Journal of Resources Development and Management www.iiste.org
ISSN 2422-8397 An International Peer-reviewed Journal DOI: 10.7176/JRDM
Vol.58, 2019

Forest Management Cost at Household Level in the Bale Mountains Eco-Region Redd+Project, Southern Ethiopia

Adamu Debelo Fetensa[1] Mustefa Sultan Dalu[2] Tadese Bedada[3]
1.Department of Economics, Faculty of Business and Economics, Ambo University, Ambo, Ethiopia.
2.Department of Forestry, College of Agriculture and Environmental Science, Arsi University, Assela, Ethiopia.
3.Oromia Urban planning Institute, Addis Abeba, Ethiopia.

Abstract
Effective forest use and management/governance requires a deeper understanding of forest's multiple socio-economic functions or benefits at various scales, in particular at local level. Hence, reliable and up to-date information on the state of forest resources are very important. Thus, the main objective of the study was to assess the cost of forest management at household level. Accordingly, Data were collected through household survey, group discussions and key informant interviews. Statistical methods such as descriptive statistics and Leaner regression was used to analyse data. The results of the study show that the performance of user groups and the attitudes and intention of households towards participating in collective management are associated with level of income and dependence on forest income. User groups that are more dependent on forest income and have higher heterogeneity in terms of dependence on the forest resource have shown lower performance. Forest dependent households have also shown a less positive attitude and intention towards engaging in planting activities. Forest prices were obtained by surveying local markets, and from information from interviews with local residents and from focus group discussions. The amount of forest management cost is calculated by the sum of thinning, cleaning, pruning, patrolling, fie line development, forest products collection costs transaction costs, costs of operational, plan preparation, attending a meeting, Capacity building, material costs and annual membership and fee that a member household has to pay were identified in study. The cost of forest management is estimated by the sum of Forest products collection costs, Transaction costs, Material costs, the annual membership fee that a member household has to pay. Accordingly, results revealed that in the study areas estimation of forest management cost is about 19,925 birr per ha up to the forest can give the actual function. It is recommended that a better outcome in terms of poverty alleviation can be achieved if pro-poor forest-based activities are specifically considered in planning conservation and development interventions.
Keywords/ phrases: Bale Eco Region, Forest income, forest-management at household level, Oromia, Ethiopia, REDD+
DOI: 10.7176/JRDM/58-01
Publication date: August 31st 2019

INTRODUCTION

Back Ground

Sustainable forest management follows that if communities are to be willing and economically able, to involve themselves in forest management then they must receive greater economic benefits from conserving forests than from degrading them. Hence, economic incentives provide tools for ensuring that both of these conditions are fulfilled (Soromessa et al., 2015). Such economic incentive provision requires that broader socio-economic conditions are supportive of community involvement in sustainable forest management, and that forest management systems themselves generate tangible benefits at the local level (Tesfaye et al. 2010).

There is a clear need to ensure that sustainable forest management is economically desirable to communities in the interests of local economic welfare as well as towards the end of sustainable forest management. In other words, it is necessary to set in place incentives for community involvement in sustainable forest management (Teyiba A, Mustefa S, 2017). A report estimates the economic benefit and costs for the Multi-Stakeholder Forestry Program (MSFP) in Nepal (MSFP, 2011). Among others the report shows that benefits of community forestry come from direct extraction of timber, fuel wood, fodder, grass leaf litter due to the improved sustainable forest management and some indirect benefit due to higher carbon sequestration, soil stabilization, reduced flood risks and improved biodiversity.

Significance of the Study

Overall issues related to the involvement of indigenous people and local communities in the REDD+ project implementation and factors determine household participations in forest management and economic incentives have not been researched and analyzed.

Therefore, as this study focuses on the estimation of economic contribution of forest resource to household economy for REDD+ in the Bale Mountain Eco region, it generates important knowledge on roles of forest in local livelihoods and the implications of this for local development and forest conservation. Study in the Bale Mountain

Eco-region REDD+ Project, Southern Ethiopia with maximum amount communities can contribute for forest economy and finally assessing contribution of community forest contribution in nesting the Bale REDD+ project to the OFLP and its importance in implementing the strategy is very timely to help REDD+ to be delivered through community forest management.

Hence, the information generated from thesis will possibly use to improve planning and implementation REDD+ and related projects to enhance the forest contribution to household local economy development and overall social-ecological sustainability.

Ethical Considerations

Although there are no risks of participating in this study, all of the participants have been treated in accordance with the ethical guidelines of a qualitative research. Throughout the study, the researcher has provided an appropriate focus for ethical issues like other kinds of scientific researches. Everyone who has participated in this study has been freely acquiesced; personal identities has been kept confidential; moral standards has been applied to decisions made in planning, conducting and reporting of the results; and there has been no deliberate misrepresentation of the purpose of the study and overstatement or understatement of the findings. Moreover, the thesis has been conducted following all the necessary steps to make it methodologically thorough as much as possible; all kinds of results and findings whether good or bad have been reported; the researcher has endured impartial throughout the study to avoid exclamations of personal feelings or bias

