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DETERMINANTS OF WHEAT COMMERCIALIZATION IN DAMOT GALE DISTRICT OF WOLAITA ZONE

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ABSTRACT

Transforming subsistence-farming to market-oriented production as a way to increase household's income and reduce poverty in Ethiopia. The objectives are to identify factors determining wheat commercialization in Damot Gale district of Wolaita zone. Multi-stage sampling techniques were employed to select total sample size of 120 households. Firstly, Damot Gale was purposively selected due to its high production potential of cereal crops. Three Kebeles, namely Wandara Boloso, Woshi Gale and Fate were purposively selected. The sample for each kebele was determined by using probability proportional to size using simple random sampling technique. Both primary and secondary data sources were used to generate qualitative and quantitative data types through structured questionnaire, focus group discussion, personal observation and in-depth interview. Data collected were analyzed using household commercialization index and binary logit model. The household commercialization index showed that 45.9% of wheat producing households were commercialized. From sample households, 72.5% participated in wheat output market. Binary logit regression model result revealed that the sex of household head, education level of household head, market-oriented production, credit utilization, extension services use and market information use, number of oxen owned, annual household income, quantity of wheat produced, use of farm inputs and age of household head. Therefore, market orientated production, farm inputs utilization, demonstrative trainings, MFI services, market information dissemination and functional adult literacy can contribute wheat commercialization of households in the study area.

KEYWORDS

binary logit model, commercialization, Damot Gale, output market participation, smallholder

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INTRODUCTION

Wheat (*Triticumaestivum* L.) is one of the globally produced and marketed cereal crop in sub-Saharan African countries, it is also a strategic commodity which generates farm income and improves food security status (Amentae et al., 2017). Many African countries are producing wheat for both consumption and sale, but the level of production and sale is varied between countries. Ethiopia is one of the largest wheat producers in terms of total wheat area cultivated nd total production (CSA, 2019). In Ethiopia, wheat and wheat products represent 14% of the total calorie intake in the country which makes wheat the second-most important food behind maize (19%) and ahead of teff (10%), sorghum (11%) and enset (12%) (FAO, 2017). Ethiopia ranks 31st in the world with 4.2 million quintals produced on 1.7 million hectares of land (Goshu et al., 2019). Wheat can be produced by both small-scale subsistence farmers and large-scale commercial farms. Teff, wheat, maize and sorghum occupy almost three-quarters of the total area cultivated, and they are the major cereal crop for the country (Tadesse et al., 2018).

In Ethiopia, the wheat commercialization program is aimed at improving the livelihood of different actors engaged in the wheat value chain. Several studies confirmed that wheat commercialization plays an important role in poverty reduction, job creation, income generation, meeting household consumption needs, and ensuring food security (Abate et al., 2021, Mihretie, 2020, Muche, Tolossa, 2022; Tadesse et al., 2022). Wheat commercialization involves a shift from subsistence production to a market-oriented production and consumption system that leads to the strengthening of the linkages between the input and output sides of a market (Rubhara, Mudhara, 2019, Tabe Ojong et al., 2022).

Agricultural commercialization stimulates the economic growth of developing nations like Ethiopia. It is one of the priority areas that the government of Ethiopia has been making reformation in the agriculture sector to stimulate rural development and poverty reduction (Birhanu et al., 2021). However, transforming agriculture from an existing scenario to a market-oriented production system is not an easy task in developing countries like Ethiopia as many factors determine its process. Commercialization of agriculture plays an important role in enhancing economic development and poverty reduction in developing nations, especially countries whose development is based on agriculture (Andaregie et al., 2021).

