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Factors Affecting Marketing Intensity of Wheat Growers in Southeastern Ethiopia

Falmata Gezachew[*]

Oromia Agricultural Research Institute, Sinana Agricultural Research Center, Bale Robe, PO Box 208, Ethiopia

*Corresponding author: Gezachew F, Oromia Agricultural Research Institute, Sinana Agricultural Research Center, Bale Robe, PO Box, 208, Ethiopia, Tel: +251114707102; E-mail: falmata.gn@gmail.com

Abstract

The study of factors' affecting the intensity of wheat marketing was undertaken in southeastern Ethiopia as to identifying factors affecting proportion wheat production supplied to the market by wheat growers in this area. Samples of 139 wheat growers were selected from the two districts of Bale zone using two stage sampling procedure. The two districts were selected purposively based on the target area of CIMMYT project and their potential in wheat production and the sample kebeles and sample respondents were selected randomly. Structured questionnaire was developed and face to face contact with the respondent of wheat growers is the method employed to collect the primary data focusing on socioeconomic, institution and demographic of the producers and wheat production, marketing and management practice in the study area. The data was analyzed by Stata software version 13. The model result of truncated regression indicates that education level at 5% significance level, area allocated to wheat production at 10% significance level, number of oxen owned at 1% significance level, asset value of household at 1% significance level and district location at 1% significance level were the variables affecting the intensity of wheat marketing positively and significantly in the study area. While distance from the market affect the intensity of wheat marketing negatively and significantly in the study area. The result confirms the literature review of the study. To improve the market supply of the wheat producers the concerned body should have to establish farmers marketing cooperatives and promoting investors to plant agro-industries as close to their residential area, capacitate farmers knowledge and ability through formal and informal education, support farmers to build their asset value.

Keywords: Marketing intensity; Truncated regression; Wheat marketing; Sinana district; Gindhir district

Introduction

Wheat is a source of food and livelihoods making crop for over one billion people in developing countries and it is a major staple food crop in many countries, it is an important source of nutrition, providing on average 40 percent of per capita calorie intake [1]. Wheat is the major staple food crop for several countries and imported in all Africa and the world's biggest wheat importer with more than 45 metric tons in 2013 at around 15 billion US$ and by considering the growing importance of wheat crop for food security in Africa, African Union Head of State endorsed their agricultural Minister' endorsements to add wheat to the list of strategic crops for Africa [2].

In Ethiopia wheat is under production for centuries and today, wheat is among the most important crops grown in Ethiopia, both as a source of food and income generating venture for farmers in the country in general, particularly for the study area. Wheat and wheat products represent 14 percent of the total caloric intake in Ethiopia, making wheat the second-most important food, after maize (19 percent) [3]. In Ethiopia both production and consumption volume of wheat were increasing in the past two decades [4]. In the study area wheat serve the community both in food security and generating income with its marketing and production constraint.

The two sides of agricultural constraints are production and marketing. From production side, smallholder farmers, particularly in developing country encounters multiple biotic and constraints abiotic such as inadequate capital, pests and diseases, poor access to improved germplasm, low labor productivity and unreliable climatic conditions and from marketing side low market price, poor marketing infrastructure, low market integration and this has led to low agricultural productivity and low supply of agricultural production to the market [5]. The limited market participation of many agricultural household's face is a major constraint to combating poverty [6]. This shows that an efficient, integrated and responsive market that is marked with good performance is of crucial importance for optimal allocation of resources and stimulating households to increase output [7].

The commercial transformation of smallholder agriculture entails that smallholders both base their production decisions on market signals thus becoming market-oriented producers as well as selling a significant proportion of their produce at market. Increasing the extent of commercialization among Sub-Saharan Africa's generally semi-subsistence, low-input, low-productivity smallholder famers is seen as playing a crucial role in poverty alleviation [8]. Most people living in absolute poverty are small farmers [9]. Commercializing smallholder agriculture is seen to bring the welfare benefits of market-based exchange economies to this group and is central to an inclusive development process [10].

