihoods).

Figure 3. A framework adapted for assessing the livelihood impact of Humbo A/R



Therefore, the above framework for livelihood analysis is adapted from DFID (1999) in order to make it suitable for assessing the livelihood impact of Humbo A/R project and benefits associated with it. In this regard, the emphasis of the present study was on the impacts of the changes in access conditions to forest products and other benefits associated with the A/R project on the livelihood assets, livelihood strategies and livelihood outcomes of the stakeholder households and communities as indicated by the bigger arrows in figure 2. Since Aynalem (2012) has comprehensively revealed the transforming structures and processes, and vulnerability contexts influencing access to forest resource and other benefits associated with the project, the present study hasn't focused on these issues. The

transforming structures and processes, and the vulnerability contexts revealed by Aynalem (2012) will be discussed later under ‘empirical literature’ section of this chapter.

2.3. Empirical Literature

2.3.1. The importance of forest resources in the livelihoods of rural households

The contribution of natural resources to the livelihoods of rural people has long been appreciated as significant. A growing body of literature (e.g. Gibson, McKean and Ostrom 2000, Ellis and Freeman 2005, Homewood 2005, Coad et al 2008, Alemayehu 2010, Yemiru et al. 2010, Aynalem 2012, Yasuoka et al. 2012) evidence that people living in forest environments depend on forests for varieties of forest products. Such dependence on forest resources is substantial particularly in developing countries since it is for both subsistence and commercial needs of communities in and around the forests.

Where people have relatively unrestricted access to forests, forest products and incomes from forest products are often particularly important for poorer groups. Poor rural families depend heavily on wild resources. For instance, World Bank (2008) indicated that in both forest-poor and forest-rich contexts, forest products are used for fuel wood, fodder, food, medicines, building materials, fertilizers, and so on. Furthermore, many of the tools the farmer needs to work the land or harvest its bounty have their origin in the forest – it is a cheaper option than going to the market place (Shimizu 2006). Apart from domestic use of forest products, the poor also use forest as an important source of cash income. For instance, it has been indicated by World Bank (2008) that 10–25 percent of incomes for smallholders living in forest margins in diverse parts of the world come from non-timber forest products.

In Ethiopia, too, many common forest areas provide a variety of resources such as firewood and small timber, animal fodder, green manure and various fruits and medicinal products for subsistence purpose at free of cost. They are also important sources of cash income and employment for the rural poor. A great number of wood and non-wood forest products, including building materials, wood-based fibers, furniture, foodstuffs, medicines, household utensils (e.g. baskets, mat) and agricultural implements are supplied to local and in some cases national markets (Demel 2001, Kasahun 2008, Alemayehu 2010). For instance, Yemru et al. (2010) indicated that cash income generated from non timber forest products constituted more than half of the total cash income of households in Bale highlands, except for the top quintile class (i.e. the rich). This figure is double to the average cash income derived from forest resources in sub-Saharan Africa. Therefore, it is indicative of the fact that dependence on forest is relatively strong in the country.

There is a growing recognition in literature that forest resources are much more important to some social groups than to the others. Studies (e.g. Byron and Arnold 1999, World Bank 2008) revealed that the poorest rural households, women and children are generally most forest dependent and they obtain a major share of their subsistence from a diverse set of forest products. Yemiru et al. (2010) also indicated that female-headed households earn significantly higher income from charcoal and other forest products. In the same vein Aynalem (2012) also revealed that income from forest resources are independent income sources for women in Humbo, with which they can purchase whatever they want independently of their husband's decision. This fact implies that these social groups are likely to be the primary losers if their access to the forest resources is compromised for one or another reason.

The importance of forest resources and cash income generated from them is more pronounced in times of crisis. In times of special hardship, and in the absence of a welfare state, the poor often look to the nearby forests and trees for the means to keep going. For instance, in countries where HIV/AIDs has taken a hold, forest foods can help keep families going when there are no longer enough healthy adults left to produce food (Shimizu 2006). In such instances, needy households consume forest foods and/or sell forest products thereby to purchase essential products from markets (Byron and Arnold 1997, World Bank 2008). In Ethiopia, Yemiru et al. (2010:76) indicated that during events like livestock loss, crop failure, and illness and death of family members, “increased sale of forest product was the only, main and part of coping strategies for 26%, 11%, and 4% of households with income crisis in Bale highlands respectively”. Therefore, forests form ‘safety net’ that enable the rural poor survive even in times of hardships.

Although Bryon and Arnold (1997) and Shimizu (2006) overemphasized the importance of forests for poor rural households and in times of crisis, people depend on forests even in normal conditions. For instance, World Bank (2008) indicated that people in sub-Saharan Africa depend on forests for both domestic and commercial purposes regardless of their wealth status in the community. This shows that depending on forest is not a livelihood activity that is left to the poor alone, but an activity pursued by wealthier community members as well in order to accumulate capital.

Forest resources play more than the role of natural capital in the livelihood of rural people, particularly the poor. For instance, they contribute to human capital by providing a range of goods such as forest foods and traditional medicines that improve health. Furthermore, the sales of forest products provide cash income that enriches the financial capital base of

households. In turn, households use such cash incomes to educate children, for trading activities and to purchase inputs for other productive activities thereby improves all other asset portfolios of the households (Byron and Arnold 1999 cited in Mahanty et al. 2006). In a nutshell, incomes from forest products provide the poor with financial capitals that the poor lack most and by doing so, they enable the poor to build other capital categories.

Therefore, given the above strong linkage between the livelihoods of rural households and forest resources in their vicinities, disentanglement of conservation practice on forests from local livelihood realities may detrimentally affect the life of people in forest margins.

2.3.2. The emergence and operation of A/R CDM projects

The atmospheric concentration of Green House Gases and several detrimental effects associated with it have recently attracted the attentions of global communities. The United Nations Framework Convention on Climate Change (UNFCCC) and the subsequent Conferences of Parties (COPs) raised the level of concern about stabilizing greenhouse gas concentrations in the atmosphere to avoid climatic calamities. Consequently, in Kyoto Protocol of 1997, parties accepted legally binding constraints, which legally committed some industrialized countries to reduce their green house gas emission by an average of 5.2% relative to the 1990's level (Smith and Scherr 2002, Maraseni et al. 2005).

Under the Kyoto Protocol developing countries are not obliged to reduce their GHG emissions, where as industrialized countries have to fulfill such targets through either of the three flexibility mechanisms namely: international emissions trading (IET), the clean development mechanism (CDM) and joint implementation (JI) (Maraseni et al. 2005, Streck et al. 2008, UNFCCC 2010). Among the three flexibility mechanisms, it is only the

CDM that is related to the developing countries. The CDM is intended to help the industrialized countries to meet a portion of their emission reduction at lower cost by either purchasing carbon offsets that were generated through CDM-registered projects or by initiating CDM projects in the developing countries. In addition, according to the protocol, CDM projects are geographically limited to non-industrialized countries in order to achieve its second objective of helping developing countries in achieving sustainable development (UN 1998). Here emerges a big question on the CDM projects' possibility of simultaneously attaining two almost opposing objectives of conservation and development.

Afforestation and Reforestation (A/R) has been recognized by UNFCCC as one of the 15 sectors that are eligible for CDM in the first commitment period (i.e. 2008-2012) (Maraseni et al. 2005). Like any other CDM projects, A/R CDM projects are also aimed at helping the industrialized countries in attaining their GHG emission reduction targets and supporting the developing countries in achieving their sustainable development goals. To this end, as World Bank BioCarbon Fund Unit (2011) indicated, the A/R projects are involved in direct human induced conversion of previously unforested land to forested land; reforestation of historically forested land; and assisted natural regeneration of degraded forests by controlling animal grazing and human exploitation.

As A/R projects bring about land use change in the areas where they are implemented, the projects undeniably bring about a change in locals' access to that specific natural resource regardless of its prior state. In addition to the initial land use change that is associated with A/R CDM projects, the disentanglement of the local people from forest resource is inevitable once after the regeneration and protection of the forestland under consideration. In this regard, Streck et al. (2008) indicated that the mature forests need to be left intact so

as to serve as alternative reservoirs for carbon dioxide which in turn demands imposition of restrictions on access to forest products by locals.

Since the adoption of Kyoto Protocol in 1997, there has been an increasing worry that valuing of carbon sequestration over other benefits derived from forests would negatively affect the livelihood of stakeholder local people's livelihoods. In this regard, the basic argument of CDM is that any cost incurred by the stakeholder communities would be compensated by the environmental services and financial benefits resulting from A/R project activities (World Bank BioCarbon Fund Unit 2011). However, the potential of the claimed financial inflows generated by the CDM projects to significantly contribute to the livelihoods of local people has become a subject of debate. The next section discusses controversies existent in the literature of development and conservation with regard to the livelihood impacts of protected area projects.

2.3.3. The impacts of A/R CDM projects on the livelihoods of rural people

Majority of the published studies concerning the impact of CDM projects on local livelihoods are based on Project Design Documents (PDD) analysis that only talks about the potential impact than the actual ones. In this review, however, maximum effort has been made to incorporate literature that are based on empirical researches conducted after the implementations of CDM projects though limited in number.

Studies (e.g. Streck et al. 2008, World Bank Carbon Finance Unit 2011) indicate the inevitability of A/R CDM projects to take into account the contribution to sustainable development as important objective of the project in order to ensure the sustainability of the forest management. The success of forest carbon initiatives depends on the active

participation of local farmers and communities, which in turn depends on the benefits that the local farmers derive from their participation in the projects (World Bank Carbon Finance Unit 2011, Romero et al 2013). This shows the protection of the forest should be accompanied with satisfying the immediate needs of nearby communities. Thus, it underlines the contribution made by A/R CDM projects to the livelihood of the participating community as a necessity in order to ensure the sustainability of carbon sequestration.

The contribution of A/R CDM projects to the livelihood of the forest dependent communities is widely argued. Unlike their contribution to reduction of carbon dioxide from the atmosphere, the scanty available literature on the issue disclose mixed, and in some cases contradicting, results concerning their contribution to sustainable development in host countries. For instance, World Bank Carbon Finance Unit (2011), in reporting insights from the BioCarbon Fund's seven years of experience in designing and implementing 21 A/R CDM projects in 16 developing countries, indicated that A/R projects can contribute to the Millennium Development Goals by alleviating poverty and promoting the socioeconomic development of rural areas. In this regard, it enumerates the contributions in terms of strengthening the natural capital of rural communities participating in projects by recovering severely degraded lands, protecting water resources, and conserving biodiversity; strengthening the social and financial capital of communities through revenues from the sale of carbon credits and other forest products, from short- and long-term employment opportunities created by the project.

There are studies that disclose findings that take another side of the argument. For instance, Brown et al. (2010) indicated that although CDM holds considerable potential for

realization of sustainable development benefits, it has been criticized recently for failing to deliver projects that offer high level of sustainable development. Winkler et al. (2011) also indicated that in CDM projects much attention is given to emission reduction than that of sustainable development goals of host countries even at the very time of designing the modalities and procedures of the projects. In a similar vein, by assessing the potential contribution of some CDM projects, Sutter and Parreno (2007) concluded that the trade-off is in favor of cost efficient emission reduction objective than that of contributing to the sustainable development goal of the developing countries. From this one can note that in designing as well as implementing the CDM projects, primacy is given to carbon sequestration than that of contributing to the immediate livelihood needs of local communities.

Some of the ways the PDDs of A/R CDM projects claim to contribute to sustainable development of host countries is through revenues from the sale of carbon credit and through short and long-term employment opportunities. However, Sutter and Parreno (2007) indicated that A/R CDM projects have minor effect on employment in host countries. This shows that promises included in A/R CDM project's PDD to improve local livelihoods are of a little weight when they are actualized.

In Africa, A/R CDM projects are very few in number and studies on them are very scanty. However, in existing limited study, negative impacts of the projects overshadow the positive ones. For instance, Jindal et al. (2008), in analyzing potential benefits and challenges of forestry based carbon sequestration projects in 14 African countries, indicated the potential of the projects to offer a win-win opportunity for economic development and environmental protection and restoration. However, they indicated that in

short term the projects offer nothing in the way of benefits to local communities and may even harm them by restricting access to natural resources or competing for scarce groundwater.

The detrimental impacts of forest enclosure are not evenly distributed among the communities where they are implemented. Instead, they disproportionately affect the most forest dependent and marginalized groups. For instance, it led to interim shortfall for the most forest dependent households in Nepal as degraded forests required some years of restricted use to be productive again (Dev et al. 2003). Similarly, in India, it was indicated that poorer households and children paid the cost of protection during the regeneration period by travelling longer distances to collect firewood; while the richer households were able to cope with firewood collection restrictions by purchasing supplies (Sundal 2000 cited in Smith and Scherr 2002).

In Mid-term evaluation report of Humbo community managed forestry, WVA (2011) claimed that the establishment of local forestry cooperatives, the provision of some inputs to assist change in the livelihood of local people, creation of employment opportunities and generation of income from the sell of carbon credit as major economic and social outcomes of the project. However, the wider impact of the claimed benefits on the livelihoods of local people has not been studied. An attempt made by Aynalem (2012) to study Humbo A/R project was limited to investigating participation and partnership in the A/R Project. Though Aynalem (2012) was not primarily concerned with revealing the livelihood impact of the project, it has adequately exposed several important issues that could be taken as transforming structures and processes, and vulnerability contexts that influence the

livelihood of communities in general and access to forest resources and benefits associated with the project in particular.

Among others, Aynalem (2012) identified various levels of government ranging from Kebele Administrations to Federal Environmental Protection Authority; organizations like local cooperatives, World Vision Ethiopia, World Vision Australia and World Bank; institutions like land tenure, global carbon market; laws like federal and regional land proclamations and by-laws of cooperatives that are worth mentioning transforming structures and processes influencing the livelihood of people of the area in one way or another. Furthermore, the study has identified some factors that can be included in vulnerability contexts. For instance, shocks such as recurrent drought, forest fire, and conflict over forest resource and trends such as rapid population growth, diminishing land size and deteriorating soil fertility, deterioration of forest stocks in the area and seasonality of forest resource availability were identified by the study.

2.3.4. Coping strategies adopted by forest dependent communities during the regeneration periods

Regeneration of degraded forests requires enclosing of forest land and consequently imposes restrictions on access to forest resources to allow the recovery of the degraded areas. In this regard, poorer households which had traditionally relied more heavily on common property resources will suffer disproportionately in the short run (Dev et al. 2003). Mahanty et al (2006) also indicated that such sudden restrictions to common pool resources significantly increased the vulnerability of the poor since they tend to be heavily dependent on common pool resources. It is obvious that households devise some mechanisms to cope

with such restrictions. However, there is a serious literature gap concerning the coping strategies adopted by households during the regeneration period of the degraded forests. But, it is necessary to review the ways people cope with restrictions on access to forest resources in general, though not in the context of A/R CDM projects. Doing so may give a clue concerning how people would cope with restrictions on access to forest products imposed by A/R CDM projects.

Gautam (2009) indicated that community forest users in Nepal that used to use fuel-wood some five years before the study, started to use Liquefied petroleum gas (LPG) instead, and limited the use of firewood for heating in winter and cooking feed for pet animals. Furthermore, the same study indicated that the restrictions triggered change in livestock ownership in terms of both quantity and quality. In the case of India, the poorer households were forced to travel longer distances for firewood collection, whereas, the richer ones purchased it from market (Sundal 2000 cited in Smith and Scherr 2002). In their study on Community Based Forest Management in few countries in Asia, Mahanty et al. (2006) mentioned migration to other area, increased indebtedness and taking children out of school as some of the responses. However, they underlined that the households' responses to such restrictions are often goes unnoticed.