Wolaita wheat and barley livelihood zone is a mountainous and densely populated area that includes the highland, and midland agro-ecologes of Wolaita administrative zone. It covers parts of Damot Gale, Sodo Zuria, Kindo Koysha, Damot Weyde and Bolosso Sore districts. Damot Gale district is known by higher wheat production potential and endowed favorable climatic and natural resource conditions that can grow diverse annual and perennial crops required for household consumption and for the market. Despite the fact that the district produces agricultural products based on rain-fed. According to Damot Gale district report (2020), the agricultural system is mixed farming. Households grow wheat, enset, barley, sweet potatoes, Irish potatoes, pulses (haricot beans, horse beans and peas) and small amounts of maize. In addition, crops such as taro, yam, beetroot, carrots and cabbages are cultivated in some pocket areas

METHODOLOGY

Damot Gale district is one of 135 districts in the Southern Nations Nationalities and Peoples Region (SNNPR) state. It is 18 km to the northwest of Sodo town, the seat of Wolaita zone administration. It is at 350 km at South-West of Addis Ababa and 135 km from Hawasa in Southern Nations Nationalities

and Peoples Region. The study area has three agro-ecological zones, namely highland (11.6%), midland (60.4%) and wet lowland (28%). The area receives rain fall in two main rainy seasons, which rangers from 900mm-1500mm per year. The topography of the area includes plain lands to plateaus, hills and rugged mountain lands. It is located between the altitudes of 1500 – 2900 masl.

There are two main cropping seasons in the area: "Belg" and "Meher". The "Belg" season begins from late February to early April where maize, haricot bean, "enset," sweet potato and Irish potato planted. The "Meher" cropping season begins from late June up to the end of September crops like Wheat, Barley, Teff, Sweet potato, Irish potato are planted. The total area of the district is 22,252.75 ha with density per square Km of 750. The total population of Damot Gale is 144,763 of which 49.34% are male headed households and 50.66% are female headed households (DGWARDO, 2020).

Multi-stage sampling technique was used to select the rural Kebeles and sample households. From four wheat producing rural districts of Wolaita Zone, Damot Gale district was purposively selected as it is known by its production potential and lack of studies. In the first stage, out of eight wheat producing Kebeles of Damot Gale, three were purposively selected. The Kebeles selection was done by referring the district`s annual report about wheat production and productivity. In the second stage, the number of sample households was determined using probability proportional to size (PPS) by considering 20% of female households. In the third stage, sample households were selected using simple random sampling.

The household heads of the three Kebeles (Fate, Woshi Gale and Wandara Boloso) were 861, 796 and 1078 respectively. There were a total of 2735 households in the three selected Kebeles. As a result, 120 households were selected for this study. Thus, the sample households selected by using simple random sampling techniques (Table 1).

Table 1. The sample household selection procedure

S. No.	Selected kebeles	Total HHs of kebeles	MHHs of the kebeles	FHHHs of the kebeles	MHHHs Selected	FHHHs Selected	Sample Size
1.	Fate	861	741	120	33	5	38
2.	Woshi Gale	796	630	166	28	7	35
3.	Wandara Boloso	1078	823	255	36	11	47
	Total	**2735**	**2194**	**541**	**97**	**23**	**120**

Source: Own survey, 2020.

In this study primary and secondary data sources were used to gather quantitative and qualitative data. The primary sources were sample households, key informants, field level Development Agents (DAs) and district level experts. Secondary data were obtained from Damot Gale District office of Agriculture and Rural Development Reports, CSA, Bureau of Agriculture and Rural Development, and Bureau of Finance and Economic Development, books, internet browsing and journals focusing on commercialization of cereal crops. Qualitative and quantitative data were collected by using household's interview schedule and Focus Group Discussion (FGD) with Key Informants Interview (KII) respectively. Semi-structured questions were developed for household's interview schedule and in-depth interview was deployed for FGDs.

