Market Chain Analysis of Maize (Zea Mays) in South Omo Zone in South Nation Nationalities Peoples Region (Snnpr), Ethiopia

Kutoya Kusse[1*], Kebede Kassu[2] Yidnekachew Alemayehu[2]

[1&2] *Southern agricultural research institute, Jinka agricultural research center, socio-economic researchers, SNNPR, Ethiopia, P.O. Box 96, Jinka, Ethiopia*

Corresponding Author: *Kutoya Kusse, Southern agricultural research institute, Jinka agricultural research center, socio-economic researchers, SNNPR, Ethiopia, P.O. Box 96, Jinka, Ethiopia, Email: getahunkusse@gmail.com*

ABSTRACT

The study was conducted in four maize producing kebeles (Shepi, Kaysa, Baysimal and Arkisha) of Debub Ari woreda in South Omo Zone of SNNPR to analyze market chain of maize. A total of 120 households from the four kebeles were included in the survey. The results of the study indicated that out of the total maize produced by sampled households, 55.01 % of maize were marketed. The sample markets were characterized by oligopolistic market structures. The major barrier of enter into the market was shortage of capital and Licensing. Moreover, the market participants have low degree of market transparency. According to the econometric results variables such as age, quantity produced, market information and extension contact have significantly affect quantity supplied to market at 5% significance level. The study recommends provision of policies that will improve the maize production capacity of farmers through identification of new technologies that create stable demand for surplus production and enhance farmer's decision in marketable surplus. Strengthening Institutions that convey reliable and timely market information required by all market participants, strengthening the extension system. Financial institutions should design a mechanism to address the challenges of financial access to smallholder farmers and traders. Also policies that will be strengthen the bargaining power of cooperative are vital in order to reduce the market inefficiency nature of market structure.

Keywords: *Maize marketing, structure, conduct and performance*

INTRODUCTION

Cereals comprise half of consumer food expenditures in Ethiopia and about 75 percent of the land area under cultivation (Central Statistics Agency, 2012). Maize is Ethiopia's most important cereal crop both in terms of level of production and area coverage. About 9 million farmers, i.e., 70% of the total farmers produced about 6 million tons of maize over two million hectares of land. The farmers grow maize mostly for subsistence, with 75 % of all maize produced is consumed by the farming households (Central Statistics Agency, 2012). Maize is the cheapest source of calorie, providing 16.7 % of per capita calorie intake nationally (Rashid *et al*., 2010).In addition, the cost of maize is roughly one half that of wheat and tef, making it particularly important for poor households (Food Aid Organization, 2015; Berhane *et al*., 2011; Rashid, 2010). Total maize production has been increasing rapidly over the

past decade by an annual growth rate of 8 percent. The growth in maize production appears to have been driven largely by an increase in yields of about 5 percent per year, as well as 3 percent annual growth (Central Statistics Agency, 2015).In Ethiopia, smallholder farmers almost in all regions of the country dominantly produce maize.

In terms of regional distribution, 41.9% of the producers are found in Oromia, 28.6% in Amhara, 18.7% in SNNP, 6.9% in Tigray, and 2.4% in Benishangul Gumuz regional states (Central Statistics Agency, 2013). While considerable gains have been made in maize productivity over the last decade, there remains a large potential to further enhance it. While maize yields have nearly doubled over the last decade (from 1.75 tons/ha in 2003/04 to 3.25 tons/ha in 2013/14), the current level of maize yields (3.25 tons/ha) is still much lower than yields on experimental and demonstration plots

(up to 8 tons/ha) and fall far behind the world average (5.5 tons/ha) and average yields of the top ten maize producing countries (6 tons/ha) (Central Statistics Agency, 2014; Food Aid Organization, 2015).Like that of other cereals, maize is predominately produced for subsistence in Ethiopia.

Farm household consumption accounted for 89 percent of the total maize production in 2013/14 (Central Statistics Agency, 2014), while the share of maize that reached the market was 11 percent. Despite substantial growth in maize production over the last decade, the marketed surplus rate has not changed much. For example, while maize output had increased by about 65 percent since 2008/09, the marketed surplus rate has increased by four percentage points (Central Statistics Agency, 2009; 2014). In south Omo zone maize is produced as part of major crop and farmers face high market problem with the commodities.

However, no study has been carried out on marketing chain analysis of maize in the study area. Therefore, this study was aimed at analyzing maize marketing chains analysis which will narrow the information gap on the subject and will contribute to better understand on improved strategies for reorienting marketing system for the benefit of small farmers and traders and point out valuable intervention areas for support service providers.

Objectives of the Study

The main objective of the study is to analyze maize market chain in the study area while the specific objectives are as follows:

- To assess maize marketing channels, the role and linkages of marketing agent in the study areas;

- To analyze the market structure, conduct and performance of maize in the study area and;

- To identify the determinants of market supply of maize in the study area;

METHODOLOGY

Description of the Study Area

South Omo Zone is one of the 13 administrative zones found in SNNPRS which covers an area of 25530 km2 and is located 4.430-6.46' N and 35.790-36.06'E, and has an estimated human population of 472,977 persons. The population density of the zone is 19 persons per km2 it's

bordering with Gamo Gofa Zone, Keffa Zone Konta and Basketo special District in north, Kenya in south, konso and Derashe districts in east and Sudan & bench maji Zone in west. The Zone is divided into 8 districts and 1 city administration. Generally the altitude of the zone ranges between 360 and 3500 m.a.s.l (DAO, 2003).

The traditional agro-ecology Classification of the Zone were; Dega, Woinadega, Kola and semi arid cover 0.5, 5.1, 60, and 34.4 percent respectively of the total area. Rainfall pattern in the area is bimodal. The mean annual rainfall ranges between 400 and 1600 mm. The mean annual temperature ranges between 10.1 and ›270c (Alemayehu, and Tezera, 2002). Whereas Maize, Sorghum, Barley, Wheat, Teff, Godore, Millet, Cassava, Haricot bean and field peas are the major crops grown in the area.

