

# Assessing the Impacts of Farm-investment on Farmer's Quality of Life in Near to Woldia Town, North Wollo Ethiopia

Bantie Getnet\*, Kinfe Gebrekrstos, Lidet Dereje

Department of Statistics, Woldia University, Woldia, Ethiopia

## Email address:

bantiegetnet@gmail.com (B. Getnet)

\*Corresponding author

## To cite this article:

Bantie Getnet, Kinfe Gebrekrstos, Lidet Dereje. Assessing the Impacts of Farm-investment on Farmer's Quality of Life in Near to Woldia Town, North Wollo Ethiopia. *Science Journal of Applied Mathematics and Statistics*. Vol. 9, No. 3, 2021, pp. 85-93.

doi: 10.11648/j.sjams.20210903.13

**Received:** June 28, 2021; **Accepted:** July 16, 2021; **Published:** July 24, 2021

---

**Abstract:** In Ethiopia, small scale farmers contribute about 80% of the total population of the country and their land holding and also small, that farmer cannot allow the land to stay fallow. Some developing region in the country is not fully benefit from the opportunities that can be generated by farm investment project. The study investigates the quality of life of people in near to Woldia town. The main objective of this study was to assess the impact of farm-investment on farmers' quality of life in near to Woldia town. The appropriate methodology to meet sample size in this study was obtained by using simple random sampling techniques which gives equal chance to every members of population to be selected as a sample. The data was analyzed by using both descriptive and inferential statistics. And the model used for this study was binary logistic regression used to analysis the inferential statistics. And also chi-square used for testing association between dependent and independent variables like gender, marital status, family income, and occupation. This study also identifies gender, occupation, family income; marital status and educational level have impact on quality of life. Finally, the study recommended that the advantage of investments for farmers such as employment opportunities, construction of different social services like school, health center, and economic development to bring a families good quality of life.

**Keywords:** Quality of Life, Logistic Regression, Farmers, Investment

---

## 1. Introduction

Quality of life is relative young concept. It is multidimensional coverage may be categorized within five dimension; Physical well-being, Material well-being, Emotional well-being, Social well-being, Development or production well-being

First surveys on quality of life more conducted in more mid-sixties, although the term Quality of Life (QOL) was first mentioned in 1920 by A. C Pigou. Pigou defined QOL as non-economic welfare: now a day's QOL has become popular theoretical construct in social science and numerous definition can be found in literature [8]. Furthermore, the literary analysis shows that there is overlap happiness, life satisfaction well-being.

In the last years three principal QOL research tend have emerged. One the first approach is the objective approach, it use aggregate social indicators which an external to the

individual to measure QOL [1]. One example for such an indicator is income. Indicators can be simultaneously observed by other people than the individual itself [3]. The second approach is based on an individual is the conception of QOL this subjective perspective of its condition in life [1]. Subjective indicators aim at values and attitudes of individuals. Indicators can further more be divided into two groups the first is a set of global indicators which assesses living condition in general example is satisfaction with life. The second groups relate to individual life domain example satisfaction with work. [6] Underline the great majority of more recent definition model and instrument have attempted to break down the QOL construct in to constituent domains. The third approach is very common in Germany peaking countries and tries to combine both approach [7] out line that objective social indicators and subjective well-being measure may only modestly correlate. Therefore, the author is not to the complementary nature of both approaches. Therefore

approach in the context of agricultural research numerous studies on perceive QOL were conducted in the course of the US farm crisis of 1980s. In Ethiopia, the effect of farm-investment project on farmers, QOL includes change in agricultural land in to investment, loss of farm lands, change in ecological lands, change in farming practice and farmers life style and population.

Several studies (in particular [11]) examine the impact of agricultural factors such as income, farm size and employment on subjective well-being. Studies succeeded in detecting a correlation at least short-term between total household income and QOL. However, there was no correlation found between QOL and farm income [4]. This might be explained by the fact that farmers perceive their work both as business and way of life [4] and economic and noneconomic reward such as QOL contributed to satisfaction with farming. A recent study by [1] concluded that positive assessment of QOL among farm families depends strongly on non-farming domain of their life. In this context, the authors underline the growing importance of off-farm employment in order to maintain QOL.

