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The Role Of Acacia Decurrens Tree On Farmers Livelihood In The Banja Woreda

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ABSTRACT

The aim of the study assesses the role of Acacia Decurrens tree on Farmers Livelihood in the Banja Woreda. To this purpose, the study adopted descriptive survey design. The study focused on the three kebeles such as Zek na Gumerta, Bidana Jegola and kesa Chewsa in the Banaja district of the Awi Zone, Amhara regional state. This design would employ multiple sources of data such as distribution of questionnaires and conducting interviews with the concerned parties. The target population for this study was 25 rural kebeles, from those kebeles I selected three kebeles according to the homogeneity characteristics in plantation of Acacia decurrens tree. To determine the required sample size, the selected kebeles has 678 households' farmers, 105 sample farmers are represented. Then, 35 sample farmers from each kebeles are selected by random sampling method. One-sample t-test analysis was made using Statistical Package for Social Sciences (SPSS) software version 20 to show the result of study. The result discussed by the use of the descriptive and econometric analysis.

Keywords: Acacia Decurrens, Farmers Livelihood, Households

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1. Introduction

Ethiopia has the most highland areas of any country in Africa. These highland areas have a large number of plants and animals. The Ethiopian highlands are threatened by wide scale deforestation and erosion as a result of high population pressure. This is true at all levels of the highlands particularly *Dega* areas (an agro -climatic zone which lie between altitude 2300 to 3200masl) where growing conditions are often extreme. However, as the counterbalance for the deforestation and erosion, in Ethiopia conducted massive tree planting and reforestation programs in the past decades to rehabilitate uncovered areas and to protect and develop natural forests where large unified natural forests still exist (Getachew and Biruk, 2014).

The planting tree and reforestation programs extensively practiced in the Amhara region because of the serious soil erosion and deforestation. Extensive afforestation and reforestation activities taken place during the Dreg regime as the campaign of plantation. Almost all, the afforestation programs were focusing more on the planation of exotic species mainly *Acacia decurrens* in the high lands of Ethiopia. *Acacia decurrens* was introduced into state-owned plantations of the north-western highlands of Ethiopia in the early 1990's (Amhara Agriculture Research Institute, 2015). Its plantation expanded as private plantation for multirole in the highlands of Awi Zone of the Amhara regional state particularly at Fagita-Lekoma and Banja districts around the same year (*Ibid*; Menale and Woldie, 2018).

Exotic trees have multiple purposes in rural Ethiopia, providing significant economic and ecological benefits. Planting exotic tree especially *Acacia decurrens* supplies rural households with wood products for their own consumption as well for sale and decreases soil degradation. *Acacia decurrens* is an excellent exotic tree species used for source of fuel-wood (charcoal), building poles, pulpwood, tanning of hides, mine props, fence posts, hardboard production and valuable timber specie. It is also a moderately deep rooted, drought-tolerant, nitrogen-fixing tree widely planted as windbreak, controls wind erosion and stabilizes ash spoil and ornamental plantings (Azene, 2007; Menale and Woldie, 2018). The planting of it has acted as a defense against financial crisis for many poor farmers on land unsuited to sustainable agriculture (Getachew, 2016). However, a clear understanding of *Acacia Decurrens* tree role is crucial in improving social, economic and environment problems and land management practices for sustainable livelihood. Planting of *Acacia Decurrens* tree in the Banja Woreda and its socio-economic and environmental role played a decisive situation on the farmer's livelihood. This study is initiated with the aim of assessing the role of *Acacia Decurrens* tree on Farmer's livelihood on the case of Banja Woreda.

1.2. Statement of the problem

Rapid population growth, extensive forest clearing for cultivation, over grazing, movement of political centers, exploitation of forests for fuel and construction materials without replanting has reduced forest cover of the country (Maru, 2010). This intended for the plantation of forests. Plantation forests are renewable natural resources primarily managed for growing wood aimed at a range of purposes. Farm forest plantation has now been seen by many households as socially acceptable due to its ability to ensure the sustainability of the resource base and improve their socio economic wellbeing. Small scale forest plantations provide a range of benefits to rural communities including fuel wood, charcoal, fodder and wood for building and daily uses, as well as environmental and service benefits (Fentahun etals., 2016).

