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Analyzing Adoption and Intensity of Use of Coffee Technology Package in Yergacheffe District, Gedeo Zone, SNNP Regional State, Ethiopia

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Abstract: ***Coffee is among the most traded commodity across the world and thus coffee plays a vital role in the balancing of trade between developed and developing countries. Coffee (Coffea arabica), originated in Ethiopia and supports the livelihood of many small scale farmers. However, the efficiency of coffee system is inhibited by different factors of which lack and low use of improved technological packages takes a big share. This research therefore, conducted in Yergacheffe District with the objectives of analyzing adoption and intensity of use of coffee technology package and investigating demographic, socio-economic and institutional factors which have relation to coffee technological packages and characterize adoption and Intensity of Use of coffee technology package related problems. The study used both primary and secondary data. 160 household heads were selected using systematic random sampling procedure with sample size allocation procedures of probability proportional to size method. Structured interview questionnaire was prepared and administered to elicit the required data. Data were analyzed, and presented quantitatively using different statistical methods such as percentage, mean, frequency, Chi-square (categorical variables) and (F-test for continuous variables), F-test and Chi-square test were employed to test the variation of the sample respondents they have towards adoption and intensity of coffee technology package and also used to describe the patterns of the sample data. The results of Tobit model indicated that respondent's level of education, social participation, access to credit, labor availability, and farm size and achievement motivation were important variables which had positively and significantly influenced adoption and intensity of use of improved coffee technology package. On the other hand, market distance had shown negative and significantly affected adoption and intensity of use of coffee technology package. Based on the finding of the current study it can be concluded that, policy and development interventions should give emphasis towards improvement of such economical and institutional support system so as to achieve wider adoption, increased productivity and increase income level of small scale farmers.***

Keywords: Coffee, Adoption, Intensity, Tobit model, Yergacheffe district, Technology package

1. Introduction

Coffee (Coffea arabica), originated in Ethiopia and is the second major traded commodity following to oil [1,2] and thus plays a vital role in the balancing of trade between developed and developing countries of the world. In Ethiopia where coffee is grown, majority of the small holders' livelihood is dependent on coffee cultivation and coffee have a paramount contribution in the overall economy of the country. In spite of its importance, coffee production system is characterized by traditional methods of production and low level of improved technology availability and application. As a result, the yield of coffee is as low as 450-472 kg per hectare of clean coffee [3]. Different empirical evidence indicated that farmers' decision on adoption of agricultural innovation can be influenced by different factors associated with socio-economic, institutional, demographic and physical characteristics. Factors such as, characteristics of household (education, age and family size), farm characteristics, technology characteristics, wealth (economic status), contact with extension workers, farmers' knowledge of the specific technology, price, access to credit, position of farmers in farmers' organization would be important determinants of adoption of technological innovations.

Although involving farmers in the research process has increased adoption rate of improved coffee varieties, it can never be a substitute for adoption study, as it does not show the actual rate and intensity of adoption of the varieties and factors influencing adoption. Moreover, adoption of improved varieties alone is not enough to achieve the desired level of yield unless farmers adopt the improved varieties with it full production packages. Empirical observations indicated that most farmers have adopted only the varieties, but not used the other essential components of improved production package as per research recommendation. Moreover, adoption rate of production technologies varies farmer to farmer.

Reasons for such diversity among farmers in adoption and intensity of use of coffee technology package in the study area have not been yet studied. On top of this, the study area is among the areas in the country which is specialized on coffee production and with long period contribution especially for organic coffee export. Hence, studying adoption of coffee technology package in the study district is worth to fill the knowledge gap regarding to coffee system.

Therefore, the main purpose of the current study was to assess the status of adoption and intensity of use of coffee technology package and identify major factors influencing adoption and intensity of use of coffee technology package in

the study area. To deal with the aforementioned issues a combined effort of literature study, focus group discussion and questionnaire based survey were implemented.

2. Methodology

2.1 Description of the Study Area

The study was conducted in Yirgacheffe district; one of the districts in Gedio zone of southern Ethiopia. The study area stretched about 395 km to the southern direction of the capital city Addis Ababa, and 35km from the zonal town, Dilla, Ethiopia. Yirgacheffe District consists of 31 kebeles with estimated total population of 199,077 [4]. The District has a total area of 29158 hectare and Yirgacheffe district is classified into two agro-ecological: Highland; with an altitude ranging between 2300 - 2500 m.a.l.s and covering 8% of the area whereas, mid-altitude is with an altitude ranging between 1750 - 2300 m.a.s.l covers 92% of the area. The minimum and maximum mean annual temperature ranges between 120c and 25^0c.The farming system of the district characterized by crop-livestock mixed farming system. Cattle, goats, sheep and chickens are important livestock species reared by farmers. Coffee, maize, and wheat are major cereal crops in the area. A variety of fruits like mango, lemon, avocado and bananas, and root /tuber crops also grows in the area.

