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Determinants of Adoption of Soil and Water Conservation Practices at Household Level in Aletawendo District, Sidama Zone, SNNPR, Ethiopia

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Abstract- **It is attested by various studies that implementation of soil and water conservation technologies is a must to tackle an ever expanding degradation in farmlands and marginal lands and to increase soil fertility. However, there is a gap in adoption of these technologies in Aletawendo district to the extent it should be. Therefore, this study was conducted to investigate determinants of adoption decision of farmers. To achieve this objective, both primary and secondary data were collected. Primary data were collected from randomly selected 372 farm households and 25 natural resources management experts found in the district. Secondary data were collected from different published and unpublished sources. The data collected were analyzed using descriptive statistics and econometric model (logit model) with the help of STATA computer program. The study result indicated that seven variables were affecting adoption decision of farmers significantly and positively. These were education level of the household head, training participation, total income, perception of farmers for SWCs, preference of farmers, extension contact, and land ownership certificate.**

Index Terms **: Adoption, Soil and Water Conservation, Determinants**

I. INTRODUCTION

It is known that implementing soil and water conservation measures is vital to prevent soil and water losses from the perspectives of Sustainable Land Management. Problems related to soil erosion have been receiving more and more attention in recent years, especially in developing countries like Ethiopia. Mot organic matter is located in the topsoil along with approximately 50% plant- available phosphorus (P) and potassium (K) (Samson, n.d). Losing topsoil due to erosion therefore contributes a loss of available nutrients and will cause yields to decline over time. Soil and water conservation is, therefore, among the top priority areas of intervention to insure food security and improve living conditions of fast growing rural population (Bekele and Drake, 2015). Sidama zone is one of the 14 zones of South Nations Nationalities and Peoples regional State of Ethiopia where there is high land degradation in the region and also where lost of conservation measures have been conducted.

Aletawendo district is one the 19 districts of Sidama zone where Soil and Water Conservation (SWC) practices have been promoted during the last four decades.

However, the level of adoption of SWCs by farmers is not to the extent it should be due to various socio-economic and demographic factors. Therefore this study is conducted in Aletawendo District to identify factors that determined adoption of soil and water conservation technologies in the district.

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II. EMPIRICAL STUDIES

A number of studies have been conducted on determinants of implementation/adoption of soil and water conservation measures. For instance Akalu *et al.* (2015) used ordered probit model to identify Household-Level Determinants of Soil and Water Conservation Adoption. He found Farm labor, parcel size, ownership of tools, training in SWC, presence of SWC program, social capital (e.g., cooperation with adjacent farm owners), labor sharing scheme, and perception of erosion problem have a significant positive influence on actual and final adoption phases of SWC.

Windkouni, (2005) employed logit model to identify determinants of adoption of soil and water conservation techniques in Burkina Faso. He found that location near the compound, highly sloping land, growing sorghum, the size of the farm, non-agricultural income and *neighbor* variable were significantly affecting adoption of soil and water conservation technologies in Burkina Faso.

Million and Kassa (2004) used binomial logit model to investigate Factors Influencing Adoption of Soil conservation measures in southern Ethiopia: the case of Gununo area. Out of the fifteen variables hypothesized to influence the adoption of physical soil conservation measures, four were found to be significant at less than one percent probability level. These variables include the number of economically active family members, whether or not a household has a plot within the SCRP catchment, perception of soil erosion problem and attributes of soil conservation structures.

Addisu et al., (2015) employed descriptive statistics to identify determinants of soil and water conservation techniques in Goromti Watershed, Western Ethiopia. They found that slope of the area, contact with extension workers, tenure status, age, size of house hold and training significantly influenced farmers to adopt soil and water conservation methods.

Tsegaye, (2014) also employed logistic regression to investigate determinants of adoption of soil and water conservation measures in Kundudo mountain catchment. He found educational level of the household head, family size, farm size, security of tenure, farm experience and development agents' visit significantly affecting adoption of soil and water conservation practices by the farmers. Therefore Logistic regression model is also employed to conduct this study since the dependent variable is binary choice.

