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Value Chain Analysis of Malt Barley (Hordeumvulgarel.): A Way Out for Agricultural Commercialization? The Case of Lemu Bilbilo District, Oromia Region, Ethiopia

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Abstract
This paper analyzes malt barley value chain and determinants of malt barley producers' market orientation in Ethiopia. Data were collected from 150 randomly selected producers using structured questionnaire, and key informant interview with different actors along the value chain. Descriptive statistics and econometric methods were used for data analysis. Multiple linear regression model and ordinary least square (OLS) estimations were used to analyze the determinants of malt barley producers' market orientation. Input suppliers, malt barley producers, cooperatives, union, collectors, grain wholesalers, processors, beer distributors, and retailers are the main actors in malt barley value chain. About 30% and 42% of the gross marketing margin and 51% and 22% of net marketing margin are shared by producers and malt factory, respectively. The econometric results show that literacy of household head, family size, land allocated for malt barely; farming experience, oxen ownership, access to improved seed, access to credit service, productivity of wheat and agricultural input cost are important determinants of malt barley producers' market orientation. Therefore, policy aiming at improving farmers' access to credit, access to improved seed, cooperative performances and strengthening actors' linkage can enhance the development of malt barley value chain and farmers' market orientation in study area.
Keywords: Malt Barley, Margin Distribution, Market Orientation, Value Chain Analysis, Ethiopia

1. Introduction

Barley (*Hordeum vulgare* L.) is the most widely grown cereal crop over broad environmental conditions and is the world's fourth important cereal crop after wheat, maize and rice. European Union, Russian Federation, Ukraine, Turkey and Canada were the largest barley producers in the world while Ethiopia, Morocco, Algeria, Tunisia and South Africa are the top five largest barley producers in Africa (USAID, 2014). Ethiopia is ranked twenty-first in the world`s barley production with a share of 1.2% and second in Africa next to Morocco with a share of 26% of the total barley production of the continent (FAO, 2014). In Ethiopia, barley is predominantly categorized as food and malting barley based on their uses with higher proportion of land for barley production is allocated for food barley (Asfaw, 2000). Food barley is principally cultivated in the highland where it is highest consumption in the form of various traditional foods and local beverages takes place. Ceccarelli *et al.* (1999) indicated that barley grain accounts for over 60% of food for the highlands in Ethiopia. According to Birhanu *et al.* (2005), barley is used in diversity of recipes and deep rooted in the culture of people's diets.

Malt barley, due to its limited usage and high-quality requirements, is a unique niche product in international grain market representing only about 1.5% of the total world grain production (USAID, 2014). It is particularly interesting in the context of smallholder commercialization and food security since it has high value as both cash and food crop. It is also the major raw material (about 90% of the total raw material cost) used in beer production and mainly produced in south eastern parts of Ethiopia particularly in east and west Arsi, west Shewa and Bale administrative zones of Oromia region (Legesse *et al.,* 2007). However, according to Mulatu and Grando (2011), malt barley supplied to malt factory in Ethiopia is produced by farmers having fragmented and small plots of land; as a result, the demand for malt barley are not being met. Asella malt factory's annual report, shows, only about 60% of the demand for malt barley is covered by domestic production while the rest is imported from foreign countries (AMF, 2015). Moreover, according to the report of Lemu Bilbilo district, from 55,245 hectares of land covered by cereal crops only 14% of the area is covered with malt barley (WoARD, 2014).

Despite the available potentials and opportunities for malt barley production and high market demand, farmer`s market orientation of malt barley in Ethiopia in general and a study area in particular is quite low. However, there is no or limited study that identify the determinants of malt barley producers market orientation in Ethiopia. Market oriented production can allow households to increase their income by producing output with higher return to land and labor and by giving them the opportunity to use the income generated from sales to purchase goods for consumption (Schneider and Gugerty, 2010). Thus, investigating the determinants of malt barley producers` market orientation in production is important in the study area in order to identify the bottlenecks of malt barley production; to meet the demand of breweries in the country and to enhance agricultural transformation.

Value chain analysis is a better alternative approach to conventional marketing to understand the determinants of malt barley producers' market orientation. It also enables researchers to analyze the different actors and their roles; benefit shares among the actors and the intrinsic need for upgrading the chain. A barley value chain research conducted by Rashid *et al.* (2014) in Ethiopia focused on production and productivity, determinants of quantity supplied and some value chain aspects of barley in general on selected zones using focus group discussion and key informant interview. Though the findings of the previous study are useful, it did not focus on malt barley and was more general in its approach. This entails a need for more comprehensive study which thoroughly analyzes the malt barley value chain in the study area. Therefore, in this paper, we analyze malt barley value chain with the specific objectives of assessing factors affecting malt barley producers market orientation; identifying the major malt barley value chain actors, their roles and benefit shares; and analyzing constraints and opportunities along malt barley value chain in east Arsi zone of Oromia, Ethiopia.

2. Data and Methods

2.1. Background of the study area and sampling procedure

Lemu Bilbilo is one of the districts found in Arsi zone of Oromia Region which is located about 235 km southeast of Addis Ababa, 56 kilometers south of Asella (Arsi Zone office of Road and Transport, 2016) (Figure 1). Topographically, the area lies within an elevation range of 1,800 to 4,180 meters above sea level with mean annual rainfall of 800-1400 mm and temperature of 6^0c to 20^0c (Woreda communication office, 2016). The district is characterized by crop-livestock mixed farming system where crop production is dominant. The major crops grown in the area are malt and food barley, faba bean, field pea and wheat. Most land is allocated to food crop production and hence the major share of livestock feed is obtained from crop residues (WoARD, 2015). The study area, Lemu Bilbilo district, is the major barley producing area in general and malt barley in particular which contributes about 25.2% of total barley production of the zone. The total land used for crop production (annual crops such as cereals, pulses, oilseed and vegetables) were about 55,245 hectare while the total number of farmers was 21,450 in 2014/15 production year. The total land used for malt barley was about 7,937 hectare where the production was about 317,480 quintal with 1,097 Ethiopian birr ETB) average price. Majority of the production takes place through contract farming with different business organizations like malt factory and beer factories in the country.

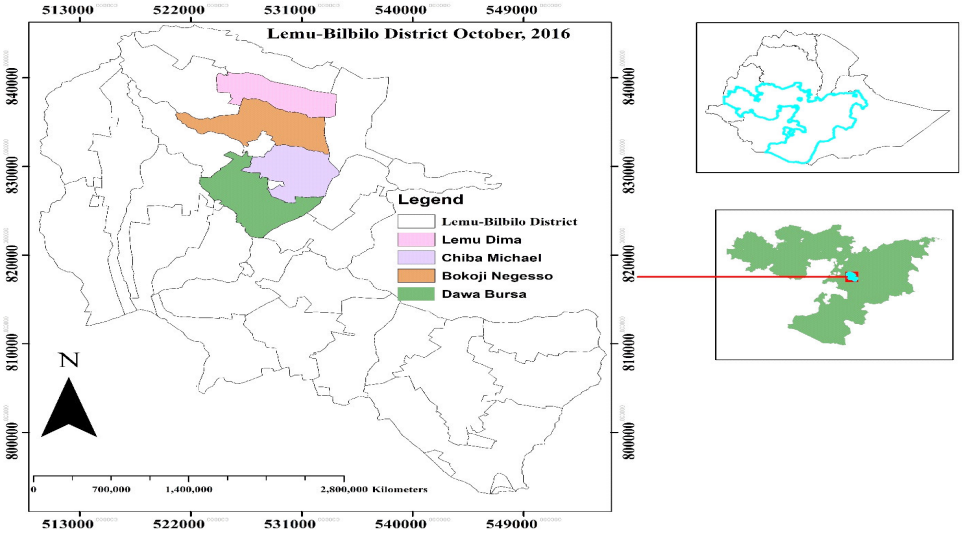


Figure 1: Location of the study area

Data were collected from 150 producers (Table 1) and 58 other actors who participated directly in malt barley value chain. About four focus group discussions consisting of 5 to 8 people, one in each study kebele, were also held. A two-stage sampling technique was used to select sample households from malt barley producer

