



DETERMINANTS OF SMALLHOLDER FARMERS IN TEFF MARKET SUPPLY IN AMBO DISTRICT, WEST SHOA ZONE OF OROMIA, ETHIOPIA

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Abstract: *The study was conducted to identify factors affecting smallholder farmers teff supply to the market in Ambo district West Shoa Zone of Oromia. Two main teff producer Kebeles, namely Amaro and Gossu Kora were selected by using simple random sampling technique from 11 high potential teff producing Kebeles in Ambo district. A total of 142 teff growing households were selected using random sampling and then interviewed. Both descriptive and econometrics analysis were employed to meet the objective of the study. By applying multiple regressions models first identify the factors affecting teff market supply. Results of the study shown that four factors were found to have significantly affect the decision of smallholder farmers on the quantity of teff sold on the market; namely, teff production (yield) at 1%, labour at 5%, income from nonfarm at 5%, and price of teff which is significant at 10% probability level. The study recommends that farmers use modern technologies such as improved production methods, improved seeds, and farming tools; access to credit and labour reducing technologies to increase quantity supply of teff into the market. The district agricultural office must create an enabling environment, especially by given support to increase production of teff. Moreover, reducing non-farm activities by making teff production more profitable and farmers must devote more time to farming activities. Further research needed on teff market chain analysis starting from producer to final consumers, and critical analysis on the value chain of teff.*

Keywords: *Teff, determinants of market supply, smallholder farmers, Ambo, Ethiopia*

INTRODUCTION

The majority of Ethiopia's population earns its livelihood primarily from agriculture. The agricultural sector, which is stunted by subsistence smallholder farmers, is the primary source of livelihood for the majority of the population and the basis of the national economy. Agriculture accounts for 42.9% of GDP (MoFED, 2014), it contributes to nearly



80% of export earnings, provides employment to 73% of the population (EATA, 2014).

In Ethiopia, smallholder agriculture is the main source of food. This sector was sharing about 96% of total crop production in 2012/13 (MoFED, 2014). According to CSA (2014), smallholder farmers produced 215,835,225.61, 28,588,805.90, and 7,112,592.38 quintals of cereals, pulses, and oil crops, respectively. Thus, smallholder agriculture is the base for family livelihood and food security of the country (Adenew, 2006). However, the productivity of this sector is very low in quantity and poor in quality. On the other hand smallholder, agriculture is the main and only supplier of staple food crops like teff in this country.

Botanical, Teff is named as *Eragrostis tef* and it is believed to be the smallest grain in the world. The plant is grown over a wide range of environmental conditions in Ethiopia and has been utilized as the primary food and food supplements in Ethiopia (Gebremariam *et al.*, 2014).Teff is grown mainly as a cash crop by most farmers in Ethiopia (Demeke and Marcantonio, 2013).

Teff (*Eragrostis tef*) is the leading crop which is unique to Ethiopia of the World. Teff cultivation requires several plowings for fine seedbed preparation, which can contribute to soil erosion, a factor which favors crop rotation and multi-cropping to maintain soil productivity (Desta *et. al.* 2000).

It is observed that teff production is increased in rapid rate recently. It is estimated that annual teff production has been increasing by 11%, which has resulted in a 100% increase every seven years. Increased productivity is believed to contribute about 6% of that 11% growth while about 5% was attributed to expansion in area cultivated for teff (EATA, 2013).

Since there is a little information about the determinant of teff market supply that means information on factors affecting a farmer's decision to teff markets. This study tried to fill the research gap by investigating the major determinants of smallholders which affect teff supply on the market.

RESEARCH METHODOLOGY

Both qualitative and quantitative data were used to answer the research questions. A qualitative method was used to collect the qualitative data. A quantitative method was used to collect information that has been transformed into numbers. The sample size was determined by using Slovin's formula (Slovin, 2003 as by cited Tadele *et al.*, 2015).

Two main teff producers peasant association (Kebeles), namely Amaro and Gossu Kora were purposely selected for this study in consultation with relevant agricultural officials from



Ambo District Agricultural Office. These selected Kebeles are a relative better production potential of teff among other Kebeles in Ambo district. The two selected Kebeles have a total of 1553 households (HH). The numbers of sampled respondents are presented below.