III. METHODOLOGY

A. *Study Area*

Sidama Zone is one of 14 zones found under South Nations Nationalities and Peoples Regional state of Ethiopia and Aletawendo is one of the 19 districts of Sidama zone which is located at the south-central part of Sidama zone at a distance of around 64 km from the capital city of SNNPR, Hawassa. The total area of the district is 27823 ha and it is bordered in the south by Dara district, in the west by Chuko district, in the north by Dale district and Wensho district, in the east by Bursa district and in the southeast by Hula district. Astronomically it is situated in the coordinates of 6^0 35′ to 6^0 40′ North latitude and 38^0 25′ to 38^0 30′ East longitudes. There were around 236070 people in the district who live being clustered in 29 Peasant Associations (PAs), out of which 49.2% (116099) were females and the rest 50.8% (119971) were males, as per the 2016 statistics of Sidama zone Bureau of Finance and Economic Development (BoFED, 2016). Around 88.2% (208141) of the people are living in rural areas depending on crop production and animal rearing and the rest 11.8% (27929) are dwellers in the urban part of the district. The average population density is estimated to be 651 persons per square kilometer and the average land holding size of the district is 0.5 hectare according to districts' BOARD (2016), which is below the national average (1.2 ha) (CSA, 2010 cited in Genene & Abiy, 2014). According to BOARD (2016), the agro-ecology of the district includes 85.1% *Weina Dega (*Temperate, cool sub-humid*)* and 14.9% *Dega* **(**Cool, humid*)*. It has mean annual temperature ranging from 10^oc to 23^oc, elevation ranging from 1858 to 2026 masl and average annual rainfall ranging from 1200mm to 1400mm.

B. Data Types, Data Sources, Method of Data Collection and Analysis

Both primary and secondary data were used to conduct this study. The primary data were collected from 372 farm households who implemented different SWCs in their farmlands, and 25 NRM experts working in the district, using pre-tested semi-structured questionnaire. The sample size was determined using the formula of Yamane (1967) cited in Israel (2012). Two stage sampling method was used to select these 372 sample farm households. In the first stage, Peasant associations (PAs) have been grouped as *Dega* and *Weyinadega* PAs based on their agro-ecologies, and 5 PAs have been selected in random basis from existing 29 PAs in the district (3 from *Weynadega* PAs and 2 from *Dega* PAs). The PAs are Gidibo, Sheicha, and Habeja from Weyinadega PAs, and Bargo and Garbicho-Kila from *Dega* PAs. In the second stage, 372 farm households have been selected in a random basis from the sampled 5 PAs. Individual interview and focus group discussion were employed to collect primary data and secondary data were collected from different published and unpublished sources. The data collected were analyzed using descriptive statistics and econometric model (binary logit). Descriptive statistics was employed to analyze socio-economic and demographic characteristics related to the study population. Econometric model (Binary logit) was used to analyze adoption decision of farmers to soil and water conservation practices at households' level.

C. *Model Specification*

Following Gujarati, (2004), the logistic distribution function for the adoption of SWC practices can be specified as:

$$p_i = \frac{1}{1 + e^{-z_i}}$$

Where P_i is a probability of adopting a given practice by i^{th} household head and Z_i is a function of explanatory variables (X_i).

The logistic distribution function for not adopting of SWC practices can be specified as:

$$1 - p = \frac{1}{1 + e^{z_i}}$$

Where $1 - p$ is a probability of not adopting a given practice by i^{th} household head.

The odds to be used can be defined as the ratio of the probability that a farmer adopts the practice p_i to the probability that he or she will not $1 - P_i$. i.e,

$$\frac{p_i}{1 - p} = \frac{1 + e^{z_i}}{1 + e^{-z_i}} = e^{z_i}$$

$$= e^{b_0 + \sum b_i x_i}$$

Taking the natural logarithm of the above equation will result in what is known as the logit model as indicated below

$$\ln\left(\frac{p_i}{1-p}\right) = \ln\left(e^{b_0 + \sum b_i x_i}\right) = z_i$$

If the disturbance term U_i is taken in to account the logit model becomes

$$z_i = b_0 + \sum b_i x_i + U_i$$

We assume that farmers base their adoption decisions upon utility maximization. A given technology is adopted when the anticipated utility from using it exceeds that of non-adoption (Tsegaye, 2014). Although it is not observed directly, the utility for a given farmer *i* of using a given technology *t* can be defined as a farm-specific function of some vector of technology characteristics and a zero mean random disturbance term as follows:

$$U_{it} = x_i \alpha_t + \varepsilon_{it} \quad t = 1, 0$$

Where 1 denotes adoption of the new technology and 0 denotes non adoption. Farmers are assumed to choose the technology that gives them the largest utility in the technology set. The i^{th} farmer adopts t=1 if $U_{i1} > U_{i0}$. Let Y be the variable that indexes the adoption decision:

$$\gamma_i = 1 \; if \; U_{i1} > U_{i0}$$
$$\gamma_i = 0 \; if \; U_{i1} \leq U_{i0}$$

