World Journal of Business Research
ISSN 2770-9078
Vol. 3, No. 1, 2023
Published by STSL Press

Original Paper

Household Perception and Its Determinants towards Improved Forest Benefit in Keffa Zone, Southern Western Ethiopia

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Abstract

Understanding the attitude and perception of the household towards improved forest benefit has been considered as a paramount importance for sustainable forest management. Household participation in sustainable forest management depend on socio-economic and demographic factors. The purpose of this study was to investigate the main factors that determine the perceived benefit of improved forest benefits for the household. The study on hand considered improved forest benefit like benefit of forest resource for rainfall attraction and water availability, soil conservation and tourism generated employment. Primary data was extracted and used from 343 household live in around forest area in keffa zone. Since the response variable of interest is ordinal, ordered logistic regression model was used as a method of analysis. The result of the study indicate that educated household head perceive more forest benefit of rainfall attraction and water availability, soil conservation and tourism employment by 1.33, 1.33 and 1.23 respectively than uneducated household head. Female household head think forest provide less benefit to them in terms of tourism generated employment than male household head by about 27%. The household with larger household size also have positive perception for forest benefit in terms of tourism generated employment than the household with small household size by 1.33 units. In addition, the household who use agricultural activity for their livelihood shows positive attitude towards forest benefit in rainfall attraction and water availability than the household with other livelihood activity. Finally the household with large land size shows positive perception towards forest benefit in rainfall attraction and water availability and soil conservation by 1.34 and 1.18 respectively than the household with smaller land size. Therefore intervention in forest conservation strategy need to be based on community interest and provision of forest friendly livelihood activities like honey production and poultry firms.

Keywords: forest benefit, household perception, Ordered logestic, Kefa zone, Ethiopia

1. Introduction

Understanding the attitude and perception of the household towards improved forest benefit has been recognized as important for sustainable forest management. The issue of forest management and conservation has increased worldwide for the growing demands of improved forest benefit like soil conservation and bio-diversity conservation (Ansong & Røskaft, 2011). Despite forest provide multiple significance to the community all over the world, FAO (2020) report indicate that the world has lost 178 million ha of forest since 1990. Africa had the largest annual rate of net forest loss in 2010–2020, at 3.9 million ha, followed by South America, at 2.6 million ha. The rate of net forest loss has increased in Africa in each of the three decades since 1990 (FAO, 2020).

Currently forest conservation practice have been implemented all over the world using community based management and participatory forest management strategy (Shibia, 2010). Household live in forest area perceived benefits from access to fuel wood, fodder and other forest resources including benefits from tourism, while crop and livestock losses from wildlife were the main costs (Karanth & Nepal, 2011). The household will have positive perception and attitude towards forest conservation for improved benefit if their livelihood needs are met (Dolisca et al., 2007).

Household participation in sustainable forest management depend on household socio-economic and demographic factors. For instance, Dolisca et al. (2007) indicate household income and age of the

household head have positive influence on forestry program, while female headed household have negative perception about forest management. Mashayekhi et al. (2010) expanding education and training access about non-use forest benefit will create positive attitude towards forest conservation practice for its service in water storage and retention.

Regarding the non-use benefit of forest resource like soil conservation, water retention and tourism employment has been recognized as the most important one. But the community attitude and perception depend on socio-economic factor. Karanth and Nepal (2011) indicate that small land size and less educated ownership resident think tourism employment benefit from forest less favorable. The role of the community not only engaged in forest conservation practice but also in afforestation program depend on forest management program and inclusiveness (FAO, 2020). Dependence on crop income, possession of bigger farmlands and better physical assets, and higher education level are positively related to intention to participate in planting activity. On the other hand, dependence on forest income is negatively related to attitude and intention (Tesfaye et al., 2012; Ratsimbazafy et al., 2012). In addition, (Ahammad et al., 2019) study show that The higher wealth groups perceived forest benefit for soil protection, soil fertility, pest and disease control as important for better crop production. On the other hand, lower income group associated with indirect benefit of forest for water purification and direct benefit of forest for fuel wood, thatch grass collection.