The farm investment support programmers of some pillar of one country. A part from improving working condition, animals, welfare and environmental condition leads to quality of life. It is particularly to improve the competitiveness of farms and to safe guard agricultural incomes. Recent econometric studies on the economic effects of the farm investment support program show that income raising effects on the measure are limited [13]. However, this does not mean that investment programmer do not work properly, rather it indicate that profits maximization is not only objective that out line in their review of literature on farm-investment behavior that farm investment relate to a large number of socio-economic issues. In marginal regions as the find them as example in Woldia town, farm-Investments are even more difficult to explain by more profit maximization. Other objective such as improving quality of life (QOL) by reducing work load might gain an important, in such regions [10] point out that farm life now a day has to cope with changed norms of society. Farmers subjectively value the quality of farm life. If this quality, however, cannot hold up against the farmer's valuation of societal norms, such as financial position, vacation or family life farmers may take decision to change their way of life. In its most radical form, this may be decision to quit farming [10] or from a successors perspective, not to take over the farm. It becomes clear that the creation or the safe guarding of ascertain level of quality of life (QOL) is too high.

This implies also to farm-investment support program which show high potential for shaping farm endowment in a way that working condition, are highly acceptable for farmers and consequently contribute to good quality of life. If programmed have the potential to influence positively, the farmer's quality of life this may also contribute to consuming comprehensive land use, in marginal regions [5].

Training farmers to better manage pests and disease, and diversity crops for cash and consumption, improve pruning

and shade management practice sound environmental stewardship. Working with farmers to establish and strengthen farmer organization, helping them to better understand market needs and opportunities, acquire improved management and marketing skills, and sell their product at higher price. Diversifying farm income and promoting environmental stewardship is through the practice of agro forestry and intercropping [13, 9].

This study produced that farmers succeed in increasing their satisfaction particularly in each domain which is highly importance for them. And it created that the awareness of QLI level is highly prior to farm investment. The investment has a result in changing the people life impact on farmers' quality of life remains unstudied, finally this study identified which effect of investment on farm quality of the people's life in near Woldia town.

The Farm investment increases the standard of living society's quality of life and adds to increase the demand for worker. In Ethiopia, small scale farmers contribute about 80% of the total population of the country and their land holding and also small, that farmer cannot allow the land to stay fallow. Some developing region in the country is not fully benefit from the opportunities that can be generated by farm investment project [8]. This paper tried to assess the impact/effect of farm-investment on farmer's quality of life near Woldia town investment and specifically address the following points.

- 1) To identify the determinants factors of farmers quality of life in near Woldia town
- 2) To examine if marital status, educational level and family income have found to be statistically significant predictor of farmers quality of life or not
- 3) To conclude that whether investment has positive or negative impacts on farmer's quality of life.
- 4) To examine the association between quality of life after investment and independent variables like: religion, sex, and occupation.

As the study would be concerned to the effects of farm-investment on farmers pursue QOL, this would apply to farm-investment support programmers which show a high potential for shaping farm-endowment in a way that working condition highly acceptable for farmers and consequently will bring good QOL. It will indicate that the nation or safeguarding of certain level of QOL high importance. For satisfaction with QOL, working income, it would benefit to bring awareness for socio-economic development for succeed from life domain and also benefit town administration to give the direction of farm life has to cope with change the norms of societies, financially and monthly and other bodies who work on issues of farm investment based.

## 2. Methodology

### 2.1. Study Area

Woldia town is located 521 kms north of Addis-Abeba, or the capital city of Ethiopia, 353 kms east of Bahirdar,

260kms south of Mekelle and 120 kms north of Dessie. This town is built between two symmetrical hills: Gabriel hill on the northwest and Quaro hill on the southeast. Much of the year it is hot during the day, but always with refreshing breeze. At night it cools down and this provides an ideal temperate climate for visitors.

### 2.1.1. Sampling Techniques and Sample Size Determination

Sampling technique is the process of taking small ratio of observation from large population in order to get information of this large population from observation [2]. For the effectiveness of this study researcher was used simple random sampling technique to select representative sample from target population.

One of the most common questions asked to survey methodology is sample size determination. As it well known, appropriate sample size is one of the means of gaining higher precision. For this study to determine the sample size the following formula was employed.

To determine the size of the sample, the following formula by considering some basic assumption will have been used.

The degree of confidence 95%,  $\alpha = 0.05$ .

Margin of error (the degree of precision  $10\% = 0.1$  because there is no enough (full information) about marginal error.

### 2.1.2. Preparation of Pilot Survey

For this preparation we would be consider the non-response rate, the relative error was taken as 5% the level of significance was 95%, then the following steps was applied in the preparing pilot survey.

- 1) We prepared one questions and selecting the samples randomly from 1367 total house hold in near Woldia town. We selected randomly 10 household from the total of 1367.
- 2) Then we distributed the questions to the selected number of household.
- 3) After collecting questionnaire the following result was obtained.