Plantation of tree in Awi Zone specifically *Acacia Decurrens* is ranging from large scale to woodlots and homesteads. *Acacia Decurrens* is the most common tree species widely planted in community woodlots and private tree investments in Amhara region in general and in

the Awi Zone in particular (*Ibid*). However, very little role has been made to promote the planting of *Acacia Decurrens* tree in Northwest part of Ethiopia regardless of their vast potential in the country. The objective of this study is to explore the planting of *Acacia Decurrens* tree in the Banja Woreda and its role on farmer's livelihood. Contrary to what is known about most areas in Ethiopia, the economic, social, political and environmental role of *Acacia Decurrens* tree is not well advanced in the Banja Woreda of the North West part of the country.

The Banja district would be selected to study due to its vast potential for the role of *Acacia Decurrens* tree in general and planting practices in particular. This is true in Awi Zone, especially the study area of Banja Woreda on the Zek na Gumerta, Bidana Jegola and Kesa Chewsa kebeles. Planting *Acacia Decurrens* tree offers a role to the economic, social, political and environmental problems in the study area. The finding of related research shows that the planting of *Acacia Decurrens* tree practices, factors affect the tree plantation and the role of tree that farmers preferred. By recognizing, the *Acacia Decurrens* tree plantation practice, most of in my study area farmers had no enough knowledge about the role of tree. This circumstance initiates me for the study that the role of *Acacia Decurrens* tree on farmers livelihood in the study area. Additionally, such kinds of researchers have never been done in the study area about the role of tree.

1.3. Objectives of the Study

The general objective of this study is to assess the planting of *Acacia Decurrens* tree in the Banja Woreda and its role on farmer's livelihood. Specifically, this study had the following objectives:

- To assesses the major motives of farmers behind the expansion of *Acacia Decurrens* plantation at the expense of annual crop production in study area.
- To evaluate the economic, environmental, political and social role of *Acacia Decurrens* versus animal food crops production.
- To identify the factors affecting *Acacia Decurrens* tree plantation practices on the farmers in the study area.

2. Method and Materials

The study would utilize the descriptive survey research design. A survey research design is a self-report study which requires the collection of quantifiable information from a sample. A survey is a method of collecting information by interviewing subjects/respondents or administering a questionnaire to a group of individuals who constitute the sample that provide data useful in evaluating present practices and improving the basis for further decisions. For the purpose of this study, the descriptive survey design is suitable for data collection since it assisted the researcher to gather qualitative and quantitative data from the target population.

For this research, the descriptive survey design would be used. The research specifically focused on the role of *Acacia decurrens* tree on farmer's livelihood in three kebeles such as Zek na Gumerta, Bidana Jegola and kesa Chewsa in the Banaja district of the Awi Zone in the Amhara regional state.

This design would employ multiple sources of data such as distribution of questionnaires and conducting interviews with the concerned parties. The researcher defines the descriptive survey and its boundary which is focusing on farmers that are offered by the plantation of *Acacia decurrens* tree. A survey can be selected because of its uniqueness or used to illustrate an issue. In order to plan how the designed instrument such as the questionnaire would be used to obtain reliable data, a pilot test and follow-up interviews would utilize. The questionnaire would distribute in the circuit area of three kebeles in the Banja District of the Awi Zone. The researcher would distribute questionnaires to the selected farmers and

Woreda District office of Agricultural and Rural Development to collect the necessary information about the study area.

Relevant documents that the farmers used for plantation of *Acacia decurre*ns tree are also studied. Several measures are taken to ensure that the participant is trustworthy and truthful in order to ensure the research findings are credible. This research involved farmers as a participant and the researchers took the necessary safety measures to ensure that the procedures used to collect data are ethical. Upon receiving the relevant documents and completed questionnaires from the participants, the open ended responses for each question are read many times. While reading the responses, themes are noted and these themes became the categories. The categories are assigned in abbreviated codes. The codes are analyzed manually.