kebeles. In the first stage, with the help of district agricultural experts and development agents, four malt barley producer kebeles were purposively selected based on their level of malt barley production. In the second stage, 150 households were randomly selected from the selected rural kebeles according to probability proportional to the population size of malt barley producers in the respective *kebeles* using Cochran sample size determination formula given in Equ. 1:

$$n = \frac{Z^2 * p(1-p)}{e^2} - - - - - - - - - - - - - - (1)$$

Where n= sample size, Z^2 = the abscissa of the normal curve that cuts off an area α at the tails (1 – α) equals the desired confidence level of 95%, the area under the normal curve i.e. z= 1.96, *P* is expected prevalence or proportion. ***e*** – is acceptable sampling error hence is 5%. In this study, P=11%, N=**1509**, Z=1.96 with 95% confidence interval.

Table 2: Sample size of producers from selected kebeles

No.	Name of kebeles	Total producers	Proportions	Sample
1	Bekoji Negesso	438	0.29	44
2	Chiba Michael	389	0.26	39
3	Lemu Dima	295	0.19	28
4	Dawa Bursa	387	0.26	39
Total		**1509**	**1.00**	**150**

Source: Sample distribution among the different *kebeles*

In addition to producers, about 15 rural collectors and 9 grain wholesalers were randomly selected from the selected *kebeles* and study district town respectively. The data were also collected from one union and four primary cooperatives (one from each *kebele*) in the district. Furthermore, one malt factory (AMF) and one beer factory (Meta Diageo) were interviewed since more than 80% of malt barley produced in the area is purchased by these two actors. Moreover, three beer distributors and 12 retailers (Hotels, grocery and cafes) were randomly selected from Asella town. The field data collection was implemented using structured questionnaire and focus group discussion for producers; and key informant interview for other actors from end of April to end of June, 2016. Well-trained enumerators, who have experience in data collection and fluent in local language, have implemented the household survey under close supervision.

2.2. Descriptive analysis

Descriptive statistics such as actor's performance analysis and SWOT analysis were used to understand the malt barley value chain. We map the current malt barley value chain, identify and explain malt barley value chain actors` functions and characteristics as well as its market channel. Furthermore, marketing performance (margin and financial profit share) of actors was assessed and finally, chains which need upgrading and governance role were identified and the intervention needed were suggested. To analyze marketing performance of the actors involved in the value chain of malt barley, similar steps used by Tegegn (2013) was followed. Marketing margin was calculated by taking the difference between malt barley producers' price and retail price. This can be calculated mathematically as, the ratio of producers' price to consumers' price as expressed in Equ. 2:

$$producers` share = \frac{producers` price}{consumers` price} = 1 - \frac{Marketing margin}{consumers` price} - -(2)$$

We compute gross marketing margin (GMM) and net marketing margin (NMM). According to Mendoza (1995), "marketing margins" should be understood as the gross marketing margins. He advises marketing researchers to emphasize on gross marketing margins in reporting their findings since net market margin requires some implicit costs which may be difficult to get them from all actors involved in the value chain. Gross marketing margin is calculated as specified in Equ. 3:

$$GMM = \frac{Retail\ price - farm\ gate\ price}{Retail\ price} * 100 - - - - - - - - (3)$$

Where GMM=Gross marketing Margin

Total gross marketing margin (TGMM) is important to analyze the other margins and is given by the difference between producer's (farmer's) price and consumer's price (price paid by final consumer) and is calculated as given in Equ. 4:

$$TGMM = \frac{Consumerprice - Producreprice}{Consumerprice} * 100 - - - - - - - (4)$$

The benefit share of actor (j) is computed from TGMM of the actor at that stage and is calculated as given in Equ. 5:

$$\mathrm{GMM}_j = \frac{SPj - PPj}{TGMM} \times 100 \quad (5)$$

Where, SP_j is selling price at j[th] stage and PP_j is purchase price at j[th] stage.

The drawback of GMM is its inability to show the importance of marketing costs and it sometimes leads to wrong conclusion about the marketing performance. Hence, we further compute net marketing margin (NMM) which is the percentage share of the final price earned by the intermediary by deducting the marketing costs as given in Equ.6:

$$NMM = \frac{GrossMarketingmargin - MarketingCost}{Consumerprice} * 100 \quad (6)$$

Higher NMM or profit of the marketing intermediaries reflects reduced downward and unfair income distribution, which could depress market participation of smallholders.

Finally, we computed the total value added and distributed among each actor in the malt barley value chain from the difference of total revenue (R) and the cost that an actor incurs. The operational costs and the required initial investment were computed from survey data and R was obtained as a product of malt barley sold (Q) and the selling price (P).

$$R = (Q * P) \quad (7)$$

The share of value added by an actor_j in the value chain is calculated by subtracting the revenues of consecutive actors and dividing it by the final retailer revenue as given in Equ. 8

$$Value\ share\ of\ actor_j = \left(\frac{R_j - R_{j-1}}{Retailer\ revenue(totaladdedvalue)}\right) * 100 \quad (8)$$

To analyze market orientation of malt barley producers, market orientation index was calculated for each household in the sample based on the resource a farmer allocates for malt barley production following Gebremedhin and Jaleta (2012). When crops are grown for both commercial and consumption purposes, farmers have different market orientation index depending on their resource allocation (land, labor and capital) for the commodity they produce. Based on the proportion of total amount sold to total production at farming system level, a crop specific marketability index (α_k) is computed for malt barley produced at farm level system as follows.

$$MBMI_i = \left[\frac{gross\ value\ of malt\ barley sold\ by\ individual\ farmer/year}{Total\ value\ of\ malt\ barley\ produced\ by\ individual farmer}\right] \quad (9)$$

Where $MBMI_i$ refers to malt barley marketability index for individual farmer in 2015/2016 production year.

$$\alpha_k = \frac{\sum_{i=1}^{N} S_{ki}}{\sum_{i=1}^{N} Q_{ki}} Q_{ki} \geq S_{ki} and 0 \leq \alpha_k \leq 1 \quad (10)$$

Where α_k is the proportion of malt barley sold (S_{ki}) to the total amount of malt barley produced (Q_{ki}) aggregated over the total sample of households in a farming system. α_k takes a value between 0 and 1, inclusive or a value between 0 and 100%, inclusive in terms of percentage. A value of zero would signify a totally subsistence level of production and the closer the index is to 100, the higher the market orientation in production. After the crop, specific marketability index is calculated, household's market orientation index in land allocation (MOI_i) was computed from the land allocation pattern of the household weighted by the marketability index of the crop (α_k) derived from Equ. 10

$$MOI_i = \frac{\sum_{k=1}^{k} \alpha_k L_{ik}}{L_i^T} L_i^T \geq 0\ and 0 < MOI_i \leq 1 \quad (11)$$

Where MOI_i is market orientation index of farmer$_i$, L_{ki} is amount of land allocated for malt barley in hectare, and L_i^T is the total crop land operated by farmer measured in hectare.