2.2 Data Collection and Data Analysis techniques

The data was collected in three data collection stages. Literature review, expert elicitation, quantitative surveys were carried out to elicit the required data. Each method is detailed below.

2.2.1 Data collection techniques

The survey was conducted over the period Oct 2012–Jan 2013 in six kebele in the study area. In order to get the overall image of adoption and intensity of use of coffee technology package in the study area, the study was used both primary and secondary data. The primary data were collected using interview schedule (farmers). A checklist was used to farmer's group discussion so as to generate data that cannot be collected from individual interviews. Secondary data were also collected from relevant governmental and non-governmental offices as deemed necessary. Moreover, relevant published and grey reports, bulletins and websites were reviewed to gather the required secondary data. Following the secondary data collection and group discussion stages an interview as made by considering 160 samples respondents. Then after, Descriptive Analysis and econometric Analysis were carried out to analyze the data in detail.

2.2.2 Data Analysis techniques

Comparisons between coffee technology user's and non-users were carried out through application of chi-square and t-test. The relative influences of various explanatory variables on the dependent variable were also analyzed.

Econometric Method (Tobit Model)
Specification of the Tobit Model

The econometric model applied for analyzing factors influencing adoption and intensity of technology use is the Tobit model shown in equation (1). This model is chosen because it has an advantage over other adoption models (LPM, Logistic, and Probit) in that it reveals both the probability of adoption of new technology and intensity of its use. Following Amemiya (1985), Maddala (1992) and Johnston and Dinardo (1997), the Tobit model can be defined as:

$$AI_i^* = \beta X_i + U_i \quad i = 1, 2 \ldots\ldots\ldots\ldots n$$

$$AI_i = AI_i^* \text{ if } AI_i^* > 0$$
$$= 0 \text{ if } AI_i^* \leq 0 \qquad (1)$$

Where

AI_i = is adoption index for i^{th} farmer

AI_i^* = is the latent variable and the solution to utility maximization problem of intensity of adoption subjected to a set of constraints per household and conditional on being above certain limit,

X_i= Vector of factors affecting adoption and intensity or level of use of coffee technology package,

β_i = Vector of unknown parameters, and

U_i= is the error term normally distributed with mean 0 and variance σ^2.

The model parameters are estimated by maximizing the Tobit likelihood function of the following form (Maddala, 1992 and Amemiya, 1985).

$$L = \prod_{AI_i^* > 0} \frac{1}{\sigma} f\left(\frac{AI_i - \beta_i X_i}{\sigma}\right) \prod_{AI_i^* \leq 0} F\left(\frac{-\beta_i X_i}{\sigma}\right) \qquad (2)$$

Where f and F are respectively, the density function and cumulative distribution function of AI_i^*. $\prod_{AI_i \leq 0}$ Means the product over those i for which $AI_i^* \leq 0$, and $\prod_{AI_i > 0}$ means the product over those i for which $AI_i^* > 0$.

A computer software known as "STATA" was employed to run the Tobit model. It may not be sensible to interpret the coefficients of a Tobit in the same way as one interprets coefficients in an uncensored linear model [7]. Hence, one has to compute the derivatives of the estimated Tobit model to predict the effects of changes in the explanatory variables.

As cited in [6, 7], [8] proposed the following techniques to decompose the effects of explanatory variables into adoption and intensity effects. Thus; change in X_i (explanatory variables) has two effects. It affects the conditional mean of AI_i^* in the positive part of the distribution, and it affects the probability that the observation will fall in that part of the distribution. Similarly, in this study, the marginal effect of explanatory variables was estimated as follows.