D. Definition, Measurement and Hypothesis of Study Variables

a. Dependent variable

The dependent variable in this study is implementation of soil and water conservation (SWC) technologies. It is a dummy variable taking a value of 1 if the households implemented any SWCs in 2015/16 production year and 0 otherwise.

b. Independent variables

These were explanatory variables expected to influence the dependent variable. Some of them were continues and some were discrete/dummy. They include sex of the household head, certificate of land ownership, experience in SWCs implementation (years), family size (EMU), training participation on SWCs, education level of household heads (grade), total land size (hectare), total income (birr), number of days of extension contact, perception of farmers towards SWCs, preference of farmers and slop of the land. Their category, measurement unit and expected effect on the dependent variable are all discussed on table 1 below.

Table 1. Definition and notation of Study variables

Variable	Category	Measurement	Expected effect
Adoption of SWCs (Dependent)	Dummy	1-if adopted; 0-otherwise	
Sex of the household head	dummy	1-if male ; 0-otherwise	positive
Landholding	Continuous	Hectare	Positive
Perception	dummy	1-if good ; 0-otherwise	Positive
Experience	Continuous	Years	Positive
Family size	Continuous	Equivalent Man Unit	positive
Participation in training	Dummy	1-if participated; 0-otherwise	Positive
Education level of household heads	Discrete	Grade	Positive
Preference	Dummy	1-if treated by preferred types of SWCs; 0-otherwise	Positive
Total income	Continuous	ETB	Positive
Number of days of extension contact	Discrete	Contact days per year	Positive

Source: A review from similar studies, (2016)

VI. RESULTS AND DISCUSSIONS

A. Socio-Economic and Demographic Characteristics of Farm Households

a. Adoption of SWC Activities

Of all sampled farm households, 83.1% implemented various types of soil and water conservation (SWC) practices in their farmlands. The rest 16.9% of them responded that they did not implement any type of SWCs in their farmlands (Table 2).

Table 2: Distribution of households by adoption of SWC activities

Variables		Frequency	Percent
Adoption of SWC activities	Adopter	309	83.1
	Not adopter	63	16.9
Total		372	100

Source: Own survey, 2016

b. Sex and marital status of adopter and non adopter households

The survey data indicated that 96.12% of the total adopter farm households in the study area were male-headed and the rest 3.88% were female headed households during the survey time (Table 3). 84.13% of the total non adopters were male headed and the rest 15.87% were female headed households. The chi-square test indicated that there is statistically significant difference among adopters and non adopters in terms of their sex. I.e. only 3.88% of the total adopters were female headed while more that 15% of the total non adopters were female headed. This result showed that there is a probability of being adopter if the household head is male.

Regarding marital status, 97.73% of the sampled adopter farmers were married, 1.3% were widowed and the rest 0.97% were divorced during the survey time. Of total non adopters, 84.13% were married and 15.87% were widowed. The chi-square result indicated that there is statistically significant difference among adopters and non adopters in terms of marital status. This might be due to the fact that there were some (0.97%) divorced respondents among adopters but no divorce among non adopters. and the household heads were married, 3.8% were widowed and the rest 0.8 percent were divorced. The other might be due to that only 1.3% of the the total adopters were widowed where as the amount of widowed were more than 15% within non adopters (Table 3).

Table 3. Distribution of sampled households by sex and marital status

Variable		Adopters		Non adopters	
		N	%	N	%
Sex	Male	297	96.12	53	84.13
	Female	12	3.88	10	15.87
	Total	309	100	63	100
	Ch2 value	13.52			
Marital status	Married	302	97.73	53	84.13
	Widowed	4	1.3	10	15.87
	Divorced	3	0.97	0	-
	Total	309	100	63	100
	Ch2 value	32.81			