2.3. Econometric Analysis

The dependent variable analyzed in this paper is market orientation index of malt barley producers as detailed above. The market orientation index is continuous variable as all farmers in our sample participate in both production and marketing of malt barley (i.e. MOI_i is greater than 0 and less than 1 inclusive). Hence, we use multiple linear regression models and ordinary least squares (OLS) estimation techniques to analyze the determinants of household market orientation following Gebremedhin and Jaleta (2012) and is given in Equ. 12.

$$Y_i = \beta_0 + \beta_i X_i + \varepsilon_i \quad (12)$$

Where: Yi=Market orientation index, (MOI_i) for i[th] farmer, $\beta_0 = constant\ term$, βi= parameters to be estimated capturing the effect of explanatory variables on market orientation, and Xi = the explanatory variables influencing market orientation of i[th] farmer representing different forms of capital ownership that are selected

based on standard micro-economic theory as reflected in the sustainable livelihoods framework (Sen, 1981; Bebbington, 1999). The definition and expected influence of these explanatory variables along with references is summarized in table 2.

Table 2: Explanatory variables used in the model along with their measurement and expected signs

Variables used in the model and measurement	Expected sign	Reference
Demographic factors		
Age of the household head (years)	±	Adegbola and Gardebroek, 2007; Onubuogu and Onyeneke, 2012
Sex of the household head(1= male, 0=female)	+	Tefera, 2014
Family size in the household (number)	±	Gebremedhin and Jaleta, 2010; Onubuogu and Onyeneke, 2012
Farming experience (years)	+	Gebremedhin and Jaleta, 2010; Onubuogu and Onyeneke, 2012
Human capital		
Education (years)	+	Randela *et al.*2008
Physical assets		
Land allocated for malt barley (ha)	+	Abay, 2007
Livestock excluding oxen and equines (TLU)	-	Tegegn, 2013; Abayneh, 2007
Oxen ownership (number of oxen)	+	Samuel and Sharp, 2007; Abera, 2009
Equines ownership (number of equines)	+	
Institutional factors		
Distance to nearest market (walking hours)	-	Berhanu and Dirka (2008)
Access to credit (1= yes, 0= No)	+	Lerman, 2004; Marteyet *al*, 2012
Frequency of extension contact (number)	+	Gebremedhin *et al*., 2006
Access to market information (1=Yes, 2= No)	+	Tegegn, 2013; CIAT, 2004
Social capital		
Cooperatives membership (1= yes, 0= No)	+	Onubuogu and Onyeneke, 2012
Other factors		
Productivity of another crop (qt/ha)	-	
Access to improved seed (1=yes, 0= No)	+	Onubuogu and Onyeneke, 2012
Agricultural input cost (birr/ha)	-	
Off or non-farm activity (1=yes, 0= No)	±	

Source: Authors summary based on literatures provided and the study area context

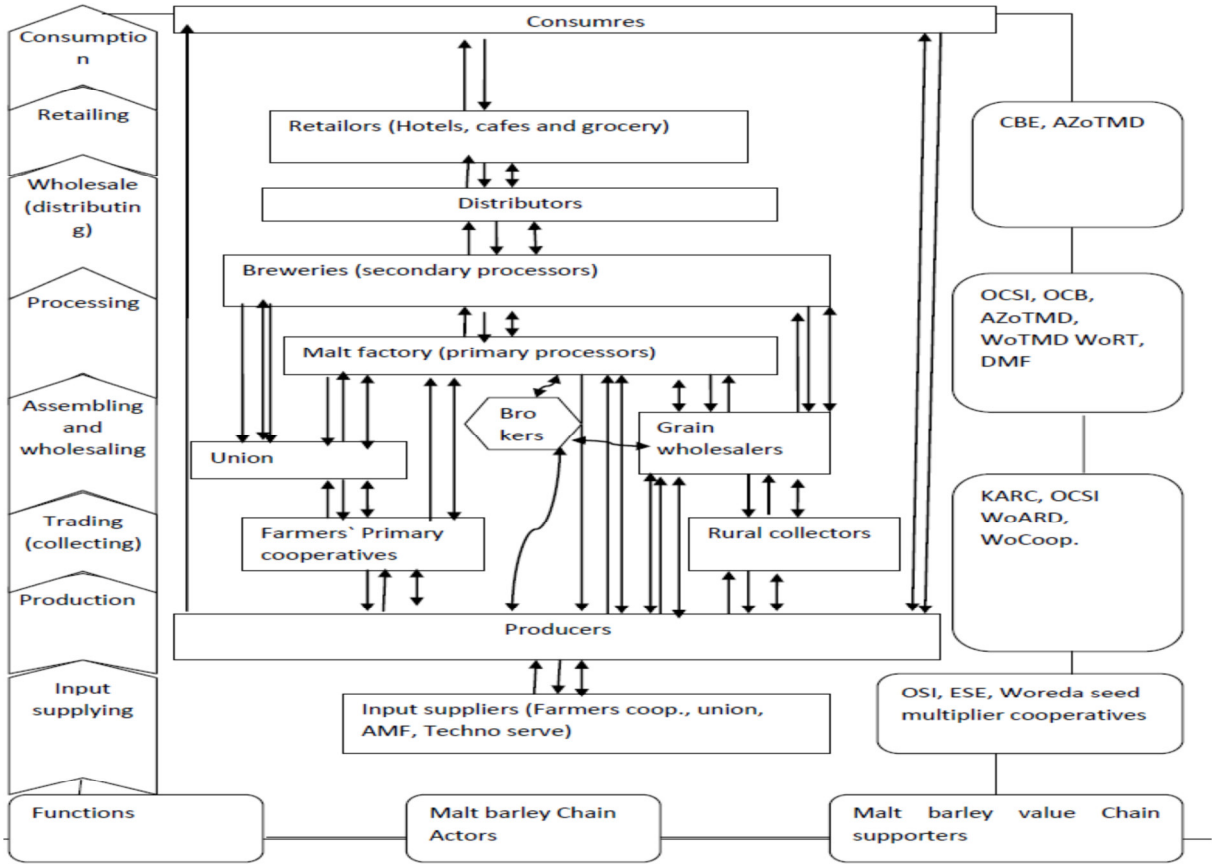
3. Result and Discussion

3.1. Value chain analysis of malt barley

3.1.1. Malt barley value chain map, actors and their relations

Figure 2 below provides the value chain map of malt barley in the Lemu Bilbilo district**.** Value chain map shows the actors, their relationships, and economic activities at each stage with the related physical and monetary flows. Malt barley products pass through different phases of production, processing, and marketing to reach the final consumers. The downward arrow shows the flow of money, the double arrow shows the two-way flow of information and the upward arrow shows the product movement in the study area.