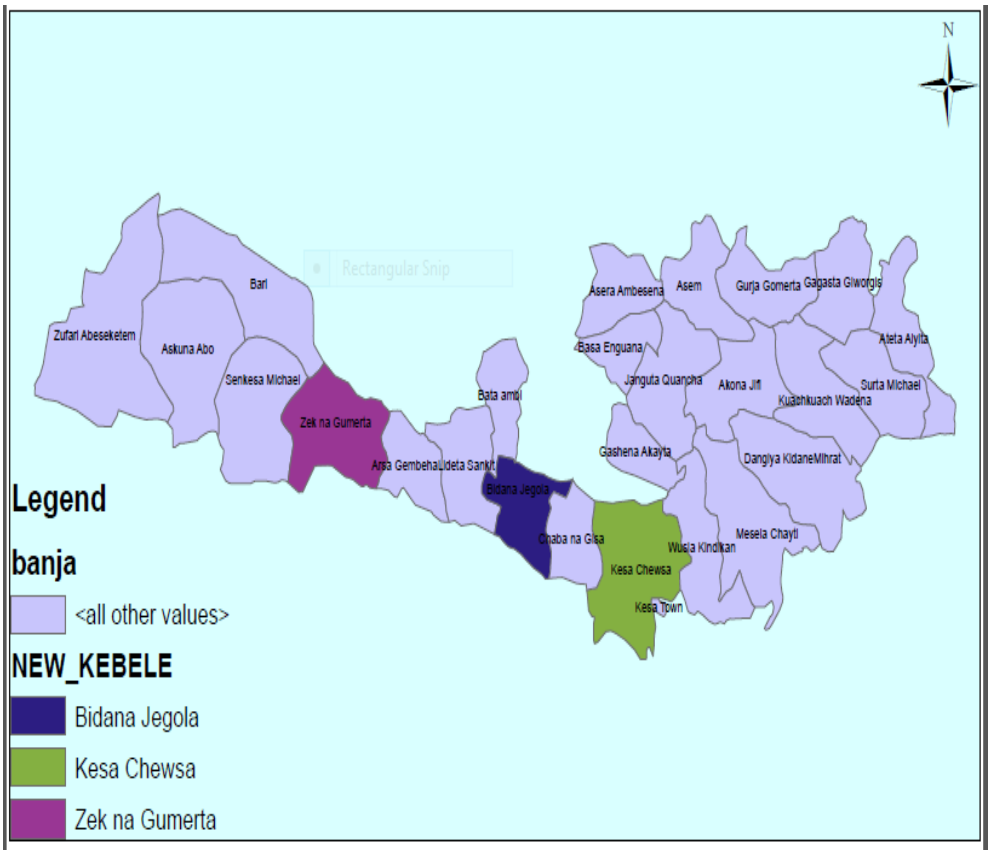

Figure.1 Map of the study area.

2.1. Sampling Design

Sample helps us to draw implications about the population from which the sample is drawn. This means sampling techniques helps us to understand the characteristics of the population by examining only a small part of it. But, the sample size and the sample selection process procedure should assure the representativeness of the population. Analysis of descriptive information and survey is also used to identify the role of individuals in managing the problems encountered with plantation of *Acacia decurrens* tree and its political, economic, environmental and social role.

