

# Determinants of Smallholder Farmer's Loan Repayment Performance: The Case of Assosa District, Benishangul-Gumuz Regional State, Western Ethiopia

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## Abstract

The study examined determinants of smallholder farmer's loan repayment performance in Assosa district, Western Ethiopia. The study used both Purposive and simple random sampling technique in order to select sampled kebeles and households, respectively. Hence, from 111 household credit users in the district, 94 households were selected randomly followed by probability proportional sample from Assosa district. Both primary and secondary data were collected for this study. Primary data were collected through direct interview of sample respondents; whereas, secondary data were also collected from published and unpublished documents. Descriptive statistics were employed in order to summarize and describe the socio-economic characteristics of the respondents. Furthermore, t-test and chi-square test analyses were employed to compare defaulters and non-defaulters in relation to the explanatory variables. In addition, binary logit econometric model was employed in order to identify the factors that influence loan repayment performance of the selected sampled household farmers. The result showed that out of 94 selected respondents, 40 were defaulters and 54 were non-defaulters. A total of thirteen explanatory variables were included in the empirical model and out of the total hypothesized explanatory variables included in the model, livestock ownership, age, family size, income from crop product, get extension agent, off farm income and sex of the respondent were found to be statistically significant (at 1%, 5% and 10%) in determining loan repayment performance of smallholder farmers. The econometric result revealed that the male headed household increases the probability of being default. On the other hand, the probability of non-default increases as off farm income, income obtained from selling livestock and crop product, contact with the extension agents and family size increases, respectively. Therefore, the study recommended that the identified significant variables have to be a spring board for further interventions by financial cooperatives, stakeholders and policy makers so as to come with a breakthrough to significantly decrease or even avoid defaulting problems.

**Keywords:** Binary logit, loan repayment, defaulters and non-defaulters, Assosa

## Introduction

The economic growth and performance of developing countries rely on the growth of agricultural sector. Being rely on subsistence nature of the agricultural sector, the contribution of smallholder farming system is enormous to the Ethiopian economy (CSA, 2007). Daniel (2015) revealed that the small holder farming system, with less than two hectares of land being the average land holding, contributed about 96.3 percent to total cultivated area producing over 95 percent of the national crop production. However, the agricultural sector has been unable to cover the total demand existed in the nation due to low production and productivity emanated from poor and backward technology, lack of logistical facilities, insufficient coverage of extension and credit facilities, limited use of modern farm inputs and the occurrence of natural calamities such as drought and erratic rainfall distribution (EEA, 2007).

The subsistence type of production existed in the economy contributed for poverty and food insecurity which are the main challenges and fundamental issues of economic development in the country (Solomon, 2013). Where subsistence agriculture prevails and small-holder farming dominates the overall national economy, farmers often face a scarcity of capital (saving) to adopt new agricultural technologies. Hence, short-term credits with favorable terms for seasonal inputs like fertilizer, improved seeds, pesticide and herbicides would generally be favored because better return would be achieved quickly within the crop season. The use of credit has been envisaged as one way of promoting technology transfer, while the use of recommended farm inputs is regarded as key to agricultural development (Tomoya and Takashi, 2010).

Many financial institutions in developing countries provide financial services such as saving and credit to aid several smallholder enterprises. This is an effort in line with the "Millennium development goals" which seeks to reduce poverty by 50% by the year 2015 (Solomon, 2013). Smallholder farmers face severe shortage of financial resources to purchase productive agricultural inputs in that price of agricultural product is steadily increasing from

time to time. Consequently, the willingness of farmers on financial institutions for credit has become substantially increasing in the recent times for adoption of new agricultural technologies and for the use of credit facilities (Million *et al.* 2012; Ayalew and Lemma, 2013). Generally, the accessibility of a good financial service is considered as one of the engines of economic development and the instruments to break the vicious circle of poverty (Sisay, 2008).

There is no doubt about the crucial roles of credit in economic development. But the increasing default rate is one of the major problems of the lending institutions (Mohammad, 2009). Failure by a farmer to repay their loans on time or to repay them at all has been a serious problem faced by both agricultural credit institutions and smallholder farmers (Million *et al.*, 2012).