There are many actors involved directly or indirectly in agricultural input supply in the study area. Currently, the district primary cooperatives and Galama farmer's cooperatives union, Asella malt factory and brewery (Meta Diageo through techno serves) are the major input supplier for the farmers of malt barley producers in the area. All such actors are responsible to supply agricultural inputs like improved seed varieties, fertilizer, herbicide and pesticide, and farm implements which are essential inputs at the production stage. In the study area seed multiplier farmers are actors responsible for the multiplication of improved seed varieties and sell their seed to cooperatives/union/Asella malt factory and techno serve which distribute to the farmers based on agreement.



Source: Authors sketch from own survey data

Key: ↑ = product flow ,↓= one way flow of money, ↕ = two way information and technology flow

Figure2: Value chain map for malt barley in the study area

The next to input suppliers, but key actors are producers**.** Farmers are the key actors who are directly involved in malt barley production activities and perform most of the value chain functions starting from farm inputs, preparation of their farms or gaining of the inputs from other sources to post-harvest handling and marketing. The major farming and value adding activities which are performed by malt barley producers include plowing, sowing, fertilizing, weeding, pest/disease controlling, harvesting and post-harvest handling (cleaning). The larger quantities of malt barley are sold during and soon after the main harvest season to cooperatives, local collectors, grain wholesalers, union, and malt factory and to consumers of the area within the same production year. In the study area, due to the recent government and other stakeholders' intervention in promoting group marketing through cooperatives, majority of malt barley producers are members of such cooperatives and have interest to sell their malt barley to the cooperatives. About 40.86% of malt barley passes through cooperatives marketing channel.

According to the survey result, the existence of cooperatives in malt barley value chain has two functions: firstly, they bring agricultural inputs from Galama union and other suppliers by adding transport and other costs and then resell it to both member and non-member malt barley producers. Secondly, they act as major actors of malt barley value chain that has a stabilizing role in the local market through purchasing the product.

In the study district cooperatives purchase malt barley from members and non-members and sell it to malt barley processors (Asella malt factory) with premium price of 5.5 % to local market price and pay to the producers through the union by subtracting their commission. The exchange activity of the commodity between producers and primary farmer`s cooperative is performed based only on observation of physical quality of the produce without using any laboratory test. Because of this, the same level of malt barley is given different prices. At similar purchasing time purchasing prices of the cooperatives are not equal since there is malt barley quality difference among each *kebele* producers. These price differences sometimes create difficulty between producers and cooperatives leaders. After all cooperatives purchase quality malt barley from both members and non-members by competing with local traders, they stock up all in warehouses and transfer bulk of malt barley to Asella malt factory and to their union.

Union is one of the actors involved in malt barley value chain in the study area. About 24 agricultural

primary cooperatives are found in the district which jointly established one union called "Galama farmers cooperatives union" for further increasing producers bargaining power and supplying the bulk volume of malt barley to the processors. Currently, Galama union performs four major activities, first: purchasing and supplying agricultural inputs based on input demand from primary cooperatives which distributes to the farmer; second: grain marketing by creating linkage with farmers through cooperatives, and sell to processors, malt factories and breweries (meta Diageo and Heineken beer factories), based on agreement; third: mechanization and fourth: training for farmers who are members as well as non-members of cooperatives.

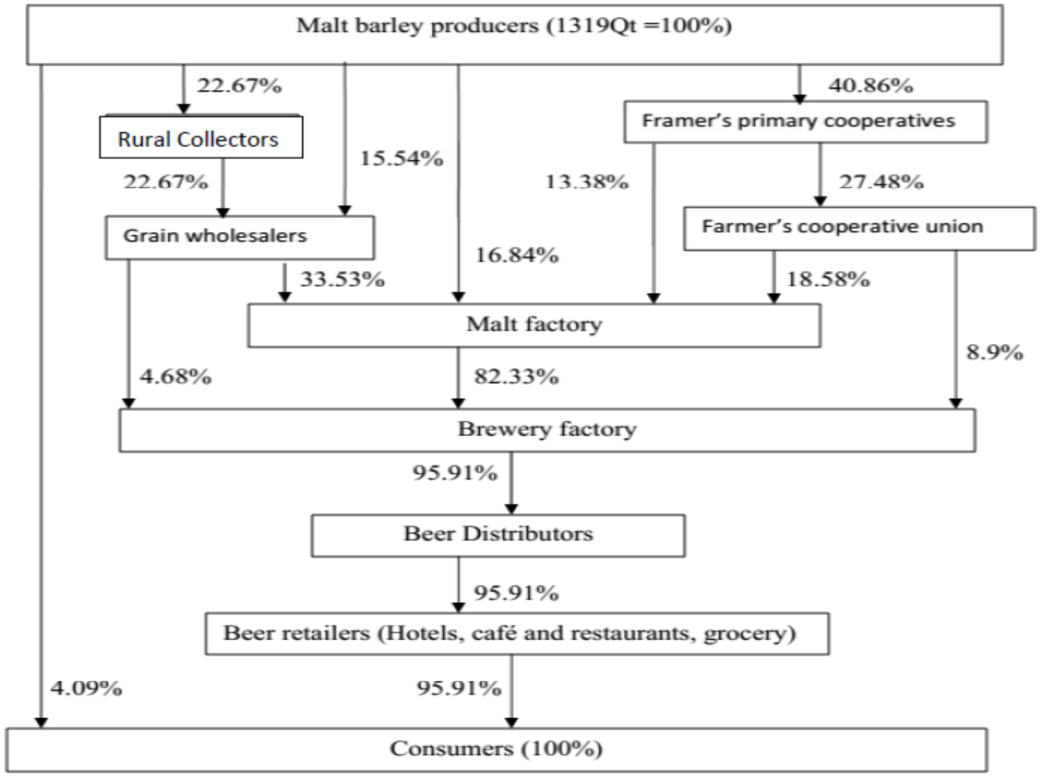
Rural Collectors are also actors in the malt barley value chain. These are traders or farmer/part-time traders who collect grain from small rural markets in the *kebele*s and from Bekoji market, and sell to grain wholesalers. They play a crucial role, particularly in collecting and transporting grain from inaccessible or distant markets for re-selling it to grain wholesalers by negotiable price without considering the quality of malt barley. They are responsible for the trading of over 22% of malt barley from production areas to rural wholesalers. The value adding activities of collectors include purchasing, assembling and selling to rural grain wholesalers. Survey result indicates that about 15 grain wholesales are found in Lemu Bilbilo district which are licensed by trade and marketing sector of the district. The district is the main assembly center for malt barley grain wholesalers from their surrounding *kebeles*. They have better access to financial, storage, transport and communication facilities than other traders found in the district. Almost all grain wholesalers have a warehouse, either owned or rented. These are suppliers of bulk of malt barley to the processors (Asella malt factory). Grain wholesalers are mainly involved in purchasing malt barley from local collectors and sometimes they collect directly from producers in larger volume and then transport it by lorry or truck to processors (Asella malt factory) through their brokers/middlemen and some part of it to the brewery (Meta Diageo).

Malt barley processors are the important actors towards improving malt barley quality as well as increasing the volume of domestically produced malt barley which would be distributed (sold) to different brewery companies in the country. For malt barley, there are two main processing stages – at malt factory and beer factory. At malt factory they entail the transformation of malt barley into a value-added product called malt. Processors have strict quality standards/parameters/ and expect their malt barley suppliers to meet these standards. These standards have different priorities in various malt barley markets (processors).