To determine sample size, I used to purposive and random sampling. From Awi Zone, Banja district is selected purposely because; it is the potential area for plantation *Acacia decurrens* tree is taking place. Banja district has 25 rural kebles, from those kebeles I selected three kebeles according to the homogeneity characteristics in plantation of *Acacia decurrens* tree. To define the essential sample size, the selected kebeles has 678 households' farmers,

105 sample farmers are represented. Then, 35 sample farmers from each kebeles are selected by random sampling method. A random sampling technique is used to avoid researcher bias and to provide an equal proportionate division. The sample households would be drawn using systematic random sampling proportionate to their respective household size. The household head list in each kebele would be used as sampling frame to select sample households. After the sample kebeles would be selected, the formula of Kothari (2004) is employed to determine the total size of sample households as follows:-

$$n = \frac{z^2 p.q}{e^2(N-1)z^2 p.q}$$

Where,

n =sample size

Z=value of standard variant at 95 % confidence interval

p=sample proportion (0.03)

e=the estimate should be within 3 percent of the true value

N=the total household population of the three eucalyptus plantation kebeles

q=1-p

2.2. Data source and Methods of Data collection

Permission is requested from the community in the circuit area of three kebeles of the Banaja district in the Awi Administrative Zone to collect data that are plantation of *Acacia decurrens* tree. In order to maintain confidentiality, the names of the respondents would not mention. The researcher personally would distribute the questionnaire to respondents and would gain information from farmers through interviewing selected informants. This gave the researcher an opportunity to explain the purpose of the study. The researcher personally would collect questionnaires from the farmers and Woreda District Office of Agricultural and Rural Development to collect the necessary information about the study area. Appreciating this, both qualitative and quantitative methods would adopt as a research instrument for this study, contact would make with the Woreda District office of Agricultural and Rural Development to collect the necessary information about the study area. In this study, physical observation, key informant interview and focus group discussion used to collect mainly qualitative information and household survey to collect mainly quantitative data from representative households.

2.2.1. Primary Data

Primary data is collected through the use of structured questionnaire and simple and non-sensitive questions of the interview. Data would be collected about the general information of the plantation of *Acacia Decurrens* tree; factors affect the tree plantation, the motives for the plantation and the political, economic, social and environmental role of the *Acacia decurrens* tree.

A structured questionnaire would use to gather data from the farmers who can write and Woreda District Office of Agricultural and Rural Development to the role of *Acacia Decurrens* tree on farmers livelihood which they are faced with concerning planting of it. Only Zek na Gumerta, Bidana Jegola and kesa Chewsa in the Banja district of the Awi Zone are used. The questionnaire would make up of a number questions and it focus on the following participant farmers and Woreda District Office of Agricultural and Rural Development that have enough information about the *Acacia Decurrens* tree. The questionnaire consisted of close-ended items was employed to collect data. To assess the planting of *Acacia Decurrens* tree in the Banja Woreda and its role on farmer's livelihood. Thus, the instruments used were highly reliable. Scores were assigned to each point on the frequency scales as follows: strongly agreed= 1, Agreed= 2, Disagreed= 3, strongly agreed = 4.

Interviews would conduct key informant interview with the selected house hold heads from three kebeles and Woreda District office of Agricultural and Rural Development

representatives that have sufficient information about the *Acacia Decurrens* tree. The interview is designed to start off with simple and non-sensitive questions. The interviewer made appointments with the interviewees. In addition, the interviewees would ask to explain their answers where necessary and surgical instrument for exploring questions are also used.

2.2.2. Secondary Data

Secondary Data would be obtained through a review of literature on the expansion of *Acacia Decurrens* tree, factors that affect the tree planting, the motives for the plantation and its economic, political, environmental and social role of *Acacia Decurrens* tree. Also, data is gathered from the Woreda District Office of c Agricultural and Rural Development who have enough information on the plantation of *Acacia Decurrence* tree in the Banja District, Awi Administrative Zone of the three kebeles. Published and unpublished written sources are collected from internet. Unstructured interview acquired from the representatives of the household, Woreda District Office of Agricultural and Rural Development and rural management Office also would be crosschecked with responses of questionnaire and existing literatures.