Low loan repayment in developing countries such as Ethiopia has become a major problem in agricultural credit administration; especially to smallholders who have limited collateral capabilities (Okorie, 2004). According to Abreham (2002), borrowers involved in the agricultural sector are more defaulters compared with other sectors like industry and service. In line with the above, Jamal (2003) revealed that urban borrowers have better repayment rate than rural borrowers. Since, there is low repayment performance in rural borrower, it discourages the lender to promote and extend credit to large and fragmented farm households.

To increase agricultural production and productivity through adopting modern agricultural technologies, the Assosa district, Benishangul-Gumuz Regional State, the regional government along with non-governmental organizations are extending credit provision and facilities to meet the demand and supply of capital to farming households. Although there are such problems related to loan repayment in Assosa district, factors that affect loan repayment performance of small holder farmers had not been studied in this area. Therefore, analyzing the determinants of small holder farmer's loan repayment performance in Assosa district as a main objective along with describing the barriers of farmer's loan repayment performance and identifying the major factors influencing small holder loan repayment performance in the study area as a specific objective is the primary concern of the study. Therefore, the study result help society to identify the problem related to credit repayment performance and for policy makers to formulate successful credit policies and programs that were again help in allocating financial resources effectively and efficiently.

## Methodology

### Description of the study area

**Location:** The study was conducted in Assosa district which is found in Benishangul-Gumuz Regional State. Assosa district is located 687 Km West of Addis Ababa. It is one of 20 districts found in Benishangul-Gumuz Region of Western Ethiopia. The district is parts of Assosa zone and bounded by Kumuruk and Komosha in the North East; Odabuldigilu in the East, Bambassi in the South East by Mao-Komo special district in the South and by the Sudan in the West.

**Population:** The 2007 national census reported a total population for Assosa district was 104, 107; from which 52,968 are male and 51,179 are women. From this, only about 24,214 were urban dwellers and the remaining 79,933 of the total population were located in rural area of this district.

**Religion:** In the study area the religious of the people is found as Muslim covering 63.27 percent of the total population and orthodox about 31.18 percent and the remain about 5.23 percent protestant.

**Climate condition:** Assosa district is one of the six districts of the Assosa Zone. Agro ecologically, Assosa district is mostly classified as lowland with an average rainfall of 1,275 mm per annum and an altitude of 1,550 meter above sea level (BOA, 2003).

### Sampling techniques

Assosa district have 74 kebeles and the total credit user households were about 1,571. Hence, the study used both purposive and simple random sampling techniques. The purposive sampling techniques were used to select sampled kebeles in the study area. To select the sampled households, the study employed simple random sampling technique. Because a simple random sampling technique was selected in such a way that each member of the population had the same chance of being included the sample. Hence: 4 kebeles were selected from the total of 74 kebeles by using purposive sampling techniques and then from these 4 kebeles: Amba-8, Amba-5, Amba-3 and Amba-1 were selected based on potentially of credit user and the number of households were 22, 37, 22, and 30, respectively. Therefore, the total the numbers of credit users were 111 households.

The study used Yamane sample size determination formula in (1967) with 95 percent confidence level to determine sample respondents.

$$\text{Formula : } n = \frac{N}{1+N(e)^2} = \frac{1571}{1+1571(0.1)^2} = 94$$

Where: n = sample size

N = total number of household from four kebeles'

e = margin of error

Then by using proportionality, the 94 number of respondent from the four available kebele as follows:  
 Table 1: Proportionality of the four kebeles

Amba	Credit user	Proportional
1	30	25
3	22	19
5	37	31
8	22	19
Total	111	94

Then to identify the determinants of credit user in the study area, structured questionnaire method of data collection for the selected total sampled respondents were used.

### Sources and Methods of Data Collection

The study was mainly depending on primary data which was collected through structured and pre-tested questionnaire. The questionnaire was developed and pre-tested in order to assess for evenness, precision and to avoid duplication and in order to estimate the time requirement during data collection. For the data collection, five university graduate enumerators who speak the local language very fluently were recruited from the study area and were trained in order to develop their consideration on the objectives of the study, content of the questionnaire, techniques to approach the sampled respondents and conduct the interview. This questionnaire was translated into local language to make questions clear for the respondent and to facilitate the data collection. The researcher was supervising the enumerators and the filled-in questionnaire was checked daily. In addition to the primary data collection, secondary data was gathered through reviewing and examining documents, reports and different books. Data from Assosa district agricultural office, financial institutions and NGOs were used.

### Method of Data Analysis

The data collected were analyzed through descriptive statistical analysis, inferential and binary logistic econometric model analysis were used to address the objectives set in the present study.

