

Structure- Conduct -Performance of Potato Market: The Case of Jeldu District of Oromia National Regional State, Ethiopia

Bekele Wegi*

Department of Agricultural Economics, Bonga University, Ethiopia

Jema Haji

School of Agricultural Economics and Agribusiness, Haramaya University, Ethiopia

Belaineh Legesse

School of Agricultural Economics and Agribusiness, Haramaya University, Ethiopia

Abstract

Improvements in the potato production system can be a pathway out of poverty in Sub Saharan Africa, including Ethiopia. In Ethiopia, potato production can fill a gap in food supply during the hungry months of October to December before the grain crops are being harvested. Hence, Potato has been considered as a strategic crop by the Ethiopian government aiming at enhancing food security and economic benefits to the country. However, Ethiopia suffers from weak market linkages on both the input and output sides. The purpose of this study is, therefore, to analyze the structure-conduct-performance of potato market in Jeldu district. Both primary and secondary data were used. Primary data were collected from 122 producers and 32 traders. The structure-conduct-performance approach was applied to analyze the data. Market concentration ratio and barriers to entry were used to analyze the structure of the market. The conduct of the market was evaluated by traders' price setting strategies, purchasing and selling strategies. Potato market performance was also evaluated by calculating marketing margin and profit share for producers and traders under various marketing channels.

Keywords: Structure; Conduct; Performance; potato; Jeldu

1: INTRODUCTION

In developing countries including Africa, major changes are happening in agricultural and food markets due to globalization, economic liberalization and urbanization (Tsakok, 2011). In Africa, there is a large potential for improvements in agricultural production and market development since Africa has more than half of the world's uncultivated but agriculturally suitable land and has scarcely used its extensive water resources (World Bank, 2013).

Despite the large potential for improvements in agricultural productivity and market performance in Africa, especially given rapid overall economic growth, evidence on changes in domestic food market is still limited, possibly due to a lack of accurate and reliable data (Jerven, 2013)

Improvements in the potato production system can be a pathway out of poverty in Sub Saharan Africa, including Ethiopia. It is an excellent smallholder farmer crop in the highlands, with a short cropping cycle, potential for large yield per hectare, and serves as both a cash and food security crop. In Ethiopia, potato production can fill a gap in food supply during the hungry months of October to December before the grain crops are being harvested (International Potato Center, 2013).

Potato has been considered as a strategic crop by the Ethiopian government aiming at enhancing food security and economic benefits to the country. As the population grows rapidly, increased productivity of potatoes can improve the livelihood of smallholder potato producers and is required to meet the growing demand (Gildemacher, 2012). About 70% of the country's available agricultural land is located at an altitude of 1800-2500 m which is suitable for potato production (Bezabih and Mengistu, 2011).

However, Ethiopia suffers from weak market linkages on both the input and output sides. Farmers either cannot afford improved inputs or lack the knowledge to use them. Weak systems connect agricultural outputs to processors and numerous barriers exist that prevent quality products from reaching end users, such as insufficient packaging and storing, inability of Ethiopian products to meet international market standards, and restrictive trade regulations (USAID, 2011).

2: RESEARCH DESIGN AND METHODOLOGY

2.1. Description of the Study Area

This study was undertaken in central Ethiopian highland in one of the major potato growing districts, Jeldu district of Oromia National Regional State. Jeldu district is located at 72 km to the east of Ambo (zonal town) and 115 Km west of Addis Ababa (capital city of Ethiopia). Jeldu district has 38 rural kebeles and four towns. The data obtained from district office of agriculture indicates that out of 38 rural kebeles of the district, potato is produced in 22 kebeles.

The topography of Jeldu district is mountain, plateau, hills and have three types of soil type such as nitosol, vertisol and sandy soil. Nitosol is the one which accounts for about 36.83% of the district's area coverage and got second place next to vertisol (42.1%). Therefore, most of the district's soil is vertisol which is suitable for production of various crops especially, potato.

According to the 2007 census, the total population of Jeldu district was 202,655 people (CSA, 2008). Out of the total population, about 190,260 (93.88%) live in the rural areas while the remaining 12,395 (6.12%) live in the urban centers. Regarding the sex composition of the population of the district, about 102,796 (50.70%) were females and the remaining 99,859 (49.30%) were males.