2.2.3. Focus Group Discussion

Focus Group Discussion is a vital research method to gather a variety of information from different segments of the community for qualitative data. The main purpose of focus group discussion is to gain insights and understanding about the planation of *Acacia Decurrens* tree and the economic, environmental, social and political role of *Acacia Decurrens* tree. Data from the focus groups are used along the data collected from the questionnaire. The focus group discussion is structured so that participants are asked a predetermined set of questions, using the same wording and order of questions. In each kebele, one focus group discussion is held with local elder, farmers that involved in plantation and kebele administrator. Hence, five focus group discussions are held and attended by 20 people. The focus group is limited in number because this method required time to hold the discussion and to handle the difficult task of analyzing and interpreting the information gathered. The focus group discussions took place when the respondents are available and whenever it is convenient for the participants of the group.

2.3. Methods of Data Analysis

The study employed both quantitative and qualitative data analysis techniques. Qualitative Data analysis is the processes of analyzing, explanation, understanding or interpretation and summarizing text data for the purpose of describing events. The data collected from key informant's interview, focus group discussions and personal observations would be analyzed textually to supplement the questionnaire survey.

Qualitative analysis is employ involve the derivation of explanation and making of interpretation of the findings based on respondents' description of issues. The concern is on descriptions of patterns singularizes or uniqueness in the data collected. Qualitative information is mainly present through explanation and photographs. The qualitative data collected through key informant interview, focus group discussion and physical observation would narrate and summarized.

Quantitative data analysis, on the other hand, is a process of tabulating, interpreting and summarizing numerical data for the purpose of describing or generalizing the population from the samples. Upon completion of the data collection, the data would be coded, edited and entered into SSPS version 20 and analyzed using descriptive and inferential statistics. Descriptive statistics such as frequency, percentages and tables would be used for data analysis. Before proceeding to analysis, model fitness would be assessed by using Hosmer&Lemeshow goodness of fit test. According to Hosmer *et al*., (1997), the binary logistic regression model best fits if the value of

the Hosmer- Lemeshow goodness of fit is greater than 0.05 approaches to one.

Quantitative analyses on the other hand involve analysis of data using inferential statistics that on numerical values. Data from the field are first coded and frequency tables prepared using the statistical package for social science (SPSS). Statistical Package for Social Sciences (SPSS) software would use to analysis the data. Simple descriptive analysis is used to compute the percentages and frequencies for some socio-economic variables.

A binary logistic regression model would use to analysis the effect of different variables on farmers' perception. One dependent variable (perception of farmers on plantation of *Acacia decurrens* tree) and independent variables (perceived to have the political, social, economic and environmental role). The dependent variable is a dichotomous discrete variable that is generated from the questionnaire survey as a binary response and the independent variables are a mixture of discrete and continuous. Finally, the whole variables are organized, coded, entered into SPSS software and used to analysis the interaction between various independent variables and their responses towards the planation of *Acacia decurrens* tree.

Binary Logistic regression allows predicting a discrete outcome from a set of variables that may be continuous, separate and a combination. This led to production of descriptive statistics that is would present in the form of frequency scores and percentages. The data generated through quantitative method is organized and statistical computations are made to explore the inherent relationships among the different variables. Simple quantitative analysis techniques such as percentage and frequency distributions are also employed. Finally, the results would summarize in a table form so that the analysis and meaningful interpretations of results is made to draw conclusions and implications.

3. Results and Discussion

According to the objectives of the study, section one, discusses results of descriptive analysis about the role *Acacia decurrens* on the farmers livelihood based on the response of three kebele farmers and the workers of Woreda District Office of Agricultural and Rural Development. In section two, the econometric results using the logistic regression models are to be presented and discussed. Hence, the quantitative data was analyzed using techniques like frequency, percentage, followed by interpretation and discussion. SPSS statistical software was also employed to run the logistic regression model results on the role of *Acacia Decurrens* on the farmer's livelihood at Banja Woerda.

3.1. Results of Descriptive Analysis

The descriptive results were divided in to three sections. The first section is demographic characteristics of the respondents. In this section, the farmers and the workers of woreda district office of agricultural and rural development personal background such as sex, age, marital status and educational status have shown in table 1, 2 and 3 below.