### Descriptive Statistics

A descriptive analysis such as percentages, mean values, frequencies and standard deviation and tables were used to meet the stated objectives which helps to compare and contrast different categories of the samples to infer important conclusions. Also, the study used independent sample T-test for continuous and Chi square tests for discrete variables to compare defaulter and non-defaulter groups with some independent variables.

### Econometric Model

Loan repayment is a dependent variable, while different socio-economic and lender related factors are considered as independent variables. The dependent variables value was 0 and 1, which is 0 if the borrower is a defaulter and 1 if the borrower is non-defaulter. The study used binary logistic regression model because it has got advantage over the others in the analysis of dichotomous outcome variable in that it is extremely flexible and easily used model from mathematical point of view and results in a meaningful interpretation (Hosmer and Lemeshew 1989). Hence, the logistic model was selected for this study to test proposed hypothesis and to reveal the impact of different variables on credit use and loan repayment performance. Therefore, the cumulative logistic probability model is econometrically specified as follows:

$$P_i = F(\mathbf{Z}_i) = F(\alpha + \sum \beta_i x_i) = \frac{1}{1 + e^{-z_i}}$$

As Hosmer and Lemeshew (1989) pointed out, the logistic model could be written in terms of the odds and log of odds, which enables one to understand the interpretation of the coefficients. The odds ratio implies the ratio of the probability (Pi) that an individual would choose an alternative to the probability (1-Pi) that he/she would not choose it.

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

Then by taking natural logarithm  $\ln\left(\frac{p_i}{1-p_i}\right) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_m X_m + u_i$

Where,

- **Pi** is the probability that an individual was make a certain choice (defaults or does not default) given Xi;
- **e** denotes the base of natural logarithms, which is approximately equal to 2.718;
- $\beta_0, \beta_1, \beta_2,$  and  $\beta_n$  are coefficients of explanatory variables
- $x_1, x_2,$  and  $x_n$  are predictor variables
- $m$ = number of explanatory variables
- $u_i$ = error term

### **Dependent variable**

The dependent variable for this study was determinants of smallholder farmers' loan repayment performance. It was hypothesized to be a function consisting of the following components.

### **Independent Variables**

The main explanatory variables of this study are: Age of the borrower, Sex of the sampled respondent, marital status, Family size, educational level of the respondent, total land holding size, get extension agent, distance from credit source, expenditures on social festivals, income earned from selling of livestock product, amount of loan, off-farm income and income obtained from selling crops.

### **Results and Discussion**

#### **Descriptive Statistics of continuous variables among Defaulters and Non-Defaulters**

Out of the total 94 interviewed households, 54 (57.4%) were non-defaulters, and the remaining 40 (42.6%) were defaulter in Assosa saving and credit association in Assosa branch.

**Age of the respondents:** Age was one of the independent variables related with borrower's characteristics and expected to determine successful loan repayment performance of the borrowers. The average age of the whole sampled household heads was 44.78 years with the minimum and maximum ages of 25 and 70 years, respectively. The average age of defaulter was 41.63 years while that of non-defaulter was 47.11 years with mean difference significant at 1% probability level from table (3). The study result was in line with (Firafis, 2015) which revealed that non-defaulters are aged than defaulters, which helped them to accumulate better wealth and able to repay their debt in time than defaulters.

**Family size:** The average family size of the sample households was 3.97, the maximum family size was 6 and the minimum was 1. The average family size of defaulter was 3.45 while that of non-defaulter was 4.35. With mean difference significant at 1% probability level from table 3. From the study result, we can conclude that default rate increases as the average family size increases.

**Land ownership:** Land is the basic asset of farmers. The average size of own cultivated land was nearly 0.97 hectare, in that the minimum and maximum of being 0 and 2 hectare, respectively. Non defaulters and defaulters have on average area of land 0.96 and 0.98 hectare respectively. The research result was in line with Daniel (2015) in that farmers having larger farm land could produce more agricultural output than farmers having smaller farm land. Hence, as the size of farm land increases, level of income obtained by farm households could increase and this intern decreases the default rate of the sampled households.

**Off-farm income:** The income generated from non-farm activity ranges from 0 birr to a maximum of 8000 birr during the year of 2017. The mean annual non-farm income of sample households was found to be 1,261.7 birr. The study showed that non defaulters and defaulters have an average income of 1,668.52 birr and 712.5 birr, respectively. The mean difference between the off farm income defaulters and non-defaulters was statistically significant at 1% of probability level from table 3. The chance of getting income from participating in off farm activity could increase income of the household and in that it could possibly enable households to pay the loan on the schedule.