Regarding the land use the proportion of cultivated land, grazing land, forest land, cultivated land and non-cultivable land and others are 11.22, 29.25, 12.55, 15.69, 10.85, and 20.42 percent respectively. There are 16 different ethnic groups found in 8 districts. Except the Ari ethnic group which covers 2 of the 8 districts and a farming system of sedentary farming. The rest of the ethnic groups have a farming system of pastoral and semi-pastoral type. The study was conducted in one of the potential maize producing Woreda (Debub Ari) in South Omo Zone of SNNPR.

Sampling Techniques and Sample Size

A multi-stage sampling technique was employed. In the first stage, the study area was selected purposively based on the maize production potential of the zone. In the second stage, four participant kebeles (Shepi, Kaysa, Baysimal and Arkisha) were also purposively selected based on the secondary data of the woreda and consulting experts of the respective woreda office. Secondary information was gathered from the Zone and Woreda office of agriculture as well as trade and industry office. The numbers of sample households based on the proportion 5 to 10 % of the total households living in each selected Kebele were included. Finally 120 maize producing farmers were selected by simple random sampling proportional to the total households of the selected kebele's. The survey for the traders was based on their availability. The major market actors that were interviewed include traders, farmers, consumers and processors.

Map of the Study Area
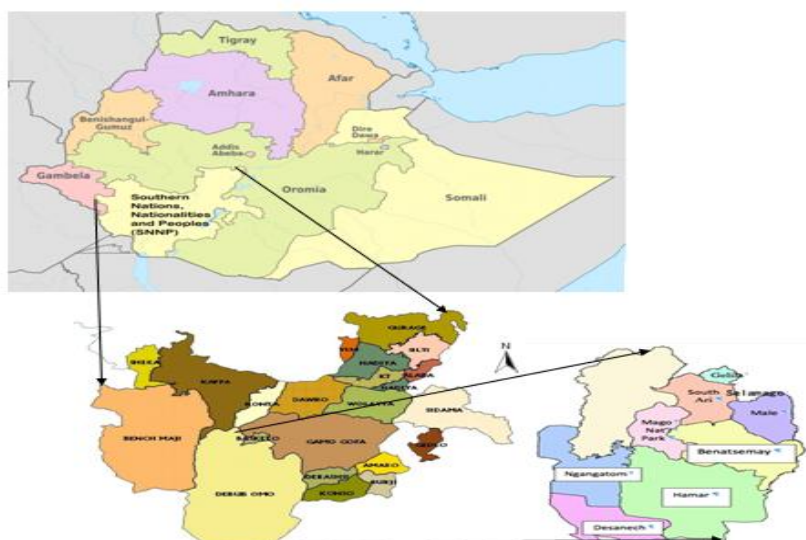
METHOD OF DATA COLLECTION

Data collection methods used during the investigation periods includes group discussion with key informant interview. Structured questioner was prepared and pre-tested for each sample respondents within the study area. Using the questioner interviews were conducted through socioeconomics researchers to gather data on household's socioeconomics and demographic characteristics, farm information, production, marketing and market access, information service, market structure, conduct and performance, market actors, price determination, maize production and marketing, marketing channels, challenges and opportunities of maize production and marketing.

DATA ANALYSIS

Both descriptive statistics and appropriate econometric model (Logit model) were used to analyze the data with the help of SPSS Version 16 soft ware.

RESULTS

Demographic Characteristics of Sample Households Heads

Attempts were made to collect information on demographic characteristics of the households to provide information on some of the key variables for the study area. The variables examined in this section were household heads' sex, age, education level, marital status and family size. The result of the study (Table1) indicates that 97.5% of Maize producing households was male headed households. The remaining 2.5% of households were female headed households. In terms of marital status, whereas 98.33% of households were married, only 1.67% of maize producing households were single.

Table1. *Demographic Characteristic of Sample Farmers*

Variables		Producers(N=120)	Percentage
Sex	Male	117	97.5
	Female	3	2.5
Mean age of HHH		35.21(6.82)	
Educational Level	Illiterate	49	40.8
	Primary	52	43.3
	Junior	17	14.2
	Secondary	1	0.8
	Certificate	1	0.8
Marital Status	Married	118	98.33
	Single	2	1.67
Mean family Size		7.79(2.29)	

Figures in parenthesis represent standard deviations, N= total sample size

Source: *Survey Data Result, 2010*

As Table 1 depicts, the age of respondents ranged from 20 to 52 years with an average age of 35.21 years. The educational background of the household heads is believed to be an important feature that determines the readiness of household heads to accept new ideas and innovations. More educated farmers are expected to adopt new technologies to increase their land and labor productivity. Based on education categories the data indicated that 40.8% of the sample respondents were Illiterate, 14.2% attained junior education, while 43.3% of the respondents had Primary formal education. The remaining 0.8% and 0.8% of the sample respondents attained secondary education and certificate respectively. The average family size of the respondents was 7.79 with a minimum and maximum family size of 3.00 and 12.00 persons respectively. Maize traders have on average of 6.23 years of trading experience which ranged between 2 and 13 years.

Table2. *Experience of maize traders*

Trading experience range	Frequency	Percent	Commutative percent
2-4	6	40	40
5-7	4	26.67	66.67
8-10	3	20	86.67
11-13	2	13.33	100

Source: *Survey Result, 2010*

According to the survey, the mean trading experience for sampled traders in the area was 6.23 years. The general trading experience of interviewed traders ranges between 2 to 13 years. The percent of Maize traders that had marketing experience ranging from 2 to 4 years, 5 to 7 years, 8 to 10 and 11 to 13 years were 40%, 26.67%, 20% and 13.33 % respectively. Hence, the results revealed that majority of maize traders in the area are with a trading experience between 2-4 years.

Table3. *Working capital of traders*

Capital	N	Minimum	Maximum	Mean	Std. Deviation
Initial working capital	15	2,000.00	32,000.00	10,933	9074.82
Currently working capital	15	6,000.00	43,000.00	12,667	9044.86
Valid N (list wise)	15				

Source: *Survey Result, 2010*

As trader's initial working capital for maize trading increases, the current working capital for traders also increases. This indicates that there is positive relationship between initial and current working capitals for maize trading.