Source: Own survey, 2016

c. Age, family size and educational level of household heads

The mean age of the adopter farmers in the study district was around 50 years with standard deviation of 10.91. The mean age of non adopter farmers was also around 50 years with standard deviation of 10.9. The t-test result indicated that there is no statistically significant difference among adopters and non adopters in terms of their age (Table 4). The mean family size of sampled adopters was around 6 persons per household with standard deviation of 2 (Table 4). The mean family size of non adopters was also around 6 persons per household with standard deviation of 2.1. The t-test result indicated that there was no statistically significant difference among adopters and non-adopters in terms of their mean family size (Table 4). Regarding education, the mean grade level achieved by adopters was about grade 5 with standard deviation of 2.8 and the mean grade level achieved by non adopters was about grade 2 with standard deviation of 2.1. The t-test result indicated that there is statistically significant difference among adopters and non adopters in terms of their achieved mean education level. The t-test result of adopters and non adopters in terms of age and family size indicated that these two variables were not reasons that classified farmers as adopters and non adopters of SWCs in the study district.

Table 4: Distribution of sampled households by Age, family size and education

Variables	Adopters		Non Adopters		t-value
	Mean	Sd. Dev	Mean	Sd. Dev	
Age	49.85	10.91	49.46	10.9	0.79
Family size	6.1.	2	5.71	2.1	0.28
Education	4.75	2.8	2.35	2.1	1.79

Source: Own survey, 2016

d. Experience and landholding of household heads

The mean landholding size of adopters was 0.52ha with standard deviation of 0.48. The mean landholding size of non adopters was 0.47ha. The t-test result in table 5 below indicated that there is no statistically significant difference among adopters and non adopters in their mean landholding size which implies that the probability of land size to be a reason for adopting or not adopting SWCs is low. The mean experience of adopters in SWCs implementation was around 11 years with standard deviation of 6.98 (Table).

Table 5: Distribution of respondents by experience and landholding

Variables	Adopters		Non adopters		t-value
	Mean	Sd. Dev	Mean	Sd. Dev	
Experience	10.84	6.98			
Landholding	0.52	0.48	0.47	0.37	0.39

Source: Own Survey, 2015

e. Types of soil and water conservation technologies implemented in Aletawendo District

Of all sampled SWCs adopter farmers, 24.7% implement only structural SWCs, 20.2% implement only vegetative SWCS, 22.6% implement agronomic SWCs, 2.4% implement management measures and the rest 30.1% implemented combinations of all types (Table 6).

Table 6: Distribution of respondent farmers by types of Soil and Water Conservation measures implemented

SWC types	Frequency	Percent
Structural	76	26.6
Vegetative	62	20.1
Agronomic	70	22.65
Management	7	2.26
Combination	94	30.42
Total	309	100

Source: Own survey, 2016 based on WACT, (2003) classification

f. Perception and Preference of farmers regarding SWCs

Regarding perception, 95.79% of the total adopter farmers have good perception for SWCs while the rest 4.21% of them have poor perception for SWC measures (Table 4). Of the total non adopter farmers, 93.65% have poor perception for SWCs. The chi-square test result indicated that there is statistically significant difference among adopters and non adopters in their perceptions about SWCs i.e. 95.79% of the adopters have good perception for SWCs where as 93.65% of the total non adopters have poor perceptions about SWCs. Non-adopter farmers argue that soil and water conservation schemes cost a sort of land and labor to construct. Since the sampled non adopter farmers on average have a farm size less than one hectare (0.47ha), which is less than national average (1.2 ha) as stated in Genene & Abiy, (2014), they do not need to invest any parcel of land for conservation.

In addition to that, the other factor that negatively affected perceptions of farmers regarding structural SWCs is the gap between the needs of farmers and the packages that come to the farmers. Most of the non adopter farmers (82.54%) responded that they are not being addressed by their own preferences (table 4). Some of the adopter farmers (8.41%) are also not being addressed by the types of SWCs preferred by themselves. As per the survey result, farmers in the study district are complaining that they are not being provided with the types of SWCs they prefer to implement. They are forced to implement those soil and water conservation activities which are delivered by development agents, which again are forced to disseminate these technologies to the farmers by the district heads. The chi-square test statistic revealed that there is statistically significant difference among adopters and non adopters in terms of being treated by their own preference. This might be the reason for most of not adopters for not adopting SWCs

Table 7: Distribution of respondents by perception and preference

Variables		Adopters		Non adopters	
Perception		N	%	N	%
	Good	296	95.79	4	6.35
	Poor	13	4.21	59	93.65
	Total	309	100	63	100
	Chi2		268.2		
Preference	Yes	283	91.59	11	17.46
	No	26	8.41	52	82.54
	Total	309	100	63	100
	Chi2		173.51		