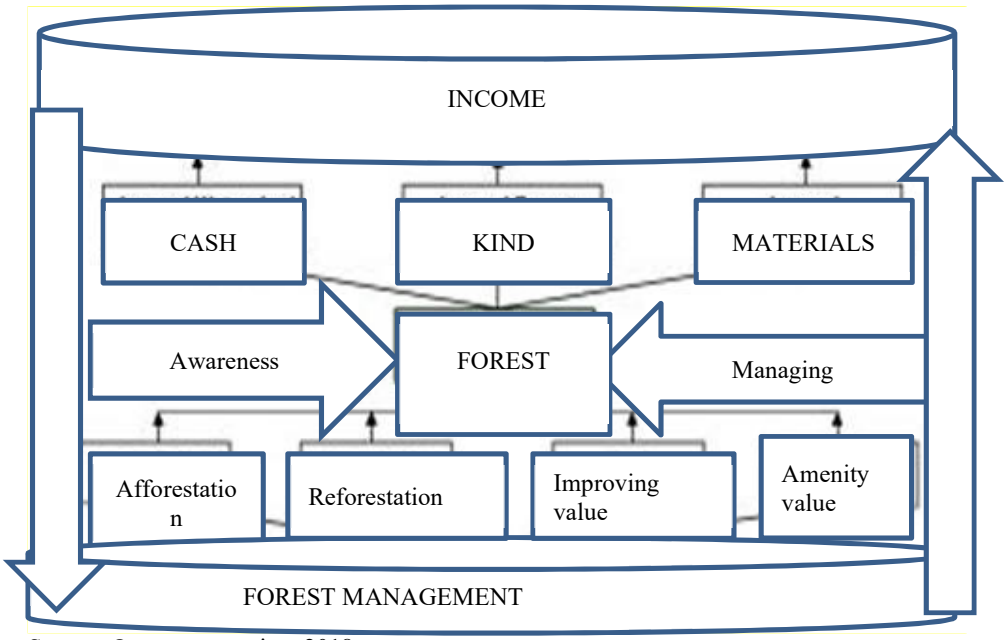
Conceptual Framework

Forestry is uniquely positioned to contribute to addressing the problems of environmental degradation and rural poverty, given the multiple roles forests can play in the provision of food, the generation of income and the maintenance of the natural resource base (Gow, 1992, Warner, 2000, Kaimowitz, 2003). Participatory forest estimation and management schemes aim at achieving these dual objectives of sustainable development. On the other hand, owing to the open access situation of forest production, the methodological difficulties of measuring forest income and proper valuation, the contribution of forest resources and their role in peoples‟ livelihoods have been neglected or underestimated. Sustainable livelihood provides a suitable analytic framework in which to conceive forests in the context of households‟ vulnerability, the multiple factors influencing access to forest resources as a natural capital including institutions and other assets, and the place of forest production in the construction of estimation forest resource. The multiple products and services of forests combined with the differential spatial distribution and production predictability preclude the divisibility of forests and thus imply their management as common property (Arnold, 1998, Jessup and Peluso, 19860).

Correspondingly, a study on the value estimation of forest resource as common property should focus on examining the role of forest resources in the contribution of income for the local people, the socioeconomic characteristics of households participating in the co-management, identifying their interests and heterogeneity with regard to forest use, forest dependency, wealth or asset ownership, and attitudes towards the estimation of income contribution.

Identifying the interaction of these contextual variables in relation to the performance of collective action as measured by livelihoods outcome (income, food security, and sustainability of the forest resource base) is provide insight for a proper identification of important contextual variables related to the forest and user groups.

In parallel with the previous experiences of changes in tenure for land and natural resources and the top-down introduction of conservation and development activities in the past, it is likely that the co-management arrangement was experienced as an external import among local people. How the participating households perceive the initiative and what attitudes they hold are debatably important aspects in understanding their commitment and the success of implementation. The study is therefore applying the framework of income contribution of forest resource for individual household and forest resource management at household level. It was use the collective action framework to examine the relationship among resource characteristics, and socioeconomic characteristics of user groups, and performance in management.



Source: Own computation, 2018
Figure 1: Conceptual framework showing forest management.

METHODOLOGY

Description of the Study Area

Location, climate, population and brief history of study area.

The Bale Mountains Eco-region lies between 5º22'–8º08'N and 38º41'–40º44'E within the Oromia Regional State in the Southern Ethiopia. Among the Bale Mountains Eco-region Adaba-Dodola is found the northern foothills of the Bale Mountains (between 6050'-7000'N la and 39007'-39022'E lo (Teshome, 1999). The Bale Mountains Eco-region is one of the two highland divisions in Ethiopia, separated from the larger called western plateau of the Ethiopian highlands by the Great African Rift Valley, one of the longest and most profound chasms in Africa and the world. The main central area of the Bale Eco-region is a high plateau, much of which is over 3000 m a.s.l. with several peaks rising from it. The highest peak in the eco-region is Tullu Dimtu (4377m), the second highest point in Ethiopia. South of the plateau the land falls steeply to the Harenna Escarpment and further into the Somali and Borana lowland plains, and further into the Indian Ocean.

Administratively, the project area comprises sixteen Districts namely Agarfa, Dinsho, Adaba, Dodola, Goba, Sinana, Gololcha, Gasera, DeloMena, Kokosa, Berbere, Harenna Buluk, Nensebo, Mada Walabu, Goro and Guradhamole. In these districts there are six priority forest areas (PFAs): Aloshe Batu, Goro Bale, Harana Kokosa, Menna Angetu, Kubayu, and Adaba Dodola, which in total are 566,258 ha including the forests in the Bale Mountains National Park or 480,910 ha without the park forests. The total population of the districts is more than 1.6 million, 85% of which is rural and the rest urban. Dodola has a total of 237,805 residents (population) with a crude population density of 42 per square kilometer.

Farm Africa and SoS Sahel-Ethiopia have worked in the Bale Eco-region since 2006, addressing deforestation by developing and pioneering a Participatory Forest Management (PFM) approach and a REDD+ scheme. Up to date 100 CBOs established to manage and use the forest resources sustainably. About 64 of the established CBOs are selected as REDD+ CBOs. Anthropogenic deforestation is one of the major environmental problems in Bale Eco-region: between 2000 and 2011, the Eco-region experienced an average annual deforestation rate of 2.6% and lost 178,000 ha of high forest. During this period, it caused emissions of 70 Mt CO2e GHG and had a significant detrimental environmental impact on biodiversity and livelihood opportunities (OFWE, 2014).