In Ethiopia, studies are scanty concerning the mechanisms people adopt to cope with shortage of forest products when such restrictions, as in the case of A/R CDM projects, are imposed. However, it is imperative to look at how households coped with such shortages in areas where once area closure had been undertaken for reforestation activity. Alemneh (1990) indicated that shortage of grazing land due to area closure for reforestation resulted in enormous livestock pressure on the most productive crop land and exposed it to more

degradation. Demel (2001) also argued that as fuel wood scarcity grows worse, women and children had to collect fuel wood from more remote places and substitute more dung and crop residues for household fuel in “wood famine” areas of Ethiopia. He further indicated that in the intensively farmed rural areas as well as in the drought-prone areas of the northern and the eastern part of the country, cattle dung has already replaced wood as primary sources of household energy. In agreement with Alemneh (1990), Demel (2001) concluded that such kinds of shifts in source of domestic energy led to a reduction in crop productivity. Therefore, in the history of the country, forest area closure was associated with unintended detrimental impacts on the livelihood of surrounding community in general and agricultural productivity in particular.

The perceived costs and benefits of area closure by nearby communities in turn significantly influence their attitude towards forest protection and thereby determine the life span of the resource under consideration. For instance, though not in the context of A/R CDM Projects, Yeraswork (2000:249) identified that among others “deficiency in the flow of tangible benefits to farmers” and “the farmers’ propensity for private and short term gains and their misgivings regarding communal and long-term undertakings” were causes for the foreseen unwillingness of community members to carry on with protection of hillside plantations induced on them.

Given drought proneness, small landholdings, high population pressure and recurrent food insecurity that characterize Humbo *Woreda* (World Vision 2006, Brown et al 2010, Aynalem 2012), and the resultant strong dependence of some community members on the forest products for fuel-wood, fodder, and charcoal for both consumption and selling (World Vision 2006, Aynalem 2012), an investigation on the impacts of A/R CDM project

on the livelihoods of local people and their corresponding attitude towards the protected forest is, therefore, very important for it contributes to the limited literature on the relationship between local people and carbon forestry projects.

CHAPTER THREE: RESEARCH METHODS

3.1. Introduction

In this chapter, the researcher begins with discussing the background of the study area and the project under consideration and then goes on to the detail research approaches and methods such as research design, sampling techniques, data collection tools and methods of data analysis employed in this study. Furthermore, it provides the detail of procedures of data collection, challenges encountered in the course of data collection and experiences acquired by the researcher.

3.2. Description of the Study Area

3.2.1. Geographical setting

Federal Democratic Republic of Ethiopia is composed of nine regional states and two city administrations. The research area is located in the Southern Nations, Nationalities and Peoples Region (SNNPR). Humbo *Woreda* (District), the research site, is one of the 12 *Weredas* in Wolaita zone, which is one of the thirteen zones of SNNPR. The *Woreda* is bordered by Soddo *Zuriya Woreda* in the north, Ofa *Woreda* in the west, Damot Woyde *Woreda* in the north-east, Dale *Woreda* of Sidama zone in the south-east and Boroda *Woreda* of Gamo Gofa Zone and Lake Abaya in the south. It is located 397 km South- West of the capital city Addis Ababa and 18 kilometers from Soddo, which is the administrative seat of Wolaita Zone. The *Woreda* is composed of 41 *Kebele* Administrations, of which 39 are rural and 2 are urban.

3.2.2. Climate

Humbo *Woreda* is located between 6.50 to 6.81° N Latitude and 37.57 to 38.04° E Longitude. When considered in terms of agro climatic zones, 11.11% of the *Woreda* falls under highland (*Dega*), 27.77% falls under mid-highland (*Woina-Dega*) and the remaining 61.12 % falls under lowland (*Kolla*). Mean annual temperature of the *Woreda* is 22.0°C and mean annual rainfall is 1123.15 mm. With regard to highest and lowest places in the area, the largest mountain in the district is Solko Mountain which has a height of 2335 meters above sea level. The lowest area in the district is found in the south east along Lake Abaya, the largest rift valley lake, where altitude is less than 1100 meters above sea level (Wolaita Zone Finance and Economic Development Department 2013).

3.2.3. Population and economy

According to Wolaita Zone Finance and Economic Development Department (2013), the total area of Humbo *Woreda* is 859.4Km² and had a population of 144,739 of which 72,729 were male and 72,011 were female in the year 2013. Out of the total population of the district, only 7,897 were urban dwellers and the rest 136,842 were rural. This shows that the inhabitants of Humbo *Woreda* predominantly live in rural areas.

The population of Humbo *Woreda* consists of different ethnic groups, though the overwhelming majority of the inhabitants belong to Wolaita ethnic group. The beginning of settlement scheme in Abela area of the *Woreda* and the establishment of modern mechanized farm in Abaya in the 1960s contributed to ethnic diversity in the *Woreda*. Thus, the inhabitants of Humbo *Woreda* include among others Wolaita, Amhara, Sidama, Gamo, and others (Bisrat 2011).

With regard to economic activities, like the other *Woredas* of Wolaita Zone, agriculture (mainly crop and livestock production) is the most important economic sector in Humbo *Wereda*. The main crops produced in the *Woreda* are cereals such as maize, sorghum, *teff*, haricot beans; cash crops like coffee; root crops like sugar potato, *Enset*, and onions; and fruits like banana, mango, avocado and others (Wolaita Zone Finance and Economic Development Department 2013). However, due to severe soil erosion, fragmented land size, and erratic rainfall, crop production has been negatively affected (WVE 2006, Bisrat 2011, Aynalem 2012). In the *Woreda*, farming is mainly rainfall dependent though inhabitants around rivers like Hamassa and Bilate and Lake Abaya use irrigation system. Livestock (e.g. cattle, sheep, goat, poultry, and donkey) has also important place next to crop production in the economy of the inhabitants of the *Woreda*. Furthermore, other economic activities like handcraft industry, trade and others also play important role in the life of the inhabitants of the *Woreda* (Bisrat 2011, Wolaita Zone Finance and Economic Development Department 2013).

Humbo *Woreda* recurrently experiences food shortages. Poverty, hunger and increasing demand for agricultural land have driven local communities to over-exploit forest resources. Consequently, tree cutting for fuel-wood, charcoal making and construction material supply are livelihood activities of last resort that some people rely on to compensate periodical food shortages created by decline in agricultural production in the area over long period of time. Before the introduction of the A/R project by World Vision Ethiopia, resource poor households in the area significantly relied on the forest in order to get some forest products for the aforementioned livelihood activities. And such dependence

on forest has been aggravated by recurrent food insecurity that affects the inhabitants of the area (Elias 2006, WVE 2006).

3.3. Description of the Project

In 2006, Assisted Natural Regeneration project was introduced to a mountainous Humbo District of South Western Ethiopia. The Humbo Community Managed Natural Regeneration (CMNR) Project was based on a partnership between World Vision, the World Bank, the Ethiopian Government and the Humbo communities. The project area falls in seven *Kebeles* of Humbo *Woreda*: Abela Gefeta, Abela Shoya, Abela Longena, Bola Wanche, Bossa Wanche, Hobicha Bada and Hobicha Bongota (WVE 2006). The goal of the project is “to regenerate 2,728 hectares of previously degraded forest land with the aim of enhancing the local communities’ livelihoods through improved environmental conditions as well as financial inflows to be achieved through linkages with carbon markets” (WVA 2011:4). Accordingly, the area was closed to both human and animal intruders in 2006. The project interventions include: protecting areas that still have live stumps and remnant trees to foster natural regeneration; planting of both indigenous and naturalized tree species in open areas where there are poor stumps and soil seed banks and implementing forest management practices such as thinning, pruning, coppice reduction, livestock and fire management (WVA 2011, Biryahwaho et al 2012).

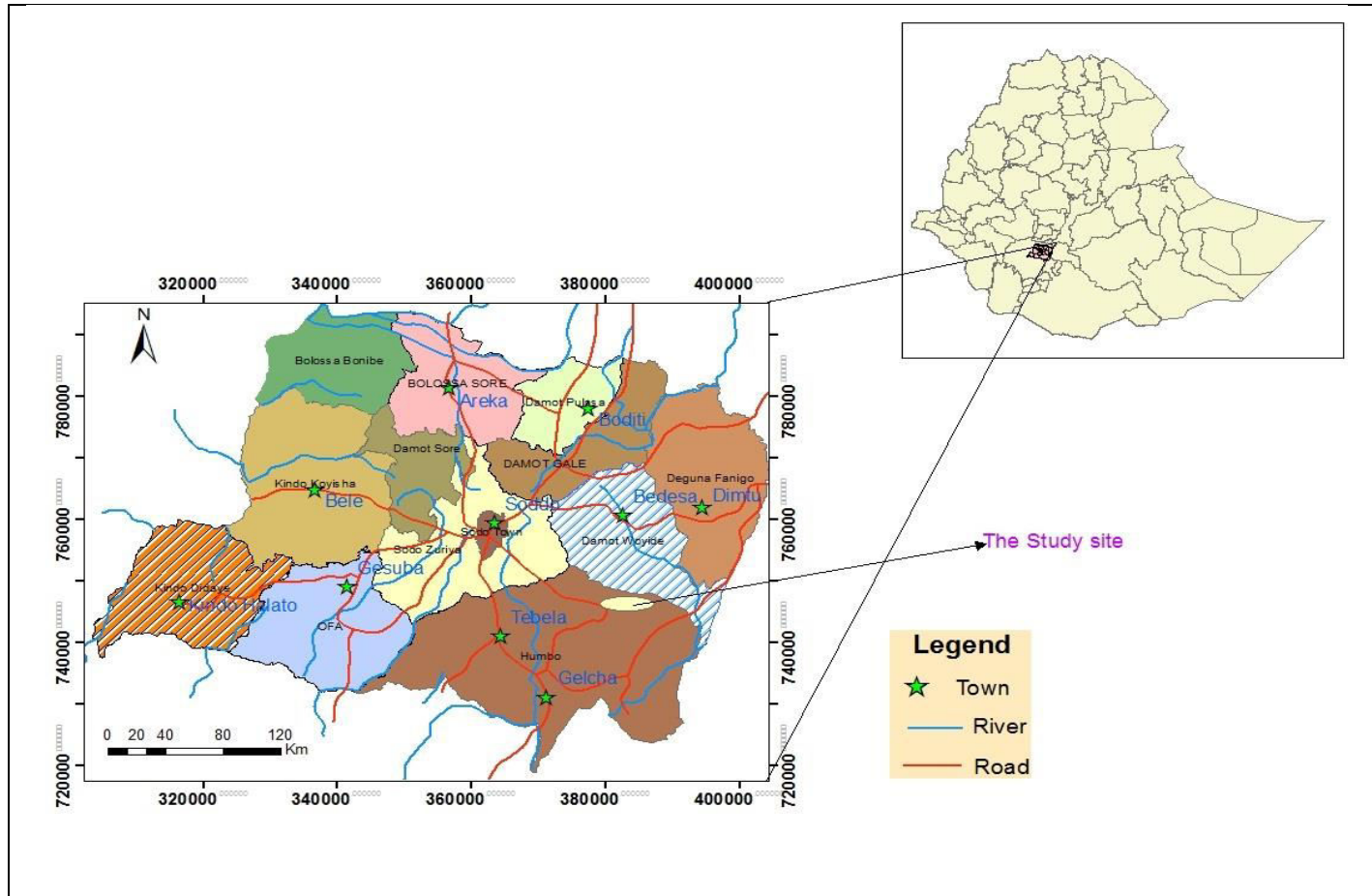
As made explicit by WVA (2011:5), the specific objectives of the project include:

- Community management of public land with multiple objectives of promoting natural resource management, poverty alleviation and biodiversity enhancement.

- Piloting CDM methodologies for GHG removal by carbon sinks through reforestation.
- Establishing legal frameworks and local institutions for forest ownership and management.
- Improving the area's hydrology to reduce erosion and improve the quality of downstream farm land.
- Creating opportunities for non-destructive forest activities such as apiculture and eco-tourism.
- Delivering immediate community benefits such as improved forage for animals and bee keeping.

To achieve the aforementioned objectives, international, national and local actors such as local forestry cooperatives, WVE, WVA, World Bank and Ethiopian government are working in partnership. In this regard, seven community forestry cooperatives were formed; nurseries for the production of seedlings were established; bylaws and internal law to govern the regeneration process were developed. Furthermore, emission reduction purchase agreement was signed with the carbon buyer i.e World Bank for 165,000t CO₂ reduced over the first ten years period out of 880,295t CO₂ expected to be reduced over 30 years time (Biryahwaho et al 2012).

Figure 4. Map of the study area



3.4. Research Design

This study employed a cross-sectional research design in order to obtain data concerning the issue under study. A cross sectional design entails a collection of data at a single point in time from a sample selected to describe some large population at that time (Bryman 2004). Since the aim of this study was a single-time description of the issue under investigation (i.e. describing the coping strategies adopted by households to make up forest product loss they were encountering, the impact of the A/R project on their livelihoods, and the association between certain demographic and socio-economic characteristic of

households and the attitudes of household heads towards the protected forest at the time of this study), cross sectional design is the most appropriate one.

3.5. Research Approach

The researcher employed a mixed methods research (i.e. both quantitative and qualitative approaches) for this study. Mixed methods research refers to “the employment by social researcher of more than one method of research in order to build up a fuller and more comprehensive picture of social life” (McNeill and Chapman 2005:23). “Triangulation is a way of assuring the validity of research results through the use of different research methods and approaches” (Yeraswork 2010:66). Furthermore, it has an “additional advantage of allowing the researcher to cover different aspects of his or her research objectives by employing different sources of information, data and methods” (Yeraswork 2010:66). McNeill and Chapman (2005) and Creswell and Clark (2011) also highly recognize the aforementioned dual functions of triangulation in social research.

Therefore, the rationale for triangulating data sources and methods in this study was primarily to address various aspects of the research objectives (i.e. to describe the impact of A/R project both at household and community level). Furthermore, it allows the researcher to validate data obtained from key informants concerning some community level impacts of the project such as impacts on community level human, social, physical, financial and environmental capitals.

3.5.1. Quantitative approach

Quantitative research “usually emphasizes quantification/numbers and measurement in the collection and analysis of data” (Yeraswork 2010:30). In this regard, survey method,

census and most experimental research are categorized under this method. Survey method has been employed for this study. In a survey, information is gathered from a sample of a population “through written questionnaires that either respondents fill out themselves or enumerators fill out for them in the course of face-to-face interview” (Yeraswork 2010:134). In this regard, survey is preferred by social researchers for it allows the gathering of large amount of information that can be used for descriptive and/or causal analysis purpose.

Therefore, the rationale behind employing a quantitative approach (i.e. mainly survey method) for a lion’s share of this study was that it allows the collection of some quantifiable data from sample households that could be used for both descriptive and causal analysis purpose. In this regard, household survey was employed to generate data concerning demographic, socio-economic and geographical characteristics of the households; the change in the households’ access to the forestland and the coping strategies they devised to deal with restrictions imposed on their access to forest products; the impact of the A/R project on the household’s livelihoods and the attitudes of household heads towards the protected forest.

3.5.2. The study population

The target population of this study was households that are affected by Humbo Community-based Natural Regeneration Project. The project area falls in seven *Kebele* administrations of Humbo *Woreda*. During the introduction of the project (i.e. 2006), forest user households were assisted by World Vision Ethiopia and Cooperative office of Humbo *Woreda* to establish forestry cooperative societies in their respective *Kebele*

administration. Consequently, one Forest Protection and Development Cooperative (FPDC) was established in each of the seven *Kebele* administrations in order to manage a designated area of the forest. For this study, out of the seven cooperatives, households in three cooperatives namely Bola Wanche Gamo Mt. FDPC, Bossa Wanche Kacha Mt. FDPC and Hobicha Badda Woyto Mt. FDPC were purposively selected as a population of this study. The rationale behind purposively selecting these cooperatives is that their relative proximity to Soddo town and possibility of getting transportation to the areas. Therefore, it is to save time and money. Non-members of forest development and protection cooperatives were not included in the study for they are not directly involved in forest management and therefore, are not the main beneficiaries of the claimed benefits associated with the project.

3.5.3. Sampling design and sample size

The study employed both probability and non-probability sampling techniques in the way to select sample households for survey. Probability sampling is a method of selecting sample in which each member of the study population has an equal chance of being selected as a study participant. Whereas in the case of non-probability sampling, each member of the study population does not have an equal chance of being selected as a participant in the study (Vanderstoep and Johnston 2009).