3. 1. 1. Demographic Characteristics of the respondents

As can be observed from Table 1, from the total sample farmers (105), 68 (64.76%) were males and 37 (35.238 %) were female house hold heads. The respondents' key information was nearly all ranged in age from 20 and above years old. Females were less familiar with the plantation activities and there was little exchange of information with males. Most commonly planted tree species in Banja worada was *Acacia Decurrens* and rapidly expanding still today (2018 E.C).

As can be understand from Table 2, from the total sample farmers (105), 59 (56.2%) were married males and females house hold heads. 34(32.4%) of males and females were single. The divorce females from total sample size were 12(11.4%).

Table 1 Statistical summary of sex and age of the respondents (n=105)

Sex and Age	Frequency	Percent
M:- 20-35	32	30.5
M:- 36 and above	36	34.3
F:- 25-35	17	16.2
F:- 36 and above	20	19
Total	105	100

Table 2 Statistical summary of marital status of the respondents (n=105)

Marital status	Frequency	Percent
Married Male	45	42.8
Married Female	14	13.3
Single male	20	19.2
Single Female	14	13.3
Divorce Male	____	
Divorce Female	12	11.4
Total	105	100

Table 3 Statistical summary of educational background of the respondents (n=105)

Educational status	Frequency	Percent
M:- cannot read and write	2	1.9
F:- Cannot read and write	5	4.76
M:- can read and write	5	4.76
F:- can read and write	_____	
M:- from grade 1-6	17	16.2
F:- From grade 1-6	_____	
M:- from grade 7-9	30	28.57
F:- From grade 7-9	5	4.76
M:- from grade10-12	17	16.2
F:- from grade10-12	5	4.76
M:- Diploma	7	6.67
F:- Diploma	_____	
M:- Degree	10	9.52
F:- Degree	2	1.9
Total	105	100

The educational background of the respondent varies from cannot read and write to grade 12 and above. Respondents asked whether the role of *Acacia Decurrens* in the locality satisfy the demand of the farmers. 99.97% of the respondents' report shows that the farmers depending up on *Acacia Decurrens* tree plantation on behalf of their economic role with the added social, environmental and political role. To fulfill the fire wood, fences, charcoal, rehabilitation of degraded land and land tenure security were the causes for the *Acacia Decurrens* plantation expansion by farmers in the study area.

3.2. Econometrics Result and discussion

The major objective of this section is to identify the role of *Acacia Decurrens* tree on the farmer's livelihood in the study area. In eight items of linkert scale, the Farmers and the workers of Woreda District Office of Agricultural and Rural Development indicated the role of *Acacia Decurrens* tree on farmers' livelihood and made recommendations on how to address the

problems. The result of the logistic regression model can be used to assess the role of *Acacia Decurrens* tree on farmers using statistical package for social science (SPSS) was employed to run the logit model.

So, to study the role of *Acacia Decurrens* tree on farmer's livelihood, data gathered from 105 farmers were subjected to binary logistic regression model analysis. The logistic logit model was selected for analyzing the role of *Acacia Decurrens* tree on the farmer's livelihood of the sample households.

Table 4:- The logistic Regression estimates for the role of *Acacia decurrens* tree on farmers

3. 2.1. Descriptive Statistics

	Mean	Std. Deviation	N
Sex	1.33	.474	105
economic role	3.68	.470	105
environmental role	2.29	.906	105
social role	2.03	.849	105
political role	1.76	.849	105

The table 4 above showed that the descriptive statistics of logistic regression. Logistic regression indicates the mean and standard deviation of the variables. The mean shows the result of each variable. Sex (farmers) that depended on the *Acacia Decurrens* role perceived as dependent variables whereas the roles of *Acacia Decurrens* tree perceived as independent variables. The logistic regression result of mean of the independent variables decreasing from the economic role to the political respectively. In contrary, the standard deviation is increasing

As can be observed from above table, 1.34 % (71) respondents strongly agreed for the economic role of *Acacia Decurrens* tree while 1.32%(34) of the farmers agreed for the economic role of it.