Once malt barley is finally processed by beer factories, beer pass through distributors and retailers to reach final consumers**.** Distributors are wholesalers who involved in distributing the value-added product of malt barley at brewery level to different retailers of different areas in the country. They have their own truck which is used to transport the product to different customers of their product. Retailers (Hotels, cafe and grocery) are traders who are involved in purchasing and retailing beer. They receive the product from the distributors and resell it to ultimate consumers. Consumers are the final users of malt barley products and the unprocessed malt barley. Almost 4% of raw malt barley goes directly to consumers without any processing while 96% of it reaches to consumers as a processed product.

3.1.2. Malt barley marketing channels

Marketing of malt barley is carried out at farm gate, local market and zonal markets. Pricing is decided mainly by Asella malt factory based on the quality requirement and has six levels of prices where the highest and lowest quality are priced for 1025 and 925 ETB per quintal respectively. Some times the price of malt barley is also decided between traders and farmers based on buyers' preferences and to some extent based on grading the product through visual estimation. From the total 1896 quintal produced by sample respondents in the study area, about 1319 quintal of malt barley is supplied by the farmers to different buyers. The product passes through different channels to reach final consumers (figure 3).



Source: Authors calculation and sketch from own survey data (Note: Qt= Quintal)
Figure 3: Marketing channels Map for malt barley

About 95.91% of malt barley is processed in to malt before it reaches to final consumer and the balance (4.09%) is distributed to consumers in the form of whole grain. The main buyers from producers are a rural collector (village traders), grain wholesalers, primary cooperatives, malt factory (Asella malt factory) and consumers with an estimated percentage share of 22.67%, 15.54%, 40.86%, 16.84%, and 4.09% respectively.

Farmers` cooperative union and Asella malt factory were the main buyers from farmer's primary cooperatives with an estimated share of 27.48% and 13.38% respectively. Malt factory and breweries were the main receivers from grain wholesalers with respective share of 33.53% and 4.68% whereas malt factory and breweries (via techno serve) were the main buyers from farmers' cooperative union with respective share of 18.58%and 8.9%. A total of 82.33% of the malt barley was purchased by Asella malt factory. According to the response from Asella malt factory malt barley purchasing officer, about 55%, 33%, 8% and 3% of the malted barley was sold to BGI[1], Heineken, Meta-Diageo and Raya brewery factories respectively in 2015/2016 manufacturing year. After processing the raw malt into beer, the breweries distribute to the distributors which finally sell to retailers like hotels, cafes and groceries. According to Asella malt factory, from 100 kg of raw malt barley about 77 kg of malt is extracted and sold with 2000 ETB/qt. This study identified about nine main alternative channels for malt barley marketing (figure 4). Moreover, based on the volume that passed through each channel starting from producers to consumers, channel comparison was made to understand which channel is the largest or the least, profitable or non-profitable. Accordingly, about 19.89% of malt barley passed through channel III which is the largest of all in carrying high volume of the product followed by channel VII (18.59%) and channel VI (16.84%) with respective quantity of 262.37qt, 245.17 qt and 222.11 qt from the total (1319 qt) of malt barley supplied by the producers to different stakeholders in value chain for average price of 944 ETB/qt. In another case, the least channels carried small quantity of the product are channels IV, II and I in increasing order and with respective volume of 25.11 qt, 36.62 qt and 53.94 qt. The rest three channels, IX, VIII and V, are the medium channels with increasing order carrying about 117.32 qt, 176.5 qt and 179.86 qt of the product respectively.

[1]BGI =George Beer Industry

Channel I: Producer ⟶ Consumer (53.94qt= 4.09%)

Channel II: Producer ⟶ Rural Collector ⟶ Grain Wholesale ⟶ Brewer ⟶ Distributors ⟶ Retailor ⟶ Consumer (36.62 Qt = 2.78%)

Channel III: Producer ⟶ Rural Collector ⟶ Grain Wholesaler ⟶ Malt Factory ⟶ Brewery ⟶ Distributor ⟶ Retailor ⟶ Consumer (262.37 Qt = 19.89%).

Channel IV: Producer ⟶ Grain Wholesaler ⟶ Brewery ⟶ Distributor ⟶ Retailor ⟶ Consumer (25.11 Qt = 0.19%)

Channel V: Producer ⟶ Grain Wholesaler ⟶ Malt Factory ⟶ Brewery ⟶ Distributor ⟶ Retailor ⟶ Consumer (179.86 Qt = 13.64%)

Channel VI: Producer ⟶ Malt Factory ⟶ Brewery ⟶ Distributor ⟶ Retailers ⟶ Consumer (222.11 Qt = 16.84%)

Channel VII: Producer ⟶ Farmers` Primary Cooperative ⟶ Union ⟶ Malt Factory ⟶ Brewery ⟶ Distributor ⟶ Retailer ⟶ Consumer (245.17 Qt = 18.59%)

Channel VIII: Producer ⟶ Farmers` Primary Cooperative ⟶ Malt Factory ⟶ Brewery ⟶ Distributor ⟶ Retailor ⟶ Consumer (176.5 Qt = 13.38%)

Channel IX: Producer ⟶ Farmers` Cooperative ⟶ Union ⟶ Brewery ⟶ Distributor ⟶ Retailor ⟶ Consumer (117.32 Qt = 8.89%)

Figure 4: alternative channels for malt barley marketing in the study area
Source: Authors calculation from own survey data

In channel I, producers sell their produce directly to consumers without any interference of middlemen and change of the form of the product. Price is negotiable with low variability (800-900 ETB/qt). These channel benefits consumers since they purchase the product directly from the farmers, hence get homogenous product and benefit the farmers since they receive the value of their produce as soon as they sell. Channels II and III have similar characteristics in which different key actors play a bridging role between producers and consumers except malt factory plays additional processing role in channel III. In both channels, the rural collectors purchase the raw barley from producers with price ranging from 870 to 930 ETB/qt based on the quality of malt barley expected to be produced and sold to grain wholesalers.

The action of grain wholesalers distinguishes channel IV from the above three channels. Farmers have access to sell their produce directly to wholesalers rather than to rural assemblers. Wholesalers have the potential to purchase and handle a large volume of malt barley through their brokers which will be sold to the factories with high price. Therefore, farmers have an opportunity to sell the required amount of produce to wholesalers. This in turn reduces the opportunity costs of the farmer (in terms of transportation costs, labor and time). Channel V is the third largest marketing channel where malt barley is passed from producers to processors. The role of grain wholesaler here is that they purchase malt barley from producers and sell to the malt factory. They purchase from farmers for average price of 930 ETB/qt and sell to malt factory and breweries for average price of 1035 ETB/qt. Channel VI shows the role of processors (malt factory and brewery) in the malt barley value chain. Malt barley can be processed in to malt through value adding activity and sold to different breweries for further processing. Different channels including; channel I, channel II and channel IV hinders the malt barley to be transported to malt factory. In this channel, the malt factory purchases raw malt barley from producers directly in the form of contract farming.

Channels VII, VIII and XI give an overview of the bridging role of cooperatives and unions over product handling and transferring from farmers to malt factories and breweries. Channel VII is the largest channel among them where large volume of malt barley is handled and transferred to the respective destination.