A bimodal local climate with two wet seasons that have heavy and small rains is characteristic in the eastern part of the project area, while the western part is characterized by a mono-modal rainfall pattern. In the part with a bimodal rainfall pattern, heavy rain occurs from July to October, with the highest peak in August and the small rains from March to June, with a peak in April. There are typically eight rainy months (March-October) and four dry months (November-February) in a given year in the part with mono-modal patter. The far south and lower altitudinal areas experience a shorter, four-month rainy season usually from February to June. This lower altitude area receives between 600-1000mm of rainfall annually, whereas the higher altitudinal areas receive between 1000-1400mm. The mean annual temperature of Bale-Eco region and Dodola district are 14°C and 16°C

respectively. The daily temperatures during the dry season show high fluctuation. The lowest temperature that has been recorded in the mountains is -150°C at night, with the highest recorded temperature the next day of +260°C; thus a range of 400°C within a 24-hour period.

The vegetation ecosystems of the Bale Eco-Region include: Afro-alpine grassland, Erica forest/shrubland, Mountain grassland, Dry Afromontane evergreen forest, Moist Afromontane evergreen forest, Bamboo forest, Combretum-Terminalia woodland, Acacia-Commiphora woodland and Wetland. The fauna and flora species in the eco-region comprise a large percentage of Ethiopia's endemics, some species of which are only found in Bale.

The main soil types common in the area are Cambisols, Vertisols, Luvisols, Lithosols and Nitosols. There is limited information on the conditions of the soils of the eco-region due to limited study on soils of the area. However, the Vertisols, Cambisols and Luvisols in the wide plateau of the eco-region are very fertile supporting subsistent and commercial agriculture with high productivity to the standard of the country.

Specifically Dodola is one of Bale mountain Eco region found in the Oromia national regional state (ONRS) of Ethiopia in the West Arsi Zone administrative area in the Dodola district (district) (Figure 2). It has a total area of 356,006 km2 constituting 35% of the total population and 31% of the total area of the country (CSA, 2008). About 12.4% of the population lives in urban areas. The forest area is situated in the Bale Mountains eco-region. The Bale Mountains eco-region is known for its extensive area of Afro-alpine, as the origin of four major rivers, which are the only sources of perennial water for the arid lowlands of the east and southeast of Ethiopia, and for its unique and diverse fauna and flora (CRSO-BARD). It is the location of the Bale Mountains National Park and several forest priority areas (ibid). The climate of Bale ranges from tropical in the southeaster lowlands to alpine in the north-western highlands, the altitude varying between 400 and 4377m a.s.l. (GFA, 1991).

The total population of the district is about 194,000. The urban population of 35, 000 (18%) is one of the largest in the zone (CSA, 2008). An early estimate indicated that 95% percent of the total population belongs to the Oromo ethnic group and the remaining 5% constituted mainly of the Amhara and Guraghe ethnic groups (GFA, 1991). Based on the households sampled in the survey, almost all households are from Oromo ethnic groups. For the Dodola area, June, July and August constitute the growing season when the cultivation, seeding, fertilizing and weeding activities take place. September is the month with a relatively low level of agricultural work. Harvesting starts in October for barley, November for teff, and between November and December for wheat.

About 60% of the rainfall comes in the main rainy season from June to August while a small amount of rainfall occurs between January and March followed by a dry spell in May. The main dry season is in November and December (IFMP, 2002).

The daily temperature varies between 14°C and 17°C at an altitude of 2500m (ibid). A daily temperature variation between 8°C and 27°C has been recorded for the years 1996 – 2002.

Table 1: Dodola district WAJIB with their members

No	CBO Name	Members		
		Male	Female	Total
1	Adele	238	76	324
2	Ashena Robi	94	26	120
3	Dobedo Kuse	86	202	288
4	Hara Bubiftu	200	88	288
5	Mekalitu Ode	168	30	198
6	Bura Chele	206	48	254
7	Burkitu Bikika	168	32	200
8	Berisa	135	28	163
9	Deneba	347	115	462

Source: Survey data (2016) REDD+ field office.