Table 1. pilot survey results.

Question	Response	
	Yes	No
Is there quality of life after investment	6	4

From this result we can obtain:

The probability of success who says "yes" was:

$$P = 6/10 = 0.6$$

$$p = 0.6, q = 1 - 0.6 = 0.4$$

Z was Normality distribution assumption by using the above assumptions the sample size was computed by using the following formula:

$$\text{Where } n_0 = \left( \frac{Z_{\alpha/2} \times p q}{d} \right)^2 [14]$$

P = the Population proportion

$$q = 1 - p$$

n = Sample size

d = Marginal of error

$$N = 1500, P = 0.6, q = 0.4, Z_{\alpha/2} = 1.96$$

$$n_0 = 1.96^2 \times 0.5 \times 0.5 / 0.1^2 = 92$$

Hence  $92/1367 = 0.067$  which is greater than 0.05. Thus, we must have to adjust the sample size as the following formula.

$$\text{So, } n = \frac{n_0}{1 + \frac{n_0}{N}} = \frac{92}{1 + 92/1367} = 86, \text{ therefore the researcher was}$$

used 86 households in near Woldia town which are representatives of the total 1367 household.

### 2.2. Method of Data Collection

The data was collected from both primary and secondary sources. Primary data was collected from participants through questionnaire and interview. By using questionnaire researcher used both closed ended and open ended questionnaire written form to obtain relevant information from respondents. By using interview researcher used structured questionnaire which contain written questions that people may respond to directly on questionnaire from itself, with or without the aid of an interviewer all question are arranged in specific order arrange of possible response. Secondary data were collected from record sources data in Woldia town administrative office.

#### Variables in the Study

Here the response/dependent variable is quality of life index (QOLI) of people after investment and independent variables are: Gender, Age, Marital status, Family income, Occupation, Religion, Family size and Educational level.

### 2.3. Method of Data Analysis

#### 2.3.1. Descriptive Statistics

The descriptive statistics deal with any method or procedure used to organize and summarize mass of numerical data into meaning form by using various statistical techniques like table, graph, chart, summary statistics (variance and average).

#### 2.3.2. Inferential Statistics

It consists of estimation and hypothesis testing. The appropriate test for this study was chi-square and logistic regression.

##### i. Chi Square Test of Independence

Chi-square test of independence is appropriate when our variables are categorical. Hence the qualitative data use in computation of the test statistical as the frequency of associated with each category of the variable of interest. Hence the test is applied when we have two or more categorical variables. It uses to determine whether there is an association between the response and explanatory variable under consideration. We want to test the association between the response variable and explanatory variables. The test consists of the following steps:

Step 1:

$H_0$ : There is no association between response variable and explanatory variable.

$H_1$ : There is an association between response variable and explanatory variable.

Step 2: Level of significance  $\alpha = 0.05$  or 5%

Step 3: test statistics

$$\chi^2_{cal} = \sum_{i=1}^r \sum_{j=1}^c \left[ \frac{(O_{ij} - E_{ij})^2}{E_{ij}} \right]$$

Where: -  $O_{ij}$ =observed frequency

$E_{ij}$ =expected frequency

$E_{ij}$ =row total\*column total/Grand total

Step 4: computed critical value is,  $\chi^2_{\alpha/2 (r-1) (c-1)} = \chi^2_{tab}$

Step 5: Reject  $H_0$  if  $\chi^2_{cal} > \chi^2_{tab}$

ii. Chi-square Goodness- of-fit Test

When one is testing to see whether frequency distribution fits a specific pattern, the chi-squared goodness- of- fit is used.

iii. Assumptions of Chi-square Test Goodness –of- Fit Test:

- 1) The data are obtained from random sample
- 2) The expected frequency for each category must be 5 (five) or more
- 3) The variable under the study is categorical
- 4) No distribution data and the chi-square test did not follow the normal distribution assumption

The Hypothesis Tests Are:

$H_0$ ; the data are consistent with a specified distribution

$H_a$ ; the data are not consistent with specified distribution

In the goodness- of- fit test the degree of freedom are equal to the number of categories minus one (1).