From the sampled traders about 40% have their own source of working capital while the remaining 60% were loans from different sources. The major loan sources for those who have been engaged on maize trading were relatives/family, microfinance institutions, friends and from other traders.

Selling Practices of Traders

The sampled traders sell the maize about 14.7% to village market, 22.3% were to district market, 32% to zonal market, 20.5% out of the Zone, like Segen Zone, Gamo Gofa and Mojo and 10.5% were to village, district and other market. The average selling price of traders was 597.70 birr ranged between 560 birr and 630.56 birr. The terms of payment about 95% was on cash, 2.5% was advance payment while 2.5% were both cash and advanced payment.

Land Holding and Land Use Patterns

Land is the single most important factor of production in the study area. The average land owned for maize production was 0.94 hectares.

The survey result indicates that the cultivated land holding of households ranged from 0.12 to 8.00 hectares with standard deviation of 1.26 hectare. The average cultivable landholdings respondents were 1.20 hectares.

Working Capital and Selling Practices of Traders

Among the interviewed 15 sample traders about 13.33% were wholesalers, 26.67% village collectors, and 40% retailers while 20 % were urban assemblers.

According to the sampled traders about 46.67% participate in maize trading when maize supply is high or during the harvest time, 53.33% participate year-round.

Table4. *Land Use Patterns of Respondents*

Land owned (ha)	Minimum	Maximum	Mean	Std. deviation
Total land	0.12	10.00	2.16	1.80
Cultivated land	0.12	8.00	1.20	1.26
Plantation land	0.06	3.25	0.58	0.54
Fallow land	0.02	4.00	0.74	0.86
Homestead land	0.03	1.00	0.25	0.23
Pasture land	0.06	1.00	0.47	0.33
Rented out land	0.25	1.50	0.83	0.49
Rented in land	0.06	1.50	0.42	0.40

Source: *Own Survey Results, 2010*

Farm Input Utilization

Fertilizer is one of the most important agricultural production inputs mostly used by maize farmers. Moreover, proper application of the recommended fertilizer rate is important to obtain the required yield and the marketable surplus; as shown in Table 5 below. To control the occurred Fall Army Worm the sample respondents were used an average of 1.25L and 1.5L of insecticide/pesticide. Also proper management of weeds is one way of increasing production and productivity, so using herbicide enables the farmers to control the weed in a short period of time and saving of labor.

Table5. *Agricultural inputs used by Maize Producers in the last two years*

Variables		Year 2008		Year 2009	
		(yes)%	Mean	(yes)%	Mean
Fertilizer	DAP(kg/ha)	87.5	36.23	90.0	42.5
	Urea(kg/ha)	82.3	18.12	86.8	21.25
Herbicides(Lt/ha)		5.8	0.5	6.2	0.75
Insecticide/Pesticide(Lt/ha)		41.7	1.25	45.8	1.5
Improved seed(kg/ha)		85.8	17.26	86.7	20.7

Source: *Survey Data Result, 2010*

For this reason about 5.8% and 6.2% of the sample respondents were used an average of 0.5L and 0.75L herbicide for the last two years respectively. This low proportion of the respondents who uses herbicide indicates that the farmers in the study area have no skill and knowledge of herbicide usage.

Production, Storage and Marketing of Maize

Production of maize is the main source of cash for farmers in the study area. Production of maize in the study area is a rain-fed with twice harvest in a year.

Table6. *Area cultivated, production and productivity of maize*

Variables	Minimum	Maximum	Mean	Standard deviation
Area Cultivated (ha)	0.125	3.50	0.89	0.61
Quantity produced (qt) per HHH	4.00	60.00	20.65	11.85
Amount Marketed (qt) per HHH	1.00	40.00	11.36	7.65

Table.6 Above depicts the average land allocated for maize production by the respondents were 0.89 hectare with corresponding standard deviation of ±0.61 hectares the minimum and maximum land allocated by respondents to the production of maize were 0.125 and 3.50 hectare respectively. The average quantity of maize produced per respondent was 20.65 quintals.

Table7. *Type of storage facilities, purpose and length of storing maize*

Variables	N=120
System	
Filling in sacks and place it on floor (%)	1.70
"Gotera/store (%)	98.30
Mean storage length in (month)	5.86 (2.61)
Reasons	

High price expectation (%)	43.30
Purpose of saving (%)	27.50
Consumption purpose (%)	29.20

Figures in parenthesis represent standard deviations, N= total sample size

Source: *own survey result, 2010*

In order to reduce post harvest losses farmers need to select appropriate storage system for maize. The two major storage systems typically used in the study area are filling in sack and placing it on the floor inside the house and storing the cops without thrashing in "Gotera." Table.7 depicts that 1.7% of maize producing respondents stored their product by filling the sack than placing it on the floor inside their house and the remaining 98.3% respondents stored in "Gotera" that was constructed from locally available materials in the compound (Muhammed, 2011). The results reported from respondents' shows that, about 90.8% of maize producing farmers avoided sales of their product immediately after harvest. The results also show that, the average storage time of maize was 5.8 months. In addition, 43.3% of maize producing households indicated that the major motive behind storing maize was in anticipation of higher prices.

ACCESS TO MARKETS AND OTHER SERVICES

Access to different services has important contribution in improving production and productivity and thereby increasing marketable surplus and ultimately for increasing the income of smallholder farmers. The most important services that are expected to promote production and marketing of maize in the study area include proximity to markets, access to credit, access to extension services and access to market information.

Market Distance

Regarding the distance taken to travel from home to the nearest market place where they sold their product, farmers reported that they had to travel an average distance of 60.78 minutes with corresponding standard deviation of ±33.62 minutes. The maximum and minimum distances that respondents travelled to access nearest market centers were 180 and 5 minutes respectively.

Market Information

The amount of marketable surplus primarily depends on access to market information and the willingness and ability of farmers to use the information. The role of Market information is crucial to reduce information gaps and uncertainties that exist in the agricultural sector. It is required by producers in their planning of production and way of marketing the product. 46.6% of respondents got market information from their neighbors, 28.8% by visiting market, and 24.7% from traders. As indicated the majority of respondents in the study area got market information from their neighbors informally before they sell their product.