DOI: 10.7176/JRDM

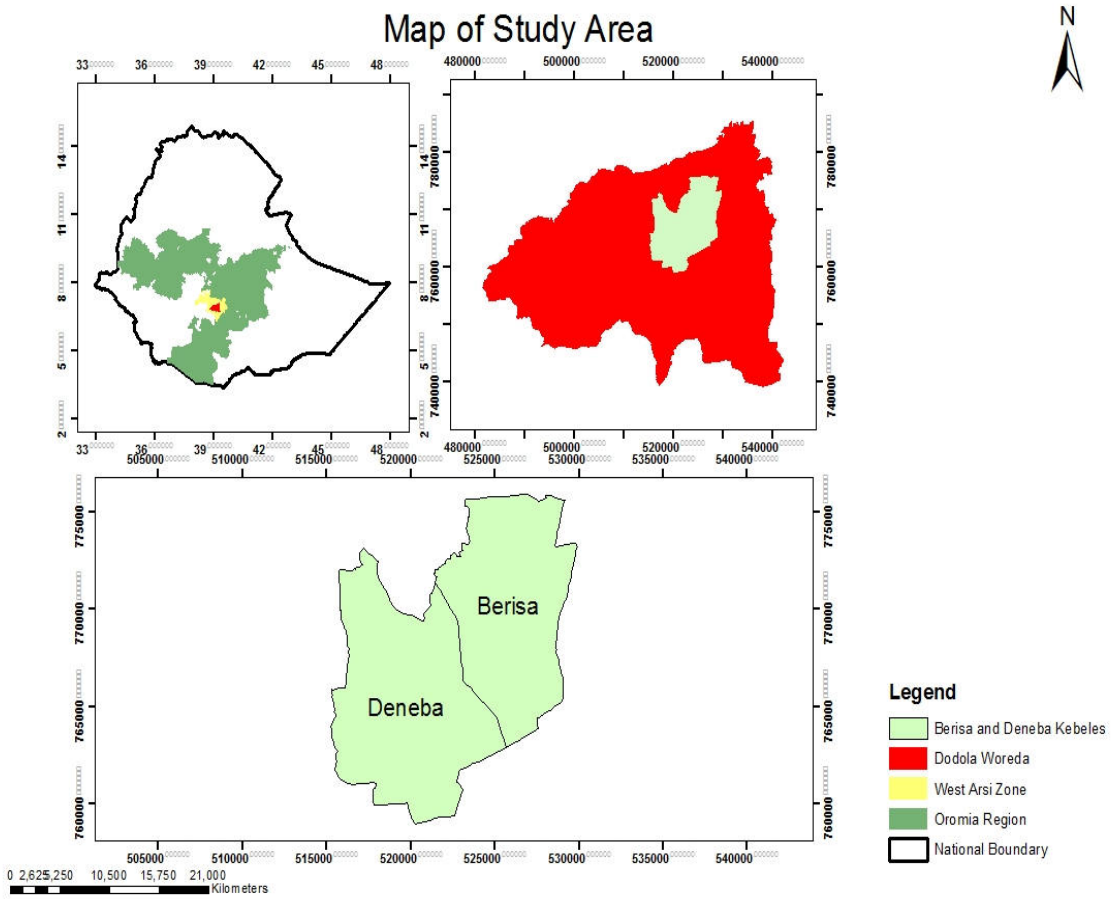


Figure 2: Geographical location of the study area

Sampling Design and Procedures

Bale REDD+ is being implemented in 11 districts of Bale eco-region. Among 11 Bale REDD+ phase project intervention districts, only one district, Dodola, has been randomly selected. The district has 9, REDD+ CBOs. Among 9 REDD+ CBOs, 2 REDD+ CBOs namely Deneba and Berisa were randomly selected. For this study, a 153 sample households were selected based on the sample size of population in the study area or. To select sample of household simple random sampling method was employed. In-person interviews are generally believed to produce the better data, though they are very expensive to undertake. Secondary data desirable was taken from Bale REDD+ field office and data was taken from different individuals as secondary source

Sampling

Data for the empirical study were drawn from, closed formal questionnaire designed for gathering relevant quantitative and qualitative data from respondents. The reason for choosing those two PAs among the 9 of CBO was their pioneering role in concluding contracts with the forest administration implementing the WAJIB approach. WAJIB blocks were stratified into groups based on strata neighbours and selection of blocks was made randomly from each strata. Two separate lists of kebeles, one from Deneba and other from Berisa, were compiled (Table 1). The member of households in each WAJIB members was as shown compiled.in (Table 2). Deneba PA includes those WAJIBs that are located at the forest-agriculture frontier. Owing to their location and relative accessibility, most of the forests in these WAJIBs have been exposed to massive exploitation before WAJIB establishment.

The Berissa PA consists of the oldest WAJIBs. The new concept of forest dwellers‟ association was first accepted in the Berissa peasant association. Most of the WAJIB"s in the Berissa PA are also found at the forest frontier and close to the main road. Thus, there has been massive exploitation before the establishment of WAJIBs. Because this areas the nearest marketplace is the Dodola market place or town.

Table 2: The number of samples taken from WAJIB blocks in the studied kebeles.

S.N	Kebeles	WAJIB block	Number of Respondents	Male	Female
1	Berisa	Gede	7	6	1
		Mudi	6	6	0
		Sokora	6	4	2
		Ali	7	6	1
		Sulala	6	4	2
		Bulchano	7	6	2
	Sub-total of Berisa kebele		40	32	8
2	Deneba	Bulchana Hubo	7	6	1
		Cangeti	7	5	2
		Ido Sibilo	8	6	2
		Jeldo Bubisa	7	5	2
		Ido Wite	7	6	1
		Tarura	8	6	2
		Deneba Hida Tula	8	4	3
		Shushi Shika	8	6	2
		Birbirsa Guta	8	6	2
		Botole Changiti	7	5	2
		Sadi Oda	8	5	2
		Lobe Gutu	8	6	2
		Lephepho Dugda Guda	8	5	3
		Artu Fite	7	6	1
		Anunu Lobe	7	6	1
	Sub-total of Denebekebele		113	83	28
	Grand total		153	115	36

Table 3: Number of the Household Members in CBOs in the studied areas

kebele	Number of the interviewed households	Number of the non-interviewed households	Total number of households
		householdsHousehold	
Deneba	113	352	462
Berisa	40	124	163

Source: Survey data (2018)

This is because based on the total number of households in the two kebeles, households would have been selected 113 from Deneba (with a total of 462 households members) and 40 from Berisa (which had only 163 households members) if proportional sampling had been used (Table 3).

Thus, the study also aimed to get an even distribution of households across the two kebeles. The average number of CBO groups in the two areas was sampled 153 sample size 74% was taken from Deneba and 26% from Berisa from total number of HH based on the member ship size frame of the WAJIB members. Among the 74% and 26% of interviewed household members, 20 % and 5 % is a numbers of females households interviewed from the CBO in Deneba and Berisa respectively. In other meaning from the 74% and 26%, interviewed household 19% and 5 % interviewed is the number of female in Deneba and Berisa respectively.