1. The marginal effect of an explanatory variable on the expected value of the dependent variable is:

$$\frac{\partial E(AI_i)}{\partial X_i} = F(z)\beta_i \quad (3)$$

Where, $\frac{\beta_i X_i}{\sigma}$ is denoted by z, following Maddala, (1997)

2. The change in the probability of adopting a technology as independent variable X_i changes is:

$$\frac{\partial F(Z)}{\partial X_i} = f(z)\frac{\beta_i}{\sigma} \quad (4)$$

3. The change in the intensity of adoption with respect to a change in an explanatory variable among accessed (utilized) is:

$$\frac{\partial E(AI_i / AI_i^* > 0)}{\partial X_i} = \beta_i\left[1 - Z\frac{f(z)}{F(z)} - \left(\frac{f(z)}{F(z)}\right)^2\right] \quad (5)$$

Where,

F (z) Is the cumulative normal distribution of Z,
$f(z)$ Is the value of the derivative of the normal curve at a given point (i.e., unit normal density),
Z Is the Z score for the area under normal curve,
β Is a vector of Tobit maximum likelihood estimates and
σ Is the standard error of the error term?

Before running the Tobit model all the hypothesized explanatory variables were checked for the existence of multi-co linearity problem. Two measures often suggested testing the existence of multi-colinearity. These are: Variance Inflation Factor (VIF) for association among the continuous/discrete explanatory variables and contingency coefficients for dummy/categorical variables. In this study, variance inflation factor (VIF) was to test multi-co linearity problem for continuous/discrete and dummy/categorical variables.

According to Maddala (1992), VIF can be defined as:

$$\text{VIF}(X_i) = \frac{1}{1 - R_i^2}$$

Where R_i^2 is the squared multiple-correlation coefficient between X_i and the other explanatory variables? The larger the value of VIF, the more would be the problem, as a rule of thumb, if the VIF of a variable exceeds 10 (this will happen if R_i^2 exceeds 0.95), that variable is said to be highly collinear (Gujarati, 1995). Tobit using computer software (STATA) and insignificant variable was dropped and all significant variables were included in to the Tobit model.

3. Results and Discussion

This chapter consists of the overall findings of the study under adoption and intensity of use of coffee technology package. In this chapter the status of adoption and intensity of use of coffee production package, current practices of coffee technology package are discussed in detail. Subsequently, the influence of different personal, demographic, socio-economic, institutional and psychological factors on the adoption and intensity of use of coffee technology package were discussed consecutively.

3.1 The status of adoption and intensity of use of coffee production package

Table 2: Distribution of respondents by level of adoption of coffee technology package

Adopter Category	N	Index Percent	Score	Mean	F
Non	20	12.5	0	0	
Low	11	6.87	0.35-0.57	0.48	
Medium	43	26.88	0.58-0.78	0.69	
High	86	53.75	0.79-1.00	0.88	
Total	160	100	0.00-1.00	0.69	1232***

Source: own survey data, 2011; ***the mean difference is significant at 1% level.

Table 3: Descriptive statistics among Low, Medium and High adoption categories

	Adopter Category N	Mean	S.D	F
Adoption of Coffee varieties				
Low	11	0.35	0.15	
Medium	43	0.41	0.18	6.408***
High	86	0.52	0.22	
Compost application Rate				
Low	117.85	4.64	1.12	
Medium	4330.71	4.14	1.08	2.284^{NS}
High	8661.43	4.54	1.04	
Weed Management				
Low	117.86	3.00	0.45	
Medium	4330.71	3.65	0.72	54.518***
High	8661.43	5.23	1.10	

Source: own survey data, 2011; *** and NS the mean difference is significant at 1% level and no significant difference

Table 4: Descriptive statistics among Low, Medium and High adoption categories

	Adopter Category								
	Low		Medium		High		Total		Chai square
	N	%	N	%	N	%	N	%	(χ2)
Pruning Practices									
Yes	54	5.5	27	62.8	77	89.5	109	77.9	
No	65	4.5	16	37.2	9	10.5	31	22.1	19.164***
Spacing Practice									
Yes	6	54.5	31	72.1	80	93	117	83.6	
No	5	45.5	12	27.9	6	7	23	16.4	16.472***

Source: own survey data, 2011; χ2= 19.164***, df=2, p=.000

3.2 Descriptive Results

Table 5: Descriptive statistics among Low, Medium and High adoption categories

	Adopter Category					
	None	Low	Medium	High	Total	
	%	%	%	%	%	(χ2)
Sex						
Male	65	64.6	89.7	98.1	81.87	
Female	35	35.4	10.3	1.9	18.12	0.365***
Access to credit						
Yes	10	45.5	86	95.3	78.8	
No	18	55.5	14	4.7	21.2	79.304***
Radio Listening Habit						
Yes	90	81.8	95.3	94.2	93.1	
No	10	18.2	4.7	5.8	6.9	2.985^{NS}