**Amount of loan:** The sampled households on average borrowed Birr 3,195.64. However, the loan size varied in accordance with the type of financial institution. The survey result also revealed that the maximum amount of loan was 13,000 birr and the minimum amount loan was 400 birr. The average amount of loan was 3,195.64 birr. The average amount loan of defaulter was 3,472.25 birr while that of non-defaulter was 2,990.74 birr.

**Expenditures on social festivals:** Expenditure on social festivals includes expenditure for social ceremonies such as wedding, circumcision, funeral of a family member or close relative and engagement. All of the respondents were celebrated one or more of the above occasional ceremonies during the study period. From the small holder farmers, the minimum and maximum amount of expenses for such ceremonies were Birr 0 and Birr 40, 000, respectively. As per this, on average, 3,163.8 birr was spent for festivities. The average money invested on social ceremony for defaulter was 3,470 birr while that of non-defaulter was 2,937 birr. The research result showed the possibility of being default and the amount of money spent on social celebration goes in the same direction.

**Number of livestock owned:** The mean livestock owned by sampled respondents is 0.91 TLU with the minimum and the maximum TLU of 0 and 4.5, respectively. Defaulters of the sampled households own a mean livestock of 0.64 TLU and defaulters owned an average of 1.25 TLU. The study result indicated that farm households with having more number of livestock could get additional income from livestock products, in that it might decrease the default rate.

**Income from crop selling:** The prepayment capacity of farmer's increases as farmer's generated income from crop activities. The maximum and the minimum amount of income obtained from selling crop product was 0 and 5,000 birr respectively. The average income obtained from crop product was 1,427 birr. Non defaulters and defaulters have earned an average crop income ranging from 1936.1 birr to 740 birr respectively. The mean difference between the income from crop defaulters and non-defaulter was statistically significant at 1% level of

probability level from table 3. The study showed that the higher the crop income obtained by the farmer, the greater the repayment capacity of the farmers and the higher the probability to be non-defaulter and vice versa.

**Distance from service:** The distance in kilometers that the borrowers travelled to get main road for accessing different services. In line with this, the total average distance traveled by the respondents to the main road to obtain service was about 10.27 kilometers and the maximum and the minimum distances to obtained extension service were 16 and 3 respectively. The average amount distance of defaulter was 10.38 kilometer while that of non-defaulter was 10.19 kilo meter. The study result was in line with Daniel (2015) in that farm households located near to the main road could have better access to transportation services that can help them to sell the produced agricultural products in the market and earn a better farm income that could enable them to repay their debt on time.

**Extension contact:** is the number of days per month that a farmer contacts a development agent for technical guidance. The minimum and maximum contact was 1 and 6 days per month, respectively. The average extension contact of the total sampled households during the study year was 3.30. Non defaulters and defaulters have a mean extension contact of 4.07 and 2.25 days per month, respectively. The mean difference between the extension contact existed between defaulters and non-defaulters was statistically significant at 1% level of probability level from table 3. The study indicated that the higher the linkage between farmers and development agents, the more the information flow and the technological (knowledge) transfer from development agent to farmers. Farmers who have frequent contact with extension workers are more likely to have up-to-date information on production technologies that would help them to increase their production and productivity and thus generate better income. Thus, those farmers who have frequent contacts with development agents are likely to settle their debts on a timelier base.

