

Smallholder Agro-pastoralists Commercialization of Major Crop (Maize and Onion) in Fentalle District: The Case of Boset-Fentalle Irrigation Scheme, Ethiopia

Abdi Etafa

Socio-economic and Agricultural Extension Research Process, Adami Tulu Agricultural Research Center, Zeway, Ethiopia

Email address:

abdrom.etafa@gmail.com

To cite this article:

Abdi Etafa. Smallholder Agro-pastoralists Commercialization of Major Crop (Maize and Onion) in Fentalle District: The Case of Boset-Fentalle Irrigation Scheme, Ethiopia. *International Journal of Agricultural Economics*. Vol. 1, No. 2, 2016, pp. 31-34.

doi: 10.11648/j.ijae.20160102.12

Received: June 26, 2016; **Accepted:** July 7, 2016; **Published:** July 21, 2016

Abstract: The study was conducted in Fentalle agro-pastoral district with the aim of studying the level of small holder agro-pastoral crop commercialization and analyzing the determinants of commercialization among the smallholder agro-pastoralists in the study area. Multi stage and random sampling technique was used to draw 109 households from three Kebele in the district. Data was collected with structured interview and analyzed using descriptive and Tobit regression. In addition, household commercialization index was calculated. The findings revealed that half of the respondents were not commercialize their product. Distance to the district market and TLU negatively affect commercialization and market participation meanwhile, the use of input and household income enhanced surplus production and commercialization. The study forwarded that improved market facility and market information access is necessary. The optimal and economical use of input will intensify crop production along with economical return.

Keywords: Agro-pastoral, Commercialization, Fentalle, Market Surplus

1. Introduction

While Southeast Asia and parts of Latin America are rapidly moving towards commercialization; the countries of East Asia are at the high end of the agricultural commercialization pathway, South Asia and much of Sub-Saharan Africa are at the lower end of the commercialization pathway [1]. While the speed of commercialization differs substantially across continents and countries they are all moving in the same direction [2].

Agriculture contributes the lion share to the national GDP and labor employment in Ethiopia. It is mainly characterized by small scale farming. Being one of the emerging fast growing economies in the world, maximizing this potential necessarily requires increasing the level of smallholders' agricultural productivity which is existed at base level due to several socio economic bottlenecks. For instance, lack of adequate technological option coupled with diminishing productivity of cultivated land, low level of technological adoption and institutional failures are among the main problems. In addition to this, lack of adequate market price,

inadequate linkage between market actors and small holders farmers contribute for low level of agricultural productivity. In spite of the fact, transforming Ethiopian small holder agriculture from its current subsistence into market orientated production system forms the basis of the agricultural development strategy of the Government of Ethiopia (GoE). Ethiopia has developed growth and transformation plan that promote and enhances the commercialization of small holder agriculture. Pastoral and agro pastoral societies are part of the society that is vulnerable to recurrent drought. Cognizant to this fact, Government of Ethiopia has developed different resilience enhancing projects and programs. Among these projects and program; development of small scale and large scale irrigation scheme got major attention. Consequently, there is an implemented large scale irrigation project in Fentalle agro-pastoral district. Thus, this research differentiates the existing smallholder agro-pastoral commercialization of major crop with special attention given to maize and onion with the purpose of:

- To study the level of small holder agro-pastoral crop

commercialization;

- To analyze the determinants of commercialization among the smallholder agro-pastoralists in the study area.

2. Methodology

2.1. Description of the Study Area

Fentalle, located in the great Ethiopian mid rift valley under the east Shoa zonal administrative division of Oromia regional state crossed by the Kesem and Awash River. Fentalle district is located between 8°45'N to 39°50'E which is in tropical climatic zone. Metehara is the capital town and administrative center of the District. It is found in the Northern section of Oromia Rift system ranges in altitude from 1500m-2000m. The major ethnic groups inhabited in Fentalle district are Kereyu and Ittu Oromo's and few Somali ethnic minorities. Out of 18 kebeles located in Fentalle district 11 are considered to be pure pastoralist (Fentalle DSEP, 2013).