As said earlier, three out of seven forestry cooperatives were purposively selected. Having the list of member household heads of the selected cooperatives in hand, the researcher employed systematic random sampling technique in order to select household heads for survey. Systematic random sampling is a way of sampling in which every n^{th} item on a list

is selected. An element of randomness is introduced into this kind of sampling by using a random number to pick up the unit with which to start (Kothari 2004). Yeraswork (2010) indicated that it is more convenient to use as compared to simple random sampling technique. Therefore, for this study systematic random sampling was preferred over simple random sampling for it is simple and saves time of the researcher by allowing him to directly utilize the hardcopies of lists of households to select n^{th} household.

Accordingly, the list of household heads of each selected cooperative was obtained in order to make the final selection of households by using a systematic random sampling. Considering the resources in hand, the researcher selected about 10 percent (i.e. 132 households) by picking up every 10th household in each list. Accordingly, 41 households from Bossa Wanche, 53 from Hobicha Badda and 38 from Bolla Wanche were selected for final data collection.

From the sample households, household heads (i.e. elder male or elder female) were contacted to respond to the questionnaire. In most cases, the household heads contacted were husbands except for female headed households. But where husband was absent for one or another reason, a female head (i.e. wife) was contacted and data concerning demographic and socio-economic characteristics of households; forest resource the households were denied access and their coping strategies to make up the loss; the impact of their involvement in the project on their livelihoods; and his/her attitude towards the protected forest was collected. Here, household heads were preferred over other members of their household with the assumption that they know better about the issues under concern for they directly participate in the A/R project.

3.5.4. Qualitative approach

Qualitative research “usually emphasizes words and meanings rather than quantification in the collection and analysis of data” (Yeraswork 2010:30). Among a number of qualitative methods, key-informant interviews and FGDs have been employed for this study.

Key informant interview has been used in order to generate data concerning the impacts of A/R project on community level assets. In this regard, by allowing the researcher to generate data concerning the impacts of regeneration and protection of the forest and other benefits associated with the project on the human, social, financial, physical and natural capitals of the community, this method contributes to presenting the fuller picture of the impact of the project under investigation.

The key informants of this study were selected on the base of their specialized knowledge of the issue under investigation. Accordingly, based on the suggestion of the chair person of each cooperative, one key-informant from the executive committee of each FDPC was selected. Here, the basic assumption behind selecting key-informants from the executive committee than the ordinary members of the forestry cooperatives was that the former would be more knowledgeable with regard to the project’s impact due to their position. In addition to the main key informants, the researcher contacted one additional key-informant from Bossa Wanche to get basic information about the history of forestland management prior to the introduction of the A/R to the area. Here, the need to add an older key-informant arose when the three main key informants selected from executive committees of the cooperatives failed to tell the history of the management of Humbo forest.

Focus Group Discussion was another qualitative method employed in this study for two main reasons. First, to supplement and substantiate data that was obtained from key-informants with regard to the community level impacts of the project. Second, to generate additional data on household's coping strategies that may remain obscured during household survey. Therefore, this method was used both to supplement and to substantiate data collected through household survey and key-informants interview respectively.

Participants for FGD in each of the site were recruited giving special place to the number of years they spent in forest protection cooperatives. In this regard, persons who have been members to the cooperative since its very establishment were selected as participants of focus group discussions. The rationale behind selecting senior members was that they know better about the changes on community level assets resulted by the project than the new members. One focus group discussion was conducted in each of the site. In all cases, the group was composed of six members of which four were men and two were women. Here, the number of participants in each group was limited to only six for the questions covered were a bit lengthy.

3.6. Sources of Data

Since this study was aimed at investigating the issue under concern from the perspectives of the communities involved in the rehabilitation and protection of Humbo forest, the main source of primary data were household heads involved in the activity. Similarly, key informants as well as participants of focus group discussions were from the households that are members to cooperatives managing and protecting the forest. In a nutshell, this study

entirely depended on primary data collected from households affected by Humbo A/R CDM project.

3.7. Data Collection Instruments

The following three major data collection tools were employed in order to gather the relevant data from the households and communities affected by the A/R CDM project.

3.7.1. Questionnaire

In order to collect data from sample household heads concerning demographic and socio-economic features of the households/household heads; forest resources the households are denied access due to the current management system of the forest; the coping strategies they devised to make up forest resource loss; the impacts of regeneration and protection of the forest and benefits associated with the A/R project on their livelihoods and the household heads' attitude towards the protected forest, a structured questionnaire was prepared. The questionnaire generally had four parts. The first part of the questionnaire asks about the demographic, socio-economic and geographic information of respondents and their households. The second part of the questionnaire is about the forest products the households were denied access and the coping strategies they devised to make up the losses they encountered due to the A/R project. The third part asks about the impacts of the project on the livelihood assets, livelihood strategies and livelihood outcomes of the households. And the final part measures the attitude of the respondents towards the regenerated and protected forest.

The survey instrument was pre-tested before it was administered to the sample household heads. The pre-testing has been conducted on 10 individuals in Kokate and Delbo Wegene

Kebele administrations of Soddo *Zuriya Wereda* where similar A/R project was under implementation. Based on the pre-testing, the survey instrument was corrected by adding, deleting and/or rephrasing some items. Then, the corrected survey instrument was administered to the respondents through face-to-face interview. Here, the rationale for employing structured face-to-face interview instead of respondent administered questionnaire is that the former allows the collection of data from respondents who are not capable of reading and writing. The detail procedure of data collection is discussed in the next section.

3.7.2. Key informant interview

This data collection method was used to generate data from key informants concerning the impact of regeneration and protection of the forest and other benefits associated with the project on community level assets. Totally, four key informants were contacted. As said earlier, one key informant was selected from the executive committees of each FDPC. One additional (i.e. the fourth) key informant was selected from community elders. Except the interview with the community elder, the other three interviews were conducted in the office of the respective FDPC and each took 45 to 60 minutes. The interview with the community elder was conducted in his own home and took 32 minutes. Except the community elder who refused to receive the incentive, the key informants from each cooperative were compensated for the time they spent with the researcher during the interview as well as assisting other important activities.

3.7.3. Focus group discussions

Group discussions were employed to generate qualitative data to supplement and substantiate data obtained from key informants. Furthermore, it was used to generate additional data concerning households' coping strategies to forest resource losses due to protection of the forest. In this regard, it was used with an assumption that it would reveal some coping strategies that might remain hidden during household survey due to some reasons. All focus group discussions were conducted on Sundays afternoon (i.e. three Sundays for three FGDs) in the compound of their respective *Kebele* and each took more than an hour. The discussions were held in the local language (i.e. Wolaitegna) and were facilitated by the researcher himself.

3.8. Procedures of Data Collection

Before directly starting collection of the required data, the researcher has consulted and gave the letter of cooperation given by department of Sociology of AAU to Humbo *Woreda* Administration. Up on the request of Humbo *Woreda* Administration office, the office of Agricultural and Rural Development of the *Woreda* issued a letter to the researcher which officially allows the research in the area and requests the cooperation of the concerned *Kebele* administrations and FDPCs. Furthermore, the researcher gave similar letter of cooperation to World Vision Ethiopia, Humbo ADP and the manager communicated to the chair man of each FDPC through phone and thereby facilitated the researchers' contact to the FDPCs. After getting permission from the office, in the same vein, the researcher contacted some of the executive committee of each FDPC. Having convinced the leaders of each cooperative about the purpose of the study, the researcher

obtained data concerning the number and list of member households of each cooperative from respective FDPC office.

Having the list of households selected from each cooperative in hand, the researcher arranged days for actual data collection. The final data collection from the sample household heads consumed about two weeks (from 19th March to 4th April). The survey team consisted of the researcher and four other enumerators. Two of the enumerators were university instructors and close friends of the researcher. The other two were also first degree holders and having good experience in collecting data from rural settings. The researcher as well as the enumerators were fluent in the local language (i.e. Wolaitegna). Furthermore, all assistants were given adequate orientation by the researcher concerning ways of approaching the respondents and recording of the responses, and the informed consent of respondents.

The researcher with his assistants used various techniques to contact the respondents. Since the researcher as well as the assistants were new to the research sites, the researcher hired two men from each village to guide the data collectors to the selected household heads. Majority of the respondents were contacted at their home and on their farm. However, the researcher also used other opportunities like meetings of cooperative members and *Kebele* meetings to contact some respondents particularly those whose house is a bit far from the cooperative office. In such instances the researcher and his assistants made a good use of the time before and after the meetings to contact the respondents. In all this regards the contribution and commitment of the six local men (i.e. two men from each FDPC) was meaningful.

With regard to collecting data on community level impacts of the project, key informant interview was followed by focus group discussion in each of the site. The key informants were contacted in the office of their respective FDPCs. It was only one community elder from Bossa Wanche who had been contacted at his home. Here, focus group discussions were preceded by key informant interviews for doing so allows the researcher to substantiate the data obtained from key informants.

3.9. Field Challenges and Experiences

As a beginner, the researcher encountered challenges particularly while conducting the first FGD at Hobicha Badda. Though the researcher made a brief explanation about himself and the purpose of the study, initially the participants of focus group discussion seemed suspicious of the researcher. The researcher further assured the participants that he doesn't represent government or non-governmental organizations involved in the implementation of the project. As participants seemed uncomfortable with the camera in the hand of the researcher, the researcher stopped using it for recording the discussion and took field notes instead. The challenges encountered and experiences learned from the first FGD enabled the researcher to effectively conduct the subsequent focus group discussions at Bossa Wanche and Bolla Wanche.

During survey, the initial response of some respondents was a bit discouraging. Some said they were busy even before they were told the issue on which they are required to respond. However, as the researchers introduced the issue to them, some immediately turned willing to participate while some others said "comeback on afternoon". Despite the challenges, the researcher and his assistants managed to win the consent of all respondents.

Finally, difficulty to get public transport service particularly from Soddo town to Hobicha Badda due to the rainy season was another unforgettable challenge the researcher and enumerators encountered during the survey. As a result, for the last two days' data collection, the researcher arranged motorbikes from Soddo to Hobicha Badda and back to Soddo before nightfall which was a bit costly.

3.10. Methods of Data Entry and Analysis

The data obtained through quantitative method (i.e. household survey) were coded and entered into a Statistical Package for Social Science (SPSS version 20.0) for appropriate statistical analysis. Data concerning forest resources the households are denied access, the coping strategies they devised; and impacts of the regeneration and protection of the forest and other benefits associated with the project on the livelihoods of households were analyzed by employing univariate descriptive analysis.

Based on the levels of measurement of variables analyzed, correlation analysis was used to measure the associations between certain demographic, socio-economic and geographic characteristics of households/household heads and the household head's attitude towards the protected forest. In this regard, Pearson's r (i.e. Pearson's product moment correlation coefficient) was used to measure the association between independent variables at interval/ratio level of measurement (i.e. level of education and age of the respondents, size of agricultural land of the households and distance of the households from the forest) and household head's attitude towards the protected forest.

One-way ANOVA was employed to test whether there is a variation of attitude among respondents whose households get fuel wood and fodder from different sources.

As one-way ANOVA involves the analysis of one independent variable with more than two categories, it is an appropriate statistical method to be used in this regard.

Finally, qualitative data collected through key informant interview and focus group discussions were analyzed according to the main themes of interviews and discussions (i.e. impacts of the project on human, social, natural, financial and physical capitals of the community). Here, qualitative data collected concerning community level capital were analyzed separately as it is a separate specific objective of the study. Whereas, additional data generated through FGDs concerning coping strategies of households were simultaneously analyzed with survey data.

3.11. Limitations of the Study

Although the project covers seven *Kebele* Administrations of Humbo *Woreda*, this study was confined to only three cooperatives in the three adjacent *Kebeles* of the *Woreda*. Consequently, the findings of this study cannot be generalized to Forest Development and Protection Cooperatives that were not included in the study. The second limitation is the researcher's inability to sufficiently review literature concerning A/R CDM projects particularly concerning Ethiopian context due to lack of published studies on the issue.

CHAPTER FOUR: DATA ANALYSIS AND DISCUSSION

4.1. Introduction

This study was intended to disclose the impact of Afforestation/Reforestation Clean Development Mechanism Project on the livelihoods of local people and their attitude towards the protected forest. With regard to the project's impact on the livelihoods of stakeholder households, the study exclusively focused on households' livelihood assets, livelihood strategies and livelihood outcomes. Moreover, in order to present the fuller picture of the impacts of the project in the area, the project's impact on community level assets was also given equal attention.

The first section of the chapter presents the demographic, socio-economic and geographic characteristics of the respondents and their households. The second section identifies major changes in the households' access to forestland and their responses. The third and fourth sections of the chapter assess the impacts of the A/R project on the livelihood of households and community level livelihood assets respectively. The final section examines if there is a relationship between certain demographic, socio-economic and geographic characteristics of the respondents/their households and the attitude of the respondents towards the protected forest.

4.2. The Demographic and Socio-economic Profile of the Respondents

This sub-section of the chapter presents the demographic and socio-economic profile of the respondents and the households of this study. Doing so is very important for it makes clear the socio-economic situation of sample households of this study which in turn adds to our understanding of the livelihoods of the households under consideration. Furthermore,

discussing here the socio-economic, demographic and geographic characteristics of the respondents and their households makes possible the examination of associations between these variables and the respondents' attitude towards the forest that will be dealt in the final section of this chapter.

4.2.1. Sex of the respondents

Table 2. Distribution of respondents by sex

		Sex of the respondent		Total
		Male	Female	
The respondents' cooperative	Bola Wanche	60.5	39.5	100.0
	Hobicha Badda	83.0	17.0	100.0
	Bossa Wanche	87.8	12.2	100.0
Total		78.0	22.0	100.0

Source: Field data (March-April, 2014)

As shown in the above table, in terms of sex, 78% male and 22% female participants were involved in this study. This indicates that the overwhelming majority of household heads that participated in this study were male. This was perhaps due to the fact that household headship is culturally vested in male (i.e. husband) as most part of Ethiopia.

4.2.2. Age of the respondents

Table 3. Distribution of respondents by age

		Age of the respondents				Total
		Below 30	31-40	41-50	Above 51	
The respondents' cooperative	Bola Wanche	18.4	50.0	21.1	10.5	100.0
	Hobicha Badda	1.9	56.6	30.2	11.3	100.0
	Bossa Wanche	22.0	46.3	19.5	12.2	100.0
Total		12.9	51.5	24.2	11.4	100.0

The age distribution shows that the age of respondents ranges from 23-71 with more than half (51.5%) of the respondents falling in the age category of 31-40 years, about 24.2% in the age range of 41-50 years, about 12.9 % in the age range of 23-30 years and the remaining 11.4% were 51 and above.

4.2.3. The family size of the respondents' households

Disclosing the family size of the households under investigation is imperative for it informs us about the degree of the prevalent demographic pressure on productive resources and environmental assets of the households and communities under consideration. Moreover, it also shows some aspect of the livelihood assets of the households as the availability of labor is a constituting element of human capital of rural households.

Table 4. Family size of the households by cooperatives

		Family size			Total
		5 and less	6-10	11 and above	
The respondents' cooperative	Bola Wanche	26.3	63.2	10.5	100.0
	Hobicha Badda	17.0	69.8	13.2	100.0
	Bossa Wanche	24.4	73.2	2.4	100.0
Total		22.0	68.9	9.1	100.0

Source: Field data (March-April, 2014)

As shown in the above table, more than two-third (68.9%) of the respondents' households has a family size of 6-10 members, about 22% of the households have 2-5 members and the remaining 9.1% have even a larger family size of more than 10 members. The average family size is 7.33. From this it is evident that the study area is characterized by a large family size as more than three-fourth of households has more than 5 members. As Desalegn (2007) indicated, such noteworthy demographic stress in the area has resulted in small land size which he called 'micro-holdings and micro-agriculture'.

4.2.4. The educational background of the respondents

Educational status of individuals is an important component of human capital. On top of that, it influences the way people live in general and the world view of people concerning the surrounding environment in particular. Thus, the educational status of the household heads was considered in this study.