Table1. Number of sample respondents taken from each Farmer Associations

Grain type	Name of selected FAs	No of Teff Producing HH	%	No of Sample HHs taken
Teff	Amaro	619	39.85	57
	Gossu Kora	934	60.14	85
	Total	1553		142

A total of 142 respondents were randomly selected to collect primary data and information at producers, for the present study. Among total respondents teff growing farmers 57 households from Amaro Kebeles and 85 households from Gossu Kora were selected and interviewed.

Pre-tested and semi-structured interview questionnaires were used for collecting data and information from respondents. The interview questioners were formulated after a pilot survey was conducted in the study area by asking teff producers, development workers and agricultural officers in the district. Primary data was collected by using personal interview technique from the producer. The validity of collected data and information were triangulated through focus group discussion with key informant using checklists.

ECONOMETRIC MODEL SPECIFICATION

Multiple regression models were used to examine the demographic, socioeconomic, and institutional factors that are associated with market participation by producers. This model is chosen because it helps to identify factors that determine the quantity of teff supply to the market and extent of participation by producers.

To identify factors affecting teff market supply and extent of production and marketing, multiple regression models were used. It is indicated that in a situation where the one dependent variable and two or more independent variables relationship is estimated by multiple linear regression model. The relationship can thus be expressed as:

$$\hat{Y} = \hat{\beta}_1 + \hat{\beta}_2 X_2 + \hat{\beta}_3 X_3 + \hat{\beta}_4 X_4 + \dots + \hat{\beta}_k X_{ki} + \varepsilon_i$$

Where: Y_i = Teff quantity supplied to the market

β = a vector of estimated coefficient of the explanatory variables

X = a vector of explanatory variables



ϵ = error terms

Moreover, multicollinearity, endogeneity and heteroscedasticity detection test were performed using appropriate test statistics.

RESULTS AND DISCUSSION

Determinants of Quantity of teff Supplied

This section, multiple regressions analysis is performed to identify the decisive factors affecting the amount of total teff crop that sampled respondent supply to the market. It is worth mentioning at this stage that almost all farm households who participated in the market as sellers are considered in this analysis since the objective is to identify what factors determine for a household to sell more or less of its crop production in the market.

Table 2. Indicates that the decision of how much quantity was sold by households. Each decision has been studied by using a selection model which calculated by multiple regressions estimation of the decision to sell into the supply equations. There are 13 potential explanatory variables (7 continuous and 6 dummy). Out of these four variables, non-farming income, the price of teff, yield and labour had a significant effect on the quantity of teff sold.

Table 2. Determinant of teff quantity sold to the market

Variable	Coefficient.	Std. Err	t	P> t
Gender	0.825	0.732	1.13	0.262
Total production of teff in quintal	0.367***	0.043	8.42	0.000
Labour	1.201**	0.507	2.37	0.019
Farm size	0.118	0.118	1.00	0.319
Access to extension service	0.703	0.671	1.05	0.297
Nature of land	-0.275	0.415	-0.66	0.510
Total fertilizer use in quintal	-0.000	0.000	-0.99	0.323
Income from nonfarm	0.000**	0.000	2.00	0.048
Price of teff	1.105*	0.567	1.95	0.053
Access to credit services	0.703	0.640	-0.46	0.649
Nonworking age	0.342	0.220	1.55	0.123
Family size (AE)	-0.025	0.022	-1.12	0.264
Time of selling teff	0.119	0.225	0.53	0.599
_cons	-1.526	2.026	-0.75	0.453