3.1.3. Performance of malt barley value chain actors in the study area

Table 3 presents the marketing margin of actors in malt barley value chain**.** According to the survey result, the total cost incurred by malt factory was the highest of all actors followed by unions and cooperatives with value of 23.33, 17.47 and 16.89% respectively while that of producers are the least of all which is 10.49% and the traders were found at middle stages in the value chain of the commodity. Of the total market margin of malt barley value chain actors, malt factories have the largest share (42.33%) followed by producers (29.84%), farmers' cooperative union (8.13%) and grain wholesalers (7.96%), rural collectors and farmers` primary cooperatives share the least marketing margin (5.87%) each during the survey year. The producers` share is 0.7

times less than that of the malt factory. This is since; sales price for malt factory is higher as compared to sale price of producers.

Table 3**:** Cost and margin distribution of actors in malt barley value chain

Items (ETB/qt)	Producers	Rural collector	Grain wholesaler	Farmers' cooperative	Union	Malt factory	Horizontal sum
Purchase price	0	900	940	975	1000	1035	4850
Production cost	588	0	0	0	0	0	588
Marketing cost							
Un/loading cost	0	10	10	6	6	10	42
Transporting cost	35	20	25	25	20	0	125
Material cost	8	8	8	8	8	15	55
Storage cost	0	0	2	2	2	3	9
loss	0	0	0	0	0	159	159
Processing cost	0	0	0	0	0	180	180
Commission fee	0	0	0	0	15	0	15
Tax	0	0	2	0	0	2	4
Total marketing cost	43	38	47	41	51	369	589
Total cost	631	938	977	1016	1051	1404	6017
Total cost (%)	10.49	15.59	16.24	16.89	17.47	23.33	100
Sale price	944	970	1035	1045	1097	1540	6631
Market margin	356	70	95	70	97	505	1193
Share of margin (%)	29.84	5.87	7.96	5.87	8.13	42.33	100
Profit margin	313	32	58	29	46	136	614
Share of profit (%)	50.98	5.21	9.45	4.72	7.49	22.15	100

Source: Authors calculation from own survey data

Regarding share of profit of actors in malt barley value chain, producers and malt factory get the highest share of profit margins with respective value of 50.98% and 22.15% followed by grain wholesalers (9.45%) and farmers' cooperative union (7.49%); local collectors (5.21%) and farmer's primary cooperatives (4.72%). The profit margin for the producers is higher than malt factory (2.3 times), grain wholesalers (5.4 times), farmer's cooperative union (6.8 times), local collectors (9.6 times) and primary cooperatives (10.8 times). The profit margin showed that, the farmers primary cooperatives had the poorest position followed by local collectors while the producers had the highest position followed by traders in the study area. This result is also in line with Rashid et al. (2014) who show the minimal role of cooperatives in barley value chain despite heavy public emphasis on them.

3.1.4. Marketing performance of actors across malt barley market channels

Table 4 presents the results of margin distribution along the different channels. Accordingly, channel III and V have the highest TGMM followed by channel VII or VIII and channel VI while channel I and channel IX had the least total gross market margin (TGMM). Producers share is the highest value of gross margin in channel I, IX and IV with respective value of 100, 90.7 and 88.57% implying that creating market linkage directly with consumers and breweries through wholesalers and cooperatives is more worthwhile for producers. About 9.52% and 11.43% of the gross market margin goes to grain wholesalers in channel I and channel IV respectively implying that direct selling to breweries is more worthwhile for grain wholesalers rather than selling to malt factory.

Table 4: GMM and NMM of malt barley value chain actors along the marketing channels

Margins in percent	I	II	III	IV	V	VI	VII	VIII	*IX*
TGMM	0	14.29	44.41	11.43	42.55	39.16	39.78	39.78	*9.3*
Gross marketing margin (GMM)									
Producer	100	85.71	55.59	88.57	57.45	60.84	60.22	60.22	*90.7*
Collector	--	4.77	3.09	-	-	-	-	-	-
Wholesaler	-	9.52	5.52	11.43	4.63	-	-	-	-
Primary Cooperative	-	-	-	-	-	-	2.78	4.20	*4.18*
Cooperative union	-	-	-	-	-	-	4.76	-	*5.12*
Malt factory	-	-	32.79	-	37.92	39.16	32.24	35.58	-
Net Marketing Margin (NMM)									
Collector	-	1.14	0.74	-	--	-	--	-	-
Wholesaler	-	5.05	2.35	6.95	1.73	-	-	-	-
Primary Cooperative	-	--	-	-	-	-	0.25	1.67	*0.37*
Cooperative union	-	--	-	-	-	-	1.61	-	*0.37*
Manufacturing	-	-	13.28	-	15.13	16.37	9.45	12.79	-

Source: Authors calculation from own survey data, "-" no transaction

In channels VI and V, about 39.16% and 37.92% of the gross market margin goes to malt factory implying that direct market linkage with producers and grain wholesalers is worthy relative to having marketing linkages to local collectors or other intermediaries like cooperatives or unions. Channels VII, VIII and XI describe the marketing partnership of cooperatives and unions with processing factories like malt and beer factory. In channel VIII about 4.2% of gross marketing margin goes to cooperatives while 2.78% and 4.18% in channels VII and IX respectively implying that creating market linkage directly with processors is worthwhile for cooperatives. From overall actors involved in marketing of malt barley, the malt factory shared the highest net market margin followed by grain whole sales in channels VI and IV with share of 16.37% and 6.95% respectively while the cooperatives and unions share the lowest net market margin in channel VII and IX with share of 0.25% and 0.37% respectively. From all channels, channel III is the longest and the largest of all carrying larger volume of malt barley in which local collectors, grain wholesalers and malt factory are the main participants. From all actors involved in channel III, the NMM of malt factory was ranked as fist (13.28%), followed by grain wholesalers (2.31%) and local collectors (0.74%).

3.1.5. Value addition and distribution in malt barley value chain

In calculating the value added at each stage, reference has been made to one quintal of malt barley final product called malt and input requirements of preceding activities were determined using standard conversion factors. The malt factory uses 1.3quintal of raw malt barley to produce one quintal of malt (i.e. 1qt raw malt barley = 0.77qt malt). Channel III and channel VII are the longest and significant channels for value addition of malt barley value chain actors. Since there is no linkage in transferring malt barley from traders to cooperatives/unions and vise-versa, the two channels were selected to analyze the value addition by traders and government institution separately.

Table 5: Value added by actors in malt barley value chain

Channel III (Producer to processors through traders)					
Actors	Cost (ETB/qt)	Revenue (ETB/qt)	Net income (ETB/qt)	Value added (ETB/qt)	Value share (%)
Producers	631	900	269	900	58.44
Collectors	938	950	12	50	3.25
Grain wholesalers	997	1035	38	85	5.52
Malt factory	1404	1540	136	505	32.79
Total	3970	4425	455	1540	100.0
Channel VII (Producer to processors through government institutions)					
Actors	Cost (ETB/qt)	Revenue (ETB/qt)	Net income (ETB/qt)	Value added (ETB/qt)	Value shared (%)
Producers	631	975	344	975	63.31
Cooperative	1016	1020	4	45	2.92
Union	1071	1097	26	77	5.0
Malt factory	1404	1540	136	443	28.77
Total	4122	4425	455	1540	100.0

Source: Authors calculation from own survey data

As can be seen from table 5, among all actors participating in channel III and channel VII, the rural collectors and primary cooperatives took the lowest position in respective order while producers added the highest value followed by malt factory in both channels. Grain wholesalers took the third rank in channel III and

union took the third rank in channel VII. The value added (share) of producers were 58.44 and 63.31% in channel III and channel VII respectively, followed by malt factory with respective shares of 32.79 and 28.77% respectively. The value added (share) by rural collectors and grain wholesalers was about 3.22 and 5.52% respectively while that of primary cooperatives and union is 2.92 and 5% in channel III and channel VII respectively.