Table 2: Descriptive Statistics of continuous variables

Number	Loan repayment performance	No respondent	Mean	Std. Deviation	Min	Max	t-value
Age of the household head (year)	Defaulter	40	41.63	9.591	25	70	-2.79***
	Non defaulter	54	47.11	9.173			
Family size of borrower (number)	Defaulter	40	3.45	1.131	1	6	-3.89***
	Non defaulter	54	4.35	1.084			
Income obtained from selling of livestock (birr)	Defaulter	40	2,819.50	2,531.47	0	9000	-.213(NS)
	Non defaulter	54	2,920.37	1,847.93			
Off farm income (birr)	Defaulter	40	712.5	1,310.94	0	8000	-2.83***
	Non defaulter	54	1,668.52	1,959.12			
Total land size (hectare)	Defaulter	40	0.98	0.218	0	2	.323(NS)
	Non defaulter	54	0.96	0.282			
Amount of loan (birr)	Defaulter	40	3,472.25	3,585.30	400	13000	.664(NS)
	Non defaulter	54	2,990.74	3,317.79			
Income invested for ceremony (birr)	Defaulter	40	3,470.00	6,101.07	0	40,000	.540(NS)
	Non defaulter	54	2,937.04	1,530.85			
Distance to obtained extension service (km)	Defaulter	40	10.38	3.417	3	16	.272(NS)
	Non defaulter	54	10.19	3.245			
Get extension service (day)	Defaulter	40	2.25	1.149	1	6	-7.04***
	Non defaulter	54	4.07	1.358			
Income obtained from selling of crop product (birr)	Defaulter	40	740	904.915	0	5000	-4.43***
	Non-defaulter	54	1,936.11	1,682.33			

\*\*\*, \*\*, \* statistically significance at less than 1%, 5%, 10% respectively and NS=not significance

Source: own survey (2017)

### Descriptive Statistics of Discrete Variables among Defaulters and Non-Defaulters

**Sex of household head:** The sampled households were composed of both male and female-headed households. Of the total sampled household heads, 79.8 percent were male headed households and 20.2 percent were female headed households. The study indicated that from the total household heads, 15 percent of the defaulters and 24 percent of the non-defaulters were female headed households, respectively. Also, 85 percent and 76 percent of the male headed households were defaulters and non-defaulters, respectively. The study implied that being male headed households could result in low loan repayment performance and vice versa.

Table 3: Loan repayment performance of sex

		Loan repayment performance						Chi-Square
		Defaulter		Non-Defaulter		Total		
		N	%	N	%	N	%	
Sex of the borrower	Female	6	15	13	24			1.173 (NS)
	Male	34	85	41	76	75	80	

NS = Not significance, Source: own survey (2017)

**Education level of the borrower:** the study result indicated 59.6 percent of the household heads were illiterate and 35 and 5.4 percent of the sampled borrowers were attended primary and secondary education level. About 63, 31.5 and 5.5 percent of non-defaulters were illiterate, primary level and secondary, respectively. While 55, 40 and 5 percent of defaulters were illiterate, primary and secondary educational level, respectively. Therefore, the survey result showed that the difference between non-defaulters and defaulters with regard to educational level of household head was not statistically significant between two groups. This research result was in line with the findings of Retta (2000) and Fikirte (2011).

Table 4: Loan repayment performance of education

		Loan repayment performance						Chi-square
		Defaulter		Non defaulter		Total		
		N	%	N	%	N	%	
Educational status of the borrower	Illiterate	22	55	34	63	56	59.6	0.733(NS)
	Primary	16	40	17	31.5	33	35	
	Secondary	2	5	3	5.5	5	5.4	
	Total	40		54		94		

Source own survey (2017), NS =Not significance

**Marital status:** The study revealed that 83.3 percent of the sampled household heads were married, 7.5 percent were single, 3 percent were divorced and 1 percent was widowed. Whereas the marital status households of married, single, divorced and widowed of the household heads of non-defaulters were 94.3, 1.9, 1.9, 1.9 percent and defaulters were 80, 15, 5 and 0, respectively with regard to marital status level of household head was statistically significant at less than 10% probability level. From this the married in marital status group were largely participate in the accesses of credit use.

Table 5: Marital status of loan repayment performance

		Loan repayment performance of borrower						Chi-square
		Defaulter		Non defaulter		Frequency		
		N	%	N	%	N	%	
Marital status of the borrower	Married	32	80	51	94.3	83	88.3	0.332*
	Single	6	15	1	1.9	7	7.5	
	Divorced	2	5	1	1.9	3	3.2	
	Widowed	0	0	1	1.9	1	1	
Total		40	100	54	100	94	100	

Source own survey (2017): significance at 10% \*

### Econometric Model Result

The econometric result was carried out to identify the determinants of repayment performance of small holder farmers based saving and credit cooperative members in the Assosa district. The binary logit model was employed in order to examine the hypothesized thirteen explanatory variables. Among the hypothesized variables, seven of them were found to be statistically significant. The logistic regression model showed that age of the borrower, family size, income earned from selling livestock product, off farm income, get extension agent and income obtained from selling crop product were factors affected loan repayment performance of borrowers in the study area. The coefficients of get extension contact and income obtained from selling crop product were statistically significant at 1% significant level. Age of the borrower, family size, income earned from selling livestock product and off farm income were statistically significant at 5% significance level. On the other hand, coefficients of sex of the household head were significant at 10% significant level in explaining loan repayment performance of the sampled respondents. STATA Version 13 were used in order to analyze factors influencing the loan repayment performance of the borrowers.