Community in various region of Ethiopia are not homogenous. Therefore, management decisions and understanding household perception towards improved forest benefit may be critical to forest management and decision makers. The study on hand considered improved forest benefit like benefit of forest resource for rainfall attraction and water availability, soil conservation and tourism employment. The previous study for instance (Dolisca et al., 2007, Mashayekhi et al., 2010, Shibia, 2010) was identify the main determinants of deforestation in different parts of the world. The purpose of this study is to investigate the household factors that determine the perceived benefit of improved forest benefits. This study aim to answer “What are the main factors determine the perceived benefit of improved forest benefits for the household?

2. Method and Material

2.1 Study Area

The study was conducted in selected forestry area from Keffa zone, located in Southern Nations, Nationalities and Peoples Regional State (SNNPRS), southwest Ethiopia. The study area situated about 454 km away from Addis Ababa. Kafa zone is located in the south western part of Ethiopia in between 6 ° 24' to 7 ° 70' North and 35 ° 69' to 36 ° 78' east. The total area of the study area is 10.636Skm2 which accounts 7% of the entire area of the region. Keffa zone is known as the birth place of coffee and the origin of Coffee Arabica and specifically is at a location known as Mankira in Decha wereda. The landscape is dissected by numerous small to large rivers and exhibits highly diverse topography including flat plateaus, undulating to mountainous terrain, forest and very steep slopes (Riechmann, 2007). Keffa forest is known for the high levels of biodiversity characterizing its plant and animal communities (Dereje & Woldemariam, 2007). It is home to some of the most rare flora and fauna in the East African region (Riechmann, 2007).

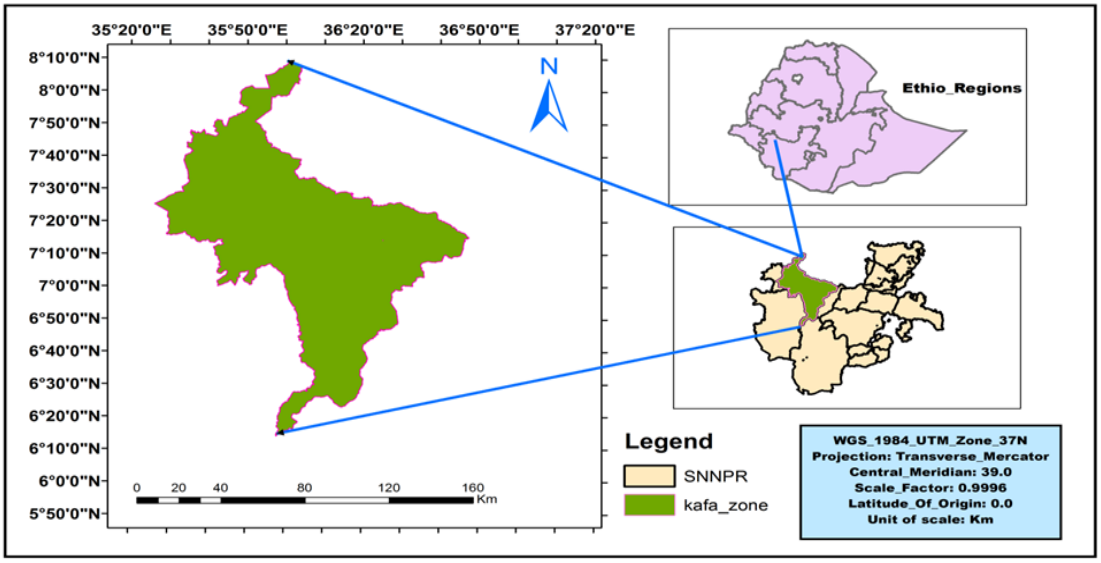

Figure 1. Maps of the Study Area

Source: Kaffa zone administration Office

2.2 Data Source

The study used the primary data set that was collected from Keffa zone household. The survey units are households living up to 10 km from the forest edge. The questionnaire was administered through in-person individual home interviews. A stratified random sample of 343 household was selected in Kefa district. The strata used were three forest area in the districts i.e., Bonga forest, Boginda forest and Mankira forest. No significant problems were detected in the survey application.