Table 5. Characteristics of respondents in terms of their educational background

		Educational background				Total
		Illiterate	Grade 1-8	Grade 9-10	Above 10	
The respondents' cooperative	Bola Wanche	23.7	47.4	18.4	10.5	100.0
	Hobicha Badda	24.5	49.1	17.0	9.4	100.0
	Bossa Wanche	9.8	51.2	26.8	12.2	100.0
Total		19.7	49.2	20.5	10.6	100.0

Source: Field data (March-April, 2014)

With regard to the educational background of the respondents, as shown in table 5 above, almost half of the respondents (49.2%) have obtained primary education; and about 31.1% obtained post-primary education. The illiterate constituted only 19.7% of the respondents. Here, the relatively high percentage of literate people may be related to the sex and age of the respondents (i.e. the overwhelming majority of the respondents were male and young adults); and the relative proximity of the study sites to *Woreda* and Zonal towns where schools are easily accessible.

4.2.5. The livelihood activities of the households

It is well recognized that the livelihood activities pursued by rural households are highly influenced by private and communal resources in their disposal. Accordingly, the livelihood activities of the households are undeniably affected when their access to the assets is affected. Therefore, disclosing the main livelihood activities of the households under study may help us in understanding the impact of the initiative on them.

Table 6. Distribution of the households in terms of their main livelihood activity

		Main livelihood activity of the respondent's household					Total
		Farming	Trade	Pottery	Civil servants	Others	
Respondents' forestry Cooperative	Bola Wanche	89.5	5.3	2.6	2.6		100.0
	Hobicha Badda	81.1	9.4	1.9	3.8	3.8	100.0
	Bossa Wanche	85.4	7.3		7.3		100.0
Total		84.8	7.6	1.5	4.5	1.5	100.0

Source: Field data (March-April, 2014)

The respondents were asked to rate the main livelihood activity of their respective households. As shown in the table above, in all of the sites farming (both crop production and livestock rearing) forms the main livelihood activity of the respondents' households. In average it forms the main livelihood activity of 84.8% of the households. Only 7.6% and 4.5 % were merchants and civil servants respectively. Pottery and other livelihood activities formed the main livelihood activities for the rest. In terms of main livelihood activity, therefore, there was an insignificant variation among the sample households as well as among the sites. Furthermore, it shows that the main livelihood activity of the overwhelming majority of the households is the one that is likely to be affected to lesser or greater extent by area enclosure.

4.2.6. The households' land holdings

Both farm and grazing land are undeniably the most important assets of the households as overwhelming majority of the respondents reported farming as the main livelihood activity of their households. Thus, farm size of the households was considered for it adds on our understanding of the livelihood assets of the households.

Table 7. Size of farmland held by the respondents' households

		Size of farmland				Total
		0.25 and less	Between 0.26 and 0.5 ha	Between 0.51 and 1 ha	Above 1 ha	
Cooperative	Bola Wanche	23.7	44.7	26.3	5.3	100.0
	Hobicha Badda	58.5	32.1	9.4		100.0
	Bossa Wanche	29.3	31.7	31.7	7.3	100.0
Total		39.4	35.6	21.2	3.8	100.0

Source: Field data (March-April, 2014)

As the above table shows, about three fourth of the sample households possess agricultural land measuring 0.5ha and below. About 21.2% posses agricultural land between 0.51 ha and 1 ha and only 3.8% possess agricultural land greater than 1 hectare. Though all sample households posses a piece of agricultural land, the average size of agricultural land owned by the sample households is very small (i.e. 0.51 hectare). This indicates that there is a severe shortage of agricultural land in the area though 84.8% of the respondents reported that their main livelihood activity is farming. As shown in the above table, there is a noticeable difference between the study sites in terms of farmland size possessed by the households. For instance, in the case of Hobicha Badda, the overwhelming majority of the

sample households (58.5%) possess farm land measuring below 0.25 hectare. This was perhaps due to the sub-urban nature of the community as the members of Hobicha Badda Woyto Mt. FDPC settled in outskirt of Hobicha Badda town. Possession of such smaller farm land in turn is likely to intensify the households' dependence on the forestland for one or more resources regardless of the status of the forestland.

With regard to the availability of own grazing land to the respondents' households, as household survey data indicates, little more than half (52.3%) of the respondents hold private grazing land. Whereas, the rest 47.7% of the respondents reported that they don't have own grazing land. Thus, the lack of own grazing land for noticeable number of households is perhaps one of the factors making the forestland important communal resource as livestock production is an important component of the main livelihood activity of 84.8% the households.

2.2.6. The households' distance from the forest

It is obvious that the distance of households from the forest areas to some extent influences the two way relationship between people and forest resources.

Table 8. Households' distance from the forest

		Distance from the forest			Total
		1 km and below	B/n 1.1km and 2km	Above 2 Kms	
Cooperative	Bola Wanche	39.5	44.7	15.8	100.0
	Hobicha Badda	45.3	28.3	26.4	100.0
	Bossa Wanche	39.0	34.1	26.8	100.0
Total		41.7	34.8	23.5	100.0

As shown in the above table, some 41.7% of households are located within 1 kilometer distance from the forest area. 34.8 % and 23.5% are located between 1.1 and 2 km and above 2 km distance respectively. This shows that the overwhelming majority of the sample households were located in the close proximity of the forest under consideration.

4.3. Changes in Access to the Forestland and the Households' Responses

As a key informant of this study has indicated, the forestland under consideration had been an open access resource until the time A/R project was introduced to the area (i.e. 2006). Consequently, the open access regime governing the utilization of the forestland allowed the surrounding individual households to use the forestland as they wanted to. Contrariwise, the recent introduction of A/R project to the forestland came up with restrictive regulations with regard to access to the forestland. Denial of access to historically open access resources in turn takes us to the issue of the responses of the concerned households to deal with the restriction. Therefore, in order to identify changes in access to the forestland, the researcher started with disclosing forest product utilization status of the concerned households in time immediately before the introduction of the A/R project to the study areas.

As data collected from sample households shows, 92.4% of the respondents reported that their households used to utilize forest products before the introduction of A/R project to the area. It was only 7.6% of the respondents that reported not to have depended on the forest under consideration for any forest product even prior to the restrictions imposed by the A/R project. This indicates that there existed a noticeable dependence of the surrounding households on the forestland.

Considerable change has been noticed in the households' dependence on the forestland after the introduction of the A/R project to the area. Only 21.2% of the respondents reported that their respective household currently uses forest product such as firewood and grass from the rehabilitated forest. Whereas, the rest 78.8% respondents reported that they no longer depend on the rehabilitated forest for any forest product as before. The above figure informs one that the households' dependence on the forest for various forest products has significantly declined after the introduction of the A/R project. Therefore, it is imperative to disclose the detail account of major changes in access to forestland and the coping mechanisms devised by the households.

4.3.1. Access to fuel-wood

It is well recognized that forests are very important sources of domestic energy in rural areas. In this regard, fuel wood is perhaps the most frequently used forest product by households inhabited in and around forests.

As the collected data shows, 90.2% of the respondents reported that their household used to depend on the forestland under consideration for fuel-wood immediately before the introduction of the A/R project in the study area. This indicates that fuel-wood was collected from the forestland by considerable number of households though the forestland was severely degraded.

However, such dependence of the households on the forestland for fuel-wood has been changed significantly after the introduction of the A/R project. Here, it is imperative to disclose the main source of fuel-wood for the households after the introduction of the project to the study area.

Table 9. The main source of fuel-wood for the households after the introduction of A/R project

		The main source of fuel-wood for the households			Total
		Own land	Protected forest	Market	
Cooperative	Bola Wanche	92.1		7.9	100.0
	Hobicha Badda	43.4	5.7	50.9	100.0
	Bossa Wanche	87.8	7.3	4.9	100.0
Total		71.2	4.5	24.2	100.0

Source: Field data (March-April, 2014)

As the above table shows, 71.2% of the respondents reported that their households collect fuel-wood from trees scattered on their own land. Whereas, 24.2% reported that they get fuel-wood from local markets by purchasing. Only 4.5% of the respondents reported that the rehabilitated forest is the main source of fuel-wood for their household during the survey. With regard to the main source of fuel-wood, there was noticeable variation between the study sites as shown in the above table. While the overwhelming majority of households in Bossa Wanche and Bola Wanche rely on trees on their own land, more than half in Hobicha Badda obtain fuel-wood by purchase. This is perhaps due to the smaller land possession and the sub-urban nature of the Hobicha Badda community.

However, the small portion of households in all sites reported to obtain fuel-wood from the forest under protection evidences that the rehabilitation of the forest hasn't improved the households' access to fuel-wood in contrary to the mid-term evaluation report of the same project by World Vision Australia (2011). Instead, it made some households (24.2%) to

incur additional cost in order to purchase fuel-wood from local suppliers. This in turn detrimentally affects the financial capital of those households.

As the above evidence shows, about a quarter of the households resorted to purchasing fuel-wood from local markets due to the protection of the forest by the project. Though this is indicative of lack of fuel-wood on own land of the households, as survey data shows none of the respondents reported that their households use cattle dung as a main source of domestic energy. In this regard, the finding of this study contradicts with the finding of Demel (2001) where he reported the substitution of animal dung for fuel-wood in “wood famine” areas of Ethiopia.

Evidences collected from focus group discussions were used to augment survey findings with regard to the mechanisms adopted by the households to deal with fuel wood scarcity. Evidences obtained from focus group discussions at Bossa Wanche and Bolla Wanche revealed depending on trees on own land followed by using crop residues (e.g. stalk of maize) as the main coping strategies of the households in the area. Whereas, relying on trees on own land and purchasing fuel-wood from local markets were identified by participants of focus group discussion at Hobicha Badda as the dominant coping strategies of households in the area. The above evidence of this study differs from the finding of Abebe, Koch and Alemu (2012) where rural households in forest-degraded areas of Tigray, Amhara, Oromia and Southern regions of Ethiopia respond to fuel-wood shortages by increasing their labor input for fuel-wood collection. However, as indicated by the participants of FGDs, in the present study areas the households have not any other alternative community woodlands to increase labor input for fuel-wood collection.

A close investigation of dependence on the forest before and after the protection of the forest by the project reveals that open access regime of the forest and lack of private woodlots or lack of trees on own land for some had contributed to the sheer dependence of households on the forest prior to the A/R Project. By the same talk, change in property right regime of the forest and the emergence of institutions governing access to forest products contained its exploitation after the introduction of the project.

4.3.2. Access to fodder

In addition to wood products, rural households depend on forests for various non-wood forest products. In this regard, fodder (mainly grass and tree leaves) is important forest product that rural households harvest from the forests for both domestic and commercial purposes.

As data collected from the respondents shows, 84.1% of the respondents reported that they used to utilize fodder from the forest before the A/R project started its operation in the forest area. This indicates that the forest served as an important source of fodder for the overwhelming majority of households in the study area. Here it is imperative to identify the main source of fodder for the households after the introduction of the project in order to reveal its implication on the livelihoods of the households.

Table 10. The main source of fodder for the households after the introduction of A/R Project

		The main source of fodder for the households			Total
		Own land	Market	Rehabilitated forest	
Cooperative	Bola Wanche	52.6	28.9	18.4	100.0
	Hobicha Badda	30.2	62.3	7.5	100.0
	Bossa Wanche	65.9	19.5	14.6	100.0
Total		47.7	39.4	12.9	100.0

Source: Field data (March-April, 2014)

The above table shows the main source of fodder for the respondents' households after the introduction of the A/R project to the study area. As can be seen from the table, the overwhelming majority of the respondents (47.7%) resorted to use it from their own land. 39.4% of the respondents reported that the main source of fodder for their household is market (i.e. they buy grass or hay). Only 12.9% of the respondents rated the rehabilitated forest as the main source of fodder for their households. However, there was variation among the study sites with regard to the main sources of fodder. The greater majority of those who obtain fodder by purchase were from the Hobicha Badda site. This variation can be explained by the sub-urban nature of and the small land size that characterize the Hobicha Badda households. Likewise the issue of domestic energy (i.e. access to fuel-wood), access to fodder is also making 39.4% of the households to incur additional costs which in turn detrimentally affects the savings of the concerned households.

In attempts made to obtain qualitative data with regard to the coping mechanisms of community members, key informants from each FDPC indicated the existence of rules for

harvesting grass from the forest under rehabilitation. Accordingly, cooperative members harvest grass from the regenerated forest through card system (i.e. cooperative members buy a coupon which enable them to harvest grass from the forest for a specific period of time). Nonetheless, participants of FGD at each site explicitly indicated that grass collected from the forest lasts for short period of time. Banning the collection of tree leaves exacerbated fodder shortage as some participants at Hobicha Badda indicated. Consequently, participants of focus group discussions in Bolla Wanche and Bossa Wanche indicated that, even households that claim to get fodder from their own land are increasingly using *Enset* and other crop residues due to severe shortage of grass. Whereas, in Hobicha Badda, reducing the number of livestock, using *Enset* and other crop residues, purchasing grass from local market, and purchasing stored grasses from lowland areas such as Elo Erasho *Kebele* of Damot Woyde *Woreda* and Dale *Woreda* of Sidama Zone were mentioned as the main mechanisms adopted by community members to cope with fodder shortage.

Some of the above coping strategies coincide with the finding of Belay et al (2013) where farmers in Ginchi watershed, Ethiopia, cope feed shortage by conserving crop residue and hay, limiting livestock number based on available feed resource, and using some crop land for pasture and forage production. While using portion of land for pasture and forage production hasn't been reported, purchasing grass is a new coping mechanism reported in the present study.

Given the controlled manner of harvesting fodder from the forest and the limited availability of crop residues due to small size of agricultural land, it is plain that there is a noticeable feed shortage in the study areas which, in turn, detrimentally affects the

livestock production and productivity. Furthermore, it undeniably affects the financial capital of the households by eroding cash in their hand and by discouraging the households from saving their financial capital in the form of liquid assets (i.e. livestock).

4.3.3. Access to grazing land

Besides being source for various forest products, the surroundings and floor of forests play significant role as a grazing land for livestock of the surrounding households. Therefore, it is imperative to disclose the response of households to restriction of grazing around and in the floor of the forest, since the A/R project outlawed grazing at the very time of its introduction.

Table 11. The grazing land of the households prior to the A/R project

		The respondent's grazing place prior to the A/R project			Total
		Own land	The forestland	Communal grazing land	
Cooperative	Bola Wanche	7.9	92.1		100.0
	Hobicha Badda	3.8	96.2		100.0
	Bossa Wanche	9.8	82.9	7.3	100.0
Total		6.8	90.9	2.3	100.0

Source: Field data (March-April, 2014)

In all study sites, as table 11 shows, there existed significant dependence of the households on the forestland for grazing purpose. It had served as a grazing land for 90.9 % of the households prior to the introduction of A/R project to the area. The rest 6.8% and 2.3 % used own grazing land and communal grazing land respectively even before the exclusion

of grazing in the project area. This indicates that apart from being a source for fuel-wood and fodder, the surroundings and floor of the forest served as a main grazing land for the livestock of the overwhelming majority of sample households.

The closure of the forest area by the A/R project resulted in a significant change in the places where the households take their livestock for grazing. As table 12 below shows, 50.0 % reported that they use their own grazing land; 40.2 % resorted to tethering and stall feeding of their cattle and the remaining 9.8 % take their livestock to communal grazing lands.

Table 12. The grazing land of the households after the introduction of the A/R project

		The grazing land of the households after the area enclosure			Total
		Private grazing land	Communal grazing land	Tethering and stall feeding	
Cooperative	Bola Wanche	60.5	13.2	26.3	100.0
	Hobicha Badda	26.4	9.4	64.2	100.0
	Bossa Wanche	70.7	7.3	22.0	100.0
Total		50.0	9.8	40.2	100.0

Source: Field data (March-April, 2014)

Although tethering was practiced throughout the study sites, as table 12 shows, the largest share of households that practice it were from Hobicha Badda. As evidences collected from focus group discussion at Hobicha Badda and Bossa Wanche, the households that practice tethering and stall feeding either keep their cattle indoors and supply them with fodder through cut and carry system or they tether their cattle in a small plot of land in

front of their house. As participants indicated, those who rear their cattle in this way are required to collect twofold fodder relative to what they used to collect prior to the introduction of the project as the fields where they tether their cattle are overgrazed. This shows the existence of a noticeable number of households (i.e. more than 1/3rd) to whom livestock production is at cross roads.