Source: own survey data, 2011; ***, and NS significant at 1 and non-significant respectively

Table 6: Descriptive statistics among Low, Medium and High adoption categories

	Adopter category				
	Non	Low	Medium	High	F
AGE	44.70	43.09	46.02	48.91	1.927^{NS}
EDUCATION	2.35	4.09	4.39	6.50	21.058***
FAMILY SIZE	4.35	6.45	6.47	6.89	9 .734***
LABOR	1.23	1.73	1.96	2.19	4.960*
LANDSIZE	1.40	1.39	1.53	1.61	2.303*
LIVESTOCK	1.96	0.74	1.05	1.95	4.337***
ANINCOME	7601	11455	12870	16127	11.304***
DISMARKET	2.43	2.23	1.58	0.69	26.143***
CONTEXTEN	1.10	0.91	1.05	1.22	2.422*
SOCIAPART	10.45	9.82	11.69	16.57	23.546***
COSMOP	1.70	0.64	1.58	2.71	23.204 ***
ACHIMMOT	12.50	14.73	15.86	16.69	28.557***
ATTITUDE	33.75	30.46	33.42	36.05	13.378***

Source: own survey data, 2011; ***, * and NS significant at 1, 10% and non-significant respectively

Table 7: Determinants of adoption and intensity of use of coffee technology package

Variable	Estimated Coefficient	Standard Error	T-ratio	P-value
Constant	-.143	148	-0.96	0.337
SEXHH	.045	031	1.44	0.152
AGEHH -	.002	.001	-1.51	0.134
EDUCHH.	018	.005	4.03***	0.000
SOCIALPT	.008	.003	2.76***	0.006
RADIOHB`	.012	.042	0.29	0.772
COSMOPLT	.002	012	0.18	0.856
LIVESTOCK	.001	.008	0.08	0.939
FAMSIZE	.003	.005	0.72	0.473
LABORAVAL	.023	.010	2.26**	0.026
ANINCOME	-2.37	1.83	-0.13	0.897
FARMSIZE	.054	.023	2.39**	0.018
PARTRAIN	-.017	.033	-0.53	0.600
ACCESSCR	.072	.029	2.44**	0.016
DACONTACT	-.017	.025	-0.69	0.490
DISMARKET	-.034	.013	-2.59**	0.011
ACHIMMOT	.034	.007	5.25***	0.000
ATTITUDE	.000	.000	0.47	0.637
Sigma		.1992136		.012357
Log likelihood = 76.507161				
ANOVA based fit measure (R^2) = 0.6387				

Source: Model output, ** and *** represents significance at 5% and 1% level respectively.

Educational level of the household head

As expected, education was positively and significantly influencing the probability of adoption and intensity of use of coffee technology package at 1% significant level. Generally education is thought to create a favorable mental attitude for the acceptance of new innovation and practices. It enhances farmers' ability to acquire, analyze, interpret and use information relevant to the adoption of agricultural innovations. The result of the analysis indicated that an increase in years of schooling increases the probability of adoption and intensity of use of coffee technology package by 1.8%. This suggests that farmers with higher educational background would have better opportunity to access information and can easily understand the benefit of improved coffee technology and apply the technologies as per the recommendation. This result supports the findings of earlier researches on technology adoption by [9, 10, 11] who reported positive and significant influence of household heads' educational level on adoption and intensity of use of improved technology package.

Social participation (SOCIALPT)

Social participation plays a crucial role in technology adoption. The model indicated that farmers who have participation in social activities were hypothesized to have more opportunity of getting access to information and adopting technologies better than the non-participants. The marginal effect from the model result shows that a one unit variation of social participation increases the adoption and intensity of use of coffee technology package by 0.79%. The finding of the current study is in agreement with the previous works of [12], which indicates interpersonal network as a core component in technology diffusion process since it have the

capacity to create information exchange between those individuals who have already adopted an innovation and those who are then influenced to do so. In this study also, social participation was considered to influence adoption positively. It is a social asset that creates an opportunity to share experience and exchange information on innovations in the farming community. This imply that strong social participation lead to have better access of information and technologies then lead to better technology adoption.