The District climate is grouped in Arid, characterized by steep type of vegetation with less fall and more coarse grasses. The mean annual temperature and rainfall of Fentalle district varies between 18°C and 34°C and 377mm-742mm respectively (NMA, 1989-2011). Its agro-climatic condition is suitable for rearing livestock. Maize occupied the largest cultivated land area from all crops produced in the area. It is the most staple crop of the district. Vegetables are commonly produced and also share the larger area of land next to cereals.

2.2. Sampling Technique and Method of Data Collection

Two stage sampling in combination with random sampling was used to draw a total of 109 households from three Kebele in the district, namely, Elala, Turo and Gidara Kebele¹. Structured interview schedule was used to collect data farm household.

2.3. Method of Data Analysis

Descriptive statistics (frequency distribution, percentage, mean and standard deviation), household commercialization index and Tobit regression was used for the study. According to [3, 4] the household commercialization index (HCI) measures the ratio of the gross value of crop sales by household *I* in year *j* to the gross value of all crops produced by the same household *I* in the same year *j* expressed as a percentage. It measures the level to which households' crop production is aimed at market.

To draw inferences on the causal factors for commercialization of households, the probability of participating in the market and the extent or intensity of participation in the context of household characteristics captured by the X_i , The Tobit regression model, a hybrid of the discrete and continuous model, was used. It reveals both the probability and the intensity of level. It is expressed as:

$$y_i = \beta x_i + U_i$$

Where:

$Y_i > 0$ if household commercialize, otherwise

$Y_i = 0$ if household do not participate in the market

X_i represents set of explanatory variables

β estimable parameters of the respective variables

U is an independently distributed error term

3. Result and Discussion

Table 1. Household socio-economic characteristics.

Variable	n	Mean	Std. dev.
Age	109	35.7	9.3
Gender (1= male)	109	72.48	0.44
Education level	109	1.38	2.53
TLU	109	14.9	20.0
Total land	109	0.95	0.44
Farm experience	109	8.7	5.4
Family size	109	6.22	3.07

The above table indicate that on average agro-pastoral farmers in the area are less than forty years this is less than the result obtained by [5, 6] in three zones of Nigeria and Kenya respectively. The youngest and the oldest being 20 and 71 years respectively. Age is the representation of farmers experience in market participation and higher accumulation of marketing experience and asset. Age of the household head reflect risk preference and quality of family labor. Young farmers are more likely to adopt risky and high-labor intensive farm enterprises which have higher expected income. Education is a tool for household ability to gather, assess and utilize information for an effective production and marketing decision. Among the study respondents 14% are educated. Livestock is also a valuable asset in pastoral and agro-pastoral area. It has a social value, serve as source of draft power, and it is the main source income for the study area. Although there is high deviation from the mean, the tropical livestock unit of the study area is nearly fifteen. The tropical livestock unit is a measure of tropicalized grazing land carrying capacity per annum. Average total land per household which is less than one hectare in this study is smaller than the result obtained by [7] in Ethiopia and the study by [5] in Nigeria. This result indicates that household land ownership in Ethiopia is declining from time to time. Small land holding and the expansion of irrigation facilities encroaching grazing land is the indication of higher assignment of livestock unit per area. The mean farming experience in the area is nearly nine years. The average family size is similar with the result of [7].

Table 2. The extent of agro-pastoral farmers' crop commercialization.

No.	HCI	Frequency	Percent
1	0	53	51.5
2	0.01-0.3	9	8.7
3	0.31-0.6	14	13.6
4	0.61-0.8	8	7.8
5	0.81-1	19	18.4
Total		103	100.0

11s frontline and lower level administrative structure and division.