## 2.4. Statistical Models

### 2.4.1. Model Specification

In logistic regression the relationship between the dependent and independent variable is not linear. Instead logistic regression the function used, thus the response probability,  $p$  ( $y_i=1/x_i$ ) is evaluated as;  $\ln\left(\frac{p_i}{1-p_i}\right) = \beta_0 + \beta_1 x_1 + \dots + \beta_k x_k$

Where  $\beta_0$  is the constant of the equation,  $\beta_i$  are the coefficients of the predictor variables and  $x_i$  is the collection of  $k$  predictor variables corresponding to subject ( $i=1, 2, \dots, n$ )

The response and non-responses probabilities both lie in the interval  $[0, 1]$ , and hence interpretable. An alternative way of the logistic regression equation is  $P_i/1-p_i$  is the probability of success to failure is called the odds of success.

### 2.4.2. Binary Logistic Regression

Logistic regression often the response is not a numerical value instead the response is simply a designation of one of two possible outcomes (a binary response). Although responses may be accumulated to provide the number of successes and the number of failures, the binary nature of the response still remains. Use binary logistic regression to perform logistic regression on a binary response variable. A binary variable only has two possible values, such as presence or absence of a particular event. A model with one or more predictors is fit using an iterative-reweighed least squares algorithm to obtain maximum likelihood estimates of the parameters.

Binary logistic regression has also been used to classify observations into one of two categories, and it may give fewer classification errors than discriminates analysis for some cases [12, 15].

*Odds Ratio (OR)*: is the measure of how much the greater or less the odds are to subjects possessing the risk factor to experience a particular outcomes.

$$\ln\left(\frac{p_i}{1-p_i}\right) = \beta_0 + \beta_1 x_1 + \dots + \beta_k x_k$$

Where:  $p$  is the probability of success

$1-p$  -is the probability of failure

$\beta_0$  -is the constant term

### 2.4.3. Assumption of Logistic Regression

Assumptions of Logistic Regression Model are:

- 1) Logit transformation is linear.
- 2) The dependent variable must be categorical or the groups must be mutually exclusive and exhaustive; a case can only be in one group and every case must be a member of one of the groups.
- 3) The independent variables need not be interval, nor normally distributed, nor linearly related, nor of equal variance within each group.
- 4) Larger samples are needed than for linear regression because maximum likelihood coefficients are large sample estimates. A minimum of 50 cases per predictor is recommended.
- 5) No multicollinearity and No outliers.
- 6) Dependent variable need not assume its distribution within the range of exponential family such as normal, poison, binomial and gamma.

### 2.4.4. Parameter Estimation

i. Maximum likely Hood ratio estimation

The goal of logistic regression is to estimate unknown parameters, this parameter estimation involves maximum likelihood estimation by using SPSS or/ Minitab software. The logistic regression uses maximum likely-hood estimation after transforming the dependent in to a logit link. The parametric approach of statistical modeling of family of probability distribution, such as the binomial distribution has to be meeting for the response variable. In general for the binomial outcome of  $y$  success in  $n$  trial the maximum likely hood estimation equal  $P=y/n$  this is the sample proportion success for the  $n$  trial. Used to explore the extent to which the fitted response obtained from the postulated model compares with the observed data. The summary measure of goodness of fit test statistics that was used in this study are the walled test, the likely hood ratio test and score test.

### 2.4.5. Model Diagnostic (Over All Test of the Model)

Measures of goodness of fit test are statistical tools used to explore the extent to which the fitted response obtained from the postulated model compares with the observed data. The summary measure of goodness of fit test statistics that will be

used in this study are the likely hood ratio test and Hosmer-Lemeshow test.

i. Hosmer-Lemeshow (H\_L) test

It is used to partitioning the observation into ten equal side groups according to that predicted probabilities. i.e

$$Gh^2 = \sum_{j=1}^{10} \left[ \frac{o_j - E_j}{E_j(1 - E_j/n_j)} \right]^2 \quad (\text{Mountgomery, 2006})$$

Where,  $o_j$ = observed number of cases in  $j^{\text{th}}$  group (indicate 0's and 1's that are observed in the dependent variable) and  $E_j$ = expected number of cases in  $j^{\text{th}}$  group (predicted values of the dependent variable based on the full logistic model). If H-L value is insignificance, there is no significance difference between the observed & expected values, than the model are good fitted model.

ii. Likelyhood ratio test

A likely is a probability, specifically the probability that the observed value of the dependent variable may be predicted from the observed value of the independent variable. The likely hood ratio test uses the ratio of maximized value of the likely hood function for the full model ( $L_f$ ) over the maximized value of the likely hood function for the simpler model (current model  $L_c$ ).

$$\text{Likely hood ratio test} = -2\log\left(\frac{L_f}{L_c}\right) = -2\log(l_c - l_f) = -2(l_c - l_f)$$

This log transformation of likely hood function yields a chi-square statistics with k degree of freedom, where the number of explanatory variable in the model. This is the recommended test to be used when building a model through back ward stepwise elimination.

iii. Omnibus Test

The omnibus test is also another method of testing the coefficients and the significance of the model. Which means the overall model is significant if all variables are included in the model.

iv. Goodness -of -fit test for  $\beta$ 's (Coefficients)

v. Wald Test

A Wald test is used to test the statistical significance of each coefficient ( $\beta$ ) in the model. The test statistic is a chi-square statistic with a desirable outcome of non-significance, indicating that the model prediction does not significantly differ from the observed.