Table 6: logistic regression result (with odd ratio report)

Independent Variables	Binary Logit model regression result				
	Coef.	Odd ratio	Std.Err	Z	P> Z
Age of the borrower	0.1899504	1.20919	0.992934	2.31	0.021**
Marital status	-0.541766	0.604003	0.468983	-0.7	0.516
Sex of household head	-2.475579	0.084114	0.110602	-1.9	0.060*
Family size	1.26242	3.533965	1.981412	2.25	0.024**
Educational status of the borrower	1.33612	3.804253	3.740469	1.36	0.174
Income earned from selling livestock product	0.0008025	1.000803	0.000372	2.16	0.031**
Off farm income	0.0009971	1.000998	0.000444	2.25	0.025**
Total land size	-1.13605	0.321085	0.603611	-0.6	0.55
Amount of loan	-5.57E-05	0.999944	0.000195	-0.3	0.775
Expenditures on social festivals	-0.000164	0.999836	0.000113	-1.4	0.149
Distance from credit source	0.382926	1.039035	0.20107	0.2	0.843
Get extension agent	1.885578	6.590159	3.804806	3.27	0.001***
Income obtained from selling crop	0.0021482	1.002151	0.000777	2.77	0.006***
Number of obs		94			
Prob>chi <sup>2</sup>		0			
LR Chi2 (13)		91.59			
Pseudo R <sup>2</sup>		0.7144			

\*\*\*, \*\*and\* significant at 1%, 5%, and 10% probability, respectively

Hence, age of the borrower, income obtained from selling livestock product, off farm income, get extension contact, family size, sex of the borrower and income obtained from selling crop product were significant variables determining the factors affecting loan repayment performance of the selected sampled households.

**Age of the borrower:** This is another exogenous variable that was positively and significantly affected loan repayment performance of the small holder farmers at 5% significance level. From the econometric model result, as citrus Paribas, the odd ratio is in favor of the loan repayment performance increase by odds of 1.2 as age increase by one year. This might be due to the fact that as the number of year increases, the sampled household's ability to earn additional income were increased so that the person to repay the loan will increase as well. In addition, as the age of the household increases, work experience also increases and elders are better than youngsters in adopting technologies, being flexible, accessing education and the like. Gebrehiwot (2007), Sholotan *et al.*, (2007) and Mohammad (2009) also come up with similar result findings.

**Income obtained from selling livestock product:** This is one of the explanatory variables that positively affect the loan repayment rate at 5% significance level. From the result obtained we can observe that, citrus Paribas, the odd ratio in favor of the loan repayment performance increase by odds of 1 as the income from livestock increase by one unit. An increase in the income from livestock increases the probability of being non-defaulter. The implication is that, livestock can be easily liquidated into money and serve as security against crop failure. Farmers who owned more livestock are able to repay their loans even when their crops fail due to natural disaster. In addition, as a proxy to oxen ownership, the result suggests that farmers who have larger number of livestock have sufficient number of oxen to plough their field timely and as a result, obtain high yield and income to repay loans. The study result was supported by findings of Amare (2005) and Abebe (2011).

**Off farm income:** The variable influenced the loan repayment performance of the respondents of farmers positively at 5% significance level. From the binary model result, as citrus Paribas, the odd ratio in favor of the loan repayment performance increase by odds of 1 as the off farm income increase by one unit. This indicate that the off-farm activities were become additional sources of income for smallholders and the cash generated from these activities could back up the farmers' income to settle their debt even during bad harvesting seasons and when repayment period coincides with low agricultural prices. Each additional unit of off-farm income increases probability of being non-defaulter. However, this result is contrary to Bekele (2001), findings that, off-farm income was negatively related with loan repayment performance of farmers.

**Get extension agent:** It was positively associated with loan repayment performance at 1% significance level. From the binary model result, as citrus Paribas, the odd ratio in favor of the loan repayment performance increase by odds of 6.59 as the get extension agent increase by one day. The possible justification for this result is that as the number of contact days of the household head increases, farmers with more access to technical assistance on agricultural activities were able to repay their loan as promised, more than those who had less or no assistance at all. The reason for this is that, farmers who have frequent contact with development agents are better informed about markets and production technologies. As a result, they are motivated to repay their loans on time.