Analytical Techniques and Variables Measurements
Household Commercialization Index (HCI)

The Household Commercialization Index (HCI) is used to determine household specific level of commercialization (Govereh, Jayne, Nyoro, 1999). This ratio does not incorporate the livestock subsector, which could be more important than crops in some farming systems (EEA, 2018). The index measures the ratio of the gross value of wheat sales by household i in year j to the gross value of all crops sales by the same household i in the same year j expressed as a percentage. The index measures the extent to which household wheat production is oriented toward the market. A value of zero would signify a totally subsistence-oriented household and the closer the index is to 100, the higher the degree of commercialization. The advantage of this approach is that commercialization is treated as a continuum thereby avoiding crude distinction between "Commercialized" and "Non-Commercialized" households. This effectively brings subsistence food production to the center of discussions about commercialization.

$$\mathrm{HCI_i} = \frac{Gross\ value\ of\ wheat\ sales\ hh_i year_j}{Gross\ value\ of\ all\ crops\ sale\ hh_i year_j} * 100\% \quad \text{.....(1)}$$

Where: $\mathrm{HCI_i}$ = household commercialization index
$\mathrm{hh_i}$ = sample household participated in wheat sale
year j = selected production year for this study

Binary Logistic Model Specification

For models used for dummy dependent variable analysis for the binary response, the binary logit model was used to compute the probability of household wheat output market participation for this study Gujarati (2003). In estimating the binary logit model, the dependent variable is wheat output market participation which takes the value of 1 if a household sell the product in the specific market and 0 otherwise. Review of literature and authors knowledge about wheat commercialization, wheat output market participation, of the study area was used to identify the potential determinants of smallholder's wheat output market participation. The explanatory variables, their description and measurements are given in Table 2.

The mathematical formulation of Binary logit model is as follows:

$$P_i = \frac{e^{Z_i}}{1+e^{Z_i}}$$

Where P_i is the probability of wheat output market participation for the i^{th} household and ranges from 0-1.

Z_i is a function of N- explanatory variables which is also expressed as:

$$Z_i = \beta_o + \sum \beta_i X_i + U_i$$

Where: i= 1, 2, 3…….. , n

β_o = intercept
β_i = regression coefficient to be estimated or logit parameter

U_i = is a disturbance term, and
X_i = output market participation

The probability of households belongs to non- participation is:

$$1 - P_i = \frac{1}{1 + e^{Z_i}}$$

Therefore, the odds ratio can be written as:

$$\frac{P_i}{1 - P_i} = \frac{1 + e^{Z_i}}{1 + e^{-Z_i}} = e^{Zi}$$

Now, P_i /1-P_i is simply the odds ratio of participating in output market. It is the ratio of the probability that the household would participate in wheat output market to that he/she not participate in output market.

Finally, by taking the natural log of equation (4) the log of odds ratio can be written as:

$$L_i = Ln\left(\frac{P_i}{1 - P_i}\right) = Ln\left(e^{\beta o + \Sigma_{j=}^{n} 1 \beta_j X_{ji}}\right) = Zi = \beta_o + \sum_{j=1}^{n} \beta_j X_{ji}$$

Where: L_i is log of the odds ratio in favor of participation in the output market, which is not only linear in X_j but also linear in parameters.

Table 2. Summary explanatory variables

Variables	Specification	Expected Sign	Unit of Measurement
Age of household head	Continuous	+	Number of years
Sex of household head	Dummy	+	Male or Female
Education level	Categorical	+	Assign scale
Market information use	Dummy	+	Assign score value
Credit utilization	Dummy	+	Assign score value
Use of extension service	Dummy	+	Assign score value
Family size	Continuous	-	Household members
Total household income	Continuous	+	Ethiopian Birr
Use of farm inputs	Dummy	+	Assign score value
Proximity to market	Continuous	-	Kilometers
Number of oxen owned	Continuous	+	Number
Total land size	Continuous	-	Hectares
Market orientation	Dummy	+	Assign score value
Quantity of wheat produced	Continuous	+	Quintals

Source: Own survey, 2020

RESULTS AND DISCUSSION

Household Commercialization Index, Household's wheat market participation

Agricultural commercialization refers to the process of increasing the proportion of agricultural production that is sold by farmers. Commercialization of agriculture as a characteristic of agricultural change is more than whether or not a cash crop is present to a certain extent in a production system. It can take many different forms by either occurring on the output side of production with increased marketed surplus or occur on the input side with increased use of purchased inputs.