The Wald test statistics, for this hypothesis works by testing the null hypothesis that aset of parameters/coefficients simultaneously is equal to zero. However, several authors have identified problems with the use of Wald statistic.(Menard, 1995) warns that for large coefficients, the standard error is inflated, lowering the Wald statistic (chi-square) value. The likelihood ratio test is more reliable for small sample sizes than the Wald test.

## 3. Results and Discussions

### 3.1. Descriptive Statistical Analysis

Table 2. Frequency table of summary of individual Characteristics.

Variable	Category	Frequency	Percent
Gender	Male	48	55.8
	Female	38	44.2
Marital status	Married	35	40.7
	Single	19	22.1
	Divorced	17	19.8
	Widowed	15	17.4
Religion	Orthodox	23	26.7
	Muslim	21	24.4
	Protestant	18	20.1
	Catholic	12	13.9
	Other	12	13.9
Occupation	Agriculturalist	29	33.7
	Government employer	21	24.4
	Petty	9	10.5
	Shopkeeper	8	9.3
	Other	19	22.1
	Illiterate	13	14.6
Educational level	Primary	24	27.9
	Secondary	15	17.4
	Diploma	20	23.2
	Degree and above	14	16.9
Family income	Low	16	18.6
	Medium	37	43.02
	High	33	38.38
Quality of life	Yes	64	74.4
	No	22	25.6

From Table 2 the result shows that 48 (55.8%) of respondents were male and the rest 38 (44.2%) were females, as the result indicates majority of the respondents were males.

In addition 35 (40.7%), 19 (22.1%), 17 (19.8%) and 15 (17.4%) of respondents are married, single, divorced, widowed respectively.

In terms of religion 23 (26.7%), 21 (24.4%), 18 (20.1%), 12 (13.9%), 12 (13.9%) of respondents were orthodox, Muslim, protestant, catholic and other respectively,

And also if we consider the occupation 29 (33.7%) of them are Agriculturalist, 21 (24.4%) of them are government employer, 9 (10.5%) of them are petty, 8 (9.3%) were shopkeepers and the rest 19 (22.1%) were had other occupation.

As the result indicated above table most of respondents are primary, that is 24 (27.9%), 13 (14.6%) of respondent are illiterates, 15 (17.4%) of respondent are secondary, 20 (23.2%) of respondent have Diploma and 14 (16.9%) of respondent have Degree and above.

And also 22 (25.6%) of respondent are say no on question o quality of life after investment and 64 (74.4%) say yes.

Based on the figure 1 pie chart of family income of farmers 18.6% were had low level of income in their family and 43.02% had medium level of income, and the rest 38.38% had a high level of income. This shows that

the major of the households have medium level of income.

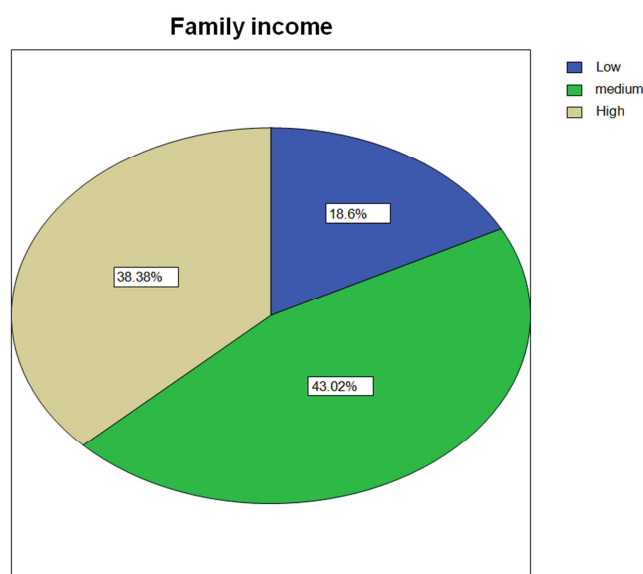


Figure 1. Pie chart of family income of farmers.