Source: Own survey, 2015

B. *Determinants of Adoption of Soil and Water Conservation Technologies in Aletawendo District*

Twelve variables have been hypothesized to determine adoption of SWCs in Aletawendo district. These variables were sex of household head, family size, education, experience, farm size, training, perception, preference, extension contact, slop of the land, land certificate and total income (ln) (Table 8). Of these variables, 7 are found to be significantly affecting application of soil and water conservation technologies in Aletawendo district at households' level. These variables include, education, training, perception, number of extension contact, preference, land certificate and total income (ln). All the hypothesized explanatory variables were checked for the existence of multi-co linearity. Un-centered variance inflation factor was employed to investigate the degree of multi-co linearity among explanatory variables. The mean VIF value was 1.75. Hence, multi-co linearity was not a serious problem among explanatory variables. The overall goodness of fit of the regression model was measured by the coefficient of determination (R^2). It was 80.76%. It tells what proportion of the variation in the dependent variable was explained by the explanatory variables. The value of Pearson - χ^2 also indicated the goodness-of-fit test for the fitted model. The likelihood ratio test statistic exceeds the $\chi 2$ critical value with 12 degrees of freedom at less than 1 % probability level. This indicates to reject the null hypothesis saying that all the coefficients except the intercept are equal to zero. This implies, in our case, that the impact of covariates on the regressand (adoption of SWCs) is zero which is false.

Table 8: Determinants of implementation of SWCs in Aletawendo district (mfx after logit)

VARIABLES	Coefficients (dy/dx)	Standard errors	z-value
Sex	-1.666	1.247	-1.34
Family size	0.159	0.149	1.06
Education	0.0735*	0.0385	1.91
Experience	-0.0174	0.0387	-0.45
Farm size	-0.913	0.654	-1.40
Training	0.675**	0.311	2.17
Perception	0.108***	0.368	2.93
Preference	0.262***	0.0991	2.64
Extension contact	0.0897**	0.0362	2.48
Slope of the land	1.409	1.246	1.13
Land certificate	0.194*	0.0994	1.95
Total income (ln)	0.0352***	0.0137	2.57

Dependent variable = adoption of SWC measures N=372, PR^2 = 0.8076, LR = 32. 55, the ***, ** and * show statistically significant variables at 1%, 5% and 10% respectively.

Participation in training was positively and significantly affecting adoption of SWCs at households' level in Aletawendo district as shown in Table 8 above. It was a dummy variable and significant at 5% significance level. It is known that giving trainings for farmers on the importance and method of implementation of SWCs can fill the knowledge gap that constrained adoption of SWCs. Those households who attend trainings on benefits and implementation of various SWC can easily adopt these technologies and can implement more compared to those households who do not attend trainings. The marginal effect after logit model result predicted that as compared to those households who did not participate in trainings, adoption of SWCs for those households who participated in increases by 67.5%.

Education level of the household heads affected adoption of SWCs at households' level positively and significantly as hypothesized. It was statistically significant at 10% significance level. The model output indicated that increase in one additional formal year education leads the household head to increase adoption decision of SWCs by 7.35%. The positive and significant relationship indicates that education improves the farmers' ability to acquire new idea related to the use of SWCs, which in turn improves adoption of SWCs.

Extension contact was also affecting implementation of SWCs positively and significantly as discussed in table 7 above. It was statistically significant at 5% significance level. Extension contact and its frequency had a significant impact in adoption of new technologies and ideas. This increases the farmers' tendency to adopt SWCs. The model result in table 8 indicated that increase in extension contact by one day increases households' adoption of SWCs by 8.97%.

Total income (ln) affected adoption of SWCs at households' level in Aletawendo district positively and significantly as expected (Table 8). It is measured in birr and is in logarithm form since there were outliers in the data set. It was continuous variable and significant at 1% significance level. It is assumed that as total cash income increases, farmers will be in a better position to finance SWC measures. Therefore adoption of SWCs increases. The marginal effect after logit in table 7 above indicated that increase in total income by 1% increases households' adoption of SWCs by 3.52%.