2.3 Method of Analysis

The objective of the study was to identify the main factors that determine the perceived benefit of improved forest benefits for the household. The study used ordered logistic regression, which is useful for ordinal response variable. When the response variable of interest is ordinal, it is advisable to use a specific model such as the ordered logit model (Grilli & Rampichini, 2014). Ordered logit model is an extension of logisitic regression applied when the dependent variable Yi is categorical and has meaningful order with more than two categories (Grilli & Rampichini, 2014).

The response category in our study was categorical and ordinal in nature from 1 to 5. One indicate completely unimportant and 5 indicate completely important and the value 2,3 and 4 represent unimportant, neutral and relatively important respectively. The variable with such ordinal response are better suited to analysis with Ordered Logit Model. Previous study by (Karanth & Nepal, 2011) Specified and applied ordered logit model for Local residents perception of benefits and losses from protected areas in India and Nepal. Similarly the study on hand also used Ordered logit Model to identify the determinates of perceived forest benefit in the study area.

Following (Gujarati, 2004) and (Grilli & Rampichini, 2014), the model specified as follow: Let Yi be an ordinal response variable with C categories for the i-th subject, alongside with a vector of covariates xi. The ordinal variable Yi is a function of another variable Y*, that is continuous and not measured and has various threshold points, as showed by the following formulas:

$$Y_i = 1, \text{ if } Y^* \leq k_1 \quad (1)$$

$$Y_i = j, \text{ if } k \leq Y_i^* \leq k_{i-1} \quad (2)$$

$$Yi = M, \text{ if } Y_i^* \geq k_{M-1} \quad (3)$$

The continuous latent variable Y* is equal to:

$$Y_i^* = \sum_{k=1}^{k} \beta_k X_{ki} + \varepsilon_i \quad (4)$$

In which there is a random disturbance term normally distributed. The error term reflects the fact that the variables may not be perfectly measured, and some relevant variables may be not introduced in the equation. The vector of β parameters is estimated by the Maximum Likelihood method. The statistical impact of variables is based on the p-values of the Wald tests (Grilli & Rampichini, 2014). Following this specification, the study adapted the ordered logit model to estimate the weight of each forest attribute/service. The first forest attribute/service used in this study was in rainfall attraction and water availability, the second and the third forest attribute were soil conservation and tourism generated employment respectively. The response category for each forest attribute/service was 1= completely unimportant, 2= unimportant, 3= neutral, 4= important and 5= completely important. In these models the independent variables are the socio economic characteristics of the household i.e Gender(1= female), Family size, Education, HH Expenditure, Training(1=yes) , Livelihood(1= agri) and Land size.

Application of ordinal logistic regression require to meet the proportional odds/ parallel lines assumption of the ordered logit model (Gujarati, 2004). The assumption indicate that the coefficient/slope parameter need to be the same across response category. According to (Gujarati, 2004) the null and alternative stated as:

H0: the slope coefficient are the same across response category

H1: the slope coefficient are not the same across response category

Rejection of the null hypothesis means evidence that the parallel regression assumption has been violated. The study on hand has test this assumption and found no evidence to violate the assumption

3. Household Perception and Attitude towards Forest Resource

In this chapter we present the how the community benefited from the existence of forest. The community attitude towards forest resource benefit will be presented. Finally using the ordered logistic regression the man factor that determine the perceived benefit of improved forest resource discussed.

3.1 Forest Use and Household Benefit from Forest Resource

Forest provide various service to the community like timber and other forest products, have cultural values, deliver recreation benefits and ecosystem services, including regulation of soil, air and water, are reservoirs for biodiversity, and act as carbon sinks (Moges et al., 2010). According to information obtained from household in three forest area, the household were asked “Is there any benefit that you derive from local forests around you?” and the household respond was about 96.5% say yes and the remaining 3.5% of the study population say no.