### 3.2. Inferential Statistics

#### 3.2.1. Chi-square Test

Table 3. Chi-square test.

Variables	Pearson chi-square	Df	Sig
Gender	11.163	1	0.001
Marital status	23.674	3	0.039
Religion	5.977	4	0.201
Family income	10.674	2	0.013
Family size	16.34	4	0.087
Occupation	37.223	4	0.026
Educational level	13.505	4	0.013

From Table 3 Chi-square Tests, it is clearly observed that

Table 6. Result of model summary.

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	66.685 <sup>a</sup>	.286	.426

From Table 6, the Nagelkerke R-square shows that about the variation in the outcome variable is explained by this logistic model. The model which includes the explanatory variables explains between 28.6% and 42.6%) indicates that approximately 28.6% and 42.6% of the variable in which the quality of life after investment can be predicated from the linear combination of the independent variables of the variations in the QOL in household. R-square= 28.6%, as we can see from the R-square the model fit and dependent

gender, occupation, marital status, educational level of house hold and family income of household are significantly associate on with quality of life after investment at 5% level of significance. But religion and family size aren't significant. And also we can show the relationship between quality of life and age of respondent. This below table (Table 4) shows that there is no relationship between them, because p-value is not less than 0.05.

Table 4. Chi-Square Tests.

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	30.845 <sup>a</sup>	35	.669
Likelihood Ratio	37.890	35	.339
Linear-by-Linear Association	.248	1	.619
N of Valid Cases	86		

a. 72 cells (100.0%) have expected count less than 5. The minimum expected count is .26.

#### 3.2.2. Binary Logistic Regression Analysis

Table 5. Omnibus Tests of Model Coefficients.

		Chi-square	Df	Sig.
Step 1	Step	87.993	23	.000
	Block	87.993	23	.000
	Model	87.993	23	.000

From Table 5, since the p-value for the model is less than the commonly level of significance value (0.05), reject the null hypothesis which state that the entire model coefficients are non-zero,  $\beta_i \neq 0$ , where  $i=1, 2, 3$ , which indicates that the overall significance of the model when we are considering all variables included in the model. Therefore, we conclude that at least one coefficient different from zero, the binary logistic model is fitted, or when we consider all the variables (predictors) together, then the model is significant.

variable has weak relation.

The Hosmer and Lemeshow Test (table 7), provides a formal test for whether the predicted probabilities for a covariate match the observed probabilities. A large p-value indicates a good match. A small p-value indicates a poor match, which tells you that you should look for some alternative ways to describe the relationship between this covariate and the outcome variable. In Our case, the p-value is (0.864) indicating a good model.

Table 7. Result of Model checking (Hosmer and Lemeshow Test).

Step	Chi-square	Df	Sig.
1	3.920	8	.864

Variables in the Equation

**Table 8.** Parameter Estimates of Binary Logistic Regression.

Variables in the Equation		B	S.E.	Wald	df	Sig.	Exp (B)
Step 1 <sup>a</sup>	gender (female)	-2.117	1.405	2.270	1	0.031	.120
	Age	.072	.107	.459	1	.498	1.075
	marital status			1.890	3	.015	
	marital status (single)	-.767	1.796	.182	1	.009	.464
	marital status (divorced)	-.607	2.056	.087	1	.038	.545
	marital status (windowed)	-2.377	2.059	1.334	1	.248	.093
	Religion			3.998	4	.406	
	religion (1)	-.809	1.465	.305	1	.581	.445
	religion (2)	-1.042	1.815	.329	1	.566	.353
	religion (3)	-.594	1.634	.132	1	.716	.552
	religion (4)	-3.782	1.962	3.718	1	.054	.023
	Occupation			2.213	4	.007	
	occupation (gov.emp)	.260	1.900	.019	1	.011	1.296
	occupation (petty)	1.811	1.862	.947	1	.891	6.119
	occupation (shopke)	2.184	1.924	1.288	1	.256	8.879
	occupation (other)	-2.863	1.04	2.75	1	.018	.057
	Educational level			4.450	4	.0149	
	Educational level (1)	3.022	1.011	8.938	1	.613	20.527
	Educational level (2)	.170	.687	.061	1	.074	1.186
	Educational level (diploma)	-.356	.696	.262	1	.019	.700
	Educational level (degree)	0.307	2.56	.0149	1	.013	1.359
	Family income			3.981	2	.0137	
	Family income (medium)	3.266	1.788	3.337	1	.028	26.206
	family income (high)	2.880	1.497	3.699	1	.044	17.812
	family size			6.54	4	.265	
	family size (1)	6.654	3.195	4.338	1	.637	775.633
	family size (2)	3.053	2.536	1.449	1	.229	21.172
	family size (3)	1.802	2.263	.634	1	.76	6.062
	family size (4)	-1.385	1.705	.659	1	.837	.250
	Constant	.265	.446	.354	1	.552	1.304

From table 8, the p-value of the marital status, occupation, gender, family income, and educational level are less than the level of significance of ( $\alpha=0.05$ ).