There are some additional noteworthy responses of households to the exclusion of grazing in the forestland. The data collected from sample household heads shows that 29.5% of the respondents practice stubble grazing on crop lands particularly immediately after harvesting cereals. This is another strategy by which the households deal with lack of grazing land. However, it also points the fact that the response of the households is undeniably affecting the soil fertility of a little less than 1/3rd of the sample households.

Finally, reducing the number of livestock was another strategy adopted by households of the study area.

Table 13. Impact of the A/R project on the size of livestock held by the households

		Whether the households reduced their livestock size due to exclusion of grazing		Total
		Yes	No	
Cooperative	Bola Wanche	47.4	52.6	100.0
	Hobicha Badda	84.9	15.1	100.0
	Bossa Wanche	48.8	51.2	100.0
Total		62.9	37.1	100.0

Source: Field data (March-April, 2014)

As the above table depicts, 62.9 % of the respondents reported that their households reduced the number of livestock by selling out in order to deal with lack of grazing land. Again, in this regard, households from Hobicha Badda account the lion's share. This shows that the exclusion of grazing in the project area detrimentally affected livestock production which is the integral part of the main livelihood activity of the overwhelming majority of the households.

4.4. The Impacts of A/R CDM Project on the Livelihoods of Households

In this sub section of the chapter, the researcher analyzes data collected with regard to the project's impact on each livelihood capital of the sample households of this study.

4.4.1. Impacts on human capital of the households

This study has mainly emphasized on employment creation, and knowledge and skill transfer endeavors of the A/R project in order to identify the impact of A/R project on human capital of the households. In this regard, the contribution of job opportunities created by the project to the income of concerned households is given due attention for it is likely to enable the households to enhance the health and education of their members. To this end, the respondents were asked whether they were benefited from job opportunities created by the A/R project. As the collected data indicates, 68.9% of the respondents reported that their household has been benefited from one or another job opportunity created by the project. However, here, it is imperative to see the types of jobs created by the project in order to weigh up their contribution to human capital of the households.

Table 14. The type of job opportunities the households benefited from

Job opportunities that the members of the respondents household took part	Frequency	Percent
Seedling production	13	9.8
Guarding forest	9	6.8
Plantation of seedlings	25	18.9
Pruning activities	41	31.1
Carbon monitoring	3	2.3
Total	91	68.9

Source: Field data (March-April, 2014)

The above table shows the types of jobs associated with the A/R project in which the concerned households took part. As shown in the table above, 31%, 18.9% and 9.8% of the respondents' households participated in pruning and thinning activities, plantation of seedlings and production of seedlings respectively. Whereas, 6.8% and 2.3% of the respondents reported that they participated in forest guarding and carbon monitoring jobs respectively. Here again, in addition to disclosing the types of jobs created, identifying whether the respondents/any member of their household was on job during the survey is important to make explicit the contribution of the project to human capital of the households.

Table 15. The respondent's/household members' status of employment during the survey

Are you benefiting from any job opportunity associated with the A/R project?	Frequency	Percent
Yes	9	6.8
No	123	93.2
Total	132	100.0

Source: Field data (March-April, 2014)

During the time of this study, as the above table shows, only 6.8% of the respondents reported that they/member of their household were on job created by the project. The rest 93.2 % of respondents were not taking part in jobs created by the project. This not only shows the irregularity of the jobs created by the project, but also shows that their absence by time in which the households are most vulnerable to food insecurity since the survey was conducted in a well known food insecure months (i.e. March-April) in the area.

Participants of focus group discussions in all sites indicated that some job opportunities (such as area preparation, seedling production, replanting, pruning and thinning) existed during the beginning of the project. However, as evidence collected from participants of FGD at each study site indicates, the availability of job opportunities in association to the project has gradually declined. Participants indicated that forest guarding employing only 2-3 people, and pruning activity which is very sporadic and lasting for only 5-10 days as the only job opportunities currently available in association to A/R project. Consequently, participants of focus group discussion in each study site agreed that employment opportunities created by the project were not in a state to compensate losses

incurred particularly by poor households who previously depended on the forest to sustain their life.

From the above finding it is evident that the job opportunities created by the project were not in a state to enable the community members to sustainably invest in the health, education, housing and food security that can boost human capital of the households. Therefore, the impact of employment generated by the project on human capital of the households was not worth mentioning.

Another important human capital is the skill of the household members. In order to disclose the impact of the project on the skills of members of respondents' households, emphasis is given to the trainings provided by the project. As data collected from sample households shows, 79.5% of the respondents reported that they took trainings associated with the A/R project. As indicated by the key informants of this study too, the project provided trainings to the stakeholder households concerning issues related to family planning, reproductive health, HIV/AIDS, land management, bee keeping, animal fattening, fruit production, tailoring, poultry and so on. Therefore, from this it is evident that the overwhelming majority of the households were exposed to trainings on some important issues.

An attempt has been made in this study to identify whether the member(s) of the concerned households were exposed to skill trainings. In this regard, 37.1% (49) of the respondents reported that they were trained in one or another skill particularly in farm and non-farm income generating activities.

Table 16. Income generating activity on which the respondent/household member took training

Income generating activity in which the respondent/household member took training	Frequency	Percent
Bee keeping	7	5.3
Tailoring	4	3.0
Poultry	13	9.8
Animal fattening	15	11.4
Carbon monitoring	6	4.5
Others	4	3.0
Total	49	37.1

Source: Field data (March-April, 2014)

As displayed in the table above, the A/R project provided trainings in variety of income generating activities. 11.4%, 9.8%, 5.3 %, and 4.5% of respondents received skill training in animal fattening, poultry, beekeeping, and carbon monitoring respectively. In addition, about 3% were trained in tailoring, and the rest 3% received trainings in other activities. This shows that the project trained more than 1/3rd of the respondents/their household member in one or another income generating activities in order to enhance their capacity to diversify their livelihood away from the extraction of forest products. However, the researcher found it imperative to identify whether the households were making use of the skills they developed through training sessions in order to weigh up the contribution of the endeavor to human capital of the concerned households. In this regard, only 25.8% of

the respondents reported that their household is benefiting from the income generating activities in which they were trained. Hence, the above figure indicates that the trainings assisted about a quarter of sample households to get additional income by engaging in income generating activities introduced to them. Conversely, it also makes explicit the existence of households which are not benefiting from the income generating activities in which they were trained for one or another reasons.

Finally, as some studies (Asquith, Rios and Smith 2002) indicate, improving stakeholder households' access to health services and potable water is associated with forest carbon projects. However, in the present study, there was no evidence of provision of health care and of improvement in the households' access to potable water.

4.4.2. Impacts on social capital of the households

Though it is difficult to measure social capital at household level, here emphasis is given to some important issues like the role of the A/R project in creating an opportunity for households to be members of formal social groups and its impact on the households' ability to work together with other members of FDPC.

One of the important measures of social capital is the membership of households in formal or informal social groups. In this regard the project enabled the stakeholder households to be members of the FDPC (i.e. formal group) as all the sample households were cooperative members. However, in addition to the existence of such social network, it is imperative to disclose the functionality of this social network vis-a-vis the livelihoods of the households. In this regard, the households' affiliation to the FDPCs enabled some households to be eligible for various benefits associated with the project

(e.g. exposure to trainings in income generating activities, provision of equipments, and participation in job opportunities though limited). As indicated in the foregoing discussion, it enhanced the capacity of some households to engage in additional livelihood activities.

The project's impact on the individual household's ability to work with other members of FDPC also deserves attention. In this regard, the respondents were asked whether they perceive the project has enhanced their households' ability to work with other members of their respective FDPC. As the collected data indicates, 75% of the respondents reported that they perceive their ability to work with other members of their FDPC has been enhanced due to the project. The remaining 25% were those who didn't perceive that their ability to work with others has been enhanced.

It is also important to look at the impact of the project on quality of interaction of a given household with other member households of the FDPCs.

Table 17. Impact of the project on the household's social interaction

		Impact on the households interaction with other members		Total
		Positive	Negative	
Cooperative	Bola Wanche	78.9	21.1	100.0
	Hobicha Badda	64.2	35.8	100.0
	Bossa Wanche	80.5	19.5	100.0
Total		73.5	26.5	100.0

Source: Field data (March-April, 2014)

The above table shows the perception of the respondents with regard to the impact of the A/R project on the quality of the social interaction of their household with other members of their respective FDPC. As shown in the table, 73.5% of respondents perceived that the projects' impact on their social interaction with other members of their respective cooperative as positive. However, about a quarter of the respondents reported that the project negatively affected their interaction with other members of their community. Households from Hobicha Badda site accounted higher share in this regard. Though this study didn't find out how the project has negatively affected the social interaction of some households, it uncovers that the project's impact on the social interaction of cooperative member households was not identical.

4.4.3. Impacts on financial capital of the households

Here the projects' impacts on households' savings both in forms of cash and liquid assets particularly livestock, and access to credit were given due emphasis. To this end, the respondents were asked whether they perceive the yearly income of their households has increased after the introduction of the project. As data collected from sample households shows, about 24.2% of the respondents reported that their households' income has been improved after the introduction of the A/R project and almost all of them (i.e. 22%) associated the improvement in their households' income to the income generating activities introduced by A/R project.

Another associated impact of the project on the saving of households is through eroding the saving of some households (i.e. 24.2% of households' obtain fuel-wood and 39.4 % of households' access fodder from market as indicated in table 9 and table 10 respectively).

This shows that it made some households to incur additional cost for purchasing fuel-wood and fodder which in turn undeniably erodes the savings of the households.

The impact of the project on other kind of saving (such as liquid assets particularly livestock) was detrimental to the overwhelming majority of households. As indicated in table 13, 62.9% of the respondents reported that they reduced the number of their livestock by selling out due to exclusion of grazing in the forest and the associated shortage of animal feed. Therefore, this shows that the project has negatively affected the households' effort to keep their saving in form of livestock.

Finally, it is important to uncover the projects' impact on the households' access to credit service. Though the cooperatives are receiving carbon revenue on yearly bases, access to microcredit services hasn't been reported by the respondents of the survey. The key informants from each cooperative also indicated that providing microcredit service is only a long term plan of their respective cooperative. Therefore, this shows that the households' social network (i.e. membership to the FDPCs) hasn't enhanced their access to loan services.

4.4.4. Impact on physical capitals of the households

In order to identify the impact of the A/R project on the physical capitals of the stakeholder households, equipments the project distributed among the stakeholder households, and equipments purchased by the households using the income from the project if any were considered. With regard to equipments received by the households, as data collected shows, 53% of the respondents reported that their household received one or another type of equipment from the A/R project. However, here, disclosing the type of equipments

received by the households is imperative to judge whether the equipments received were productive or not.

Table 18. The type of equipments received by the households

Equipments the households received from the A/R project	Frequency	Percent
Improved cook stove	23	17.4
Modern beehive	7	5.3
Sewing machine	4	3.0
Forestry equipments(e.g. sickle and machete)	36	27.3
Total	70	53.0

Source: Field data (March-April, 2014)

As can be seen from the above table, only 25.7 % of the respondents received equipments (namely: improved cook stove, modern beehive and sewing machine) that can enhance the other capitals of the households in one way or another. Whereas, the larger share (i.e. 27.3%) received forestry equipments (such as sickle and machete) whose contribution to other capitals of the households is negligible.

Except the provision of the aforementioned equipments which were limited in their coverage, the impact of the project on other private physical capitals of the households was not apparent. As none of the respondents reported receipt of cash income from carbon revenue, they couldn't add on their private physical capitals.

4.4.5. Impacts on natural capitals of the households

As many natural capitals are not privately owned by households, in this study the emphasis is only given to the impact of the A/R project on the privately owned trees, and private land of the respondents' households.

The study attempted to identify whether tree plantation on own land of the respondents' households has increased due to the A/R project. In this regard, 42.4% of the respondents reported increment of plantation of trees on the private land of their households. This concurs with the results of focus group discussions particularly at Bolla Wanche and Bossa Wanche where there was strong consensus among the participants that households with marginal land have increased tree holding by planting seedlings provided by the A/R project.

It is imperative to see the A/R project's impact on land since land is a very indispensable capital of farm households. Participants of focus group discussions particularly at Bossa Wanche and Hobicha Badda indicated the reduction of water and wind erosion on lands adjacent to the rehabilitated forest. Furthermore, participants of FGDs at all sites agreed that the moisture retentions capacity of soil has been enhanced due to the rehabilitation of the forest. The exclusion of grazing in the forest area, however, came up with a detrimental impact on the private land of some households. As indicated in section 4.3.4, 29.5% of the respondents reported that they take their cattle to farm lands for grazing particularly in harvest seasons. Therefore, the practice is likely to make the land vulnerable for wind erosion and thereby to reduce the productivity of the land. Furthermore, as 62.9 % of households reduced the number of cattle they possess due to exclusion of grazing in the

forest area (see Table 13), it is clear that the amount of manure that the households spread over the land has also reduced. This in turn negatively affects the productivity of the agricultural land of the households.

4.4.6. Impacts on the households' livelihood strategies

In one way or another, the A/R project has influenced the livelihood strategies of the stakeholder households. Here, it is imperative to see the influence of the A/R project on farming (both crop and livestock production) as it is reported to be the main livelihood strategy of the overwhelming majority of the respondents households (i.e. 84.8% as shown in table 6) and undeniably highly related to the project activity.

The project came up with both positive and negative impacts on crop production as evidences collected by this study show. For instance, as indicated by participants of focus group discussions in all study sites, the timely rain fall and enhanced moisture retention capacity of soil which resulted from the forest protection has enabled the farm households to cultivate various crops. However, as evidences collected from participants of FGDs in all sites indicate, the crops of some households were severely damaged and destroyed by the wild animals that came back to the forest. Though farm households near to the forest land are able to produce variety of crops like *Enset*, sweet potato, yam, potato, cassava, , and so on, the participants exposed that , it is a vain effort since their crops are severely destroyed by wild animals mainly warthog, baboons, porcupine and bush duikers. This clearly shows the differential impact of the restoration of the forest on the stakeholder households' activities where households near the forest land are highly exposed to harm caused by wild animals in the same forest.

When the impact of the A/R project on another equally important livelihood activity (i.e. livestock rearing) is considered, as indicated in table 13, 62.9% of the respondents reported that their household reduced the number of livestock by selling out due to the exclusion of grazing in the forest area and the resultant shortage of fodder. Furthermore, the threat posed by wild life on the livestock of some households adds to the aforementioned negative impact of the project on livestock production. There was strong consensus among participants of FGD at each site that the livestock of inhabitants closer to the forest land are exposed to frequent attack from wild life like hyenas, leopards, and some bird species. From this it is clear that the A/R project has a discouraging effect on livestock rearing which is an integral part of the main livelihood of the majority of households.

In addition to the main livelihood activity of the households, it is imperative to see the impact of the project on the supportive livelihood activities of the households. In this regard, the study identified whether the households dropped a livelihood activity due to the A/R project. 40.9% of the respondents reported that they dropped one or another livelihood activity due to the project activity. Those who reported to have dropped one or another livelihood activity were asked to identify the type of livelihood activity they dropped.

Table 19. The livelihood activities the households dropped due to the A/R project

Livelihood activities the households dropped due to the project activity	Frequency	Percent
Selling fuel-wood	26	19.6
Selling grass	10	7.6
Selling fuel-wood and grass	10	7.6
Supplying charcoal	8	6.1
Total	54	40.9

Source: Field data (March-April, 2014)

As shown in the above table, 19.6 % of the respondents reported marketing of fuel-wood, 7.6% reported selling of grass, 7.6% reported selling of both fuel-wood and grass, and 6.1% reported supplying of charcoal as livelihood activities dropped by their household due to the protection of the forest. In fact, the aforementioned livelihood activities dropped by the households constitute unsustainable livelihood strategies. And as presented in section 4.3.1 of this chapter, the project created some job opportunities and introduced some income generating activities in order to counteract the losses of forest based livelihood activities of stakeholder households. However, only few households (25.8%) were benefiting from income generating activities introduced by the project and even much fewer households (6.8% as shown in table 15) were employed in jobs associated with the project during this survey. This shows the existence of some households that lost their supportive livelihood activities due to the introduction of A/R project to the study areas.