Improving the degree of market participation of the smallholders can have more impact on reducing poverty than promotion of few large ventures [11]. Therefore, this study was initiated to analyze factors affecting marketing intensity of wheat growers in southeastern

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Ethiopia by considering household characteristics, socio-economic and institutional factors in to econometric models. Because of identifying factors that limit the level of market participation of agricultural product in general, particularly wheat crop improves marketing supply level of small scale farmers assisted by policy formulation.

Empirical findings

Martey undertook the study of Market Information and Extent of Agricultural Commercialization in Ghana using truncated regression and found that access to market information from informal sources, such as farmer association, friends and relatives significantly influence the extent of household agricultural commercialization [12].

Esmael conducted the study on determinants of level of smallholder farmers participation in potato sales in kofele district, oromia region, Ethiopia using truncated regression model and found that livestock owned and access to market information affect farmers extent of potato sales positively whereas family size and participation in off/non-farm activity affects the extent of potato sales negatively [11].

Omiti conducted the study on Factors influencing the intensity of market participation by smallholder farmers: A case study of rural and peri-urban areas of Kenya using truncated regression and found that closeness to urban area, distance from farm to point of sale is a major constraint to the intensity of market participation and better output price and market information are key incentives for increased sales [13].

Hypothesis and definition of variables

Sex: This is dummy variable measured as 1=if male, 0=if female refers to sex of household head and hypothesized to affect the intensity of wheat marketing of wheat growers positively or negatively.

Education level: This is continuous variable refers to grade score of respondent household and this variable hypothesized to affect the intensity of wheat marketing positively. Education level affects fruit supply to the market positively and significantly [14].

Area allocated to wheat: This is continuous variable refers to area of land allocated to wheat production and used as proxy variable to volume of production and the variable hypothesized to affect the intensity of wheat marketing positively and significantly. Quantity of teff produced affect teff quantity supplied to market positively and significantly [15].

Experience in wheat growing: This is continuous variable, proxy variable to age of respondent refers to the year of farmers experienced to grow wheat crop and the variable hypothesized to affect the intensity of wheat marketing positively. Farmers experience to teff production affects teff quantity supplied to market positively [15].

Family size: This is continuous variable refers to number of family members living under the same roof and this variable expected to affect the intensity of wheat marketing positively. Family size affects fruit supply to the market positively [14].

Distance to the market: This is continuous variable refers to distance of respondents' residence from the point where output sold, and this variable expected to affect the intensity of wheat marketing negatively. Distance to market affects fruit supply to the market negatively and significantly [15]. Distance to market affects intensity of market participation among small holder Yam-based system negatively and significantly [16].

Number of extension contact: This is continuous variable refers to respondents estimated number of contact with extension agent per year on the issue of agricultural production and marketing and this variable hypothesized to affect the intensity of wheat marketing positively. Extension contact affects fruit supply to the market positively [14]. Extension contact affects commercial behavior of smallholder potato producers positively [17].

Number of oxen: This is continuous variable refers to number of oxen owned by the respondent during the survey period and this variable expected to affect wheat marketing intensity positively. Number of oxen owned affects cereal crop market supply positively and significantly [18].

Asset value: This is continuous variable refers to estimated asset value of respondents and this variable hypothesized to affect the intensity of wheat marketing positively. Christopher Sebatta undertook the study of smallholder farmers decision and level of participation in the potato market in Uganda and found that value of household equipment affects the volume of potato sold by a farmer in a market positively [19].

District: This is dummy refers to two districts which is Sinana and Gindhir and this variable is proxy variable to closeness to agro-industries and this variable expected to affect the intensity of wheat marketing positively. Sinana district is which clos to agro-industries which enclosed in the Bale zone area and Gindhir is which far from the agro-industries found in the zone.

Methodology

Description of the study area

The study was conducted in the highland of two districts of Bale zone administration, which is one of the eighteen zone of Oromia region found around southeastern Ethiopia country. The two districts namely Sinana and Gindhir the two of the eight highland districts of Bale zone and potential in crop production in general, particularly in wheat production.