Therefore, the null hypothesis is rejected. Hence, those variables are statistically significant variables in quality of life after farm-investment house hold.

### 3.2.3. Parameter Estimation

From Table 8, the variables in the equation which fit the model for logistic regression are only those which are significant to the model i.e. those who have less than 0.05 p-values.

Since the equation is written in the form of the logit of the odd ratio of the success probability to the failure one.

$$\text{Log odds } (Y_i = 1/X_1 \dots X_i) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \dots + \beta_i X_i$$

$$\text{Ln } (p/1-p) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_i X_i$$

Where:-  $\beta_0$  is constant.

$\beta_1, \beta_2, \dots, \beta_i$  are the parameter estimator and  $X_1, X_2, \dots, X_i$  are the explanatory variables.

$Y_i = \{1 \text{ if the respondents say yes, } 0 \text{ otherwise}\}$

$X_1 = \text{gender}$

$X_2 = \text{marital status}$

$X_3 = \text{occupation}$

$X_4 = \text{educational level}$

$X_5 = \text{family income}$

### 3.2.4. The Fitted Model

$$\text{Logit } P(Y) = \beta_0 + \beta_1 X_1 + \beta_2 X_{21} + \beta_3 X_{22} + \beta_4 X_{31} + \beta_5 X_{34} + \beta_6 X_{43} + \beta_7 X_{44} + \beta_8 X_{51} + \beta_9 X_{52}$$

Where  $X_1 = \text{gender}$ ,  $X_{21} = \text{single}$ ,  $X_{22} = \text{divorced}$ ,  $X_{31} = \text{government employer}$ ,  $X_{34} = \text{other occupation}$ ,  $X_{43} = \text{diploma}$ ,  $X_{44} = \text{degree and above}$ ,  $X_{51} = \text{medium}$ ,  $X_{52} = \text{high}$  and  $Y = \text{QOL}$

$$\text{Logitp}(Y) = 0.265 - 2.117X_1 - 0.767X_{21} - 0.607X_{22} + 0.260X_{31} - 2.863X_{34} - 0.356X_{43} + 0.307X_{44} + 3.266X_{51} + 2.880X_{52}$$

### 3.2.5. Interpretation

From the above logistic regression model (referring table 8) the researcher can interpret the following points.

- 1) The p-value of the age, religion and family size is greater than 0.05, these three variables are not statistically significant (insignificant) predictor of farmers quality of life.
- 2) The p-value of gender is less than 0.05. There is significant predictor of quality of life.
- 3) The p-value of marital status is less than 0.05. There is

significant predictor of quality of life of farmers in near to Woldia town.

- 4) quality of life of farmer in near to Woldia town
- 5) The p-value of family income is less than 0.05. It means that there is significant independent variable of quality of life farmers.
- 6) In specific the p-value of single is less than 0.05, this means there is significance predictor of quality of life of farmer in near to Woldia town.
- 7) Additional the p-value of divorced is less than 0.05. Therefore; there is significance predictor of quality of life of farmer in near to Woldia town.
- 8) And also the p-values of medium and high are less than 0.05. We can say there is significance predictor of quality of life of farmer in near to Woldia town.

Interpretation of Odd ratio  
 $\beta_0 = 0.265$  indicates that if all of the independent variable have no association on the quality of life after investment in near to Woldia town.

The coefficient  $\beta_1$  is negative this indicate that there are negative association between gender of people and quality of life of farmer near to Woldia town.