**Family size:** The coefficients of this variable were hypothesized to influence loan repayment performance

negatively. The study result showed that family size was contrary to prior assumption that the family size has significant on loan repayment performance at 5% significance level. From the model result, as citrus Paribas, the odd ratio in favor of the loan repayment performance increase by odds of 3.53 as the family size increase by one person (child). An increase in the family members, the more the labor force available for production purpose. Therefore, there is a possibility to have more alternative sources of income to overcome credit risks. Compared to those with less or no contact with extension agents. Similar result was also obtained by Chirwa (1997), Belay (2002) and Roslon and Karin (2009).

**Sex of the borrower:** The coefficient of this variable was hypothesized that male headed households had a negative impact on loan repayment performance. The study result revealed that being male headed households had negative influence on loan repayment performance at 10% significance level. The possible reason for this result was the fact that males are more experienced to earn income from hiring out their labor force to others than being female headed households. In addition to the above, female-headed households are less experienced in participation of loan taking from formal source of credit and hence will be defaulters because they know little about the consequences of loan defaulting. The study result was in line with the findings of (Doreen and Philip, 2014).

**Income obtained from selling crop product:** The coefficient of this variable is expected to influence loan repayment performance positively. The study result was in consistent with the prior expectation. The logit model result revealed that this variable affected loan repayment performance positively at 1% significance level. From the binary model result, as citrus, the odd ratio in favor of the loan repayment performance increase by odds of 1 as the income obtained from crop increase by unit. An increase in the income from crop increases the performance of being non-defaulter. The implication is that, the crop product used for marketing activity and easily can liquidated into money and recovers the credit risk. Farmers who owned more crop productivity are able to repay their loan.

### Conclusion

The study was conducted to examine the socio economic and econometric factors affecting loan repayment performance in Assosa district of Western Ethiopia. Descriptive and econometric analysis were used in order to analyze the socio economic and econometric characteristics of the sampled respondents in the study area. In addition, t-test and chi-square analysis were used to compare the defaulters and non-defaulters of the borrowers.

Descriptive statistics of the sampled respondents revealed that about 40% and 54% of the sampled households were defaulters and non-defaulters, respectively. The t-test for the continuous descriptive variable showed that age of the household head, family size of the borrower, off farm income, get extension service and income obtained from selling of the crop product have a significant difference between the defaulter and non-defaulter group. The chi-square test indicated that only marital status of the borrower has significant relationship with the loan repayment performance in the selected study area. Econometric result expressed in terms of binary logit model revealed that from the total hypothesized 13 explanatory variables, seven of them, age of the borrower, family size, income earned from selling livestock product, off farm income, get extension agent and income obtained from selling crop product were found to be statistically significant that influenced loan repayment performance of borrowers in the study area.

### Recommendation

Based on the study result obtained in the study, it is recommended that credit institutions should have to look for the major factors that significantly affect loan repayment performance before granting them with credit service to the users in order to reduce the occurrence of defaults. The study recommends that age of the borrower should have to be considered in granting credit to the users because this variable was positively associated with repayment performance. Offering credit for the borrowers that have few family size has the advantage of being non-defaulters because a few number with in family member's means there is a possibility to have more alternative sources of income to overcome credit.

Age of the borrower determines loan repayment performance positively and significantly. This might be due to the fact that as the number of year increases, the sampled household's ability to earn additional income were increased so that the person to repay the loan will increase as well. Hence, the study recommends that granting credit for aged user results in less probability for being defaulter. On the other hand, Income obtained from selling livestock product positively affect the loan repayment rate. Hence, the study recommends that offering a loan for credit users for those who obtained income from selling livestock product would increase the probability of being non-defaulter. The implication is that, livestock can be easily liquidated into money and serve as security against crop failure.

Borrowers who have contact with the extension agent was found to have a positive significance level. The reason for this is that, farmers who have frequent contact with development agents are better informed about markets and production technologies. As a result, they are motivated to repay their loans on time.

Income obtained from selling crop product revealed that this variable affected loan repayment performance positively. It is recommended that an increase in the income from crop increases the performance of being non-defaulter in that the crop product used for marketing activity and easily can liquidated into money and recovers the credit risk. Hence, farmers who owned more crop productivity are able to repay their loan.