Perception farmers have for SWCs affected implementation of SWCs in Aletawendo district positively and significantly as shown (Table 8). It was dumy variable and significant at 1% significance level. It is known that poor perception of farmers towards SWCs discourages farmers from adopting SWCs in the needed extent. The model output predicted that as compared to those households who have poor perceptions for SWCs, adoption of SWCs for those households who have good perception increased by 10.8%;

Preference is another factor that affected households' adoption of SWCs in Aletawendo district positively and significantly as shown in table 8 above. It was dummy variable and significant at 1% significance level. When households are addressed by their own preferred types of SWCs, their probability of adopting SWCs increases. The model output in table 8 above predicted that as compared to those households who are not addressed by their own preferred SWCs, adoption of SWCs for those households who addressed by their own preference increased by 26.2%.

Land ownership certificate also affected households' adoption of SWCs positively and significantly. It was dummy variable and affected adoption of SWCs at 10% significance level. Land certificate implies security of land and creates sense of ownership of land. This improves the tendency towards adopting SWCs. The logit model result in table 8 above predicted that as compared to those households who did not secure land ownership certificate, adoption of SWCs for those households who secured ownership certificate increased by 19.4%.

V. CONCLUSION

Implementation of soil and water conservation technologies is vital to rehabilitate degraded lands and to prevent loss of soil particles as well as water loss in advance due to various social and environmental phenomena. However, there was a gap in adoption of these technologies in Aletawendo district. Estimation of determinants of decision to adopt soil and water conservation technologies was employed using 12 hypothesized explanatory variables with the help of logit model. The result showed that education level of the household head, training participation, total income, perception of farmers for SWCs, preference of farmers, extension contact, and land ownership certificate were found to be significantly affecting adoption decision of farmers. The model result in tabe 7 above predicted that adoption of SWCs for those households who participated in trainings increases by 67.5% compared to those households who did not; increase in one additional formal year education increased adoption of SWCs by 7.35%; compared to those households who have poor perceptions, adoption of SWCs for those households who have good perception increased by 390.8%; increase in total income by 1% increases households' implementation of SWCs by 3.52%; compared to those households who did not implement own preferred SWCs, adoption of SWCs for those households who addressed by their own preference increased by 289.2%; increase in extension contact by one day increases households' adoption of SWCs by 8.97%; compared to those households who did not secure land ownership certificate, adoption of SWCs for those households who secured ownership certificate increased by 19.4%.

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REFERENCES

[1] Addisu Damtew Atnafe, Husen Maru Ahmed and Demeku Mesfin Adane. *Determinants of Adopting Techniques of Soil and Water Conservation in Goromti Watershed, Western Ethiopia*. (Journal style). Vol. 6(6), 2015, pp.168-177, ISSN: 2141-2391. Available www.academicjournals.org/JSSEM.

[2] Akalu Teshome, Jan de Graaff, and Menale Kassie. *Household-Level Determinants of Soil and Water Conservation Adoption Phases: Evidence from North-Western Ethiopian Highlands*. (Journal style) No.57, 2015, pp.620–636.

[3] Aletawendo Districts Bureau of Agriculture and Natural Resources Development. "Different Organizational Document and Reports". (Unpublished work style), unpublished.

[4] Bekele Wegayehu and Lars, D. *Adoption of soil and water conservation measures by subsistence farmers in the Eastern Ethiopia*. (Book style). Swedish University of Agricultural Sciences, Department of Economics. 2015.

[5] Sidama Zone Bureau of Finance and Economic Development. "Annual statistical abstract for the year 2015/2016". (Unpublished work style), unpublished.

[6] Genene, T. & Abiy, G. *Review on Overall Status of Soil and Water Conservation System and Its Constraints in Different Agro Ecologies of Southern Ethiopia*. (Journal style), 2014, pp.65-68.

[7] Gujarati, D.N. *Basic Econometrics*, 4th ed. (Book style). New York, Mcgraw-Hill Inc. 2004.

[8] Israel, G. *Determining Sample Size*. 2012. Available http://edis.ifas.ufl.edu.

[9] Million Tadesse and Kassa Belay. *Factors Influencing Adoption of Soil Conservation Measures in Southern Ethiopia: The Case of Gununo Area*. (Journal style), Vol.105, No.1, 2004, pp. 49–62

[10] Samson, R. *Soil and Water Conservation. Farmer to Farmers Participatory Training Course*.

[11] Tsegaye Feyissa. **"**Adoption of Soil and Water Conservation Measures in Kundudo Mountain Catchment, Jarso District, East Hararghe Zone, Oromia National Regional State". (Unpublished work style), unpublished.

[12] Windkouni, E. "Determinants of Adoption of Soil and Water Conservation Techniques in Burkina Faso". (Unpublished work style), unpublished.

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