Regarding the types of benefit that the household obtained from the forest around them range from timber product to asthenic value. As revealed in table 1 about 96.5% of the respondent indicate there are beneficiary from the local protected forest benefit. The major benefit obtained from the local forest are collection of thatch (hareg) grass and honey production. It accounted by 48.3% of the study population benefited from thatch/hareg collection and 22.1% of the respondent benefited from honey production. The remaining respondent choice the benefit of forest as way of soil conservation (21.4 percent), fuel wood collection (5.4 percent), asthenic value (1.5 percent) and other (1.2 percent) service like medicine, material for agricultural activity, fence material.

The result indicate that there has been increasing in understanding the forest and forestry sector in the household day to day livelihood activities. According to focus group discussion despite forest are important in their livelihood the issue of equity among forest user is becoming the major challenge. The reliance on forest resource vary across communities socio economic characteristics (Garekae & Thakadu, 2017). The study on hand indicate the existence of difference in forest user between male and female household head and found male relatively more forest resource user but it’s not significant difference.

Table 1. Household Benefit from the Local Forest

Does your household benefited from the forest around here?	*Male (%)*	*Female (%)*	*P value*
Yes	96.9	92	0.457
No	3.1	8	
Types of benefit obtained for the resident (n= 331)			
Wood, fuel wood and timber	18	5.4	0.00*
Honey and other edible fruits	73	22.1	
Aesthetic values	5	1.5	
water and soil conservation	71	21.4	
collection of thatch(hareg) grass	160	48.3	
Other	4	1.2	

Source: survey result, 2020, note that *** indicate significance at 5 percent

In addition, the household also have positive attitude and perceived to be benefited from forest in terms of rainfall attraction, tourism generated employment and importance of forest resource to the future generation. The study household show positive attitude towards forest management. (Dolisca et al., 2007) indicate that household most value economic and environmental objective in promoting forest management program. Respondent who believe that their farming activities would be benefited from forestry program through rainfall attraction, soil conservation tends to be more positive attitude towards forest management (Karanth & Nepal, 2011).

Table 2 below described the household understanding about the benefit of forest. The result indicate that the 69.7 percent household believe that forest is completely important in rainfall attraction and water availability. On the other hand only .87 percent of the household did not recognize the significance of forest in rainfall attraction and water availability. The possible reason for not recognizing the importance of forest in rainfall attraction and water availability could be the microeconomic theoretical explanation of diminishing marginal utility. 98.2 percent of the study population also recognize that forest are important trough soil conservation. Despite positive attitude about forest benefit through tourism generated employment exist, only 67 percent of the household indicate recognize benefit of forest for tourism generated employment. Over 95 percent the respondent also perceived positive towards the benefit of forest for future generation.

Table 2. Household Perception towards Forest Benefit (n=343)

How do you rate benefit of forest in	Completely unimportant (%)	Unimportant (%)	Neutral (%)	Important (%)	Completely important (%)
Rainfall attraction and water availability?	0.87	0.58	.87	28.0	69.7
Soil conservation in your area	.29	.29	1.2	26.5	71.7
Tourism generated employment	.58	.29	1.75	30.0	67.4
Future generation	.58	.29	1.75	24.2	73.2

Source: survey result, 2020

3.2 Household Attitude towards Forest Management

In order for local resident to corporate in forest management, they must have positive perception towards forest conservation system and positive attitude towards forest conservation program (Ratsimbazafy et al., 2012). As revealed in table 3 Regardless of socio-economic activity, 93.5% agreed that forest protection issues are important and only 6.5 percent disagreed about importance of forest protection issue. There is no significant difference exist among respondent place of resident and importance of forest protection issue. Of the interviewed respondent, 96.7 percent of the respondent agreed forest about forest protection and conservation are importance to their livelihood and 3.3 percent of the respondent were not agreed about forest importance. But there was also significant difference among respondent between places of resident about importance of forest protection for their livelihood. 5.2 percent of the respondent from Boginda forest area believe that forest protection are not important to their livelihood. Result indicate that the household livelihood activities and forest protection system need to balance for sustainable.