Access to Credit

Access to credit is one way of improving smallholder farmer's production and productivity. Farmers' ability to purchase inputs such as improved seed and fertilizer is tied with access to credit. Farmers with access to credit can minimize their financial constraints and buy inputs more readily than those with no access to credit. Thus, it is expected that access to credit increase the production of agricultural crops in general and maize in particular. Farmers access to credit from formal institutions (banks, MFI, and cooperatives) and informal sources (Iqub, trader friends, relatives and money lenders). Government institutions and NGOs also provide credit to farmers. This study shows that only 25.8% of maize producing farmers reported that they had access to credit while the remaining majority (74.2% of maize producing sample respondents) reported that they had no access to input credit that can be used to buy improved seeds and fertilizer. According to the sample respondent's response, access to credit is influenced by lack of awareness creation and a negative attitude of farmers for credit access.

Access to extension service

Access to agricultural extension services is expected to have direct influence on the production and marketing behavior of the farmers. The higher access to extension service, the more likely that farmers adopt new technology and innovation. This study indicate that out of the total respondents of maize producing sample households, about 88.3% of maize producers had access to extension services provided by development agents of the kebele. The remaining 11.7%

of maize producing sample households responded that they did not receive any extension services from development agents.

MAIZE MARKETING PARTICIPANTS, THEIR ROLES AND LINKAGES

In this study, different stockholders were involved in bringing maize from the point of production (farm gate) until it reached the final destination (consumers). According to the data obtained market participants identified in the marketing process of maize in the study area include producers/farmers, farmer trader, urban assemblers, wholesalers, retailers and processors. The market participants involved in different activities (wholesale, retail, assembly etc), in the study area were categorized in different categories.

Producers/ Farmers

These are marketing agents who participate both in production as well as marketing of surplus commodities they produced. As the time, they transport maize to the nearest markets, District or Zonal markets by using their packs, back animals or animal driven carts over the average distance of 52.8 minutes. They had several options to sell their product, selling directly or selling through broker to assemblers (rural and urban assemblers).

Alternatively, they sell to village assemblers known as farmer traders who assemble maize from large number of farmers. Farmers also sell their products directly to retailers in District or Zonal markets. Some of the farmers in the sample also sold their maize to the consumers in the Zonal market.

Farmer Trader/Rural Assemblers

Are farmers or par-time traders in the assembly markets that used to buy small quantity of maize from farmers in village markets during slack period for the purpose of reselling it to consumers or zonal wholesalers in either in rural or zonal market?

Urban Assemblers

The assemblers play important role in the process of assembly. They consolidate the produce of individual farmers produce and prepare it for marketing on the market days early in the morning they took money from zonal wholesalers to buy the produce.

Wholesalers

Wholesalers are major market participants of the marketing system who usually buy maize of larger volume than any other actors in the marketing system and resell the product to urban retail merchants and processors than ultimate consumers.

Retailers

These market actors are located at the end of marketing chain, directly serving the ultimate consumers of marketing system. They perform numerous marketing functions such as buying, processing, storing, selling and other functions related to marketing.

Maize Marketing Channel

The marketing channel of maize identified below shows how maize passes through complicated routes of intermediaries on the way from the point of origin (producers) to reach ultimate users (consumers).
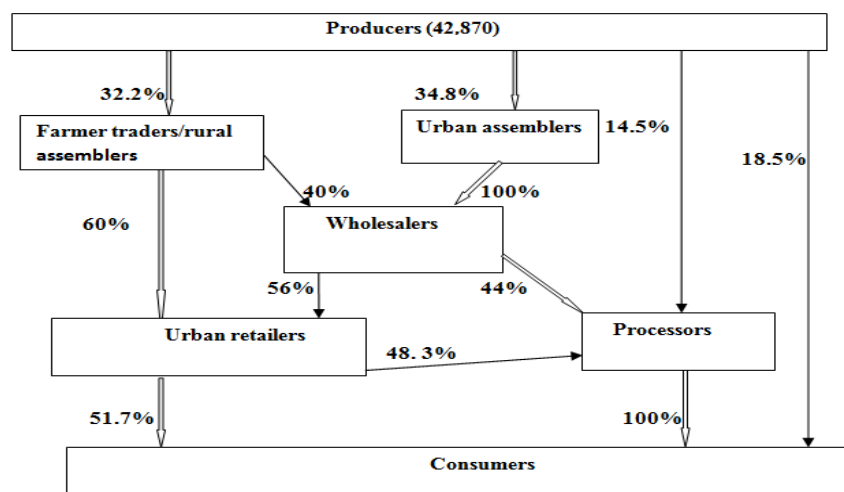

Figure1. *Maize marketing channel*

Source: *survey result, 2010*

Maize has a number of marketing channels. It passed through different channels in its way to reach the final consumers. As one can see from figure 1 above the main receivers of maize from the farmers are farmer traders, wholesalers, urban assemblers, urban retailers, processors and directly from producers to consumers. Processors in maize marketing channel represent those who buy maize from producers, wholesalers or urban retailers to mill it to make local brewed drinks like "Borde and Areke," and locally prepared foods like "Kurkufa, Fosose, Enjera, Dapo, Kollo etc. The identified maize marketing channels are listed blow as follows.

- Channel 1 Producers-Consumer
- Channel 2 Producers-Processors-Consumers
- Channel 3 Producers-Farmer traders-urban retailers-Consumers
- Channel 4 Producers-Farmer traders-Wholesalers-Urban retailers-Consumers
- Channel 5 Producers-Farmer traders-Wholesalers-Urban retailers-Processors-Consumers
- Channel 6 Producers-Urban assemblers-Wholesalers-Urban retailers-Processors-Consumers
- Channel 7 Producers-Urban assemblers-Wholesalers- Processors-Consumers

ANALYSIS OF MARKET STRUCTURE CONDUCT AND PERFORMANCE OF MAIZE

Structure of the Maize Market

The structure of the maize marketing system should be evaluated in terms of the degree of market concentration, barriers to entry (licensing procedure, lack of capital etc) and the degree of transparency (Pender et.al 2004). In this study the structure of maize market is characterized using the following indicators: market concentration, the degree of transparency (market information) and the entry conditions (licensing procedure, lack of capital etc).