Table 3. Cereal crops commercialization status in production year 2018/19

Crops	Gross value of crop sales in Birr	Gross value all crops' sales in Birr	Percentage ratio
Teff	453,600.00	1,098,000.00	41.31
Wheat	504,000.00	1,098,000.00	45.90
Barley	48,800.00	1,098,000.00	4.44
Maize	78,000.00	1,098,000.00	7.10
Sorghum	13,600.00	1,098,000.00	1.25

Source: Computation from field survey, 2020

The result of Table 3 shows that wheat is the leading commercialized crop followed by teff. The output of HCI revealed the status of wheat commercialization in the study area which is slightly higher than the national level 33 to 36% (EDHS, 2019).

Socio-Demographic Characteristics of the Households

Table 4. Proportion of dummy and categorical variables by wheat market output participation by sample households

Variables	Participated in wheat output market	Not participated in wheat output market	Chi-square	P V
Market orientation	Yes 76 (87.4%) No 11 (12.6%)	8 (24.2%) 25 (75.8%)	45.382	0.000***
Sex	Male 80 (92%) Female 7 (8%)	Male 16 (48.5%) Female 17 (51.5%)	28.26	0.000***
Education level	Illiterate 25 (28.7%) 1-4 32 (36.8%) 5-8 10 (11.5%) 9-12 11 (12.6%) 10+1 & above 9(10.3%)	Illiterate 21 (63.6%) 1-4 5 (15.2%) 5-8 3 (9.1%) 9-12 3 (9.1%)	13.155	0.011**

		10+1 and above 1 (3%)		
Credit use	Yes 37(30.8 %) No 50 (41.7 %)	Yes 7 (5.8%) No 26 (21.7%)	4.68	0.030**
Extension service use	Yes 73 (83.9%) No 14 (16.1%)	Yes 16 (48.5%) No 17 (51.5%)	15.669	0.000***
Market information use	Yes 51 (58.6%) No 36 (41.4%)	Yes 10 (30.3%) No 23 (69.7%)	7.676	0.006***
Uses of farm inputs	Yes 76 (87.4%) No 11 (12.6%)	Yes 1 (3%) No 32 (97%)	73.991	0.000***

*, **, *** indicates significance level by 10%, 5% and 1% respectively

Source: Own survey, 2020

It is hypothesized that market orientation and output market participation are positively related. The result showed that from sample household heads participated in wheat output market 87.4% were market oriented and 12.6% were not. Whereas 24.2% and 75.8% those were market oriented did not participate in wheat output market respectively. The Chi-square test result revealed that market orientation is significant in output market participation at 1% probability level.

Findings revealed that 80% were male- headed and 20% were female headed with the proportion of male headed households is quite higher than that of female-headed households. About 92% and 8 % male-headed and female-headed households respectively sold their wheat product whereas 48.5% of male-headed, 51.5% of female headed households did not sell and thus did not participate in output market. The Chi-square test confirmed that sex is significant at less than 1% probability level.

The sample household heads education level range goes from those who did not attend any formal education at all to those who attended 10+3 at diploma level. Categorically, 61.7% were literate whereas 38.3% were illiterate indicating that most of household heads can, at least, read and write- an important factor in the commercialization of farming. The result indicated that 28.7% illiterate household heads participated in wheat output market but 63.6% did not. On the other hand, 71.3% of literate household heads participated in wheat output market but 36.4% literates did not participate in wheat output market. The chi-square value proved that education is significant for wheat commercialization at less than 5% probability level.

The result also revealed that 30.8% of credit users and 41.7% who did not use credit participated in wheat commercialization. Whereas 5.8%, of those who used credit and 21.7% did not use credit did not participate in output market. The Chi-square test showed that the variable is significant at less than 5% probability level.

The large portion of household heads (83.1%) who sold their wheat product to market had accessed extension services and 48.5% who did not participate in output market accessed extension services. On the contrary, 16.1% who did not access extension services sold their wheat product to market and 51.5% who did not access extension services did not participate in output market. The Chi-square test confirmed that access to extension services is significant at 1% probability level.