Of the interviewed respondent, 88.6 percent of the respondent agreed the current forest resource is in good position. On the other hand, 11.4 percent of the respondent were not agreed about the current position/condition of forest is in good condition. There is also significant variation between place of residence and respondent attitude current position of forest. For instance in Boginda forest area 10.4 percent of the respondent was not agreed the good position of current forest resource.

Regarding deforestation, 65.4 percent of the respondent believe that the forest has been damaged a lot in the past 20 years and the remaining 34.6% of interviewed respondent were not agree the statement of forest loss in the last 20 years. The chi-square test also indicate that about loss of forest resource in the past 20 years vary from place to place. 86.2%, 20.7% and 86.2% of respondent who used to live in Bonga, Mankira and Bogindia forest area respectively were believe that forest resource have been damaged a lot in the past 20 years. The result indicate that implementing restrictive measure was necessary to sustain forest resource.

Finally among the interviewed respondent, 91.3 percent agreed the current management of the forest reflects the interests of local communities. On the other hand, the remaining 7.7 percent of respondent did not agree with forest management system current management system reflect their interest. Moreover, there were also significant variation among respondent place of resident and current forest management achieve the interest of local communities. Of the interviewed respondent from Bonga, Mankira and Boginda forest 15%, 8.2% and 2.6% respectively believed that the current management of forest resource did not reflect the interest of the communities. The result indicate that the forest management system need to satisfy the interest of local communities for sustainable forest resource management.

Table 3. Household Attitude towards Forest Management

To what extent do you agree, or disagree, with the following statements? (%)	**Bonga (%)**		**Mankira (%)**		**Boginda (%)**		**Total (%)**		**P value**
	Agree	Disagree	Agree	Disagree	Agree	Disagree	Agree	disagree	
Forest protection_issues are important	97.4	2.6	98.2	1.8	93.5	5.5	97.4	2.6	0.41
The protection of the forest is important for the livelihood of your family	97.4	2.6	98.2	1.8	94.6	5.4	96.7	3.2	0.00*
The forest is in good condition	81.9	18.1	94.6	5.4	89.6	10.4	88.6	11.4	0.00*
The forest has been damaged a lot in the past 20 years	86.2	13.8	20.7	79.3	86.3	13.8	65.4	34.6	0.00*

The current management of the forest reflects the interests of local communities	84.5	15.5	91.8	8.2	97.4	2.6	91.3	8.7	0.00*
N	115		110		117		343		

Source: survey result, 2020

Note. * indicate 5% significance by location of resident

3.3 Determinants of Perceived Benefit of Improved Forest Benefits for the Household

There has been increasing importance of understanding forest and the forestry as a key element of alternative livelihood activities and reduction of poverty (Coulibaly-Lingani et al., 2009). Three ordinal logestic regression were conducted to examine the critical determinants of perceived improved forest benefit. The study on hand identified three perceived forest i.e. rainfall attraction and water availability, soil conservation and tourism generated income and employment. The ordinal logistic regression used household socio-economic characteristics were used as independent variable.

The study on hand conducted test for parallel test and found the assumption are not violated. The parallel line test result (chi2=19.92 and sig=0.175) indicate that coefficient/slope parameter are the same across response category (1= completely unimportant, 2= unimportant, 3= neutral, 4= important and 5= completely important). Moreover, the study used Log likelihood ratio test as a way of variable selection and a value with low Log likelihood was chosen. Log Likelihood ratio test was used to choice the variable that need to be included in the regression analysis. Robust standard error were also used to avoid the problem of hetroscedasticity. The overall significance of the model was also tested by likelihood ratio chi-square test and the result indicate the overall model is significant. Despite the study sample size were 343, the ordinal regression analysis conducted based on 272 household. The remaining household has no agricultural land for their own and only 272 household willingly responded their income and expenditure level.