DEGREE OF MARKET CONCENTRATION

The market concentration ratio is expressed in terms of CRx, which stands for the percentage of the market sector controlled by the biggest X firms. Four firms (CR4) concentration ratio is the most typical concentration ratio for judging the market (Kohls and Uhl, 1985).

A CR4 of over 50% is generally considered as strong oligopoly; CR4 between 33% and 50% is generally considered as a weak oligopoly and a CR4 less than 33% is not concentrated market.

Table8. *Concentration ratio for Jinka maize market*

Sample market	Commodity	Concentration index of top four traders
Jinka	Maize	62.7
Gather	Maize	57.4

Source: *own survey result, 2010*

Table 8 indicates that the four largest maize traders possess 62.7% and 57.4% of the total volume of purchase in Jinka and Gather markets respectively. Based on the rule of thumb of market structure criteria suggested by Kohls and Uhl (1985) the maize market in Jinka and Gather showed oligopolistic market, this indicates the existence of market imperfection.

Degree of Transparency

Market information is crucial to reducing information gap and uncertainties that exist in the agricultural sector. It is required by producers in their planning of production and way of marketing the product. 46.6% of respondents get market information from their neighbors, 28.8% by visiting market and 24.7% from traders. As indicated the majority of respondents in the study area are got market information from their neighbors informally before they sell their product which is almost similar with the findings of (Daniel, 2008).

Barriers to Entry

The commonly known barriers to entry in the market in the study area are licensing, lack of capital and lack of access to road. From the respondents of maize traders, the traders residing in the town have grain trade license where as the farmer traders, who reside in rural markets had no grain trade license. According to the survey result 87.5% of the sample traders indicated that lack of capital is one of the major constraints to enter trading. Lack of access to credit has been the single most constraint in start up. More over lack of access to road is the main problem of the traders, which needs series attention.

Conduct of Maize Trade

In this study the conduct of maize traders is analyzed in terms of the producers and traders' price setting, purchasing and selling strategies.

Producers Price Setting Strategies

According to the survey result, about 19.4% of respondents reported that market price was set through negotiation with traders. And 31.5% of the respondents reported that price was set by the market. The remaining 15.7% and 33.3% of

the respondents reported that the selling price of their produce was set by themselves and traders respectively.

Buying and Selling Strategy of Traders

Generally, grain trade is based on eye appraisal of the commodity and exchange takes place on bargaining. With regard to the payment mode the producers and traders in the study area sold their product in cash.

Analysis of Market Performance

Marketing performance of maize was analyzed by estimating the marketing margin, by taking in to consideration associated marketing costs for key marketing channels. Based on production costs and purchasing prices of the major market participants along the chain, margins at the farmer, urban assemblers, wholesalers and retailers level were estimated and analyzed.

Market Margin

Marketing margin was analyzed based on the average sale price of different marketing agents in the market channels, of producers, urban assemblers, whole sellers and retailers. To give detail information on analysis of marketing margins of maize according to this TGMM = Consumer price-Producer price/Consumer Price*100, whereas TGMM is total growth market margin. It is useful to introduce the idea of 'farmer's portion', or 'Producer's Gross Margin' (GMp) which is the share of the price paid by the consumer that goes to the producer. The producer's margin is calculated as: GMp = Consumer Price-TGMM/ Consumer Price*100 On the other hand. The Net Marketing Margin (NMM) is the percentage of the final price earned by the intermediaries as their net income after their marketing costs are deducted. An efficient marketing system is where the marketing costs are expected to be closer to transfer costs and the net margin is near to normal or reasonable profit, which is NMM = TGMM-Marketing Cost/Consumer Price*100, where NMM is Net Market Margin. Table 9 depicts that the different marketing margins of maize marketing channels described as follow.

Table9. *Maize marketing margin (%), selling price, and marketing costs and profit (birr/qt)*

Marketing actors	Selling price	Marketing/production cost	% Gross marketing margin	profit
Producers	520.46	320.70	76.47	199.76
Urban assemblers	590.62	18.60	10.31	51.56
Wholesalers	630.24	23.25	5.82	16.37
Retailers	680.56	15.85	7.40	34.47

Source: *own survey result, 2010*

TGMM (along all channels) = 23.53 %

GMMUA = 10.31 %, GMMWS = 5.82%, GMMR = 7.40 %,

GMMP (producers participation) = 100% - TGMM = 100% - 23.53 % = 76.47 %

According to Table 9, the total gross marketing margin that was added to maize price, while passing through marketing system to reach the final point (consumers) was 23.53 % and out of the total gross marketing margin of maize, 23.53 %, and Urban assemblers received the highest of the all marketing agents which is 10.31 %.

The remaining 7.40 and 5.28 % of the marketing margin were received by Retailers and Wholesalers respectively along different channels. Furthermore, maize producers share in consumer price was 76.47 %.

MAJOR PROBLEMS AND OPPORTUNITIES

Production and Marketing Problems of Farmers

The problems of farmer households are usually associated with unstable and relatively lower prices and incomes. Despite the current volume of maize produced and supplied to the market, farmers face a number of problems in the production and marketing process. Based on farmers perception the major production and marketing problems reported were rain failure, prevalence of American boll worm and folly worms, lack of access to credit, lack of market information, Lack of alternative market opportunity, transportation problems and higher input price are the major problems associated with the production and marketing of maize.

Marketing Problems of Traders

The major marketing problems sample traders faced in the study area were capital shortage, lack of credit access, poor product quality of the commodity and unfair competition with unlicensed traders are the major problems faced

maize marketing trades in the study area. The other trader's problem in the study area was absence of road service in rural markets. In the district, village markets are connected to town markets by dry weather poorly paved roads.

As a result, animal driven carts and pack animals are the most frequently used transport means to transport larger loads. Almost all of the roads to the village markets are difficult for vehicles during rainy season.