3.2. Determinants of malt barley producers market orientation

3.2.1. Descriptive results for market orientation and explanatory variables

Table 6 presents the descriptive statistics of our outcome variable (market orientation index). The survey result shows that market orientation index of malt barley is below 20% (0.17) where the minimum and maximum index were 0.067 (subsistent level) and 0.5 (moderately market oriented) respectively. The marketability index of malt barley show that nearly 70% of the crop is sold on average which shows that the crop is important cash crop in the study area. However, small proportion of land is allocated for it in the study area due to different factors.

Table 6: Market orientation Indexes of malt barley producers` in the study area

	Market orientation index		Crop marketability index	
Types of crops	Mean	Standard deviation	Mean	Standard deviation
Wheat	0.15	0.06	0.58	0.20
Food barley	0.09	0.05	0.26	0.13
Malt barley	0.17	0.07	0.70	0.06
Bean	0.02	0.03	0.15	0.20
Linseed	0.04	0.06	0.30	0.44
Potato	0.02	0.04	0.22	0.36
Average	0.08	0.01	0.37	0.12

Source: Authors calculation from own survey data

Table 7 presents the descriptive statistics for independent variables used in econometric regression. About 89% of the sample households in our sample are male headed with average age of 49.37 years and 9.13 years of malt barley producing experience. Average family size is high with an average of 6.67 persons per household. About 72% of the heads are literate and received formal education. Education of the household head is expected to influence production and productivity of producers through adoption of newly introduced technologies and innovations. Hence, literate producers are expected to be in a better position to get and use information which contributes to improve their farming practices and market orientation for malt barley in the study area.

Table 7: Descriptive statistics of variables used in the model

Variables used in the model	Obs	Mean	Std. Dev.	Min	Max
Demographic factors					
Age of the household head (years)	150	49.37	8.33	36.00	68.00
Sex of the household head(1= male ,0=female)	150	0.89			
Family size in the household (number)	150	6.67	1.81	2.00	12.00
Farming experience (years)	150	9.13	2.14	3.00	17.00
Human capital					
Education (years)	150	4.13	3.30	0.00	12.00
Physical capital					
Land allocated for malt barley (ha)	150	0.44	0.17	0.25	1.50
Livestock excluding oxen and equines (TLU)	150	3.96	1.21	2.04	9.02
Oxen ownership (number of oxen)	150	2.11	0.91	1.00	4.00
Equines ownership (number of equines)	150	1.44	0.67	0.00	3.00
Institutional factors					
Distance to nearest market (walking hours)	150	0.88	0.38	0.30	2.40
Access to credit (1= yes ,0= No)	150	0.29			
Frequency of extension contact (number)	150	4.33	1.72	1.00	8.00
Access to market information (1=Yes,2= No)	150	0.84			
Social capital					
Cooperatives membership (1= yes, 0= No)	150	0.69			
Other factors					
Productivity of another crop (qt/ha)	150	36.34	10.84	21.00	65.00
Access to improved seed (1=yes, 0= No)	150	0.51			
Agricultural input cost (birr/ha)	150	1288.50	547.03	649.50	4659.50
Off or non-farm activity (1=yes, 0= No)	150	0.34			

Source: Authors calculation from own survey data

We also controlled for different physical assets such as land and livestock owned by the household, which

potentially influence the market orientation of the household. Resource endowment especially availability of land for crop production is one of the most important influencing factor. The survey revealed that the mean land size of sampled households is 2.19 hectares and the average land allocated for malt barley production is 0.44 hectare. Moreover, the sampled respondents own an average of 3.96 other livestock (apart from oxen and equines) in TLU, 2.1 oxen and 1.44 equines. Oxen ownership is common among all respondents and is the major contributor to crop production serving as a source of draft power.

3.2.1. Econometric Result

Table 8 presents the output of the regression (OLS) analysis. The model F-tests applying appropriate degrees of freedom indicate that the overall goodness of fit of the OLS model is statistically significant at less than 1% indicating that the independent variables included in the OLS model regression significantly explain the variation in the market orientation of malt barley producers in the study area by 74% (the coefficient of determination, $R^2 = 0.7388$). Regarding relationship of the variables with the market orientation of malt barley producers, education level of the household, land size allocated, farming experience, oxen owned, access to credit and access to improved seed have positive relationship whereas family size, wheat productivity and input cost have negative relationship with malt barley producers` market orientation. Family size of the household has negative relationship with malt barley producers` market orientation in the study area. A unit increase in family size decreases the market orientation of malt barley producers by 0.47%. This result is in line with Gebremedhin and Jaleta (2010) who indicated that, large household sizes diminish households from market orientation due to its effect on increasing household domestic consumption requirements. Education of household head is positively associated with market orientation of malt barley producers. A year increase in household head's education increases the market orientation of malt barley producers by 0.77%. This can be explained by the fact that as an individual get access to more education he/she is empowered with the market information and skill of production that will outgrowth individual to allocate more land for more market oriented product. This study is in line with a finding of Kemisola et *al.* (2013), who report an increase in market orientation of cassava farmers by 3.6% as their education increase by a year. Malt barley area has positive and significant effect on household market orientation. If the household increases farm size allocated for malt barley by 1 hectare, its market orientation increases by 37.44%. This study is in line with Onubuogu and Onyeneke (2012) who shows that, an increase in farm size cause an increase in market orientation of root and tuber crop production at Imo State of Nigeria.

The effect of farming experience on producing malt barley is also positive and significant at 5% level. The result implies that as the number of years of the household head experience increases by one year, the household`s market orientation towards malt barley production increases by nearly 0.32%. This result is consistent with Agwu (2012), who studied socio-economic determinants of commercialization among small holder farmers in Nigeria and revealed that as the number of years of the farmers' experience increases, the probability of farmers` market orientation also increases. Productivity of wheat was negatively related with market orientation of malt barley producers and highly significant at 1% significance level. The negative relationship of wheat productivity and market orientation showed that, as the productivity of wheat increase by 1%, the market orientation of malt barley producers decreases by 0.29%. This is intuitive since the productivity of wheat is higher as compared to malt barley and since the farmers need the crop which gives higher productivity; they focus more on the crop with higher productivity.