The first ordinal regression were conducted to identify the main factor that determine the household perception towards the perceived benefit of forest in rainfall attraction and water availability. Socio economic characteristics variable was used as independent variable and household perception (likert scale range from completely unimportant to completely important) used as dependent variable.

Table 4 contain the model estimation and it indicate that education level of the household head, income of the household and use agricultural activity were found significant. The coefficient of gender was negative but its insignificant, which indicate female perception were lower than male about forest benefit in rainfall attraction and water availability. The coefficient of training was also found negative and insignificant. The coefficient of consumption expenditure of the household were found negative (but its odds ratio is positive) and significant at 1 percent. The household with higher consumption expenditure perceived less benefit from forest towards rainfall attraction and water availability.

On the other hand, The coefficient of education were found positive and significant as expected, which indicate that more educated household perceived more benefit from forest role in rainfall attraction and water availability than less educated household. The coefficient of household livelihood activities was positive and significant at 1 percent, which indicate the household who engage in agricultural activity for their livelihood perceived more about forest benefit in rainfall attraction and water availability than the household who used non-agricultural livelihood activities. Finally the coefficient of land size was also found positive and significant at 1 percent. The household with more land size perceived more forest benefit in rainfall attraction and water availability than household with less land size.

In the second ordinal regression analysis household perception of forest benefit in soil conservation regress on socio economic characteristics of the household. The overall model was found significant at one percent (prob> chi2= 0.0067) and the assumption of slope parameter are the same across response category was not violated (Sig= 0.43). The regression result indicate that the coefficient of gender, household consumption expenditure and training was found negative but only the coefficient of

household consumption expenditure significant. On the other hand, the coefficient of family size, education level of household head, household livelihood activity and land size were found positive. More educated household perceived more forest benefit in soil conservation than less educated household and the result were significant at 5 percent. Similar to the first ordinal regression the coefficient of household consumption expenditure was found negative and significant at 1 percent. The result indicate the household are prone to change in their consumption expenditure and their perception towards forest benefit for soil conservation. Finally the coefficient of land size was found positive and significant at 10 percent. More land size means household give more attention in forest conservation for soil conservation.

Similarly the third ordinal logistic regression was also conducted about household perception towards forest benefit in tourism generated employment on socio economic characteristics of the household. The overall model was found significant (LR chi2 (7) = 29.05 and 0.00) and the assumption of ordered logistic regression was not violated (Chi-square= 19.56 and sig= 0.55). The coefficient of gender of the household was found negative and significant, which indicate female household head perceived less benefit from forest as tourism generated employment than male household head. On the hand, the coefficient of family size was found size positive and significant at 5 percent. Result indicate that household with large family size perceived more benefit from forest in tourism generated employment than household with small family size. Education of the household head was also significantly increase the household perception towards forest benefit in tourism generated employment. The coefficient of Household consumption expenditure and engage in agricultural activity for household livelihood was found negative and significant at 1 percent and 10 percent respectively. The household with large land size perceived less benefit from forest resource in tourism generated employment than household with small land size.

Table 4. Ordinal Logistic Regression for the Attitude of Household Rate about Benefit of Forest Resource for Rainfall Attraction and Water Availability, Soil Conservation and Tourism Employment

Dependent var.	Household perception towards the benefit of forest rainfall attraction and water availability		Household perception towards forest benefit in soil conservation		Household perception towards forest benefit in tourism generated employment	
Independent var. Socio economic variable	Odds Ratio(e^{β})	Robust Std. Err.	Odds Ratio(e^{β})	Robust Std. Err.	Odds Ratio(e^{β})	Robust Std. Err.
Gender(1= female)	.53 (-)	.30	.99 (-)	.62	.27(-)**	.17
Family size	1.03	.06	1.08	0.1	1.14**	0.1
Education	1.34**	.17	1.33**	.18	1.23*	.15
HH Expenditure	.99***(-)	.001	.99*** (-)	.0001	.99*** (-)	.001
Training(1=yes)	.66 (-)	.21	.83 (-)	.26	1.18	.39
Livelihood(1= agri)	.41***	.12	.79(-)	.23	.62(-)*	.18
Land size	1.34***	.14	1.18*	.12	1.1	.08