Opportunities

The study area has not only problems associated with production and marketing there is also many opportunities that need to be exploited. Consequently, production and marketing efficiency and effectiveness could be increased. Among the different opportunities that prevailed, the majors are tried to be mentioned as follows. Suitability of the area for production; it is the area endowed with fertile soil type for agriculture and farmers having better land holding relative to the average Ethiopian farmer are some of natural endowment opportunities the district had.

These opportunities are important for the growth of grain crops, vegetables and other perennial crops like fruits. Furthermore, as a mixed farming experiencing area the above mentioned opportunities also have potential contribution for livestock production. Government suitable agricultural policies designed to support farmers at the grass-root level is the other opportunity dimension. Administrative decentralization and the deployment of development agents at each peasant associations based on their academic background are also important policy dimensions. The other opportunity in the study area is the presence of NGOs working on development projects like Agricultural Growth Program II, Farm Africa and Pastoral Community Development Program. Agricultural research center played key role in identifying potential agricultural commodities grown in the area, giving training and creating linkage among different marketing stakeholders, establishing knowledge centre that facilitate knowledge sharing among peoples of different background.

Analysis of Econometric Results

Econometric analysis was used to investigate factors affecting quantity supply of maize to market. In this study the variables that have relationship with the quantity supply of maize to market are sex of household head, age of household head, educational level, family size, quantity produced in quintal, market information, extension contact and access to credit. The relationships of these variables with quantity supply of maize to market were discussed as follows.

Before the OLS regression model, the hypothesized explanatory variables were checked for the existence of multi-co linearity using the variance inflation factor (VIF) to check the degree of multi-co linearity among explanatory variables using SPSS16 soft ware package. The result of VIF ranges from 1.041 to 1.387 this indicates that multi-co linearity was not among explanatory variables.

The goodness of fit for the regression model is measured by coefficient of determination (R2). The overall goodness of fit represented by this model count R2 is 63.4 indicating that 63.4% of sample households were correctly predicted out of 120 sample household heads.

Econometric Results of OLS Model

Estimation of the parameters of the variables expected to determine the quantity supply of maize was shown in Table 10 below. There are a total of 8 explanatory variables included in to the econometric model, in which only four variables significantly influenced quantity supply of maize. These are age of household head, quantity produced in quintals, access to market information, and access to extension service the remaining four are not significantly.

Age of Household Heads (AGE)

The age of the household heads influenced the quantity supply of maize negatively and statistically significant at 1% significance level. The negative sign implies that getting older of the household head decreases quantity supply of maize by the farmer. This indicates that the household head that gets older have low capacity to bargain with trader and other market participants in the market price. The result shows that one year getting older of the household decreases 0.045 quintal of maize supply to market.

Quantity Produced

As indicated in the regression model the output of the variable was significant at 1% significant level, a positive coefficient implies that an increase in quantity of maize produced increases

quantity marketable of maize by farmers. It indicates that households, who produce more quantity of maize, supplied more to the market. The result shows that one quantity increase in maize production increases 0.072 quintal of maize marketable supply. This is similar with the previous studies conducted by Wolelaw (2005), Rehima (2006), Kindie (2007), Bosena (2008), and Assefa (2009) found that the amount of rice, red pepper, sesame, cotton and honey respectively, produced by household affected marketable supply of each of the commodities significantly and positively.

Table10. *OLS estimation result of factors determining quantity of maize to market*

Variables	Coefficients	Standard error	t-ratio	p-value
Sex of household head	0.277	0.414	0.670	0.506
Age of household head	-0.045	0.011	4.091	0.000*
Educational Level	0.016	0.091	0.176	0.857
Family size	-0.033	0.033	-1.000	0.317
Quantity produced in quintal	0.072	0.006	12.000	0.000*
Market information	-0.329	0.144	-2.285	0.024*
Extension contact	0.696	0.229	3.039	0.003*
Access to credit	0.148	0.154	0.961	0.339
Constant	2.255	0.779	2.895	0.005

*Dependent variable quantity of maize supplied to market. N=120, R = 63.4, Adj. R =60.5, * show the value statistically significant at 1%.*

Source: *survey result, 2010*

Access to Market Information

Access to market information is another factor that negatively affects quantity supply of maize at 5% significance level. The negative and significant relationship between variables indicates that as farmers have not access to market information, the quantity maize supplied at market also decreases.

The coefficient indicates that haven't access to market information for farmers will tend to decrease the marketable supply of maize by 0.329 quintals.

Access to Extension Service

Result of the study indicated that access to extension service was positively and significantly related to the quantity of maize supplied to the market at 5% significance level. It shows that if a maize producer gets extension contact the amount of maize supplied to the market increases by 0.696 quintal.

This suggests that access to extension service provides information related to technology, which improves production that affects the marketable surplus. This is similar with the findings of other authors. Such as, Yishak (2005), Rehima (2006), and Rahmeto (2007) found that access to extension service on improved maize seed, red pepper and improved haricot bean respectively affected marketable supply of each of the commodities significantly and positively.

DISCUSSION

Cultivated land used for the production of crops covered 1.20 hectares of the total land holdings of the respondents. The remaining land represents land used for plantation, fallow land, homestead, pasture, land rent in and rent out. About 87.5% and 90% of the sample respondents were used NPS and 82.3% and 86.8% of the sample respondents were used Urea for their maize production in the study area for the last two years respectively which is nearly similar to (Gashaw T. Abate et al, 2015). Sample farmers indicated different reasons for applying lower rate of fertilizer. The reasons were risky of agricultural production due to occurrence America Boll Arm Worm and Fall Army Worms, erratic rain fall distribution and lack of financial capacity are the main reasons nearly similar to (Worku et al. 2011). Improved seed is also one of the most important inputs that determine productivity and production of maize. However, the potential production response of improved seeds is determined by proper rate of fertilizer application. In the study area, sample respondents reported that the amount of maize marketed per household head varied from 1.00 to 40.00 quintals. The corresponding standard deviation was 11.85 quintals. Moreover, the average amount of maize marketed per sample household was 11.36 quintals. It is assumed that supply of maize exceeds demand in the immediate post harvest period. The glut during

harvesting season reduces producer prices and wastage rates can be high. For much of the reminder of the period before the next harvest, the product is usually in short of supply, with traders and consumers having to pay premium prices to secure whatever scarce supplies are available in the market.