Based on the Parameter Estimates of Binary Logistic Regression Table OR

- 1) OR farmer with gender female are 0.120, which indicate that other thing remain constant farmer with gender female are 0.120 less likely quality of life farmers as compared to male of farmers.
- 2) OR of marital status farmers with the single are 0.464 Which indicate that other thing remain constant, farmers with marital status single are 0.464 less likely quality of life of farmers as compared to married. OR of farmers with divorced are 0.545 which indicate that, farmer with marital status divorced are less likely quality of life of farmer as compared to married.
- 3) OR of farmers with government employer occupied are 1.297, which indicates that other thing remain constant, farmers with government employer are 1.297 more likely have good quality of life as compared to the agriculturalist. similarly, for farmers that have other occupation are 0.57 more likely to have good quality of life as compared to agriculturalists.
- 4) OR of farmers with diploma educational level are 0.700, which indicate that other thing remain constant, farmers with diploma educational level are 0.700 less likely quality of life of farmers educational level as compared to illiterate. And OR of farmers with degree and above are 1.359 which indicate that other thing remain constant, farmers with degree and above educational level are 1.359 more likely quality of life of farmers educational level as compared to illiterate.
- 5) OR farmers with family income medium are 26.206, which indicate that other thing remain constant, farmers with medium family income are 26.206 more likely quality of life of farmers family income as compared to low. OR of farmers with family income high are 17.812 which indicate that farmers with high family income are

17.812 more likely quality of life of farmers family income as compared to low.

## 4. Conclusion

The main objective of this study was to assess the impacts of farm-investment on farmer's household quality of life in near to Woldia town. Based on our findings, Marital status, educational level, family income and gender have found to be statistically significant predictor of farmers quality of life and also investment, high and medium family income relative to low family income have positive impacts on farmers quality of life in near to Woldia town. Whereas, based on marital status single, divorce have low quality of life relative to married.

Farmers that have government employee occupation living with high quality of life but with other occupation have low living quality of life relative to agriculturalist.

On the other hand depending on educational level the coefficients of diploma and degree and above are positive, farmers with diploma and above are living with high quality of level as compared to the illiterate farmers.

- 1) And also from the gender female farmers are living with low quality of life as compared to male farmers.
- 2) From chi-square there is no association between quality of life after investment and independent variables like; religion, family size and age.

## 5. Recommendation

Based on the study of this research we recommend the following terms. However, as this research described most independent variable is significant with quality of life after investment.

Therefore, by considering these land should be vital to the farmers who dependents on agricultural based on investment, however,

- 1) Training and compensation should be formulated in a way that brings sustainable income generating for those farmers who are working farm-investment.
- 2) The officials of kebele should have to stand near by the farmers who work investment project and providing required materials and beneficial services like suitable land for agriculture in order to obtain incomes.
- 3) The Government support system should have to provide sustainable relocation and establish system to design the policy raising productivity.
- 4) Thus, the town administration should implements the police ensure the situations.
- 5) The government should also re-establish an office of coordinators that support (technical and educators) for the farmers farming community and create sustainable economic development that should bring the quality of people in near to Woldia town.
- 6) Every farmer should be try to join to school and giving an advice and reward for these develop their family income to continue for the future.



- 7) Having other occupation is not available the farmers should try to find another solution to have a good quality of life.

---

## References

- [1] J. Arbuckle and Kast, (2012). Quality Of Life On The Agricultural Treadmill: Individual And Community Determinants Of Farm Family Well-Being
- [2] Allan G. Bluman Bluman (1976). Elementary statistics, a step by step approach 5<sup>th</sup> edition. Arizona State University
- [3] N. Efa, M. Gorman and J. phelan (2005). Implications of an Extension Package Approach for Farmers' Indigenous Knowledge: The Maize Extension Package in South-western Ethiopia
- [4] Cougherenour and Swanson (1988). Rewards, values and satisfaction with farm work: rural sociology.
- [5] Cougherenour and swanson (1992). Determinants of farmers with farming and life: a replication and extension southern rural sociology
- [6] Asummin (2006). The domain of life satisfaction: an attempt to order choice. social indicator research: Cardiff university
- [7] Diener and suh (2007). Measuring QOL: economic, social, and subjective indicator, social indicator research. Virginia common wealth University. Boston Toronto.
- [8] Felce and perry (1995) measurement research in developmental disabilities, California university.
- [9] Getty (2001). Statistical technique in bossiness and economic twelve edition.
- [10] Kallstorm (2005) journal of human environment 3<sup>rd</sup> edition, IOWA state University press. U.S.A.
- [11] Moral (1995). Determinates of subjective wellbeing among from operator; characteristics of individual and rural sociology.
- [12] Agresti, A. (1996) An Introduction to Categorical Data Analysis. John Wiley and Sons, New York.
- [13] Ratige (2012); Assessment of the effect of the investment support program.
- [14] William G. Cochran (1977); Sampling Techniques 3<sup>rd</sup> edition: New York Wiley press.
- [15] Hosmer D. and Lemeshow S. (1989). Applied logistic regression John Wiley and sons, Inc. New York.