Diagnostic information	Number of obs = 272 LR chi2(7) = 33.92 Prob > chi2 = 0.000	Number of obs = 272 LR chi2(7) = 19.54 Prob > chi2 = 0.0067	Number of obs = 272 LR chi2(7) = 29.05 Prob > chi2 = .000
	Log likelihood = 188.03 Pseudo R2 = 0.0827	Log likelihood= 180.6 Pseudo R2 = .0513	Log likelihood= -188.03 Pseudo R2 = 0.0710
	Test for parallel line	**Test for parallel line**	**Test for parallel line**
	Chi-square= 19.92 sig= 0.175	Chi-square= 21.482 sig= 0.43	Chi-square= 19.56 sig= 0.55

Source: survey result, 2020

Note. *, **, and *** indicate level of significance at 10%, 5% and 1% respectively, the negative sign in brackets indicate the coefficient is negative

4. Discussion

The ordered logistic regression was reported odds ratio instead of the coefficient for each independent variable for interpretation convenience. (Gujarati, 2004) indicate that the coefficients only give the signs of the partial effects of each x_i on the response probability, but it does not indicate the probability or the change from the comparison group. A more meaningful interpretation is in terms of odds, which are obtained by taking the antilog of the various slope coefficients.

The first ordered logistic regression indicate that education level of the household head have positive sign and significant its 5 percent forest benefit in rainfall attraction and water availability. The value of odds ratio is 1.34, which indicate other things remaining constant, household head with more education perceive more than 1.3 units forest benefit than the household head with less education. In line with the finding of (Karanth & Nepal, 2011) more educated household head think forest is relevant in rainfall attraction and water availability. The possible reason might be education could provide background knowledge about forest benefit in human life and ecological activity.

More over the more educated household also have positive attitude about forest benefit in soil conservation and tourism generated employment and significant at 5 percent and 10 percent respectively. The result confirm the finding of (Karanth & Nepal, 2011), (Tesfaye et al., 2012) and (Ratsimbazafy et al., 2012) indicate more educated household protect forest resource and education used as non-monetary incentive towards forest conservation.

Female headed household show negative attitude towards forest benefit in tourism generated employment. The result indicate other things remaining constant, the perception of female headed household about forest benefit in tourism generated employment lower than male by more than 27 percent. In line with (Dolisca et al., 2007) finding Female headed household has less perception towards forestry for tourism generated employment. Female headed household most of the time think forest resource as a row material for consumption and for their artesian work. In addition according to focus group discussion female headed household believe that forest used as home for wild animal and wild animal treat to their children and animals.

The previous study confirm that household size also another important determinates of forest conservation perception and attitude(Ratsimbazafy et al., 2012). Despite the coefficient of family size was found positive, it was insignificant towards perception of forest benefit in rainfall attraction and soil conservation. On the other hand the household perception in forest benefit towards tourism generated employment was found positive and significant. Larger family size associated with higher perception of household towards forest benefit in tourism generated employment. (Ratsimbazafy et al., 2012) indicate that the household with larger family size needs alternative activities for their livelihood. The reason might be the household with larger family size expand their livelihood strategies in to non-farms activities to finance their consumption expenditure and to improve their living standard. Key informant interview indicate that the household who has more labor send their family member to look for additional job around them like guarding the forest resource.

The other important household characteristics are consumption expenditure. The result indicate that as the household expenditure increase they give less attention and perception of forest conservation. The coefficient of expenditure (β= 0.99) imply as consumption expenditure increase the household perception decline against forest importance for rainfall attraction and water availability. (Tesfaye et al., 2012) and (Ahammad et al., 2019) indicate that forest conservation highly depend on the household income and expenditure, higher income group associated with provisioning improved forest service. The household with higher consumption expenditure also shows that household have negative perception about forest conservation benefit in soil conservation and tourism generated employment. According to focus group discussion the household with better income able to finance their expenditure without expansion of agricultural land.