4.4.7. Impacts on households' livelihood outcomes

It is very essential to disclose the livelihood outcome of the households since the impacts of the project on livelihood assets and livelihood strategies are ultimately reflected in their livelihood outcomes. To this end, below emphasis is given to income, food security, and vulnerability of the households.

Since increased income is clearly relevant to the economic sustainability of the stakeholder households, it is imperative to look at the impact of the project on it. In this regard, about 24.2% of the respondents (see section 4.4.3.) reported that the income of their household has increased after the introduction of the A/R project. However, it is necessary to see whether the reported improvement in the income of those households was due to the benefits associated with the A/R project. As data collected through household survey shows, 22% of the respondents attributed the increment of the income of their households to the benefits associated with the project. Conversely, it does mean that the income of the households of the remaining respondents (78%) was either unchanged or decreased due to the project.

The impact of the project on the food security of the households is worth mentioning. In this regard, it is important to see the way the A/R project influenced production and availability of food at household level. According to participants of FGDs, the protection of the forest enabled them to receive a timely rain which in turn allowed the households to cultivate various crops at least twice in a given year. However, participants of FGDs particularly at Hobicha Badda and Bossa Wanche indicated that due to the small land size of majority of the farm households of the area, they could not make a good use of

improved local climate. Furthermore, for households near to the forest it is not only the small land size that limits their effort to use the improved local climate in order to produce more food, but also the attack of wild animals on major root crops. Consequently, the participants indicated that, the households with larger land size and residing far away from the protected forest are advantageous in producing more food for their households.

The project's impact on livestock production was very discouraging as 62.9% of the respondents (see table 13) reported that their household reduced the number of livestock they possessed before. From this it is clear that it has detrimentally affected the food security of households since income from selling livestock and livestock products is a commonly adopted coping mechanism of farm households of the area particularly in food insecure seasons. Participants of FGD at each study site indicated that the households of the areas used to depend on incomes from the selling of small livestock like sheep, goat and calf of cattle to purchase farm inputs like seeds, and to purchase foodstuffs particularly between harvests. Consequently, participants of focus group discussions exposed that they were left with nothing to depend upon during food insecure months due to their inability to raise small animals like sheep and goat.

The detrimental indirect impact of the A/R project on *Enset* plant has been identified as an evidence for increasing food insecurity of households particularly in the close proximity of the protected forest. Participants of focus group discussion at all study sites indicated that the increased pressure on *Enset* plant due to rampant attack from wild animals and the utilization of the same plant for animal feed has eroded the plant's longstanding role in food security of the households of the study sites.

The inherent weakness of poor people's livelihoods makes them unable to cope with stresses. In such instances, it is well recognized that marketing of forest products is one of important source of cash income particularly for poorer rural households in the vicinity of communal forests. Therefore, it is important to see the project's impact on the households' vulnerability. To this end, emphasis is given to the state of the households' dependence on income generated from selling of forest products prior to the A/R project and the substitute livelihood activities the households are engaged in after the introduction of the A/R project to the areas. As household survey data shows, about 40.9% of the respondents reported that their household used to depend on selling one or another forest product to supplement their effort to sustain their livelihood in the face of external shocks and stresses. Therefore, this underscores the important role of the forest as a source of supportive livelihood activities for significant number of households prior to the current management system of the forest.

Looking at the ways those households substituted the livelihood activities they lost due to the protection of the forest may shine some light on the projects' impact on the vulnerability of the households.

Table 20. The supportive livelihood activities the households are engaged in after the introduction of A/R project

Supplementary livelihood activities pursued by the households after the introduction of A/R project	Frequency	Percent
Daily labor	3	2.3
Jobs created by A/R project	6	4.5
No supportive livelihood activity	13	9.8
Safety net program	22	16.7
Income generating activities introduced by the project	10	7.6
Total	54	40.9

Source: Field data (March-April, 2014)

After the introduction of A/R project in the area, the households' dependence on the income derived from forest products has ceased. As table above shows, 16.7 % of the respondents mentioned productive safety net program as a supportive livelihood activity for their households. Whereas, 9.8% of the respondents reported that their household has been left with no supportive livelihood activity. 2.3% of the respondents said that their households depend on daily labor. It was only 7.6% and 4.5% of the respondents who mentioned income generating activities introduced by the project and jobs created by project as a substitute livelihood activity for their household respectively. This shows the restriction on access to forest products has increased the vulnerability of some previously forest dependent households by leaving them without any safety net.

As discussed in foregoing section of this chapter, the project introduced and provided training in various income generating activities in order to help the households diversify

their livelihood activities thereby to reduce their vulnerability. However, as indicated in section 4.4.1, only a quarter of the respondents reported that they are benefiting from the income generating activities introduced by the A/R project. To the worst, only few of those previously highly dependent on the forest reported that they engaged in the income generating activities introduced to them. This indicates that the project's effort to achieve a successful shift in the livelihood activities of the most forest dependent households was very limited. Therefore, from this it is evident that the project did little with regard to reducing the vulnerability of stakeholder households. To the worst, it increased the vulnerability of some households as the households previously dependent on the forest products dropped their supportive livelihood activities, and live precariously.

Finally, since none of the respondents reported a receipt of cash income from carbon sell, it couldn't be claimed that the carbon revenue has reduced the vulnerability of stakeholder households. In a nutshell, the impact of the project in terms of reducing the vulnerability of households is insignificant.

4.5. The Impacts of A/R CDM Project on Community Level Assets

In this sub section of the chapter, the researcher analyzes data generated with regard to the impact of the A/R CDM project on community level assets/capitals of Bola Wanche, Bosa Wanche and Hobicha Badda communities. Key informant interviews and focus group discussions were used to generate data in order to identify changes in community level assets due to the A/R project

4.5.1. Impacts on community level human capitals

The provision of series of new trainings was the well recognized contribution of the A/R project to human capital of the concerned communities. Key informants from all of the study sites indicated that the project created a number of training opportunities to local communities on a number of issues. Particularly trainings on environmental protection, forest management, land and water conservation, financial management, and agroforestry were reported to have raised the awareness of local community members with regard to the importance of forest resources to the current and future generations of the area. A key informant from Bossa Wanche Kacha Mt. FDPC indicated that:

Trainings changed initial unfavorable attitude of some of our community members towards the conservation of the forest. In fact, not only the knowledge gained from trainings, but also the payments we received during training sessions were meaningful to convince us. Most importantly, the trainings equipped our community members with basic skills on how to restore the forest and manage it. Now they are members of this community who run our FDPC.

A key informant from Hobicha Badda also indicated the importance of trainings provided by the project as follows:

Access to a number of trainings reduced the initial resistances to protection of the forest land by raising community members' awareness about benefits to be enjoyed and thereby made us to have common vision to manage our common property and benefits derived from it.

Capacity building was, therefore, one of the important outcomes of various trainings as indicated by the key informants. In this regard, key informants at each site indicated that the trainings provided particularly on forest management, financial management, carbon monitoring and credit and saving management has built the capacity of community members to manage the forest and associated benefits of their respective cooperative with some technical and skilled man power assistance from World Vision Ethiopia and

cooperative office of Humbo *Woreda*. From this, it is evident that the project has built the institutional capacity of FDPCs which in turn positively contributes to the sustainability of forest management. This finding agrees with Corbera (2005) where it was indicated that small carbon forestry project in the state of Chiapas, Mexico, contributed to strengthened local capacities and leadership and reinforced community based natural resource management across the region.

Transfer of various skills was mentioned as another important contribution of the project to human capital of the communities. Key informants indicated that skills transferred through trainings in various income generating activities like tailoring, bee keeping, poultry, cattle fattening and other activities have created conducive environment for learning and transfer of skills among community members. Participants of focus group discussions also recognized the delivery of trainings in various income generating activities. However, only bee keeping has been identified by participants of focus group discussions as an income generating activity that has relatively been better adopted by some farmers. In Hobicha Badda, participants of FGD explicitly disclosed the difficulty of practicing cattle fattening due to severe shortage of fodder. Similarly, in all of the study sites the difficulty of practicing poultry due to rampant attack from wild animals has been mentioned by participants. From this it can be argued that some skill trainings haven't thoroughly anticipated the feasibility of and potential hurdles for their application in the communities which in turn limited their diffusion among members of the cooperatives.

4.5.2. Impacts on community level social capitals

The emergence of institution for governing access to the forest and benefits associated to its protection and securing of property right over the forest were key issues identified by key informants in all study sites. As key informants from all FDPCs indicated, before the introduction of A/R CDM project to the study area, the forest land had been an open access area for more than three decades. A 69-year-old informant from Bossa Wanche stated the condition in the following terms:

In the time of Emperor Hailesilasie, the area was covered by dense forest and belonged to individual landlords. At the time, the inhabitants of the area access forest products based on the periodic permissions of the owner of the forest. Starting from the beginning of Dergue regime until the introduction of the A/R project in 2006, the area remained open to public which gradually resulted in unmerciful destruction of the forest and killing and chasing of wild animals that used to live in it.

The formation of FDPCs was accompanied with the institutionalization of rules and regulations for utilizing the forest products and benefits associated with its protection. Describing the current management system of the forest, my key informant from Bolla Wanche Kacha Mt. FDPC indicated that “Unlike the previous condition, there are specific rules that govern access to the park by members of our cooperative since its establishment.” In the same vein, evidences collected from FGDs in Bossa Wanche and Bolla Wanche show that the formation of cooperatives introduced specific rules for access to the forest, participation in its protection and benefit sharing. Participants indicated that the emergence of rules for access to the forest, the enforceability of those bylaws, and the legal recognition of the property right of FDPCs have boosted their confidence on the effort they make to develop and protect the forest.

Initially, the impact of the project was divisive in the case of Hobicha Badda. The participants of focus group discussion at Hobicha Badda recalled the severe extent to which their community was divided during the conception and implementation of forest area enclosure. The participants attributed the then resistance of some community members to the perceived greater opportunity cost of the forest area enclosure to majority of the community members. In this regard, they mentioned the hitherto unresolved issue of restriction of grazing in the area. However, the participants indicated that the apparent environmental benefits of forest protection and the expected financial benefit of the project have enabled them to work together to protect the forest. A key informant from Hobicha Badda Woytto Mt. FDPC stated it in the following terms:

Though the protection of the forest prevented us from taking our livestock for grazing to the area, it made the forest our property which had previously been exploited by people from other *kebeles* of Humbo *Woreda* and even Sodo *Zuriya Woreda*. Though nobody is allowed to cut trees from this forest, every member of our cooperative is sure that the carbon revenue from our forest belongs to us.

Hence, the evidences from Hobicha Badda show that secure property right over portion of the forest, the current environmental benefits of the forest and expectation of future financial benefit brought cooperative members to work together. However, the existence of disincentives for forest protection (such as exclusion of grazing, restriction on collection of forest products and attack from wild life) is worth mentioning.

The organization of forest users into FDPCs has been reported to have facilitated the communities' access to other formal organizations. In this regard, the key informants from Bola Wanche and Bossa Wanche specifically indicated that their respective cooperative is working in collaboration with Water, Mines and Energy department of the Zone to increase the number of water points initially planned by the later. Here, the organization of forest

users in to cooperatives has boosted the power of local communities to access and influence other formal institutions for the betterment of the area. A key informant from Bossa Wanche Kacha Mt. FDPC described it in the following way:

In addition to giving us a user right over the portion of the forest and financial return associated with its protection, the formation of FDPC has enabled us to easily communicate with Water, Mines and Energy department of the Zone. For instance, our cooperative has reached at consensus with Water, Mines and Energy department of the Zone to support the establishment of 4 water points.

Although the project managed to assist the development of new institution for forest management in the community and enabled them to work together than they used to, it is not exempted from notable negative latent impacts on other long existed local institutions. One of the institutions the community members stopped practicing was joint ownership (*Kottaa*) and share-breeding (*Ulo Kottaa*) of livestock. Participants of focus group discussions in all of the study sites explicitly indicated that joint ownership (*Kottaa*) and share-breeding (*Ulo Kottaa*) of livestock had been the main mechanism of owning livestock among the poor community members. However, the participants indicated that, the enclosure of the forest land marked the collapse of these informal institutions for the poor have not any marginal land for grazing and fodder extraction. Consequently, the relatively wealthy people wouldn't give livestock to poor people on the bases of the aforementioned arrangements for the later couldn't access sufficient fodder for the livestock. This shows that the denial of forest products has detrimentally affected the long existed institutions for flow of wealth among social classes of the community.

Another informal institution identified to have been adversely affected due to the protection of the forest was that the arrangements for draught oxen exchange (*Gatuwa, Woosaa*). There was a strong consensus among the participants of focus group discussion in Hobicha

Baddaa that draught oxen exchange among farmers (*Gatuwa*) has been weakened due to massive cattle selling induced by fodder scarcity and restriction of grazing immediately after enclosure of forest area. The participants indicated that few people who have maintained their draught oxen are practicing *Gatuwa*. *Woosaa* is the mechanism by which poor people who don't own draught oxen access it through requesting it for free from those who own oxen particularly friends and relatives. . However, due to severe decline in the number of draught oxen in the community, accessing draught oxen through this arrangement was reported to be a difficult task. This shows that the detrimental impact that the project caused on one livelihood activity (i.e. livestock rearing) has ruined several institutions which in turn detrimentally affected another livelihood activity (i.e. farming). Therefore, the above evidences show that the project has inadvertently weakened informal social support arrangements.

4.5.3. Impacts on community level physical capitals

The impacts of the A/R project on the physical capital were more or less identical across the concerned communities. In all of the study sites, the carbon revenue paid for each cooperative was primarily used for installation of cereal milling machine in each FDPC. A key informant from Bolla Wanche Gamo Mt. FDPC stated it in the following terms:

Priority was given to planting the cereal milling machine in order to ease the burden of women and children travelling longer distance carrying grains in search of mill. Accordingly, a cereal milling machine was planted in a place central to member households of the cooperative.

Although glad for having cereal milling machine as a property of their cooperative, there was a strong consensus among participants of focus group discussions of Bolla Wanche that their priority need was not cereal milling machine which they occasionally use, rather

it is potable water which consumes 2-4 hours of women and children of the area per day. The participants of FGD at Hobicha Badda also questioned the priority given to community level physical capital in general and installation of cereal milling machine in particular. They indicated that it would have been better if the carbon revenue had been distributed among members in order to support change in their livelihoods. As the private flour mills at Hobicha Badda town are easily accessible to members of the cooperative, the participants agreed that, the installation of additional flour mill was not as such the priority need of their community. Instead, road connecting Hobicha Badda to Buge Wanche was identified by participants as a pressing issue preventing them from using transport services.

Therefore, the above results of focus group discussions from both Hobicha Badda and Bolla Wanche show that the endeavor made by the project to contribute to the physical capital of the communities was not in line with the priority need of the communities. In turn, the observed incongruence between the priority needs of communities and the physical capitals built there shows that the effort was not participatory. Furthermore, the similarity of physical capitals given priority across cooperatives indicates that the socio-economic differences among communities have been underestimated.

Road constructed across the forest by members' participation was mentioned by key informants as another physical capital emerged in association with forest protection project. As the key informants indicated, the road was constructed with the objective of controlling fire accident, accelerating pruning process and easing grass and firewood collection for the inhabitants. However, participants of focus group discussion indicated that the roads were constructed primarily for the purpose of forest protection than meeting the immediate needs of the community. There was consensus among participants particularly at Hobicha Badda

that they use the roads only occasionally where grass and firewood collection is allowed. In this case, though the road makes little direct contribution to the immediate needs of the concerned communities, it has a big potential role in saving the forest from fire accident which can nullify the sacrifices hitherto they made for the sake of the forest protection and it's hoped for benefits.