Table 4: sample size determination mechanism

Determining sample size to study Opportunities and Challenges to					Establishe	community sampled HH
Kebele	CBO Name	CBO Members			Sample size	Proportionally distributed sample size
		Male	Female	Total		
Deneba	Deneba	347	115	462	153	113.0976	113
Berisa	Berisa	135	28	163	153	39.9024	40
Grand Total				625		153	153
So, study sample size adiministered to 153 farmers using rule of thumb ≥50+8m; m= number of explanatory variat						
For this study m=12	5% contingency taken above the minimum=146+(.05*146)=153					

Members of households were defined as those households that were heavy forward the CBO members. Such households had one or more household member(s) who were involved in either decision making, needs assessment, resource mobilization and implementation activities. Contributing households were those who happily involved in doing different activities without payment or direct compensation. During the survey, sampled households were identified from the two lists of member's households with the help of two committee members, from each CBO, who distinguished the households well.

Data collection instrument

Data used in this study were obtained from a questionnaire survey of 153 household heads from Deneba and Berisa communities. The questionnaire comprised mainly of structured questions in order to obtain qualified answers (Appendix 1). However, a few other questions were left open-ended to give interviewees a chance to express their views and draw lessons from their wisdom. The questionnaire was translated into the Regional language (Afaan Oromoo). It was then pre-tested, on three randomly selected households in Deneba and one randomly selected households in Berisa. Following the pre-test, some questions were deleted and others modified to improve their clarity and ensure their contextual relevance. The questionnaire was subdivided into different sections.

There was brief introduction as to what is offered by REDD+ and its expectations from households that are able to participate. The respondents were first asked if they are aware of REDD+ programme, what they are doing with REDD+ and if they were participating in the forest management and its costs. However, because there may be incentives to falsify data if the results are linked to financial flows (e.g., Nielsen and Lund 2012), strong third party verification was required. Cross-checks are provided by the government, and there is strong NGO and donor support.

Primary Data Collection Methods

Field observation

Observation would be done across visible WAJIB areas of Deneba and Berisa forest management area before conducting the main survey to understand estimation of forest income contribution processes ,production system, family members participating in forest management and also to observe age, sex ,time allocate to forest practice that have been adopted by local community in the area. Moreover, Informal discussion with local community would be done held for some general information of the topic.

Questionnaire survey

The questionnaire was prepared to collect information concerning households' background Information , forest income and estimation , forest management , income earn from forest Service, and main output of forest, respondent's perception on forest contribution and family member participating in activities, their cooperation in the role of GDP contribution of forest information etc. The questionnaire is prepared initially in English and translated into 'Regional 'language (Afaan Oromo). Enumerators would trained on the techniques of data collection and on the contents of the questionnaire, the questionnaire was pretested on randomly selected few

households and the final survey was administered.

Focus group discussion

As people discuss the way they perceive things with each other, the possibility to reveal their true feeling and understanding about the topic can be increased. This is particularly important to have information people would otherwise like to cover. In addition, this method is used to have collective view of the respondents. A focus group discussion is invariably interested in the ways in which individuals discuses certain issues as a group, rather than simply as individuals." (Bryman, 2008).

For such reasons, the researcher would conduct, at each survey site, three focus group discussions. The first team would made up of the CBO members, the second team would the community and REDD+ project staff and finally the third team would made up of the Leader of WAJIB. The size of the group varied from 5 to 10 people. As mentioned above, the main objective of the focus groups discussion would to give the researcher a broader understanding on how the community perceives the mission. Hence, the findings from the discussions would not present in the analysis and discussion part. The researcher would use the findings to triangulate data collected from the CBO member and the community via questionnaire and establish the relevancy of such data.

Key informant interview

Key informant interview would be conducted with kebele managers and different officials, working in district Forest duelers and WAJIB forest management in Dodola district practice such as development agents, and zonal experts from the Agricultural and REDD+ Office.

Secondary Data Collection Source

In this study books, journals, articles, Reports, manuals, by browsing internet website and officially statistics collected from the offices at the local district had been used as secondary source of information.

Methods of data Analysis

Data was entered to SPSS version 20 statistical packages for analysis .The statistical methods include descriptive statistics, analysis of variance, and descriptive analysis. Descriptive statistics are important tools to present research results clearly and concisely. They help one to have a clear picture of the characteristics of sample units. Descriptive statistics aggregate household level data to user group attributes such as consistence sanction of illegal forest user, forest income and other attributes of user groups.

Users 'attitudes and perceptions about forest resources.

Gibson (2001) argues that perceptions of resource salience and scarcity are necessary for collective management of forest resources. However, there was a poor level of participation in CBFM because community members did not consider forest products scarce to warrant conservation measures. In contrast, recognition of the link between the depletion of trees and the scarcity of water led one of these villages to create rules to protect a portion of their forest that was in the relevant watershed (Gibson, 2001).

Social capital

The concept of social capital is very controversial in development economics. As a result, this study does not examine how social capital influence household decision to participate in CBO programs. However, this study agrees with Coulibaly-Lingani et al (2011) who recognized social capital as an important resource for shaping individual's participation in WAJIB. This is because while the technical aspects of CBFM are important, it is the cooperation between and active participation by local beneficiaries through their community institutions that determines successful outcomes (Dahal & Adhikari, 2008).

According to Putnam (1993), social capital refers to features of social organizations, such as networks, norms and trust that enable participants to act together more effectively to pursue shared objectives. Since collective capability and action is required to manage existing and new structures created by the project, the success of CBFM programs depends upon consensus among the users. This is dependent upon the existence of trust, norms and networks, which over a period tend to be self-reinforcing and cumulative. It can also depend upon the intervention of external agencies such as Non-Governmental Organizations (D'Silva &Pai, 2003). Characteristics of groups including size and homogeneity do influence the ability of some resource users to gain trust that others will not break the rules and substantially over-harvest.