Note: Dependent variable- is Teff quantity supply to the market

***, **, * indicate statistically significant at 1%, 5%, and 10% probability level, respectively

Number of obs = 142 Prob > F = 0.0000

R-squared = 0.5242, Adj R-squared = 0.4758



The quantity of Teff produced

As hypothesized, the multiple linear regression results show that marketed surplus was significantly affected teff quantity sold at 1% level. The positive coefficient indicates that a unit increase in the quantity of teff produced will increase the marketable supply of farmers. The result also implied that a unit increase in the quantity of Teff produced has caused an increase of 0.367 quintal of marketable teff. This result is similar with Muhammed, (2011) who studied about market chain analysis of teff and wheat production in Halaba Special District, Southern Ethiopia multiple linear regression output variable was significant at 1% significant level, a positive coefficient implies that an increase in quantity of teff produced increases volume of marketable supply of teff by farmers. It indicates that households who produce more quantity of teff had also supplied more to the market. The other result with Ashenafi (2010) who studied about Analysis of Grain Marketing in Southern Zone of Tigray Region, Ethiopia. Yield positively affected quantity supplied and is statistically significant at 1% probability level. As hypothesized when the quantity of grain produced increases, the market supplies also increase too. Other result with Berhanu and Hoekstra (2007) who studied about cereal marketing and household market participation in Ethiopia in the case of teff and wheat and rice. The study on the determinant of teff market participation indicated that about 60% of teff produce is sold, although there were significant variations among the districts. The proportion of teff produce sold ranged from 42–80%. Results also indicated that in areas, where the proportion of cultivated area covered with teff was lower, significantly higher proportion of teff produce was sold, indicating the relative role of staple food crops in market participation for a particular crop.

Labour: The coefficient of labour which shows a positive relation to the quantity of teff sold or supplied to the market. Producers checked the labour for their best benefit and this directs to the determinant to be significance at 5% level. The positive and significant relationship between the variables indicates that as the labour rises, the quantity of teff sold at the market also rises, which in turn increases the quantity of teff sold per household per year. The coefficient of the variable also confirms that a unit labour increase in the teff market directs to the household to increase yearly teff sales by 1.20 quintal. This result is similar with Kefyalew (2013) who studied about determinants of smallholder farmers' participation in sesame production this result revealed that family labour is one of the critical variables in influencing decisions of households to produce sesame in the study area.



Thus, farmers who have more **access** to family labour are more likely to participate in such activity by 5% probability level.

Income of non-farming: The coefficient of income of non-farming which shows a positive relation to the quantity of teff sold or supplied to the market. Producers checked the income of non-farming for their best benefit and this directs to the determinant to be significance at 5% level. The positive and significant relationship between the variables indicates that as the income from non-farming rises, the quantity of teff sold at the market also rises, which in turn increases the quantity of teff sold per household per year. The coefficient of the variable also confirms that a unit income from the non-farming increase in the teff market directs to the household to increase yearly teff sales by 0.0001261quintal.

This result is similar with Ashenafi (2010) who studied about Analysis of Grain Marketing in Southern Zone of Tigray Region, Ethiopia. The result indicated that Nonfarm income positively affects the supply of grain at 10% significance level. It was expected that as non-farm income of farmers increase, the sale of grains to decrease, but the analysis showed a positive relationship between supply and nonfarm income. On average if a farmer gets 1 birr of additional income causes a 0.2 kg addition in the quantity of grain supply. This could be due to the fact that farmers who have additional income would have the chance to buy food for consumption at any time and increase their marketable crops

The price of Teff: The coefficient of the price of teff which shows a positive relation to the quantity of teff sold or supplied to the market. Producers checked the price of teff for their best benefit and this directs to the determinant to be significance at 10% level. The positive and significant relationship between the variables indicates that as the price of teff at market rises, the quantity of teff sold at the market also rises, which in turn increases the quantity of teff sold per household per year. The coefficient of the variable also confirms that a unit price increase in the teff market directs to the household to increase yearly teff sales by 1.105 quintals. This result is similar with Aid (2008) report on agricultural marketing in Ethiopia in the case of Arrero, Goro, and Dehana Districts. The presented study reveals that most of the producers in the surplus producing areas positively benefited from the increased market prices while it was only 3 to 4% of the farmers in the grain deficit areas that could benefit from the price increase.