The construction of grain store was reported by key informants from Bolla Wanche and Bossa Wanche as another contribution of the project to the physical capital of the communities. The main purpose of construction of grain store was that keeping cereals purchased during harvest time to sell back to members and non-members with some discount in food deficit seasons. There was consensus among participants of focus group discussions that some cooperative members are able to get grain at nearby with some 30-70 cents discount per kilogram of a given grain. From this it is possible to argue that the construction of grain store has contributed to the availability of food at community level though access to the available food by households depends on their wealth conditions. Furthermore, the construction of grain stores beside cereal milling machine reduces the burden and saves the time of women and children.

4.5.4. Impacts on community level financial capitals

The carbon revenue resulting from protection of the forest has strengthened the financial capital of each forest development and protection cooperative. As key informants from each FDPC mentioned, the amount of carbon revenue is increasing from year to year. For instance, Hobicha Badda FDPC has received 82, 844.80 ETB in 2009, 128, 495.70 ETB in 2010, 172, 159.60 ETB in 2011 and 415, 974 ETB in 2012. Similarly, Bossa Wanche and

Bala Wanche FDPCs have received carbon revenue four times proportionately upon the amount of emissions their respective portions of the forest have reduced. Though in some cases the revenue utilization was not in line with the priority needs of the concerned communities, some amount of it was utilized to build some physical capitals (e.g. flour mill, grain store) as key informants indicated.

The forest development and protection cooperatives have started receiving carbon revenue since 2009, yet none of them have started loan services. Though cash generated through carbon stock sell is deposited in bank in the name of each cooperative, participants of FGD at each study site explicitly disclosed the fact that they don't have access to loan services from their respective cooperative. There was a consensus among participants of focus group discussions at each study site that the most common mechanisms of getting loans in the communities are based on social networks (e.g. friends and relatives) and informal social arrangements for loan (such as local money lenders (*Dichchaa*). Interview with key informants from all of the study sites also revealed that providing loan service is only a long term plan of their respective cooperatives.

Lack of institutional framework for providing loan services was mentioned by key informants as one of the obstacles for providing the service. Hence, the cooperatives' failure to provide loan services to their respective members prevents the endeavor of the initiative from having similar favorable impacts on financial capital at household level. Since financial capital is the main asset that poor people lack most, the member households could have used it for building the other household capitals if they had access to it.

4.5.5. Impacts on community level natural capitals

Environmental impacts of the project were identified by the key informants and participants of FGDs as the most noteworthy impacts. Key informant of this study from Bossa Wanche mentioned restoration of degraded forest and the resultant improvements in local environmental resources mainly improvement in rainfall condition, improvement in moisture retention capacity of soil, reduction of temperature, reduction of soil erosion and restoration of wild animals as key environmental benefits resulted from the project. While similar environmental benefits were identified by a key informant from Bolla Wanche, additional environmental benefits such as restoration of more than three spring water and reduction in wind erosion were identified by a key informant from Hobicha Badda. A 69-year-old informant from Bossa Wanche stated the observed improvements in rainfall conditions in the following terms:

The volume and time of rainfall in our vicinity is gradually restoring back to the condition that existed before 1984. In 2012 we received 1st autumn (Belg) rain in mid of April. In 2013 we received it around mid-March and in this year even earlier. Furthermore, we get sporadic rainfall even in January and February which was uncommon in the last 30 years. This is due to the park.

Participants of focus group discussions in each of the study sites strongly acknowledged the contribution of the project to environmental assets of their respective community. There was strong consensus among participants in each study site that the observed significant positive changes in the environmental assets of their respective community (e.g. increased vegetation cover, reduction in temperature, timely and adequate rainfall, increased moisture retention capacity of soil particularly in land adjacent to the forest, reduction of wind and water erosion and so on) are due to the rehabilitation of the forest. The improvements in microclimatic condition of the area have in turn contributed to agricultural practice in the

area though they alone are not sufficient conditions. For instance, in each site of the study, there was good deal of consensus among participants that the improvements in local climate has allowed them to cultivate variety of crops at least twice a year though the small agricultural land that characterizes the area and damage to crops caused by wild animals is highly limiting them from exploiting the created opportunity.

There was opposing view concerning the restoration of wild animals to the protected forest. Key informants at each study site considered wild animals as potential sources of financial benefits to their respective cooperatives. They indicated the possibility of ecotourism in the area in near future. However, there was a strong agreement among participants of focus group discussion at each study site that the restoration of wild animals is a major threat to the livestock and crops of neighboring farmers. Though households near to the forest area are able to produce variety of crops like *Enset*, sweet potato, yam, potato, cassava, , and so on, the participants indicated that, it is a vain effort that their crops are severely destroyed by wild animals mainly pigs, monkeys, hedgehogs and wildebeest. Furthermore, difficulty of raising livestock around the forest due to frequent attack from wild life like hyenas, monkeys, leopards, and some bird species was revealed by participants of FDGs. And particularly participants of focus group discussion in Bossa Wanche indicated that unless an appropriate measure is taken to solve the human-wildlife conflict, after some two years neighboring households cannot sustain their life there.

The issues raised in the foregoing discussion indicate the differential impact of the rehabilitation of the forest. Households at near distance from the protected forest became the main victims than beneficiaries of the endeavor of the initiative. This is evident from the detrimental impacts of initial area enclosure and the later increasing attack from wild

animals on agricultural produce and livestock of households closer to the forest. Here, a resource considered by some as a source of potential financial benefit has become an actual threat to the life of households in close proximity of the forest.

Restoration of grasses to the forest floor and hillsides was another important issue identified by the key informants as the contribution of the forest protection to the improvement of environmental capital of their respective community. In this regard, a key informant from Hobicha Badda Woytto Mt. FDPC stated it in the following way:

Every member of the cooperative is allowed to harvest grasses from the forest at a low price. Periodically, based on the availability of grass in the forest, we issue coupons for members whereby they can harvest grass for allotted weeks/months. They pay 4-6 birr to get the coupon.

Participants of focus group discussions in all of the study sites recognized the restoration of grass to forest floor and hillsides. There was consensus among participants at each study site that with increase in forest cover and exclusion of livestock, initially the availability of grass has increased around and in the floor of the forest. However, they indicated, as trees grew longer in height and larger in size, the availability of grass in forest floor has gradually declined. Consequently, it was indicated by participants that the grass they get from the protected forest lasts only for few months. The gradual decrease in availability of grass around and in the floor of the forest induced community members to device other alternatives to cope with fodder scarcity that were discussed in first section of this chapter.

To conclude, the establishment of FDPCs, building institutional capacity of FDPCs, helping the FDPCs secure property right over the forest land, enabling FDPCs to secure carbon revenue and contributing to the improvement of microclimatic condition of the area are worth mentioning community level positive impacts of the project. However, the

project activity has unwittingly weakened long existed informal institutions for joint ownership and share breeding of livestock, and draught oxen exchange. In general, the A/R CDM project has relatively worked better on community level assets than livelihood assets of individual households.

4.6. Key Determinants of the Respondents' Attitude towards the Forest-Implication for Sustainability

This sub-section of the chapter examines if there is a relationship between certain demographic, socio-economic and geographic characteristics of the respondents/their households and the attitude of respondents towards the forest. In order to see if there is a relationship between variables measured at ratio level (such as age and education of the respondent, and the size of agricultural land possessed by the respondent's household and distance of the respondent's household from the forest) and the respondent's attitude towards the protected forest, Pearson's product moment correlation coefficient was computed and the following results were obtained.

4.6.1. Age and educational status of the respondents and their attitude towards the protected forest

Table 21. The correlation between age and educational status of the respondents and their attitude towards the protected forest

Correlations

		Age of the respondent	Educational status of the respondent	The respondent's attitude towards the protected forest
Age of the respondent	Pearson Correlation	1	-.428**	-.318**
	Sig. (2-tailed)		.000	.000
	N	132	132	132
Educational status of the respondent	Pearson Correlation	-.428**	1	.793**
	Sig. (2-tailed)	.000		.000
	N	132	132	132
The respondent's attitude towards the protected forest	Pearson Correlation	-.318**	.793**	1
	Sig. (2-tailed)	.000	.000	
	N	132	132	132

**. Correlation is significant at the 0.01 level (2-tailed).

From table 21 above, one can see that there is a statistically significant negative correlation between age of the respondents and their attitude towards the protected forest ($r = -.318$ at $p < 0.01$). The finding supports the hypothesis which states that the respondents older in age

tend to have less favorable attitude towards the protected forest. Nevertheless, there is only a moderately weak correlation between the two variables as the value of correlation coefficient lies between 0.3 and 0.5. With regard to the association between educational status of the respondents and their attitude towards the regenerated forest, there is a strong positive correlation as $r=0.793$ at $p<0.01$. Therefore, the test result supports the hypothesis of this study which states that more educated people tend to have more favorable attitude towards the rehabilitated forest.

4.6.2. The size of farmland held by the households and the respondents' attitude towards the forest

Table 22. The correlation between the sizes of farmland held the households and the respondents' attitude towards the forest

Correlations

		Size of farmland in hectare	The respondent's attitude
Size of farmland in hectare	Pearson Correlation	1	.284**
	Sig. (2-tailed)		.001
	N	132	132
The respondent's attitude	Pearson Correlation	.284**	1
	Sig. (2-tailed)	.001	
	N	132	132

**. Correlation is significant at the 0.01 level (2-tailed).

As shown in table 22 above, one can see that there is statistically significant positive association between the size of agricultural land owned by the respondents' household and the respondents' attitude towards the protected forest as $r=0.284$ at $p<0.01$. Though the test result supports the hypothesis formulated by the researcher initially, the association between the variables is weak as the value of correlation coefficient is less than 0.3.

4.6.3. Distance of the households from the forest and attitudes towards the forest

Table 23. The correlation between distance of the households from the forest and the respondents' attitude towards the protected forest

		Correlations	
		Distance of the households from the forest in Kms	Attitude towards the forest
The distance of households from the forest in Kms	Pearson Correlation	1	.513**
	Sig. (2-tailed)		.000
	N	132	132
Attitude towards the protected forest	Pearson Correlation	.513**	1
	Sig. (2-tailed)	.000	
	N	132	132

**. Correlation is significant at the 0.01 level (2-tailed).

The above table examines if there is association between distances of the respondents' households from the forest area and the respondents' attitude towards the protected forest. As shown in the table, $r=.513$ at $p<0.01$ which signifies the existence of statistically significant moderately strong positive relationship between the two variables. Therefore,

the finding supports the initial hypothesis of the study which says people residing far away from the forest area are likely to have more positive attitude towards the protected forest. Less favorable attitude associated with living closer to the protected forest is perhaps due to a considerable reduction of the households' dependence on the forest and noticeable harms caused by wild life as evidences collected from FGDs suggest.

4.6.4. Main source of fuel-wood and fodder, and attitude towards the forest

To examine the difference in attitude among respondents whose households get fuel-wood and fodder from different sources, one-way ANOVA was computed and presented in the following table.

Table 24. Difference in main source of fuel-wood and attitude towards the protected forest

ANOVA

Attitude towards the protected forest

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	6.423	2	3.212	.034	.967
Within Groups	12207.819	129	94.634		
Total	12214.242	131			

The above table examines if there is a significant difference in attitude among respondents whose household's main source of fuel-wood is different. However, as the test result shows, there is no statistically significant difference among the respondents in this regard as determined by one-way ANOVA ($F(2,129) = .034$, $p = .967$). This goes in contrary to

the hypothesis made initially by the researcher which states that there is difference in attitude among respondents who obtain fuel-wood from different sources.

Table 25. Difference in main source of fodder and respondents' attitude towards the protected forest

ANOVA

The respondents' attitude towards the protected forest

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	750.704	3	250.235	2.794	.043
Within Groups	11463.538	128	89.559		
Total	12214.242	131			

There was a statistically significant difference in attitude towards protected forest among respondents who obtain fodder from different sources as determined by one-way ANOVA ($F(3, 128) = 2.794, p = .043$). Here, the finding goes in hand with the hypothesis which states there is difference in attitude among the respondents who obtain fodder from different sources.

In addition to correlation analysis presented above, a multiple regression was run in order to check for spuriousness of the associations and differences found out by the tests used in the foregoing section.

Table 26. the relationship between demographic, socio-economic and geographic characteristics and attitude towards the forest

ANOVA^a

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	8664.403	6	1444.067	50.850	.000 ^b
Residual	3549.839	125	28.399		
Total	12214.242	131			

Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
	B	Std. Error	Beta			Lower Bound	Upper Bound
(Constant)	12.855	2.910		4.418	.000	7.097	18.614
Age	-.035	.057	-.033	-.605	.546	-.148	.079
Educational status	1.492	.139	.646	10.736	.000	1.217	1.768
The size of farmland	6.046	1.709	.187	3.538	.001	2.664	9.429
Distance of the respondent's house	2.042	.429	.252	4.762	.000	1.193	2.890
Main source of fire wood	.238	.397	.032	.599	.550	-.548	1.024
Main source of fodder	.307	.428	.037	.718	.474	-.539	1.153

a. Dependent Variable: The respondent's attitude towards the forest

b. Predictors: (Constant), Main source of fodder , Age , distance of the respondent's house , size of farmland , Main source of firewood , Educational status

A multiple regression was run to predict the respondents' attitude towards the forest from age and educational status of the respondents, farm size of the respondents' households, the distance of the respondents' house from the forestland and the main source of fuel-wood and fodder for the respondents' households. As F ratio in ANOVA table above shows that the independent variables statistically significantly predict the dependent variable, $F(6, 125) = 50.850$, $p < .0005$, $R^2 = .709$. However, when the t-value for each variable is considered, attitude towards the forest is explained only as a result of educational status of the respondents, farm size of the respondents' households and the distance of the respondents' house from the forestland. The rest variables such as age of the respondents, and the main source of fuel-wood and fodder for the respondents' households didn't statistically significantly predict the respondents' attitude towards the protected forest.

To conclude, educational status of the respondents, size of agricultural land of the respondents' households and the distance of respondents' households from the forestland were found to be important variables that influence the attitude of the respondents towards the regenerated and protected forest

CHAPTER FIVE: CONCLUSION AND RECOMMENDATIONS

5.1. Conclusion

This study was intended to investigate the impacts of Humbo Afforestation/Reforestation Clean Development Mechanism project on the livelihoods of local people participating in the project and their attitude towards the rehabilitated forest.

To conduct the study, data was collected from sample households randomly selected from three Forest Development and Protection Cooperatives namely Bola Wanche, Bossa Wanche and Hobicha Badda. The total number of respondents was 132 of which 103(78%) were males and 29(22%) were females. The survey questionnaire by which the data was collected from the respondents was composed of four parts: namely demographic, socio-economic and geographic profile of the respondents' and their households; changes in the households' access to the forestland and their responses; impacts of the project on the livelihoods of the households, and attitude towards the protected forest. In addition, four key informant interviews and three focus group discussions were carried out in order to identify the impact of the A/R project on the community level assets of the concerned communities. The quantitative data were analyzed using descriptive statistics, bivariate correlation analysis, ANOVA (one way) and a multiple regression.

The result of this study uncovers that the introduction A/R project to the study areas resulted in noticeable sudden changes in the households' dependence on the forestland for various purposes. Fuel wood and fodder were forest products access to which depends on their availability in the forest, whereas extraction of charcoal and taking livestock for grazing were absolutely outlawed activities in the course of the households' dependence on

the rehabilitated forest. The sudden changes in the households' dependence on the forestland forced the households to devise various strategies to cope with the shortage and/or loss of the resources. Though significant number of households was coping with the shortages of resources by resorting to use their private resources, resource poor households were coerced to incur unprecedented costs to purchase the forest products, to tether their cattle and, to the worst, to reduce their livestock possession. Therefore, it indicates that the resource poor households have been hard hit by the sudden restrictions on access to forest resources.

The analysis on the impacts of A/R project on the livelihood assets of the households suggests that the project runs the risk of not effectively contributing to the livelihood assets of households as the carbon revenues were reserved for building community level capitals. In fact, the project created some job opportunities, provided various trainings and equipments to contribute to the livelihoods of the households. The training opportunities enhanced the skill of about a quarter of households thereby contributing to the livelihood of the households. However, as almost all job opportunities were of a very short duration and existed only at about the beginning of the project, the income that could be generated from them hardly enables the households (i.e. particularly the households not benefiting from the income generating activities introduced by the project) to sustainably invest it on the other assets of the households.