Table 8: OLS result for determinants of malt barley market orientation

Variables	Coef.	Robust Std. Err.	P-value
Age of the household head (years)	0.0003	0.0004	0.562
Sex of the household head	-0.0013	0.0130	0.921
Family size (number)	-0.0047**	0.0020	0.023
Education level (years)	0.0077**	0.0036	0.036
Distance to nearest market (walking hours)	-0.0073	0.0070	0.303
Land size for malt barley (ha)	0.3744***	0.0712	0.000
Off/non-farm activity (yes/No)	-0.0084	0.0074	0.257
Farming experience (years)	0.0032**	0.0014	0.025
Productivity of wheat (qt/ha)	-0.0029***	0.0005	0.000
Livestock's excluding oxen (TLU)	-0.0035	0.0026	0.179
Oxen ownership (number)	0.008**	0.0038	0.037
Access to improved seed (yes/no)	0.0160**	0.0066	0.017
Access to credit (yes/no)	.0152*	0.0088	0.088
Frequency of extension contact	.0009	0.0021	0.660
Access to market information (yes/no)	.0063	0.0079	0.430
Cooperative membership (yes/no)	.0022	0.0073	0.762
Input cost for production(birr/ha)	-0.00004**	0.00002	0.013
Equine ownership (number)	0.0012	0.0043	0.783
Constant term	0.1091	0.0493	0.029
Number of observation	150		
F-test statistic	16.88		
F-test p-value	0.0000		
R2	0.7388		

***, ** and * are significance at 1%, 5% & 10% levels respectively,
Source: Authors calculation from own survey data

The effect of oxen ownership on market orientation of malt barley producers is also positive and statistically significant at 5% significance level. The finding implies that, a unit increase in number of oxen increases the market orientation of producers by 0.80% keeping other variables constant. This result indicates that households who have a larger number of oxen are more likely to plough more land for production that enabled to produce more malt barley. This finding is in line with the study by Tefera (2014) who reports that households who have large number of oxen typically go through in to share in land agreement with farm households who have no ox which and supports the present study.

Access to inputs and services is also important determinant of malt barely producers market orientation. For instance, access to improved seed has positive and significant effect on farmer's market orientation. The result indicates that as the probability of access to improved seed increase by 1%, farmer's market orientation increases by 1.6%. Access to credit service also has positive and significant influence on market orientation of malt barley producers. The estimates show that, farmers who have access to credit are more likely to produce malt barley which directly leads to allocate larger proportion of land. The result implies that as farmers` access to credit services increase by 1% their market orientation increases by 1.52%. This finding is in line with Tefera (2014) who reports that increase in farmer's access to credit increases in the level of chickpea producer's market orientation. The input cost incurred to produce malt barley negatively and significantly affects market orientation of malt barley producers. If input cost increase by 1 ETB, malt barley producers' market orientation decreases by 0.004%. This study is in line with Tefera (2014) who found negative effect on market orientation of chickpea production and states that, increase in expense on fertilizer reduces the market orientation of chickpea.

3.3. Challenges and Opportunities in Malt Barley Value Chain

One of the merits of value chain analysis is that it helps to clearly identify bottlenecks to the development of the chain right from input supply up until the consumption level in concentrated way. Accordingly, several challenges and opportunities were explained by different actors through group discussion and questionnaire as well as from key informant interview in the study area which are currently hindering the development of the malt barley value chain and were categorized according to the three basic stages: input supplying stages, production stage and market stage.

Table 9: Challenges and opportunities of malt barley at different stage of the value chain

Stages	Constraints	Opportunities	Intervention needed
Inputs supply	• Shortage of good quality seed, Shortage of chemicals for emerging disease • High cost of fertilizers and high interest, • Low quality of seed from seed supplier companies, • Mixed seed with other varieties	➢ High demand for purchased quality seed, chemicals ➢ High demand for agricultural inputs, ➢ High demand of extension services ➢ Expansion of seed supplier cooperatives in the study area	❖ Government support for easy access to inputs ❖ Strengthen linkage between input suppliers and farmers ❖ strengthening research center ❖ strengthening farmers seed multipliers in the study area ❖ designing product upgrading
Production	• Shortage of improved malt barley seed • Poor linkage with value chain actors • Low price of product, high price of inputs • Lack of capital to purchase inputs • Higher market distance • Lack of storage, and diseases and pest attacks • High price, poor quality and low availability of malt barley seed • Limited services of extension and credit • Shortage of land	➢ Favorable climatic conditions and fertile land for malt barley production ➢ presence of value chain supporters and enabling policy environment and support from public organization and NGOs ➢ High market demand for malt barley product ➢ high demand for malt barley production at farmer level, ➢ high demand for malt barley by different factories, ➢ its potential for value addition ➢ possibility of farming advice	❖ Training to smallholders on disease/pest control method ❖ Strengthen credits service provider's institutions and ❖ improve storage facility ❖ increasing the extension service for the producers ❖ designing process upgrading strategy
Marketing/Trading	• Product quality problem, • Presence of unlicensed traders, • Low price for the products, • Limited function of cooperatives, • Limited market research and credit service, • Lack of appropriate storage facility for malt barley, • Unequal dissemination of market information, • Shortage of malt barley and • Lack of laboratory sampling test	➢ High market demand and availability of buyers, ➢ Expansion of breweries in the country, high competition among the buyers of malt barley, ➢ Government investment on infrastructure development, ➢ Establishment of cooperatives in the study area, Establishments of credit providers, ➢ Closeness of study areas to Asella Malt Factory	❖ Strengthen functions of farmer's cooperatives, ❖ Control unlicensed traders, ❖ Increase credibility and market linkages of malt barley value chain actors, ❖ Improving farmers bargaining power by supporting farmer's cooperatives

Source: Authors summary from own focus group discussion

4. Conclusion and policy implication

Our finding shows that close to 70% of malt barley produced is sold suggesting that the crop is an important component of the households' cash source. However, market orientation index of the producers revealed that malt barley is found at nearly subsistent level (below 20 percent) indicating that there is a resource allocation

problem for this crop or small proportion of land is allocated for the crop while the degree of market participation is higher among the farmers. The important factors including literacy status, land size allocated for the malt barley, farming experience, oxen owned by the household, access to credit service and access to improved seed were found to be positively and significantly affecting market orientation of malt barley producers. Moreover, family size, wheat productivity and agricultural input cost are found to be negatively affecting market orientation of malt barley producers.

Many actors play in malt barley value chain. Farmers` primary cooperatives are the most important buyers of malt barley from producers, followed by traders and malt factories. The market margin, profit share and value addition among the value chain actors indicates that the farmer's primary cooperatives and rural collectors are poorly positioned due to limited working capital, and business management skill followed by grain wholesalers and unions while malt factory is better positioned in malt barley value chain. Farmers gain better benefit when they are better connected through short links to the processing factories than when there are many more actors in between.

There are different bottle necks constraining malt barley value chain. At district level cooperatives, rural collectors, grain wholesalers and unions purchase malt barley only by inspecting through physical quality (color and impurity) of malt barley. Only physical quality inspection may not be enough to check the whole malt barley quality. Moreover, there is a communication gap between producers and end buyers of the product in malt barley value chain. These and other factors affect malt barley value chain development at input supply, production and marketing stages.

Our findings entail important policy implications for malt barley value chain development. Policies aiming at improving technical knowhow of farmers on malt barley production; facilitating adult education; farmers' access to credit and its sustainability; can help increase market orientation of malt barley producers. Process upgrading strategy by government and non-government organization as well as private enterprises through promoting and providing improved technology packages and better practices would increase the productivity of malt barley which can in turn attract the farmers towards allocation of more resources for malt barley production. Enhancing forward linkage of producers; strengthening functions of farmers' cooperatives; increasing credibility and market linkages of malt barley value chain actors, and improving information dissemination at input supply, production and marketing stages could help improve the value chain development and functioning of malt barley in the study area.

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