Forest conservation might be practiced by the communities if livelihood needs meet (Karanth & Nepal, 2011). The ordered regression result indicate that household perception towards forest conservation depend on their livelihood activities. The household who use agricultural activity shows positive attitude towards forest benefit in rainfall attraction and water availability. Since agricultural activity are rain fed farming system, communities acknowledge the importance of forest for rainfall attraction. Household with agricultural activity perceive more (β= 0. 44) benefit of forest in rainfall attraction than household with other livelihood activity. The result confirmed the finding of (Dolisca et al., 2007) and (Karanth & Nepal, 2011). The possible reason might be engage in agricultural activity may provide adequate food and non-food necessity than other livelihood activities. In addition household engage in agricultural activity see forest as a way of improving productivity of agricultural production.

Finally land size also found another critical determinants of household perceived forest benefit. The household with larger land size perceive more forest benefit than the household with smaller land size. The coefficient of land size were found significant and positive for forest benefit in rainfall attraction and soil conservation at 1 percent and 10 percent respectively. The result indicate that keeping other factor constant, the household perceive more benefit of forest in rainfall attraction by 1.34 and perceive more benefit of forest in soil conservation 1.18 than the household with less land size. The finding confirmed with (Karanth & Nepal, 2011), (Tesfaye et al., 2012) and (Ratsimbazafy et al., 2012) indicate that the household with bigger land size perceive more benefit from forest conservation in rainfall attraction and soil conservation. Bigger land size ownership does care about producing more product from the existing land and give less attention to land expansion by clearing the forest area. But household with smaller land size put great pressure on forest area to expand their agricultural land in order to get adequate food production.

5. Conclusion and Recommendation

5.1 Conclusion

Forest provide wide range of benefit from direct use value to the existence value to the society. The forest conservation practice depend on various factor including the socioeconomic factors. From the society point of view in the study area the major benefit obtained from protected forest resource range from recreational activities to honey production and thatch (hareg) collection. Despite forest are important in their livelihood, the issue of equity among forest user is becoming the major challenge.

Ordered logistic regression result indicate that perceived benefit of improved forest benefits for the household depends on various socio economic characteristics of the household. Educated household head have better understanding about forest benefit in rainfall attraction, soil conservation and tourism generated employment than illiterate household head. Education could be used as non-monetary incentive to the society towards forest conservation. On the other hand, female headed household head has less perception regarding the benefit of forest in tourism generated employment. Female headed household most of the time think forest resource as a row material for consumption and for their artesian work.

The household who use agricultural activity shows positive attitude towards forest benefit in rainfall attraction and water availability. Since agricultural activity are rain fed farming system, communities acknowledge the importance forest for rainfall attraction. Despite the adequacy of land size matter for conservation, household engage in agricultural activity see forest as a way of improving productivity of

agricultural production. Bigger land size ownership does care about producing more product from the existing land and give less attention to land expansion by clearing the forest area. But household with smaller land size put great pressure on forest area to expand their agricultural land in order to get adequate food production.

5.2 Recommendation

Based on the findings and conclusions of the study, the following modest recommendations are put forward:

Male household head and educated household relatively more forest resource user than female and illiterate household. Therefore there is a need to intervention on female headed household and illiterate head towards creating knowledge about importance of forest conservation.

The household agricultural land and its adequacy were found significant effect on forest conservation. Therefore there is a need to intervention on landless and small land size household by providing alternative livelihood activities.

Despite forest conservation program practiced in the study area, deforestation still the problem. The main reason for deforestation are lack of knowledge, shortage of agricultural land, expansion of illegal activity, carelessness, replacing native (indigenous) plant by other plant, illegal private investment. Therefore intervention needed in forest conservation strategy based on community interest and provision of forest friendly livelihood activities like honey production and poultry firms. Preparing and implementation of legal case to avoid illegal activities in forest area.

Moreover evidence indicate that inadequate infrastructural access have been the major problem to get improved problem makes difficult for tourism to visit the forest and biodiversity. Therefore basic infrastructure like road, electricity need to be addressed.

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