Profile of Sinana district

Sinana district is one of the highland and largest and potential district of Bale zones with an area of 1168 km^2 (116,800 hectares). It is divided into twenty (20) Kebeles and 4 small rural towns. According to Central statistics Authority (population census, 2007), the population of Sinana district has been 119,208 of which the share of male and female are 62,280 and 56,928, respectively. There are about 17,651 male headed households and 1633 female headed households in the district [20]. It is estimated that 5960 (5%) are urban dwellers and 113,248 (95%) are rural dwellers. About 99% of the population is engaged in agriculture. The land use of the district classified as the following, land covered with crop is about 63%, 11.78% covered with grazing land, 7.5% of land covered with forest, 0.07% of land covered with barren/degraded land and 17.65% of land occupied with others (for construction, rivers, gorges and others).

The agro-ecological zones of the district are highland (90%) and midland (10%). The altitude ranges from 1650 m to 3650 m.a.s.l. The annual average temperature is 16.5°C whereas the minimum and maximum temperature is 10°C and 23°C, respectively. The annual average rainfall is 1105 mm whereas the minimum and maximum rainfall is 1060 mm and 1150 mm, respectively. The dominant soil type

is loamy clay and pellic vertisols. Sinana district is bounded by Agarfa district in the North, Dinsho district in the West, Barbare and Goba districts in the South, Gassera district in North-east and Goro in the East and the administrative center of the district is Robe town.

Profile of Gindhir District

Ginir is one of the eight districts in the Bale zone of Oromia Region of Ethiopia with an estimated area of 2,350.63 square kilometers. The 2007 national census reported a total population for this district was 139,495, of whom 71,323 were men and 68,172 were women; 20,196 or 14.48% of its population were urban dwellers. Ginir is bordered on the south by the Goro, on the west by Sinanana, on the northwest by Gaserana and Gololcha, on the northeast by Seweyna, and on the east by Raytu. A survey of the land in this district shows that 30.5% is arable or cultivable, 31.2% pasture, 35.6% forest, and the remaining 2.7% is considered swampy, mountainous or otherwise unusable. About 15% of the area of this district is covered with valley, gorges and hills.

Agro-ecologically Ginir district was located between 6°74'–7°39'N latitude and 40°32'– 41°05' E longitude. The altitude ranges from 880-2036 meter above sea level. The soil type of Ginir district is categorized under pellic vertisols. Its annual average maximum and minimum temperature is 24.5°C and 13.4°C respectively. The area receives an average of 944 mm annual rainfall and it is characterized by bimodal rainfall distribution. The district has two major cropping seasons locally named as Gena and Bona. The first rainy season extends from March to May while the second rainy season extends from September to November.

Type and method of data collection

Both primary and secondary data were collected to achieve the objective of the study. Primary data was collected from wheat growers using structured questionnaires by face to face contact between interviewer and respondents. The secondary data was reviewed and recorded from different sources found at different level of districts and zonal level of the study area. The questionnaires were prepared inline of the objective of the study and the developed form was pretested on number of respondents and necessary modification was made, finally the corrected questionnaires were launched on 139 wheat growers.

Sampling Method and Sample Size Determination

To reach at the selection of representative study kebele and pick-out the representative sample unit respondent from a total population of all selected kebeles, two' stage sampling procedures were employed. Out of eight districts producing wheat, the two districts were selected purposively based on their potential in wheat production and target area of CIMMYT project. The study kebele and sample unit of wheat farmers were selected randomly. Sample from each selected kebele will be selected based on probability proportional to size (Table 1).

Collecting information from total population is economically not feasible in terms of money and time. Thus, taking optimum, manageable and representative sample size is recommended to infer about the population. Sampling is one of the methods, which allows the researcher to study a relatively small number of units representing the whole population. Hence, this study will employ a simplified formula provided by Kothari to determine the required sample size at 95% confidence level and desired level of precision= 5% (0.05);

$$n = \frac{z^2 \cdot p \cdot q \cdot N}{e^2 (N-1) + z^2 \cdot p \cdot q} = 139$$

Where; n=desired sample size, z=value of standard deviation at 95% confidence level (In this case 1.96), e=desired level of precision (±5%), p=sample proportion in target population which equals to 0.10, q=1–p which equals 0.90 and N=size of population.

Districts	Selected Kebeles	Total household of selected kebeles (N)	Total sample selected from each kebeles (n)
Sinana District	Gammora	696	14
	Sambitu	1311	26
	Basmanaa	509	10
	Hawishoo	1061	21
Gindhir District	Walta'ii Attotaa	716	14
	Harawaa	1130	23
	Qabana	520	11
	Areda Qabsoo	827	17
Total		6770	139

Table 1: Sample of kebeles and respondents from each kebeles.