Labor availability (LABORAVAL)

Labor availability was found statistically significant at less than 5% probability level with the expected value and positively related with adoption and intensity of use of coffee technology package. The model result confirms that households with high labor availability in man equivalent are more likely to register better adoption and intensity of use of coffee technology package than households with low labor availability in adult equivalent. The likelihood estimation indicates that the probability of adoption and intensity of use of coffee technology package increases by 2.2% as labor availability increases by one man equivalent unit. The result of this study was consistent with the finding of many other researches which were conducted in different parts of the world, as well as agrees with the ideas mentioned in the hypothesis part of this research.

Farm size (FARMSIZE)

The model output revealed that farm size had positive and significant influence to the probability of adoption and intensity of use of coffee technology package at less than 5% significant level. The finding in this study supports the hypothesis that farmers with large farm size are more likely to adopt coffee technology practices/packages than those farmers who have small land holding. The marginal effect from the model result shows that an increase in unit measure of the landholding increases the probability of adoption and extent of use of coffee technology package by 5.4 %. This research supports the finding of earlier researches on technology adoption.

Market distance (DISMARKET)

Distance from nearest market center was assumed to influence coffee technology package. The finding of this research as given in (Table 21) agrees with the hypothesis in that distance from market is negatively and significantly associated the probability of adoption and intensity of use of coffee technology package at less than 5% significance level. The negative association suggests that the likelihood of adopting coffee technology package declines as the distance from market center increases. The possible reason might be farmers nearer to market center have access to production inputs and the incentive to output market than those at far distant. This can be explained as market distance increases, farmers may incur more costs for transport, spend time and energy consumption, which increases total production cost and thereby contribute for low final return or profit of the farmer. Consequently, farmer initiation for adoption of new coffee technology package would declines. For a unit increase in market distance, the probability of adopting and use extent of improved coffee technology package will decrease by 3.4 %.

Access of credit (ACCESSCR)

Access of credit was also another institutional variable that was found to have significant influence on the probability of adoption and intensity of use of coffee production packages at less than at 5% level of significance. The model result shows that credit use was found to have larger contribution compared to other independent variables i.e. the variable accounted for a 7.2% of the variation in adoption and intensity of adoption of coffee production package. This has an implication that credit availability helps farmers to relax their limited resources for purchasing agricultural inputs. Service cooperatives distribute various types of agricultural inputs on credit basis that requires 50% down payment. In this case, only those farmers who possess cash at hand can benefit from formal credit. On the other hand, farmers who have no cash at hand will be devoid of the opportunity. Therefore improving performance efficiency of actors which are dealing with credit services is pertinent and looks for solutions to correct the defects associated with credit system.

Achievement motivation (ACHIMMOT)

Achievement motivation is something that causes a person to make an effort to become successful and be goal oriented and found to influence significantly the probability of adoption and intensity of use of coffee production packages at less than 1% level of significance. The model output result revealed that a one unit variation in the achievement motivation increases the adoption and intensity of use of coffee technology package by 3.43%. This explains that a strong need for achievement leads for better technology adoption.

Table 8: Effects of change in the explanatory variables on probability of change adoption and intensity of use of coffee technology package

Variable	Change in Probability of the Adoption	Change in Intensity of Adoption	Change Among whole
EDUCHH	.0004	.0181	.0181
SOCIALPA	.0002	.0079	.0079
FARMSIZE	.0012	.0541	.0541
LOBORAVA	.0005	.0226	.0227
ACCESSCR	.0034	.0719	.0721
DISMARKET	-.0008	-.0335	-.0336
ACHIMMOT	.0009	.0343	.0344

Source: Model output, 2012

The results computed in Table 8, indicate that the estimated increase in the probability of change on adoption and intensity of use of coffee technology package resulting from a unit change in schooling level is about 0.04% and 1.81% respectively. The overall change from this variable is .0181. The model result confirms that households with high participation in social activities are more likely to change on adoption and intensity of use of coffee technology package was .0079 with the probability of change on adoption and intensity of using coffee technology package increases by 0.02% and 0.79% as social participation increases by one unit respectively (Table 8**).**

The marginal effect of Tobit model analysis showed that the effect of farm size on adoption and intensity of use of coffee

technology package was .0541; a unit increase in the farm size of the household head increases the probability of change on adoption and intensity of use of coffee production package by 0.123% and 5.41% respectively.

Labor availability was found statistically significant at less than 5% probability level with the expected value and positively related with adoption coffee technology package. The model result confirms that households with high labor availability in man equivalent are more likely to change on adoption and intensity of use of coffee technology package was .0227 with the probability of change on adoption and intensity of using coffee technology package increases by 0.052% and 2.26% as labor availability increases by one man equivalent unit respectively.