As it is demonstrated, 58.6% who had access to market information has participated in wheat output market but 41.4% who haven`t accessed market information were found participants. On the other hand, 30.3% and 69.7% who accessed and not market information respectively did not participate in wheat output market. The Chi-square value proved that market information is positively associated with wheat output market and it is statistically significant at 1% probability level.

From the sample households 87.4% and 3% who used DAP and UREA participated in wheat output market whereas 12.6% and 97% did not participate in output market. The Chi-square value proved that market information is positively associated with wheat output market and it is statistically significant at 1% probability level.

Table 5. Mean of continuous variables by wheat market participation

Variables	Overall		Participated in output market	Not participated in output market	t-value
	Min (Max)	Mean(SD)	Mean (SD)	Mean (SD)	
Age	18 (70)	36.88(11.116)	37.25 (11.403)	44.45 (15.871)	-2.758 ***
Family size	2 (15)	4.76 (8.859)	4.34(7.790)	4.65 (7.969)	-2.186
Land holding (ha)	0.125 (4)	1.06 (0.729)	1.07 (0.97)	0.802 (0.482)	0.885
Annual income (birr)	700 (50,000)	3358(5211.30)	4306.55(5822.31)	712.12 (477.98)	5.708***
Number of Oxen	1(20)	1.04(2.085)	1.22(2.392)	0.56(0.682)	2.348
Quantity of wheat produced(qt)	3(70)	6.56(5.274)	6.98(5.87)	5.45(3.022)	1.856*
Market distance (km)	1(13)	2.24 (0.917)	2.20 (0.860)	2.36 (1.055)	-0.818

*,**,*** at 1,5,10% significant level respectively and NS (not significant).

Source: Own survey, 2020

As given in Table 5, the mean age of household's who were participated in wheat output market was 37.25years with standard deviation of 11.403 which implies that the age of households participated in output market were decreased by 8.75 years from the national average whereas the mean age of households who were not participated in output market was 44.45 years with standard deviation of 15.871, the result also decreases from the national average by 1.55 years. The mean age of the household who participated in output market is below national average and the age of households who did not participate in output market is higher than those sold to the market. The t-test confirmed that the variable age is significant at less than 1% probability level.

The overall mean family size of sample households is 4.76 which is almost similar with the national average 4.8 with standard deviation of 8.859 (CSA, 2018). The sample revealed that minimum and maximum family size of 2 and 15, respectively. It is depicted in Table 5, that the mean family size of the households who participated in output market was 4.34 with standard deviation of 7.790 and who were not participated was 4.65 with standard deviation of 7.969. The household's family size was negatively related with wheat output market participation but it was insignificant. The t-test and P value showed that the variable is insignificant.

The result revealed that the mean land holding size of the households who participated in wheat output market is owned 1.07 ha and those who did not participate was 0.97 ha. The mean values are lower than the national average 1.18 ha given in Agricultural Statistical Survey for 2007/8 by Gebregzihabher (2010). This figure demonstrates that majority of Ethiopian farmers are smallholders and they deserve attention from policy makers. The mean land holding sizes between those who sold their output and not

were insignificantly varied. As to the t-test analysis and the p value, the variable land holding size is insignificant to wheat commercialization in the study area.

Results from Table 5, indicates that the mean total annual income for households that participated in output market was 4306.55 Birr with standard deviation of 5822.31 whereas households that did not participate have earned 712.12 Birr with standard deviation of 477.98 which by far lower than the participant households. The t-test analysis result proved that household's income is significant for wheat commercialization at 1% probability level. The annual income for households who did not participate in output market is far lower than the national average income of food insecure areas.

The result shows that the household that participated in output market owned an ox on average and that did not participate had no ox. The result fitted with the ground reality and female headed households were farming by hoe/fork for farming which adversely affects their market participation due to subsistence production. Mostly male headed households who owned oxen more than three used shared-in cropping and enjoying the benefit of higher production. The t-test proved as the variable is significant at less than 5% probability level.

The average quantity of wheat produced by households participated in wheat output market was 6.98 Qt with standard deviation of 5.45 whereas the mean production of the household did not participate in output market is 5.87 Qt with standard deviation of 3.022. That result indicated that those who produce in larger amount better participate in the output market. The t-test confirmed that the variable is significant at 10% probability level.