Method of data analysis

The STATA version 13 used to analysis the data employing both descriptive and econometric methods. Descriptive statistics was used to summarize the household characteristics, socio-economics and descriptive measured variables using mean, standard deviation, frequency and percentage. The econometric method analysis used for factors affecting the intensity of wheat marketing.

Specification of the econometric model

The objective of the study is to analysis of factors affecting the intensity of wheat marketing was addressed by using truncated regression model because of nature of the data. The data was collected from a total of 139 wheat growers using randomly selection and only few proportion of respondents are not participated in wheat marketing among randomly selected respondent due to subsistent farming. Truncated regression excludes part of sampled observation based on the value of the dependent variable [21]. That is, the truncated regression uses observations only from farming households who reported positive and greater zero. Analyzing data using multiple regression results to biased estimation because of the nature of dependent variable and sample selection is determined by the value of dependent variable.

$$Y_i^* = \beta_i x_i + \varepsilon_i$$

Where Y_i^* is the percentage of output that is sold, β_i is the vector of parameters to be estimated, x_i is the set of explanatory variables and ε_i is an error term. Y_i^* is truncated at zero and the value greater than zero were included in the regression. Intensity of marketing measured in percent, zero value indicates that when there is no surplus production and 100 values indicate that when the total wheat produced was sold.

Results and Discussion

The results were elaborated in two parts, descriptive and econometric results.

Descriptive statistics

Two types of variables, dummy and continuous variable were collected to analysis the intensity of wheat marketing. From the total sample of 139, 126 respondents supply their wheat product to the market, while 13 of them produces for only household consumption. The percentage and mean value of potential variables considered in this study were described (Table 2).

Dummy Variables	Frequency	Percent
Sex		
Male	14	10.07
Female	125	89.93
Districts		
Sinana	70	50.36
Gindhir	69	49.64
Continuous variables	Mean	
Education level	6	
Expriance in wheat growing	19	
Family size	6	
Land area allocated to wheat production	1.4	
Number of extension contact	12.6	

Distance from market	15.8	
Number of oxen owned	3	
Asset value of household	16983.23	

Table 2: Descriptive result of potential variables.

Econometric results

The econometric result indicates that six potential variables were affecting the intensity of wheat marketing significantly and with the expected sign in the study area. Education level, amount land allocated to wheat production, distance from market, number of oxen owned, total asset value of household and district location from the zone are those potential variables affecting the intensity of wheat marketing in this area.

Education level of the household head is one of the potentially variable affecting the intensity of wheat marketing in the study area significantly and positively at 10% significance level. The econometric model result indicates that as the education level of household head increases by one unit the intensity of wheat marketing increases by 3.5% and the founding compromise with the study conducted in Ghana on market information and extent of agricultural commercialization number of years of education influenced the extent of agricultural commercialization positively and significantly [12].

Distance from market is another potential variable significantly and negatively affecting the intensity of wheat marketing at 10% significance level. The econometric model result indicates that as the distance from market increases by one unit, wheat marketing intensity decreases by 11%. The result of the study compromise with the study of distance to market affects fruit supply to the market negatively and significantly [14]. Distance to market affects intensity of market participation among small holder Yam-based system negatively and significantly [16].

Area allocated to wheat production is proxy variable to volume of production one of the potential variables significantly and positively at 5% significance level affect the wheat marketing intensity of in the study area. One unit increase in area allocated to wheat increase the wheat marketing intensity by 1%. The result of the study was in line with study conducted in Ghana on market information and extent of agricultural commercialization and found that farm size affect extent of maize commercialization positively and significantly [12] (Table 3).

The other potential variable affecting the wheat marketing intensity is number of oxen owned by the household and this variable affect wheat marketing intensity positively and significantly at 1% significance level. One unit increase in oxen owned increases the intensity of wheat marketing by 20%. The result of the study compromise with study conducted in Ethiopia by Abafita J et al. on number of oxen owned affects cereal crop market supply positively and significantly [18].