RESULTS AND DISCUSSIONS

The study implies that the perception of REDD+ in the WAJIB members is very high. This directly shows that in WAJIB there is high awareness about objectives and goals of REDD+ project. So that REDD+ project compensate different materials for the household both by cash and kind in order to achieve the objective of WAJIB. That"s

way every CBO members can easily know about the perception of these project. The result of the study directly shows what mentioned above.

Household Characteristics

The average age of the respondents was 45years (Table 4). The average family size the interviewed households was 8, which is higher than the national average of 5 persons per family. This discrepancy is probably caused by an inadequate difference of the view of "family" on the one hand and "household" on the other.

Table 6: Family structure

Socio-economic characteristics	Average	Maximum	Minimum
Age (years) of the respondent (household head)	45	90	24
Family size (no of members)	8.16	17	1
Male household members	4.2	10	1
Female household members	3.9	9	1

Source: Survey data, 2018

According to the result of Table 5 above and Figure 3 below, more than half of the sample households were children under 15 years of age. Out of the 245 children aged 6 to 14 years only 100 (40.8 %) attended school.

According to Todaro (1997) concept of "the hidden momentum of population growth," large proportion of children and adolescents in a population implies high dependency ratio in the present and large number of potential parents, which will inevitably put immense pressure on the forest resources in the future.

Meanwhile, on the FBAC document it is indicated that restricting settlements of the agreed number of homesteads in the WAJIB blocks is one of the votive duties of the WAJIB groups. In other words, the WAJIB members cannot open new settlements in the forest other than those registered homesteads during settlement census. The high proportion of young generation in the WAJIB blocks and the prescribed duty of the WAJIB groups to restrict settlements will sooner or later create tremendous internal pressure that risks the sustainability of the WAJIB approach unless something fundamental is designed.

Table7: The link between low educational level and high dependence on forest

HH head Socio Economic Factors	Forest Values For Household			Total
	Construction	Energy Supply	Income	
illiterate	18	23	45	86
primary	14	16	18	49
secondary	2	7	10	18
Total	34	44	73	153

Source: Survey data, 2018

Figure 3.shows that nearly 57.3% of household members were illiterate and only 11.3 % had more than primary education levels. So that the level of education also an impact on forest dependability. The study shows that illiterate HH members highly depend on forest than educated HH members (Table7.) As you observed from above table (7) there is a significant variation of forest use across educational status.

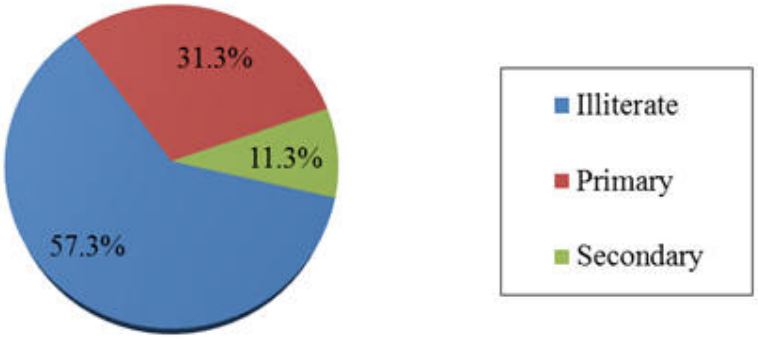


Figure 3 : Education levels of the interviewed heads households.

Source of Households Income

Crop production

The result shows that the livelihood of people in the study area is based on agriculture (crop production and livestock production). The main types of crop production that produced last year in the study area were teff, wheat, barley, beans, pea and vegetables, fruits. The income of respondents from the crop production last year is presented

in the table below.

Table 8: Income of households from crop production

Variables	No	Min	Max	Mean	Std. Deviation
Income from crop production	153	0	32300.00	11048.39	5599.97
Sales of crop production	153	0	7000	1335.78	1340.45

Source: Own survey (2018)

Table 8, shows that the income of households from crop production with average sales last year. The mean annual income from crop production in the study area is about 11048.39Br. The maximum income from crop production in the previous year was about 32300Br.

According to focus group, discussions and individuals interviews the income generated from crop production in the study area were not cover yearly budget of households in all. Therefore, this is why livelihood of households were depend on forest resource production.

Livestock Production

Table 5: Livestock production

Livestock production	No	Minimum	Maximum	Mean	Std. Deviation
Oxen	153	.00	8.00	1.8258	1.19059
Cows	153	.00	9.00	.9871	1.12231
Heifer	153	.00	3.00	.6645	.74970
Sheep	153	.00	17.00	2.4452	3.86819
Goats	153	.00	10.00	.3742	1.37769
Donkeys	153	.00	7.00	1.0387	.95946
Horses	153	.00	2.00	.2452	.46069
Poultry	153	.00	30.00	3.1548	4.33221
Calves	153	.00	6.00	.1948	.62704
Total sum)	153				

Source: Own survey (2018)

The major livestock types commonly reared in the study area include oxen, cows, heifer, sheep, goats, donkeys, horses, poultry and calves. Among these, oxen are used for farming, donkeys for carrying, and sheep and poultry are mainly kept for marketing to generate income.

Income from livestock production

Table 10: Total income and Average sales from livestock products per year

Variables	No	Minimum	Maximum	Mean	Std. Deviation
Income from Livestock	153	0	34000	4289.68	5234.71
Sales of Livestock	153	0	15000	997.16	1878.07

Source: Own survey (2018)

Table 11 shows that income of households from livestock production and average sales last year. The mean annual income from livestock production in the study area is found to be about 4289.68Br. The maximum income from livestock production in the previous year was about 34000Br. According to focus group discussions and individuals interviews the income generated from livestock production like crop production in the study area were not cover yearly budget of households in all. Therefore, this is why because livelihood of households were depend on forest resource production.