Regarding the distance taken to travel from home to the nearest market where they sold their product, the mean distance traveled by households who sell their product was 2.20 with standard deviation of 0.860 and those who did not sell was 2.36 with standard deviation of 1.055. The t-value confirmed that the mean variation of distances from home to the nearest output market for households to sell their product was not is significant.

Determinants of Wheat Output Market Participation for Smallholder Farmers

Demographic, socio-economic and institutional variables which are believed to have influence on the smallholder's wheat commercialization (output market participation) are included in this finding based on the literatures reviewed.

Table 6. Binary Logit estimates for factors determining output market participation

Variable	β	Odds ratio Exp (β)	Wald	Std error	P value
SEXHHH	1.977	7.222	15.881	0.496	0.000***
AGEHHH	-0.477	0.620	4.086	0.231	0.043**
EDUCLEV	0.862	2.368	14.718	0.225	0.000***
LANDSZ	0.105	1.111	0.128	0.294	0.720
MKTORNT	3.027	21.591	43.015	0.519	0.000***
CREDTACS	1.011	2.749	4.447	0.478	0.034**
EXTNSRVC	1.172	5.540	39.424	0.454	0.000***
FAMLYSZ	-0.430	1.044	22.178	0.073	0.554
QUNTPRD	0.091	1.095	2.434	0.058	0.119

MRKTINFO	1.181	0.437	24.658	7.310	0.006***
DISTNCE	0.034	1.035	0.199	0.076	0.655
USEFRMINP	3.374	29.20	35.485	0.566	0.000***
THHINCM	0.004	1.004	17.835	0.241	0.000***
OXENOWN	0.108	1.114	0.483	0.150	0.478
CONSTANT	0.969	2.636	22.483	0.204	0.000***

Cox and Snell R^2 0.692
Nagelkerke R^2 1.000

Note: ***, **, & * indicate significance level at 1%, 5%, and 10%, respectively.

Source: Own survey, 2020

The Binary Logit Regression analysis disclosed the explanatory variables that were statistically significant and had casual impact on smallholder's wheat output market participation.

The model goodness of fit as to the result of Cox and Snell R^2 was 0.692 indicating that 69.2% of the variation in wheat output market participation is explained by logit model. The Nagelkerke modification that does range from 0 to 1 is a more reliable measure of the relationship. Nagelkerke's R^2 will normally be higher than the Cox and Snell measure (Gujarati, 1998). Nagelkerke's R^2 is part of SPSS output in the 'Model Summary' table and is the most reported of the R-squared estimates. In this study it was 1.000, indicating as there is strong relationship of 100% between the predictor and the prediction.

Sex of Household Head

The sign of the coefficient of sex of household head showed positive and significant relationship with wheat output market participation at 1% significance level. The positive relationship implies that male headed households have more chance to participate in wheat output market. The result is fully in conformity with the prior expectation. This result agreed with ground reality as focus groups discussion convinced the farmers participating in output market and producing in market-oriented basis are male headed households than female headed households. This could be due to physical fitness and low resource endowments of female headed households; so, it made them subsistent farmers, produced for home consumption only. The odds ratio of being male headed household is in favor of participating in output market by 7.222, keeping all other variables held constant. The result is in line with the findings of Gebregzihabher (2010) in that sex of household head is one of the factors that affect poultry market participation positively and Abera (2009) showed as sex positively affects commercialization of smallholder farming.

Age of Household Head

In contrary to what is hypothesized, the age of household head had negative and significant (at 5%) relationship with wheat output market participation. Households are in favor of participating in wheat output market by a factor of 0.620 as the age of household heads decreased by one year while other variables held ceteris paribus. The more household heads gets older the lower would be wheat output market participation. However, the model outputs disagree with focus group discussion result stated as some of aged household heads have higher experiences of farming. As a result, age had positive association wheat output market participation. But the model result might relate with labor productivity

deterioration with higher age. This contradicts with the findings of Gebremedhin, Jaleta and Hoekstra (2010) as age has insignificant and positive relation with output market participation and Urgesa (2011) age has insignificant and negative relation with wheat market supply.