The table above revealed half of the sample respondents did not commercialize and participated in crop market. The lower household total land and large family size may highly contribute to the respondents' non-commercialization. In addition, the subsistence nature of farming is still persistent in the study area. The proportion of farmers who commercialized more than two third of their product are 18.4% followed by 13.6% participating in market with the marketable surplus between one third to two third of the total production.

Model adequacy can be checked by thoughtful inspection of the maximum likelihood estimation of the Tobit model. The likelihood ratio 67.52 with the probability level of 0.000 indicates that the explanatory variable all together influenced the explained. It is the indication of model fitness and appropriateness of use.

The Tobit regression result in table 3 indicate that distance to the district market, tropical livestock unit natural logarithm of income and the use of input significantly influence market participation at different level of significance but less than 10%.

Table 3. Model determinants of agro-pastoral crop commercialization in Fentalle district.

HCI	Coefficient	Std. Err.	t	P> t
Age	-.0007	.005	-0.12	0.904
Gender	0.055	0.118	0.47	0.639
Education	0.023	0.019	1.18	0.24
Farming experience	0.013	0.01	1.21	0.23
Distance to district market	-0.008	0.0045	-1.72	0.09*
TLU	-0.007	0.003	-2.87	0.005**
Ln income	0.235	0.04	5.79	0.000**
Cooperative membership	0.112	0.089	1.21	0.231
Frequency of extension per month	-0.034	0.026	-1.33	0.188
Input use	0.363	0.1170	3.10	0.003**
cons	-2.118	0.40	-5.19	0.00**
sigma	0.383	0.0396		
Number of observation = 99				
LR chi 2 (10) = 67.52				
Prob>chi 2 = 0.00				
Pseudo R 2 = 0.3905				
Log likelihood = -52.69578				

Note: ** significant at 1%, *significant at 10%

Distance to the district market and tropical livestock unit (TLU) significantly and negatively affected market participation at 10% and 1% probability level respectively. Similar result was obtained by [7-10] for crop market participation index and irrigation participation of small holder commercialization in Ethiopia and Nigeria respectively. A unit increase in both variable will decreased the extent and level of household crop commercialization. The probable reason is that as the agro-pastoral farmers get far from the district market their chance to be exposed to different market outlet will be reduced. This is related with the availability of all-weather roads, additional transaction

cost, and reduced bargaining power as the farmer become far and far. The competitive nature of farm land expansion and increased livestock number made an antagonistic effect. Since livestock has more important social and economic value than crop in pastoral and agro-pastoral community; agro-pastoralists inclination to livestock has affected the provision of marketable surplus. This could probably happen for two reasons: either through reduced labor for crop farming, or due to large no of livestock and lack of enough feed together probably make farmers to more focus on consumption than sale. Male agro-pastoral members always migrate with large livestock during dry season aggravate the triple role of women agro-pastoralist to satisfy the headship role and manage small ruminants, and women farmers have less ability to do tedious works of crop farming around home in the absence of husband. The result of this study is similar with that of [11] in southwest Nigeria. The labor competitive relationship of livestock and crop and workload of women had made to less focus on marketing and produce little marketable surplus.

Citrus paribus, the additional use of unit input and a unit increase in agro-pastoral households income will boosts the production of marketable surplus significantly and positively. The probable reason is that the more the households use different factors of production the more they intensify crop production and commercialize. The result is in line with the study of [8-10, 12] revealing the higher chance of getting higher returns per unit of factor input. Further, the higher they obtained additional income the better they afford to purchase input for production, hired labor and so on. This might create the probability of producing additional crop that would be sold.

4. Conclusion and Recommendation

The study revealed that half of the respondents were not market oriented. Some socio-economic and production factors also affected market participation. The genetic improvement and reduced number to the manageable flock size of livestock in the study area will help in reduced livestock related risk and enhanced production and marketing of high value marketable crop by using the expanded irrigation opportunity. Improved market facility and market information access is necessary. As input has an implication for commercialized farming, the optimized economical use of input will intensify crop production along with economic return.

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