It is evident that storage plays an important role in balancing supply and demands inter year (within the year) and intra year (between years) which is similar to (Muhammed, 2011).

Structural characteristics like market concentration, industry maturity, government, Participation, product differentiation, barriers to entry, and diversification, were some of the basis to be considered. The perfect competition model was used as a standard to study the structure of the market.

Market concentration which refers to number and size distribution of sellers and buyers in the market, the firm's objectives, barriers to entry, economies of scale, and assumptions about rival firm's behaviors are relevant in determining the degree of concentration and behaviors and performance (Schere, 1980). The greater the degree of concentration, the greater will be the possibility of non-competitive behavior, such as collusion, existing in the market.

The maize market in the study area showed concentrated buyers. The analysis of the degree of market concentration was carried in Jinka and Gather markets. Concentration ratio was estimated by taking the annual volume of maize purchased in 2008/09 by sample traders. The survey result indicates that in Jinka and Gather markets maize trading was dominated by few traders which is similar to (Muhammed, 2011).

Market conduct refers to the patterns of behavio r that traders and other market participants adopt to affect or adjust to the markets in which they s ell or buy. These include price setting behavior, and buying and selling practices. It is a systematic way to detect indication of unfair price setting practices and the conditions under which practices are likely to prevail.

It refers to the extent to which markets result in outcomes that are deemed good or preferred bys ociety. Market performance refers to how well t he market fulfills certain social and private obje ctives. This includes price levels and price stability in the long and short term, profit levels, costs, efficiency, quantities and qualities of commodities sold. Marketing margin is one of the approaches to measure the market performance. Market margin is the difference between the price paid by consumers and received by producers. Margins can be calculated all along the market chain and each margin reflects the value added at that level of the market chain. Total Gross Marketing Margin (TGMM) is the final price of the produce paid by the end consumers minus farmers' price divided by consumers' price and expressed as the percentage (Mendoza, 1995).

CONCLUSION

The study was conducted in order to identify production and marketing support services, structure-conduct-performance of the market, determinants of supply of maize in the study area. Production of maize in the study area is both for consumption and market. In the area, the average land allocated for the production of maize per household was 0.89 hectare. The respective average production of maize per household head was 20.65 quintals.

The average quantity of rate of DAP and Urea fertilizer applied for the production of maize were 36.23 and 18.12 kg per hectare in the year 2008 and 42.5 and 21.25 in the year 2009 respectively. Some of the reasons for sample respondents to deviate from the recommended rate of fertilizer per hectare were partly due to poor extension service and lack of financial capacity of farmers to apply the fertilizer in accordance with the recommended rate.

In the study area, during the year under the study, out of the total maize produced by sample farmers 55.01 % (42,870 quintals) of maize were supplied to the market. The remaining 44.99% of maize hold by farmers for consumption, repayment for borrowed seed and as source of seed for the next production year. Rain failure, higher cost of fertilizer and delayed delivery, lack of credit access, draft power, and prevalence of crop worms like America boll worm.

Folly arm worm were some of the production problems faced by farmers. Besides, unfair pricing, lack of institutions providing market information, lack of transportation and unavailability of alternative market opportunity were farmers marketing problems.

The study also identified the main marketing agents through whom maize were channeled from producer to final consumers, such as farmer traders, urban assemblers, wholesalers,

urban retailers, and processors. Accordingly, maize sample producers supplied 32.2% of their produce to local traders, 34.8% to urban assemblers, and 14.5% to processors.

Regarding structure of the market, the four firms concentration ratio (CR4), that is the share of the largest four wholesale traders in the total volume of maize purchased at Jinka Zonal and Gather District market, hold 62.7% and 57.4% of the total volume of maize purchased respectively, in the year 2008/09, indicating that Jinka Zonal and Gather District markets have strong oligopolistic market structure. The main barrier to entry in to the market is capital requirement.

Market information system is not transparent among farmers and traders. However, all traders have information from different informal sources. Concerning conduct of maize market, generally, trading is mainly on eye-appraisal and exchange takes place on bargaining.

Capital shortage, lack of credit access, poor product quality, lack of market information, market infrastructure, transportation cost, lack of demand and unfair competition with unlicensed traders were some of marketing problems faced by traders.

Out of the 8 variables four of them such as age of the household, quantity produced access to extension service and access to credit are statistically significant at 5%. From these significant variables two of them such as age and extension contact affect negatively.

RECOMMENDATIONS

Contribution of maize to household's nutrition, income and food security is tremendous. It also provides job opportunities for youth and the landless and for traders and poor urban dwellers engaged in its processing activities. Regardless of its contribution, however, its production and productivity is still low compared to world and regional average.

As a result, institutional support provided to the sector such as access to credit, market information and extension services were below the expected level. These factors together with several household personal, demographic and socio-economic factors greatly affected the marketable supply of maize and consequently the production and productivity of the sector. Based on the research findings of this study, the following points are recommended to improve

marketing chains of maize so as to enhance its production and productivity.

Provision of extension service has to be strengthened so as to improve farmer's access to information and extension advices through training and other related supports. Moreover, improving access to credit and reconsidering the existing bureaucratic input administrative procedure are also crucial to allow easy access to promote investment and trade.

In addition to this as discussed in the descriptive part of the study larger numbers of farmers have reported the existence of worms (American boll worm and folly arm worms) problem in the study area. The presence of maize worms created frequent yield reduction of the sector and it affected the efficiency of production and hampered the supply development.

In order to avoid the frequent reduction in output and increase supply, in short run, major worms should be controlled by strengthening the present crop protection services through availing important chemicals required to prevent the worms at reasonable price.

In the long run, development of high yielding and disease resistant varieties is a solution to the prevalence of crop disease. The enhancement of maize producers bargaining power through cooperatives is the best measure that should target at reducing the oligopolistic market structure in the Gather District and Jinka Zonal market. The measure also favors the sustainable supply of maize at reasonable price to consumers.