## References

- Abebe Mijena. 2011. Determinants of Credit Repayment and fertilizer Use by Cooperative Members in Ada District, East Shoa Zone, Oromia. MSc Thesis, Haramaya University, Ethiopia.
- Abreham Gebeyehu. 2002. Loan repayment and its determinants in small scale enterprises financing in Ethiopia, MSc Thesis. Addis Ababa University, Ethiopia.
- Amare Berhanu. 2005. Determinants of Formal Source of Credit Loan Repayment Performance of Smallholder Farmers: The Case of North Western Ethiopia, North Gondar, MSc Thesis. Alemaya University, Ethiopia.
- Bekele Hundie. 2001. Factors Influencing the Loan Repayment Performance of Smallholders in Ethiopia. MSc. Thesis Presented to the School of Graduate Studies of Alemaya University, Ethiopia.
- Belay Abebe. 2002. Factors Influencing Loan Repayment of Rural women in Eastern Ethiopia: The Case of Dire Dawa Area. Thesis Presented to school of Graduate Studies of Alemaya University, Ethiopia.
- Chirwa E. Wadonda. 1997. Econometric Analysis of the Determinants of Agricultural Credit Repayment in Malawi.
- CSA (Central Statistics Authority). 2007. Federal Democratic Republic of Ethiopia, Office of Population and Housing Census Commission. Addis Ababa, Ethiopia.
- Daniel Belay. 2006. Performance of Primary Agricultural Cooperatives and Determinants of Members decision to use as Marketing Agent in Ada'a Liben and Lume Districts. MSc Thesis presented to Haramaya University, Ethiopia.
- Firafis Haile. 2015. Determinants of Loan Repayment Performance: Case study of Harari Microfinance Institutions, Ethiopia.
- Fikirte. K. 2011. Determinants of loan repayment Performance: A Case study in Addis Ababa Credit and Saving Institution. Wageningen University, Netherlands.
- Gebrehiwot Teklu. 2007. Credit Utilization and Repayment Performance of Agricultural Service Cooperatives in Enderta district, Tigray. MSc Thesis Presented to the Haramaya University, Ethiopia.
- Hosmer and Lemeshew. 1989. Applied Logistic Regression. A Wiley-Inter science Publication, New York, USA.
- Jemal Abafita. 2003. Microfinance and Loan Repayment Performance: A Case Study of the Oromia Credit and Savings Share Company (OCSSCO) in Kuyu. MSc Thesis, Addis Ababa University, Ethiopia.
- Million S. Rose N. and Sabina W. 2012. Factors Affecting Loan repayment performance of Small Holder Farmers in East Hararge, Ethiopia. The International Institute for Science, technology and Education (IISTE), Article, 11(2).
- Mohammad. R. 2009. Factors Affecting on Loan Repayment Performance of Farmers in Khorasan-Razavi Province of Iran. A paper presented to the Conference on International Research on Food Security, National Resource Management and rural Development, Mashhad, Iran.
- Okorie. A. 2004. Major Determinants of Agricultural Smallholder Loan Repayment in a Developing Economy: African Review of Money Finance and Banking Empirical Evidence from Ondo State, Nigeria.
- Retta. G. 2000. Women and Microfinance: The Case of Women Fuel Wood Carriers in Addis Ababa. M.Sc. Thesis, Addis Ababa University, Ethiopia.
- Roslan A. H. & Abdu Karim M. Z. 2009. Determinants of micro credit repayment in Malaysia: The case of Agro bank. *Humanity & Social Sciences Journal*, 4(1).
- Sisay Yehuala. 2008. Determinants of Smallholder Farmers Access to Formal Credit: The Case of Metema Woreda, North Gondar, Ethiopia. MSc Thesis. Haramaya University, Ethiopia.
- Solomon. 2013. Factors influencing formal loan repayment performance of urban women in Tigray, a case study of Dedebit credit and saving institution, MSc thesis. Mekelle University, Ethiopia.
- Tomaya M. and Y. Takashi. 2010. The Impacts of Fertilizer on Crop Production and Income in Ethiopia. National Graduate Institute for policy Studies. MSc Thesis. Tokiyo, Japan.
- Yamane. 1967. *Statistics: An Introductory Analysis*, 2<sup>nd</sup> Ed. New York: Harper and Row, USA.