With regard to the impact of the project on the livelihood strategies of the households, in fact, the project has introduced some alternative farm and non-farm livelihood activities to the area and a handful of households successfully adopted them. However, the finding of this study demonstrated that the project was detrimentally affecting livestock production

which is integral part of main livelihood of the households. And its impact on crop production was encouraging for households located far away from the forest while being detrimental for households close to the forest particularly due to the severe damage on crops caused by wild animals. Furthermore, more than half of the households who used to engage in one or more forest based livelihood activities were left without alternative livelihood activities due to the seizure of the forest by the project.

When one considers the overall impact of the A/R project on the livelihood outcomes of the households, it was positive for few households (i.e. 22%) who have successfully adopted and were benefiting from the alternative livelihood activities introduced to them by the project. For the rest households (i.e. particularly for those that had been highly dependent on the forest for one or more forest products and who are located in the vicinity of forest), the project's impact on the livelihood outcomes was negative since it exposed their crop to the attack of wild life, prevented the income they used to generate from the sale of livestock, and other forest products and whereby making the households more food insecure and vulnerable than they had been.

The impacts of the project on community level assets were more apparent and positive relative to its impacts on household level livelihood assets. In this regard, more specifically, community level human, financial and physical capitals of the communities were enhanced without opportunity costs to the concerned communities. With regard to social capital of the concerned communities, the project managed to enhance the capacity of the communities to work together in order to sustainably manage their respective portion of forest; to develop new institutions for forest management and which in turn enhanced their capacity to easily communicate and cooperate with other formal organizations like

Water, Mine and Energy department of the zone. However, important social institutions such as arrangements for joint ownership and share breeding of livestock, arrangements for exchange of draught oxen and other informal social support systems were increasingly weakened due to the project activities. Likewise, environmental assets of the concerned communities were enhanced with the opportunity cost of losing fuel wood, fodder and grazing land and security of crops and livestock for some.

Though the physical and financial capital of the communities were enhanced without direct opportunity cost by the concerned communities, the way they are enhanced was not in line with the priority needs of the concerned communities. This in turn indicates that the plans for enhancement of physical capitals in particular and for the utilization of financial capitals in general were imposed by the project initiators. This was further signified by the similarities of physical capitals built across communities and plans for the utilization of financial capital.

Finally, with regard to the association between certain demographic, socio-economic and geographic characteristics of the respondents' and/or the households, respondents who are younger, more educated, possessing larger size of agricultural land and living far away from the forest were found to have more positive attitude towards the protected forest than those who are older, uneducated, possessing smaller size of agricultural land, and living closer to the forest. There was also statistically significant difference in attitude among respondents who obtain fodder from different sources. However, only educational status, size of farmland and the distance of the households from the forestland were found to statistically significantly predict the attitude of the respondents towards the forest.

5.2. Recommendations

In this sub section of the chapter, the researcher gives some recommendations based on the findings of this study.

- The pressing issue of human-wildlife conflict requires collective action of concerned FDPCs, and Agricultural and Rural Development office of the *Woreda* (district). In this regard, fencing the forest area by planting locally available thorny trees (e.g. *Alkashaa*) was identified by participants of focus group discussions as a cost-effective mechanism to reduce threats from wildlife. Therefore, mobilizing cooperative members to seek indigenous solutions for threats from wild life as well as utilizing a portion of carbon revenue primarily for fencing the forest area is likely to save the life of people in the vicinity of the forest.
- Strengthening the indigenous knowledge and skill of farm households through trainings thereby to capacitate them to cultivate more *Enset* plant is a viable strategy since it addresses the issue of both food insecurity and fodder scarcity in the area. Furthermore, encouraging the adoption of such innovations introduced to the households as planting trees on own farm and using improved cook stove is likely to reduce fuel-wood shortage and associated costs encountered by some households.
- Developing a framework for micro-credit services in each cooperative is likely to enhance access to financial assets by cooperative members and thereby enable them build their livelihood assets, diversify their livelihood strategies and improve their livelihood outcomes. Moreover, doing so may play an important role in linking the environmental protection endeavor of the project with the immediate livelihood needs of farm households.

- The decision over what to do with the carbon revenue in general and which community level capitals to build in particular needs to be made by the active participation of the concerned communities. Doing so is likely to meet the priority needs of the concerned communities, enhance the sense of ownership of the forest among the members of the communities and thereby contributes to the sustainability of forest management and carbon sequestration. To this end, World Vision Ethiopia needs to assume only an advisory role in deciding on utilization of the benefits particularly carbon revenue.

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APPENDICES

Appendix A: Profile of Study Participants

I. Key Informants

S. N	Name	Sex	Age	Occupation	FDPC	Role in FDPC	Date of interview
1	Henok Madebo	Male	40	Farmer	Hobich Badda	Member of FDPC committee	06/04/2014
2	Teferi Seta	Male	45	Farmer	Bola Wanche	Member of FDPC committee	13/04/2014
3	Tekle Tantu	Male	39	Farmer	Bossa Wanche	Member of FDPC committee	20/04/2014
4	Belete Boqe	Male	69	Farmer	Bossa Wanche	Member	20/04/2014

II. Participants of Focus Group Discussions

S. N	Name	Sex	Age	Occupation	FDPC	Role in FDPC
1	Mola Ade	Male	54	Farmer	Bossa Wanche	Member
2	Meskele Fola	Male	52	Farmer	Bossa Wanche	Member
3	Abalyawu Jage	Male	46	Farmer	Bossa Wanche	Member
4	Konjit Kolcha	Female	33	Farmer	Bossa Wanche	Member
5	Addise Mane	Female	41	Farmer	Bossa Wanche	Member
6	Yonas Teqa	Male	49	Farmer	Bossa Wanche	Member
7	Alana Nega	Male	56	Farmer	Bola Wanche	Member
8	Solomon Alaro	Male	41	Farmer	Bola Wanche	Member
9	Daka Malle	Male	52	Farmer	Bola Wanche	Member
10	Hirut Godana	Female		Farmer	Bola Wanche	Member
11	Meselech Anamo	Female	37	Health Extension worker	Bola Wanche	Member
12	Tesfaye Galcha	Male	40	Farmer	Bola Wanche	Member
13	Merkine Mulatu	Male	44	Farmer	Hobicha Badda	Member
14	Abera Teqa	Male	48	Farmer	Hobicha Badda	Member
15	Paulos Oda	Male	42	Farmer	Hobicha Badda	Member
16	Dinknesh Dingato	Female	34	Farmer	Hobicha Badda	Member
17	Mekbib Mana	Female	36	Farmer	Hobicha Badda	Member
18	Merkin Maja	Male	50	Farmer	Hobicha Badda	Member

Appendix B: Instruments

I. Household Head Survey Questionnaire

Addis Ababa University
College of Social Science
Department of Sociology

Dear respondent, the purpose of this study is to collect information on the impacts of Humbo Afforestation/Reforestation Clean Development Project on the livelihoods of households surrounding the forest and their attitude towards the regenerated forest. Participation in this survey is voluntary and the responses you give are extremely confidential. For the results of the research project are dependent on your genuine answers, I kindly request you to answer all the questions. I thank you in advance for your cooperation!

Direction for enumerators: *Please encircle the number of respondent's choice, or write the answer in the space provided if it is 'other'.*

Section one: Households' Demographic and Socio-economic Profile

1. Sex of the respondent
 1. Male
 2. Female
2. Age of the respondent _____
3. Number of people living in your household(Family size) _____
4. Educational status of the respondent _____
5. What is your main livelihood activity?
 1. Farming (i.e. crop production and livestock rearing)
 3. Pottery
 2. Trade
 4. Charcoal making
 5. Daily labor
 6. If other, please specify _____
6. Do you hold farmland?
 1. Yes
 2. No
7. If your answer is "Yes" for question No 6, what is the size of your farmland in hectare?_____ (Hint: 1 hectare= 4 *Timad*).

8. Do you have your own separate grazing land?
1. Yes
 2. No
9. How long is the walking distance from the forest land to your house? _____ kms.
- (Hint: 1km= 10-15 minutes adult walk)

Section Two: Forest Resources the Households are denied access and their Coping Strategies

10. Had you harvested any forest product from the Humbo forest immediately before the introduction of the A/R project?
1. Yes
 2. No
11. If your answer for the question No 10 is “Yes, which forest product did you use before the introduction of the A/R project?
1. Fire wood
 2. Fodder
 3. Timber for construction
 4. Wood for Charcoal making
 5. If other, please specify _____
12. Is there any forest resource that you are currently allowed to harvest from the restored forest?
1. Yes
 2. No
13. If your answer for question No 12 is “Yes”, what are the forest products you currently harvest from the regenerated forest? (Hint: More than one answer is possible)
1. Fuel wood
 2. Fodder
 3. Wood for charcoal
 4. Medicinal plants
 5. If other, please specify _____
14. What do you use for domestic energy?
1. Firewood
 2. Animal dung
 3. Crop/farm residue
 4. If other, please specify _____
15. If you use firewood for domestic energy, what is the main source of firewood for your household?
1. Own land
 2. Community forests in other areas
 3. The forest under rehabilitation
 4. From market
 5. If other, please specify _____

1. Yes 2. No

17. Do you have livestock?

18. If your answer for question No 17 is “Yes”, what is the main source of fodder for your household?

19. Do you think the A/R project improved your access to fodder?

20. If you have livestock, where did you take them for grazing before the introduction of the A/R project?

21. Where do you take your livestock for grazing currently?

22. Do you ever use agricultural lands for animal grazing?

23. If your answer for question No 22 is “Yes”, why?

24. Did you sell cattle due to the restriction of grazing in the forest area?

25. Did you get any cash income from the forest resource before the introduction of the project?

26. If you answer for question No 25 is “Yes” , how do you make up the loss of source of cash income _____

27. Had you ever used the forest for supportive income generating activities in food insecure seasons?

1. Yes 2. No

28. What is the supportive income generating activity of your household after the introduction of the A/R CDM project? _____

Section Three: Impacts of the A/R Project on the Livelihoods of Households

29. Have new jobs been created by the A/R project?

1. Yes 2. No

30. If your answer for question No 29 is “Yes”, have you/any member of your household benefited from the job opportunities created by the project?

1. Yes 2. No

31. Are you/any member of your family currently employed in any job related to the project?

1. Yes 2. No

32. If your answer is “Yes” for question No 31, in which type of job are you engaged?

1. Seedling production 2. Forest gardening 3. Forest replanting
4. If other, please specify _____

33. Has the project provided new trainings?

1. Yes 2. No

34. Did you take training in any income generating activity?

1. Yes 2. No

35. If your answer for question No 34 is “Yes”, please mention the income generating activities in which you took the training?

1. Bee keeping 2. Sewing 3. Poultry 4. Fruit tree production
5. If other, please specify _____

36. If you have taken training in any income generating activity, are you currently engaged in those income generating activities to generate income?

1. Yes 2. No

37. If your answer for question No 36 is “No”, why? _____

38. Has the number of other trees species planted on your own farms increased after the introduction of the project?

1. Yes 2. No

39. Did the project assist you in getting seedlings to plant on your own farms?

1. Yes 2. No

40. Has there been transfer of any kind of equipment (tools) to you by the project?

1. Yes 2. No

41. If your answer for question No 40 is “Yes”, which one?

1. Improved cooking stoves 2. Modern bee-hive 3. Sewing machines

4. Farm implements 5. If other, please specify _____

42. Do you think that your access to potable water has improved after the introduction of the project?

1. Yes 2. No

43. If your answer for question No 42 is “Yes” do you think it is associated with the project?

1. Yes 2. No

44. Have you ever received cash income from carbon sell?

1. Yes 2. No

45. If your answer for question No 44 is “Yes”, how much? _____

46. If your answer for question No 44 is “Yes” what did you do with the income?

47. Do you think the monthly/yearly income of your household has increased after the introduction of the project?

1. Yes 2. No

48. If your answer for question No 47 is “Yes”, do you think an increment in your monthly/yearly income is associated with the project?

1. Yes 2. No

49. Do you get loan services from Forest Development and protection Cooperatives?

1. Yes 2. No

1. Yes 2. No

1. Positive 2. Negative

1. Yes 2. No

1. Fuel wood selling
2. Selling grass
3. Charcoal making
4. Selling fuel wood and grass
5. If other, please specify _____

1. I view the forest as a property of me and my community.
1. Strongly disagree 2. Disagree 3. Agree 4. Strongly agree
2. I would support if the protection of the forest land continues.
1. Strongly disagree 2. Disagree 3. Agree 4. Strongly agree
3. I would report if I see others causing damage to the forest area.
1. Strongly disagree 2. Disagree 3. Agree 4. Strongly agree
4. I view the forest as making no contribution to my living condition in this area.
1. Strongly agree 2. Agree 3. Disagree 4. Strongly disagree

5. I support punishment imposed on illegal poachers of the forest
 1. Strongly disagree
 2. Disagree
 3. Agree
 4. Strongly agree
6. I would prefer if access to forest become open as it had been before the project.
 1. Strongly agree
 2. Agree
 3. Disagree
 4. Strongly disagree
7. I feel I would protect the forest if supervisions from World vision cease.
 1. Strongly disagree
 2. Disagree
 3. Agree
 4. Strongly agree
8. I feel I am made to protect the forest outside of my interest.
 1. Strongly agree
 2. Agree
 3. Disagree
 4. Strongly disagree
9. I view the forest as a threat to the life of my family and my domestic animals.
 1. Strongly agree
 2. Agree
 3. Disagree
 4. Strongly disagree
10. I perceive that benefits of the protection of the forest outweigh its costs for my household.
 1. Strongly disagree
 2. Disagree
 3. Agree
 4. Strongly agree

II. Interview Guide for Main Key Informants

1. Name -----
2. Age _____
3. Educational background _____
4. Occupation _____
5. Role in FDPC _____
6. Impacts of the A/R project on the education, and health of the community members
7. The impact of the project on transfer of knowledge in the community
8. The impact of the project on the capacity of the community members with regard to natural resource management, financial management, and wild life management
9. Conditions of access to forest resources by members and various groups of the community
10. Impact of the project on local organizations or institutions
11. The impact of the project on the wind and water erosion on lands adjacent to the protected forest areas
12. The impact of the restoration of the forest on rain condition and water resources (have water streams restored? New ones emerged?)
13. View on the restoration of wild animals to the protected forest
14. Contribution of the project to infrastructural development in the community
15. The project's impact on community members' access to credit services

III. Check List for Focus Group Discussions

Impacts on Community Level Human Capital

1. Impacts of the project on the education, and health of the community members (i.e. access to health care, education, drinking water and so on)
2. The impacts of the project on transfer of knowledge and skill in the community
3. The impacts of the project on the capacity of the community members with regard to natural resource management, financial management, and wild life management

Impacts on the Social capital of the community

1. The project's impact on organizations or institutions of the community
2. Impacts on the unity and cooperation among community members
3. Their view on access to resources by various groups of the community; and distributions of benefits and compensations made
4. Impacts on participation of community members in their affairs

Impact on community environmental resources

1. The impacts of the project on the wind and water erosion on lands adjacent to the protected forest areas
2. The impacts of the restoration of the forest on rain condition and water resources (restoration and emergence of water streams)
3. Their view on the restoration of wild animals to the protected forest

Impacts on Community level Physical Capital

1. The project's contribution to infrastructural development in the community (i.e. impacts on creation or improvement of bridges, schools, health centers, roads, water supply and so on in the community)
2. Infrastructural developments in relation to the priority needs of the communities

Impacts on Community financial Capital

1. Impacts on the saving habit of the community members
2. Impacts on community members' access to credit services

Coping strategies of the households

1. The way the households cop with restrictions on access to forest resources

DECLARATION

I, the undersigned, declare that this thesis is my original work, and has not been presented for a degree in any other university, and that all the sources of materials used for the thesis have been fully acknowledged.

Name: _____

Signature: _____