Farmers in the study area do not get timely market information up on which to base their marketing decision. They depend on traders and other farmer friends for price information. Therefore, there has to be an institution that can convey reliable and timely market information required by all stakeholders simultaneously. This would make the marketing system to operate efficiently and harmoniously.

The availability of timely and precise market information increases producers bargaining capacity to negotiate with buyers of their produce.

In order to obtain this advantage there is a need to improve extension system which focused on market extension and linkage of farmers with markets is necessary to ensure a reliable market outlet for producers of the study area.

REFERENCES

[1] Alemayehu, M and Tezera, G. 2002. Socio-economy of pastoral Community in South Omo Zone, Southern Nations and Nationalities peoples Regional State. September 2002, Addis Abeba, Ethiopia.

[2] Assefa, A. 2009, Market Chain Analysis of Honey Production in Atsbi wemerta district, Eastern zone of Tigray National State. An MSc Thesis presented to School of Graduate Studies of Haramaya University. 67-69p.

[3] Berhane, G., Z. Paulos, K. Tafere, and S. Tamiru. 2011. Food Grain Consumption and Calorie Intake Patterns in Ethiopia. Ethiopia Strategic Support Program II Working Paper 23. Addis Ababa, Ethiopia: International Food Policy Research Institute.

[4] Bosena, T. 2008. Cotton market chain analysis: the case of Metema Woreda, North Gondar Zone, Amhara National Regional State. A M.Sc. Thesis Presented to School of Graduate Studies of Haramaya University. 123p.

[5] CSA (Central Statistical Agency). 2009. Agricultural Sample Survey 2008-09. Report on Area and Production of Crops. Addis Ababa.

[6] CSA (Central Statistical Agency) 2012. Agricultural Sample Survey 2011-2012. Volume I, Area and Production of Crops, Central Statistical Agency, Ethiopia.

[7] CSA. 2013. Agricultural Sample Survey 2012-2013. Volume I, Area and Production of Crops, Central Statistical Agency, Ethiopia.

[8] CSA (Central Statistical Agency). 2014. Agricultural Sample Survey 2013-14. Report on Crop and Livestock Product Utilization. Addis Ababa.

[9] CSA (Central Statistical Agency). 2015. Agricultural Sample Survey 2008-09. Report on Area and Production of Crops. Addis Ababa.

[10] Daniel, T., 2008. Beef cattle production system and opportunities for market orientation in Borena zone, southern Ethiopia. M.S. thesis, Haramaya Univ., Ethiopia, pp: 139.

[11] Districts Agricultural Offices (DAO), 2003. Annual report, South Omo Zone, Jinka, Ethiopia

[12] FAO (Food and Agriculture Organization). 2015. Food Balance Sheets. FAOSTAT. Rome. (http://faostat3.fao.org/download/FB/FBS/E).

[13] Gashaw T. Abate, Leulsegged Kasa, Nicholas Minot, Shahidur Rashid, Solomon Lemma, and James Warner, 2015. Maize Value chain in Ethiopia: Structure, Conduct and Performance. International Food Policy Research Institute (IFPRI) Washington DC.

[14] Kindei, A. 2007. Sesame market chain analysis: the case of Metema Woreda, North Gondar Zone, Amhara National Regional State. An MSc Thesis Presented to School of Graduate Studies of Haramaya University. 123p.

[15] Hohls and Uhl, J.N., 1985, Marketing of Agricultural Product, 5th Edition, Collier Macmillan, USA. 624p.

[16] Mendoza, G., 1995. A primer on marketing channels and margins. Pp 257-275.In G.J. Scott (ends). Prices, Products, and people; Analyzing Agricultural Markets in Developing Countries. Lynne Rienner Publishers, Boulder, London.

[17] Muhammed Urgessa, 2011. Market Chain Analysis of Teff and Wheat Production in Halaba Special Woreda, Southern Ethiopia. M.Sc. Thesis.

[18] Pender,J., Ruben, R., Jabbar, M. and Eleni, Gebre-Medhin, 2004.Policies for improved land management and agricultural land management agricultural market development in the Ethiopian highlands. Summary of Papers and Proceedings of a Workshop Held at the Ghion Hotel, Addis Ababa, Ethiopia. February19 -20, 2004, IFPRI.

[19] Rahmeto, N. 2007. Determinants of Adoption of Improved Haricot Bean Production Package in Alaba Special Woreda, Southern Ethiopia. MSc Thesis Presented to the School of Graduate Studies of Haramaya University. 89- 94p.

[20] Rashid, S, Kindie, G. and Solomon Lemma. 2010. Maize Value Chain Potential in Ethiopia: Constraints and opportunities for enhancing the system. International Food Policy Research Institute. 64p. S

[21] Rashid, S. 2010. Staple Food Prices in Ethiopia. Food Security Collaborative Working Papers 97032, Michigan State University, Department of Agriculture, Food, and Resource Economics.

[22] Rehima, M., 2006. Analysis of red pepper Marketing: The case of Alaba and Silitie in SNNPRS of Ethiopia. A M.Sc. Thesis presented to School of Graduate Studies of Haramaya University. 96-95p.

[23] Schere, F.M., 1980. Industrial Market Structure and Economic Performance. 2nd Edition. Rand

[24] McNally College Publishing Agency, USA. 342p.

[25] Wolelaw, S., 2005. Factors Determining Supply of Rice: A Study in Fogera District of Ethiopia. A MSc. Thesis Presented to the School of Graduate Studies of Alemaya University.90p.

[26] Worku, M., Twumasi-Afriyie, S. Wolde, L., Tadesse, B., Demisie, G., Bogale, G., Wagary, D. and Prasanna, B. M. 2011. Meeting the Challenges of Global Climate Change and Food

Security through Innovative Maize Research. Proceeding of the Third National Maize Workshop of Ethiopia, Addis Ababa.

[27] Yishak, G. 2005. Determinants of Adoption of improved Maize Technology in Damote Gale Woreda, Wolaita, Ethiopia. Msc. Thesis (Unpublished) Presented to School of Graduate Study of Alemaya University.