Education level

Education attainment proves one of the most important determinants of wheat commercialization, especially completion of primary schools. This could be due to educated farmers are well aware to adopt new technologies and farm inputs utilization. In line with this, education level has positive and significant (1%) and relationship with wheat output market participation. The households were participating in output market by a factor of 2.368 as the education level of household head increased to secondary and tertiary levels, other variables kept constant. Qualitative analysis also agreed with the model result as educated farmers are outshining in their production volume and market orientation in their kebeles with adoption of new varieties and using mechanisms which enhance productivity. The result is compatible with the findings of education has positive and significant effect on crop output market participation Urgesa (2011) in commercialization of smallholders.

Market Orientation

The result revealed market orientation has significant and positive association with wheat output market participation at 1% significance level. The households are in favor of participating in the wheat output market by 21.591 as they are market oriented, ceteris paribus. Key informants' discussion result is also well-matched with the model output by concluding that market orientation is essential for wheat output market participation. Additionally, they argued for market-oriented households are those who early prepared and decided to participate in output market. This indicates as the household's pre-decision either to participate or not in output market is the leading force for output market participation and intensive inputs utilization. Hence, the variable is significant in both quantitative and qualitative analysis. The result is consistent with the findings of Urgesa (2011) who stated as market orientation in agriculture is basically a production decision issue and it has a positive significant relation in commercialization of smallholders.

Credit Utilization

The model result showed that credit utilization had significant and positive relationship with wheat output market participation at 5% significance level. Households using credits are in favor of participating in wheat output market by 2.749 odds ratio as their credit access increases by one unit while other variables held ceteris paribus. This could be because households who use credit are able to purchase inputs for higher productivity and can participate in output markets. But the qualitative result is incompatible with the model result as focus groups expressed ground realities as households did not access credit exist in the community due to fear of legal issues constrained and unexpected losses. Earlier study also revealed that credit is one of factors that affect the probability of adoption of improved varieties, the quantity of fertilizer farmers applies and haricot bean, respectively Gecho (2005).

Extension services use

Extension services use had also significant and positive relation with wheat output market participation at 1% significance level. As the household's extension services use increases by one unit, they are in favor to participate in wheat output market by 5.540 odds ratio while all other variables kept constant. The result directly agrees with the qualitative analysis as key informants strongly argue for the importance of the variable**,** extension services use is refreshing their skill and providing with new information. Thus, the variable is significant both in quantitative and qualitative analysis. This could be due to of extension services use enables farmers to be more commercialized than subsistence farming. This finding goes well together with the findings of Musema (2006) who found that extension services use on improved maize seed, red pepper and improved haricot bean respectively affected marketable supply of each of the commodities significantly and positively.

Use of market Information

Market information use is another variable which has positive and significant relationship with wheat output market participation at 1% significance level. The positive and significance relationship between the variables indicate that farmers market information use increases, the level of participation in output market increases. The households using market information is in favor of participating in wheat output market by 0.437, odds ratio while other variables citreous paribus. The households well used market information can better participate in output market. This could be due to the fact that the farmers used market information are able to produce on market demand basis and they can participate in output market as well. The focus group discussion also agreed as use of market information is positively related to household's output market participation. Hence, the variable is significant in both quantitative and qualitative analysis. The result congruent with the findings of Zegeye and Tesfaye (2001) which revealed that market information use positively affects the market supply of wheat and teff.

Total household income

Binary logit regression result showed that total household income has significant and positive relationship with household's market orientation at 1% significance level. The odds ratio of participating in wheat output market increased by a factor of 1.004 if a household earns a unit additional income, other variables held constant. This indicates that households with better income can purchase inputs which boosts the productivity and can participate in output market. Qualitative result of focus group discussion also confirmed as the variable is significant as it enables household`s to purchase inputs and hire labor in order to increase the productivity and those with better income households that are enjoying from wheat output market participation. Thus, both qualitative and quantitative analysis proved as the variable is significant. This result contradicts with the findings of Sharp, Ludi and Samuel (2007) as non-farm and off-farm incomes have insignificant effect on smallholder's commercialization.