SUMMARY AND CONCLUSIONS

This thesis analysed determinant of teff market supply by smallholder farmers in the case of



Ambo area. Findings of the study are shown that majority of the households covered in Amaro and Gossu Kora are mainly dependent on agriculture for their livelihoods. Teff is not only the major food crops for the majority of the population but also as a source of income at household level. It was obtained that about 82.27 % farmers are reported that teff is used as the source of income in addition to home consumption. The study has focused on identified the factors affecting the volume of teff production sold by households. The study was based on primary data collected from farmers and secondary data were generated from Ambo District Agriculture and Rural Development Office, Ambo District Trade and Market Development Office, and Central Statistical Agency.

In general, a number of actions need to be undertaken in order to promote the development of Teff production and market supply. This particularly includes capacity building, technological applications: like improve seed, improve production tool and improving harvesting methods and the device it helps to reduce post harvesting loss of teff product and reduce the time of production and labour. Agricultural extension agents and cooperative have integrated the provision of market information. Infrastructural development is also a key to support the sub-sector. In this area, emphasis should be given to transportation system and offer credit and other services to improve effective teff production and marketing

RECOMMENDATIONS

The study recommends that farmers use modern technologies such as improved production methods, improved seeds, and farming tools; access to credit and labour reducing technologies to increase quantity supply of teff into the market. The district agricultural office must create an enabling **environment**, especially by given support to increase production of teff. Moreover, reducing non-farm activities by making teff production more profitable and farmers must devote more time to farming activities. Further research needed on teff market chain analysis starting from producer to final consumers, and critical analysis on the value chain of teff.

ABBREVIATIONS

MoFED	Ministry of Finance and Economic Development
HHH	Household Head
EATA	Ethiopia Agricultural Transformation Agency
CSA	Central Statistical Agency



REFERENCES

1. Agricultural Transformation Agency (2013) *Working Strategy for Strengthening Ethiopian's Teff Value Chain: Vision, Systemic Challenges, and Prioritized Interventions*, ATA, Addis Ababa.
2. Ashenafi Amare. (2010) *Analysis of Grain Marketing in Southern Zone of Tigray Region, Ethiopia*, MA. Thesis, Mekelle University.
3. Berhanu, G. And Hoekstra, D. (2007) '*Cereal Marketing and Household Market Participation in Ethiopia: The Case of Teff, Wheat and Rice*', In: AAE Conference Proceedings Cereal Marketing in Ethiopia, Pp. 243-252.
4. Central Statistical Agency (2015) *Agricultural Sample Survey*, Addis Ababa, Volume I (Private Peasant holdings, meher season)
5. Dan Church Aid (2008) *Agricultural Marketing in Ethiopia The case of Arrero, Goro and Dehana Districts Final Report* By SID Consult Addis Ababa.
6. Demeke M., Di Marcantonio F. (2013) *Analysis of incentives and disincentives for teff in Ethiopia*. Technical notes series, MAFAP, FAO, Rome.
7. Ethiopia Agricultural Transformation agency (2014) *Annual Report TRANSFORMING AGRICULTURE IN ETHIOPIA (EATA)* Addis Ababa
8. Gebremariam, M. M., Zarnkow, M., & Becker, T. (2014). *Teff (Eragrostis tef) as a raw material for malting, brewing and manufacturing of gluten-free foods and beverages: a review*. *Journal of Food Science and Technology*, 51 (11), pp. 2881-2895.
9. Kefyalew, G. (2013) *Determinants of smallholder farmers' participation in sesame production: Evidence from Diga, Ethiopia*. In: Wolde Mekuria. (ed), *Rainwater management for resilient livelihoods in Ethiopia: Proceeding of Nile Basin Development Challenge Sciences meeting*, Addis Ababa, 9-10 July 2013. NBDC Technical Report 5 Nairobi, Kenya, International Livestock Research Institute.
10. Ministry of Finance and Economic Development (2014) *Growth and Transformation Plan Annual Progress Report for F.Y. 2012/13*, Addis Ababa
11. Muhammed, U. (2011) *Market Chain Analysis of Teff and Wheat Production in Halaba Special District, Southern Ethiopia*, M.Sc. Thesis, Haramaya University.
12. Tadele, M., Mulu, D. and J. Poul, M. (2015) *Determinants of teff and wheat market supply in Dendi District, West Shoa Zone, Ethiopia* *Prime Journal of Social Science*, 4(10), PP.11224 – 1130.