The marginal effect of access of credit on the overall coffee production package adoption was .0721. Table 8 above showed that access of credit increased the probability of adoption and intensity of adoption of coffee technology package by0.34% and 7.19% respectively. The effect is very immense as compared to the changes resulting from other significant variables implying that priority should be given to improving credit service provision system.

The result of this study also shows that distance from market center had negative significant effect on adoption and intensity of use of coffee technology package. As show in Table 7, the overall effect of this variable on adoption and intensity of use of coffee technology package was -.0336, and a unit increase in distance away from the market center decreases the probability of change on adoption and intensity of use of coffee technology package by -0.078% and -3.35% respectively.

The model result showed (Table 8) that the marginal effect of achievement motivation on adoption and intensity of use of coffee technology package was .0344, and if farmers have positive motivation toward coffee technology package, the probability and intensity of use of coffee technology package are increased by 0.078% and 3.43% respectively.

4. Conclusion and Recommendations

In the study area Arabica coffee (Coffee Arabica L.) is an economically important cash crop, which serves as a major means of income for the livelihood of coffee producing families in the study area. Moreover, the crop plays a paramount role in the economy of Ethiopia contributing the highest of all export revenues in the country. So that, institutional supports should be given to the sector, such as credit service, research and extension were not to the expected level. These factors coupled with other household personal, demographic, socio-economic and psychological factors greatly affected the adoption and intensity of use of coffee production packages and consequently production and productivity of the sector.

As illustrated above, in this particular research the Tobit model revealed that level of education, social participation, farm size, labor availability, credit access and achievement motivation were found to have positive and significant effect on the adoption and intensity of use of coffee technology package. Contrary to this, access to market had shown negative and significant influence on the adoption and intensity of use of coffee technology package. However, all of the variables considered in this study were found to have relatively more effect on intensity than probability of adoption.

Our result suggested that participation of farmers in different formal and informal organization like peasant association, informal associations (Ider, Ekub, Mahber and others, farmer's cooperatives and women's association has to be strengthened so as to improve farmers' access to information and adoption of technologies. Different coffee technology package with relatively less labor requirements should be designed. Attention should be given to developing infrastructure and transportation availability. Moreover, organizing and strengthening producers', co-operatives will ease procurement of inputs and sale of outputs in collective basis and will help to overcome market barrier to some extent. Barriers on the supply-side of credits (high interest rate, down payment, etc.) should be overcome if a genuine major means of income for the livelihood of coffee farming families is to be achieved in the study area. Generally, it is enhancing and promoting the overall national economy. The concerned bodies should be formulating a strategy for rewarding and recognition like green certificate, financial and material support for those farmers who are genuinely successful and be goal oriented.

In general, the result of this study indicated that adoption and intensity of use of coffee technology package was the result of many interplay of several factors, which needs much due attention by the stockholders in the provision of shade, pruning, fertilizing (such as compost, manure, etc) spacing, seed preparation, weed management and soil and water conservation need to be integrated to achieve a sustainable production system.

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Experience: I have been working as Senior Lecturer in Dilla University at the department of Agricultural economics from 11/09/2007 up to now. On to top of this, since 2014 I have been working as a department head of Agricultural economics. Moreover, I was working as Senior Lecturer in Dilla Agricultural TVET College for the last five years. In addition to all the above, I was also worked as Farm Management Expert in Bench Maje Zone specifically in Beftue (Gurafereda) woreda in Agricultural and Rural Development Office for eight months. In addition to my teaching duties, I have also provided training on Communication, Facilitation and Networking Skill and Farm Management and Practical Extension Methods for SNNPR, Oromia and Harare regional office of agriculture.

Training: I have a Certificate on Computer Application from Negallgn Computer Training Center. I am trained on Ethics and Anti- Corruption Training by Haramaya University and Federal Ethics and Anti- Corruption Commission, and I do have taken training of trainers' courses in Communication, Facilitation and Networking Skills with the collaboration of Ministry of Agricultural and Rural Development and Rural Capacity Building Project.

Mr Tewodros Ayalew Obtained his MSc in Crop Science & Organic Agriculture in 2011 from Wageningen University. From then, He has published more than seven papers in peer-reviewed journals. He has the first Dean, College of Agriculture & Natural Resources of Dilla University. Research interest includes Plant nutrition, Organic farming system, Innovative Technology transfer, food security issues.