Farm Input Use

Households farm input utilization is found to have statistically significant and positive relationship on household`s wheat output market participation at 1% significance level. The odds ratio indicated that

household's level of participation in wheat output market increases by a factor 29.20 if a household uses a unit of additional farm inputs. This could be due to the farm inputs capacity to increase agricultural productivity and insight for commercial farming. Focus groups also persuaded as proper use of farm inputs like DAP; UREA and improved seeds have positive relation to wheat output market participation by boosting the productivity in folds. The result agrees with the findings of Samuel and Sharp (2007) which revealed that farm inputs utilization has positive influence on smallholder farming commercialization.

CONCLUSIONS

The study was aimed to analyze determinants wheat output market participation in the study area. Out of the total sample households, the majority (72.5%) participated in wheat output market while the rest (27.5%) did not participate at all. Household's commercialization index result showed that teff, wheat, barley, maize, and sorghum had 41.31%, 45.90%, 4.44%, 7.10% and 1.25% ratios respectively. Wheat had higher marketability share, average household sold much amount of, the figure is quite higher than the national average of 33-36%. This is a vivid indicator of the high level of commercialization in the study area.

Results of econometric model indicated the relative influence of determinants of different variables on wheat output market participation in the study area. A total of fourteen (8 continuous and 6 discrete) explanatory variables were included in the binary logit model for regression, out of the total; nine variables had shown significant relationship with wheat output market participation. Accordingly, sex of household head, education level, market orientation, access to credit, access to extension services, access to market information, use of farm inputs and total household income were found to have positive and significant influence on output market participation of wheat. On contrary, age of household head has negative and significant influence on output market participation of wheat. The results of all explanatory variables agreed in both qualitative and quantitative analysis except age of household head, price of wheat, number of oxen own and credit access. Institutional support provided to the sector such as access to credit, market information and extension services were below the expected level. The factors together with household personal, demographic and socio-economic and institutional factors greatly affected output market participation of wheat and consequently the production and productivity of the sector. As a result, the following policy recommendations were made.

RECOMMENDATIONS

The government direction to transform smallholders from subsistence to market-oriented production system proved to have an encouraging result by way of enhancing output market participation. However, a lot needs to be done to enhance the level of commercialization since overwhelming majority of smallholders is not well integrated with market yet. So, young farmers have to be aware on demonstrative training for intensive use of their farm in order to higher productivity. In line with the training, functional adult literacy program has to be promoted for better technological and new ways of farming adoption. In the study area women participation in output market was very low. So, gender and development program should get insight in order to bring gender equity. The training, designed based on rural setting and focusing on labor division at household level should be promoted.

The wider range difference among farmers in farm inputs (fertilizers and improved seed) application per hectare and its deviation from recommended rate was found partly due to lower household incomes which disable them to settle other household expenditures and save for inputs purchase. As a result, developing saving culture through self-help groups (SHGs) enables smallholders to be capable for commercial transformation. Technical advice and on the spot training should be strengthen by the government and non-governmental organizations, working on farm productivity and production enhancement, and linkage with research institutes dealing with high yield varieties is also demanded. On the other hand, awareness development participatory training is needed on credit utilization as it increases their capacity to purchase farm inputs and household assets. In general, practical and awareness creation training is needed to widen farmer's attitude towards commercialization and institutional services utilization.

There is still potential for output market participant households to increase farm productivity through technical advice and capacity building training on market-oriented production decision and access to extension services should get focus for crops commercialization. A lot needs to be done by government to enhance the level of commercialization since the overwhelming majority of smallholders are not well integrated with the market yet. So, farmers should be market oriented prior to production in order to participate in output market with higher quantity and quality products. On the other hand, use of extension services has to be strengthened so as to improve farmers' use of market information through training and other related supports.

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