Dependent variables	Coefficient	Std. Err.	P >/ Z/
Sex of head of household	0.283	0.239	0.23
Education level	0.034*	0.02	0.09
Family size	-0.001	0.03	0.95
Experience in wheat growing	0	0.006	0.91

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Distance from market	-0.110*	0.064	0.08
Land area allocated to wheat	0.005**	0.002	0.03
Extension contact	0.004	0.0028	0.16
Number of oxen owned	0.197***	0.05	0
Asset value of household	0.273***	0.049	0
District	1.041***	0.143	0
Independent variable: Intensity of wheat marketing by wheat growers			
Number of obs=126			
Wald chi^2(10)=3596.51			
Prob>chi^2=0.0000			
Log likelihood=-129.85517			

Table 3: Factors affecting intensity of wheat marketing. ***, **, * indicates that the significant of variables at 1%, 5% and 10% respectively.

Asset value of household is one of the potential variables affecting the intensity of wheat marketing positively and significantly at 1% significance level in the study area. One unit increase in asset value of household increases the intensity of wheat marketing by 27%. The study was corresponding with the finding of Sebatta which undertook the study of smallholder farmers' decision and level of participation in the potato market in Uganda and found that value of household equipment affects the volume of potato sold by a farmer in a market positively [19].

District of the study area proxy variable to closeness to agro-industry is one the potential variable positively and significantly affecting the intensity of wheat marketing at 1% significance level. As the probability of close to agro-industry increases the intensity of wheat marketing also increases by more than 100% (Table 4).

Variable	dy/dx/	Std. Err.	P>Z
Sex of household head	0.2834005	0.23995	0.22
Education level	0.0345076*	0.02051	0.08
Experience in wheat growing	-0.0019255	0.03046	0.98
Family size	0.000763	0.00681	0.87
Area allocated to wheat	-0.1103701*	0.06479	0.08
Distance from market	0.0052133**	0.0024	0.03
Extension contact	0.0040404	0.00289	0.16
Number of oxen owned	0.197985***	0.0506	0
Asset value	0.2733173***	0.04998	0
District	1.041019***	0.1434	0

Table 4: Marginal effect after truncated regression. ***, **, *, indicates that the significance of variables at 1%, 5%, and 10% respectively.

Conclusion and Policy Implication

Supplying agricultural product to the market believed to be improves the income and livelihood of small scale farmer in agriculture-based community. The intensity of supplying agricultural product from its total production differs from farmer to farmer and it was affected by different socioeconomic, institutional and household characteristics factors. The econometric result indicates that in the study area intensity of wheat marketing were affected by education level, land allocation to wheat production, distance from the market, number of oxen owned, asset value of household and district location of the household. All variable except distance from the market were positively affecting the intensity of wheat marketing in the study area. The study puts a direction for the community development workers and government policy makers. The household characteristics, socioeconomic and institutional factors hindering farmers' participation and intensity of supplying their product to the marketing should have to get attention from the community development, and research worker and policy makers. Those problems should be solved on the top because of everything of economic performance of agricultural community highly linked with agricultural production and marketing improvement.

As the study result indicates, more educated person supplies more their product to the market and fetch income for their household, so the government should have to increase the capacity of farmers through formal and formal education to increase the capacity of farmers supplying their product to the market. Allocated more land to wheat crop increases amount of wheat marketing, so the government policy and strategies should have to facilitate how wheat producing farmers get and allocate their land to wheat production.

As the distance from the market increases, it discourages farmers' potential supply of wheat product to the market, so the government policy should have to organize and strengthen wheat market like cooperative marketing as close to farmers' residence and plant agro-industries as close to producer's residence. Households numbers of oxen owned affect volume of wheat market supply positively and significantly, so the government should have to support wheat producers' as they can access and afford oxen for ploughing purpose through credit facility.

Asset value of household affect the intensity of wheat marketing positively and significantly in the study area, so the government strategies and policy should have to work on how to increase the asset value of household. District location of household a proxy variable to closeness to agro-industries affects the intensity of wheat marketing positively and significantly. Being close to agro-industries or Sinana districts more supply their wheat product to market than the Gindhir district. So, the government should have to plant the agro-industries around the production area or close to the production area.

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