Forest Production

Types of forest used by households and ways of selling

Table 6: types of forest used by households get the most important

Variables		Frequency	Percent
Types forest	Natural forest	88	56.32
	Plantations forest(public)	30	20
	Own woodlots	36	23.7
	Total	153	100
Way of selling	market based	61	39.1
	Seasoning	59	37.8
	Illegally	24	15.4
	Legally	11	7.7
	Total	153	100.0

Source: Own survey (2018)

The result shows that more than half 56% of interviewed households were rely on the natural forest while around 44% of them were on plantations and own woodlots. This implies that majority of livelihood of households in the study areas were depended on natural forest than plantations and own woodlots.

Total Forest Income

Table 13: total income and Annual average income from selling forest products

Variables	No	Minimum	Maximum	Mean	Std. Deviation
Income from forest products	155	600	25000	9486.77	4311.89
Sales of forest products	155	0.00	10000	2720.97	1953.33

Source: Own survey (2018)

The mean annual income from forest production in the study area is found to be about 9486.77Br. The maximum income from forest production in the previous year was about 25000Br. According to focus group, discussions and individuals interviews, the income generated from forest production play great role in fulfilling to cover yearly budget of households in the study area.

Income from non-farm resources

Table 13. Household income from Non-farm sources (only 56 valid)

Sources of income	N	Minimum	Maximum	Mean	Std. Deviation
land renting	155	.00	5000.00	65.16	443.80
daily labor	155	.00	36000.00	1072.00	3914.97
food aid	155	.00	600.00	3.87	48.19
Petty trade (selling local beer, katicala, food, shopping)	155	.00	15000.00	896.39	2105.63
Others such as carpentry, pottery, civil services	155	.00	12000.00	189.35	1128.022
Valid N (list wise)	56				
Total income from non-farm	155	.00	36000.00	2140.0000	4330.03284

Source: own survey (2018)

Results (table 23) shows that out of 155 respondents, only 56 of them were valid and they respond that the non-farm resources which they generated income from were land renting, daily labor, petty trade, food aid and others such as (carpentry, pottery, civil services). From this, the mean total income from non-farm resource was 2140.00ETB and standard deviation is 4330.03ETB

The Cost of Forest Management

We present preliminary estimates of gross value of household production and consumption of wood forest products and estimate the net value of forest products (net operating margins) by subtracting from imputed gross values the cost of forest collection, processing and transportation. The gross value is calculated by multiplying quantity of a forest product harvested by its price. Forest prices were obtained by surveying local markets, and from information from interviews with local residents and from focus group discussions. Firstly, total harvest volumes, prices and gross values was presented and how the labor cost of forest gathering was estimated later.

The gross value of wood forest products collected annually from forests and woodlands is higher than the gross value of wood products.

The value of forest products account for the total value of household production and income whereas agriculture (including livestock) and other livelihood activities. An accurate assessment of the role of forest resources to local communities should take into account the cost of production. The cost of production enters into household cost-benefit calculations that influence household labor allocation decisions across different livelihood activities.

The next subsection presents an attempt to account for the cost of harvesting forest products to estimate net operating margins for different forest products harvested by local communities in the study area. In the second draft, I will examine in greater detail the differences in net operating margins and forest income communities and households derive from forests and compare these to net operating margin in agriculture.

In the study, different costs were identified. The first cost is the forest management cost, which covered the costs of silver cultural and forest protection activities including thinning, cleaning, pruning, patrolling, and fie line development. Second type of cost is the forest products collection costs that pay to the CFUG to get access to timber, fuel wood, and other products (e.g. fodder, Sal leaf, and grass). The time spent in collection was also considered as the collection costs. Third type of cost is the transaction costs, which include the costs of operational plan preparation, attending a meeting, capacity building and annual membership fee. These costs arise during the course of development and implementation of the community forest operational plan when forest users exercise their exclusive rights over common property resources (Adhikari and Lovett 2006). The inclusion of transaction costs into policy formulation is necessary to determine the failure and success of community forest management (Meshack et al. 2006). Hence, this study attempts to analyse the transaction costs separately. Since the tenure right

of the community forest is with the Government of users are not entitled to pay the rent for the forestland, the land rental cost is not included in the analysis. Fourth are the material costs that we used in this study. Forest users use various harvesting tools and means of transport.

The material costs included costs of tools' purchase and maintenance and transport. The last but not least is the annual membership fee that a member household has to pay. The costs of households' contributions are estimated either in monetary terms, if they are paid in cash, (e.g. annual membership fees) or in time when the contribution is in terms of labour, for example, participation in forest management activities (thinning, pruning) and meetings (user group assembly and user committee meetings).

Table19: The cost of HH forest management at WAJIB members based on the respondent in 2017/ 2010

No	Type of forest cost management	Types of cost description	Amount of ha	Amount of general cost per ha	Total estimation	Measurement
1	The costs of silver cultural and forest protection activities	The summation of ▶ thinning ▶ cleaning ▶ pruning ▶ patrolling, and ▶ fie line development	1ha	0.84 x2500 0.65 x 2500 0.3 x 2500 800 birr 0.28 x2500	5,975	ETB
2	The cost of forest production collection		1ha	0.1 x 2500	250	ETB
3	The transaction costs	The costs of ▶ operational plan preparation, ▶ attending a meeting ▶ capacity building and ▶ annual membership fee	1ha		6,225	ETB
4	The material costs	Costs of tools purchase and maintenance and transport	1ha	Based on value of materials	Sometimes it need 1500 birr per ha	ETB
5	The annual membership fee that a member household has to pay	The same is true with the cost of protection activities	1ha		5,975	ETB
	Total				19,925	ETB

Source: Survey data (2018)

Generally cost of forest management is estemated by calculating forest production and amount of labor input and output in the production process .So that estimation including that the following paterns according to the respondent idea. According to this study, the cost forest of management is estimated by the sum of Forest products collection costs, Transaction costs, Material costs, the annual membership fee that a member household has to pay (Table19).