The table above illustrates the environmental role of *Acacia Decurrens* tree. According to respondents, 1.30 %(20) are strongly disagreed, 1.30(47) disagreed, 1.35 %(26) agreed and 1.50 %(12) strongly agreed about the environmental role of *Acacia Decurrens* tree. The respondents replied that the environmental role of tree less than that of the economic role.

From above result, the respondents stated that the 1.31 %(32) are strongly disagreed, 1.33 % (42) disagreed, 1.41 %(27) agreed and 1.00 %(4) strongly agreed. When compared the economic, environmental and social role, the role of *Acacia Decurrens* socially less than from the environmental and economic correspondingly.

As can proves from the above table, 1.29 %(49) respondents replied as strongly disagreed, 1.39 %(36) as disagreed, 1.31 %(16) as agreed and 1.50% (4) as strongly agreed. The respondents answered *Acacia Decurrens* has almost the same social and political role in the study area. Based on the respondents reply, *Acacia Decurrens* tree at Banja woreda has superior economic role. The next is environmental role, and then it has social and political role respectively in the study area

4. Conclusion

The serious soil erosion and deforestation eradicated in Ethiopia by extensive planting tree and reforestation. Afforestation of exotic

species mainly the *Acacia Decurrens* planted as private for multirole in the highlands of Awi Zone at Fagita-Lekoma and Banja districts around the 1990's.

Table 5 proves the results of one-sample statistics of T-Test

	N	Mean	Std. Deviation	Std. Error Mean
economic role	105	3.68	.470	.046
environmental role	105	2.29	.906	.088
social role	105	2.03	.849	.083
political role	105	1.76	.849	.083

Table 6 clarifies the results of the One-Sample Test

	Test Value = 0					
	T	Df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
economic role	80.119	104	.000	3.676	3.59	3.77
environmental role	25.842	104	.000	2.286	2.11	2.46
social role	24.492	104	.000	2.029	1.86	2.19
political role	21.253	104	.000	1.762	1.60	1.93

Table 7 displays the Case Processing Summary

	Cases					
	Included		Excluded		Total	
	N	Percent	N	Percent	N	Percent
sex * economic role	105	100.0%	0	0.0%	105	100.0%
sex * environmental role	105	100.0%	0	0.0%	105	100.0%
sex * social role	105	100.0%	0	0.0%	105	100.0%
sex * political role	105	100.0%	0	0.0%	105	100.0%

Table 8 presents the economic, environmental, social and political role of *Acacia Decurrens* tree on farmer's livelihood at Banja woreda

sex * economic role

economic role	Mean	N	Std. Deviation
Agreed	1.32	34	.475
strongly agreed	1.34	71	.476
Total	1.33	105	.474

sex * environmental role

environmental role	Mean	N	Std. Deviation
strongly disagreed	1.30	20	.470
Disagreed	1.30	47	.462
Agreed	1.35	26	.485
strongly agreed	1.50	12	.522
Total	1.33	105	.474

sex * social role

social role	Mean	N	Std. Deviation
strongly disagreed	1.31	32	.471
Disagreed	1.33	42	.477
Agreed	1.41	27	.501
strongly agreed	1.00	4	.000
Total	1.33	105	.474

sex * political role

political role	Mean	N	Std. Deviation
strongly disagreed	1.29	49	.456
Disagreed	1.39	36	.494
Agreed	1.31	16	.479
strongly agreed	1.50	4	.577
Total	1.33	105	.474

The study selected the Banja district due to its vast potential for the role of *Acacia Decurrens* tree in general and planting practices in particular. The study areas in the district are Zek na Gumerta, Bidana Jegola and Kesa Chewsa kebeles. Planting *Acacia Decurrens* tree offers a role to the economic, social, political and environmental problems in the study area. To study the role of *Accacia Decurrens* tree in the three kebeles used descriptive survey research design. This design would employ multiple sources of data such as distribution of questionnaires and conducting interviews with the concerned parties. The result of this study would be discussed by the use of the descriptive and econometric analysis.

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