Thus the amount of cost of forest management starts from thinning to the annual membership fee that a member household has to pay for the general investigation .So that according to the respondent in the WAJIB members in the study areas estimation of forest cost management needs 19,925 birr per ha up to the forest can give the actual function. The study can identify identified the amount of cost forest management from respondent what mentioned above (Table19).

Therefore, to get the forest cost management in all forest area in the WAJIB, we calculate by amount or size of forestland by **19,925** with a given period (the year up to forest actual function). The cost of forest management is different in different institution and in different WAJIB members (Table13).

CONCLUSIONS AND RECOMMENDATIONS

Conclusion

Forest resources are vigorous but diminishing in terms of obtainability and variety due mainly to human factors and natural factors. The effort of IFMP to congestion the Deneba and Berisa WAJIB is outstanding in that it rights

forest dwellers with exclusive use rights in order to regulate uncontrolled access to the forest and to provide a maintainable solution to the "fatherless" state of the forest. This importance comes at the expense of the clear social cost of increases income mainly to the members of CBO in different ways.

Results of the study have exposed that there is a high perception of REDD+ in the WAJIB occurring mainly between the state forest conservation agencies and the community. After the implementation of WAJIB, there is sustainable access of forest in the WAJIB groups have become prominent by emerging into "controllable" catastrophes. Moreover, the result depicts that the forest is the major income contributor to the household's than most of the household livelihood activities. The household earns 51.3% of cash income and 34% of total income from the forest for which they are provided with all rights to manage, develop and use.

A modifying factor is to be seen in the fact that in CBO members there is no equal or fair distribution of to derive income from the natural forest irrespective of family size to the WAJIB-scheme. On the other hand, forest dwellers too have to make sacrifices. Sustainable forest management necessarily yields less than overexploitation in the short run.

Thus, it was to be probable that total sales of forest products decline due to WAJIB-implementation. In fact, this is what they should if the resource base is to be secured.

The regression test of significance of the relationship between Educational level and forest income products as a source of revenue and wealth status was found significant at more than 6% level of significance in WAJIB. It reveals the presence of relationship between the household's wealth status and dependence on the forest as a source of revenue in CBO. As the result shows the poorer, a household is the larger is its dependence on the forest as source of revenue.

Thus the amount of cost of forest management starts from thinning to the annual membership fee that a member household has to pay for the general investigation .So that according to the respondent in the WAJIB members in the study areas estimation of forest cost management needs 19,925 birr per ha up to the forest can give the actual function. The study can identify the amount of cost forest management from respondent what mentioned. Here I recommend that both government and NGOs can financially support households in the WAJIB members because the cost of forest management is high and difficult to cover only the farmers.

Households that attach more values on the products and services provided by forests are more motivated to invest their time in forest conservation activities. Thus, the values that households attach to forests disclose the degree of commitment they may have in conserving forests through local participation. Households can participate for anthropocentric, cultural/moral/spiritual and livelihood reasons and not just financial gains. Therefore, people's decisions to participate in WAJIB are verbalized by their magnetism to varied values, rather than through separate assessments of the costs and benefits of each part. By understanding the forest values that people hold, policy makers will be better equipped to design policies that reduce economic gaps with family size among stakeholders, and assist communities to implement forest plans.

Household decision to participate also depends on many socio-economic factors and the institutional setting in the management of local forests. In Deneba and Berisa, men are more probable to participate than women because the gender disparity in decision-making power within communities that undermines the participation of women is here.

In addition to women, older household heads, larger households, those who observe that there is degradation in the area and those who attach high anthropocentric and cultural/moral/spiritual values to forest resources are more likely to participate in CBO. On the other hand, younger household heads, men, married people, those with high levels of household income or social grants are less likely to participate in CBO. Although households might have an interest to participate, they may in fact fail to do so if they are displeased with the way previous CBO initiatives have been managed i.e., CBO conflicts, perception of discrimination, running of the committees and if they do not have confidence in the continuity of benefits and benefit distribution.

Policy Recommendations

Drawing from the empirical results, this study recommends that:

- ✓ Policy makers should consider the values households assign to forest resources not just financial benefits when authorizing policies to adoptive participation in the WAJIB.
- ✓ Forest products contribute large share of local community incomes in the study area. Therefore, conservation of forests is thus very essential to sustain local people livelihoods.
- ✓ Development activities of Government extension services and Non-Governmental Organisations need to hold WAJIB and provide support to improve environmental and technical awareness. This can improve the perception of WAJIB members towards forest degradation and broaden the participation base and assurance the sustainability of WAJIB programs.

Recommendations for Further Studies

- ✓ The levels of participation in WAJIB were not considered in this study. There is, therefore, a need for

further examination on the factors influencing the different levels of household participation in a given WAJIB members (Motivation level in participation).

- ✓ The cost of forest management is too high or beyond the capacity of the farmers, therefore Government or NGOs would need hold.

ACKNOWLEDGEMENTS

We would like to take the first opportunity to thank the almighty God for all his mysterious help and support. We would like to take this opportunity to appreciate our advisor Yoseph Melka (Ph.D) for his keen, unlimited support and guidance from proposal development stage to final thesis preparation. We would also like to thanks all our families, and friends as well as staff members of Wondo Genet College of Forestry and Natural Resources for their respective unreserved material and non-material supports during thesis preparation.

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