In Jeldu district, agriculture contributes much to meet the major objectives of farmers such as food supplies and cash needs. The sector is characterized by its rain-fed and subsistence and small scale agriculture that is dependent on rainfall. The study area comprises mixed farming where crops are grown for food and cash, and livestock are kept for complementary purpose, as a means of security during food shortage, and to meet farmers' cash needs. The dominant crops grown in the district are wheat, barley, teff, sorghum, maize, field beans, peas, chickpeas, potato, sweet potato, onion, garlic, enset, etc (Getachew, 2015).

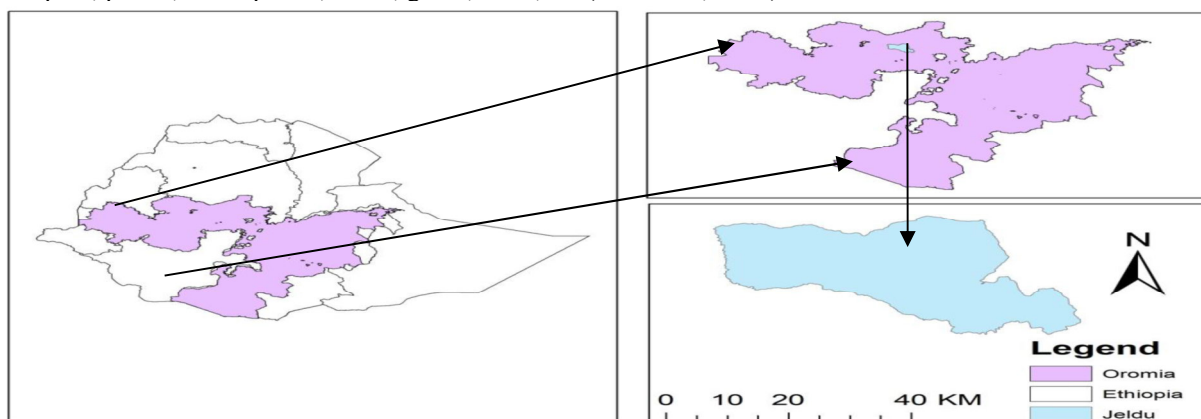


Figure 1: Geographical location of the study area
 Source: Adapted from the Ethiopian map (Ethio-GIS)

2.2. Types and Sources of Data and Methods of Data Collection

The study used both primary and secondary data sources. The sources of primary data were potato producer households and traders (local collectors, retailers and wholesalers). Primary data were collected through surveys. The survey was undertaken through formal interview with randomly selected households and traders using a pre-tested structured and semi-structured questionnaire for each group.

Secondary data sources were the Central Statistics Agency of Ethiopia (CSA), District Office of Agriculture and Rural Development, District Revenue and Custom Authority Office, kebele administrations, published and unpublished journals, websites, internet, etc.

2.3. Sampling Method and Sample Size

In order to select a representative sample that represent the population, a two-stage sampling technique was used. In the first stage, in consultation with agriculture and rural development office of the district, out of 22 potato producing kebeles of the district, four kebeles namely Edensa Gelan, Tulu Bultuma, Chilanko and Kolu Gelan were selected randomly.

In the second stage, using the population list of the sample kebeles, 122 potato producer households were selected randomly using probability proportional to number of potato producer households from each sample kebeles (Table 1). The number of sample households was determined by using the following formula given by Yamane (1967).

$$n = \frac{N}{1 + N(e)^2}$$

Where: n = is the desired sample size, N = is the total population of potato producer households in the district (14,234), and e = is the level of precision (9%).

Table 3: Distribution of sample potato producer households in the selected *kebeles*

Name of kebele	Number of households	Sample
Edensa Gelan	725	43
Tulu Bultuma	557	33
Chilanko	478	28
Kolu Gelan	310	18
Total	2070	122

Source: District Office of Agriculture and *kebeles*' administration, 2016 and own computation

In addition to farm households, sample respondents were also selected from traders (local collectors, wholesalers and retailers). The sites of traders were market towns available in Jeldu highlands in which good sample potato traders existed. Accordingly, two market sites (Gojjo and Shukute) were selected as the major marketing sites for the study area. Here, sampling was a very difficult task because of the absence of recorded information about the population of the traders. Based on information obtained from District Revenue and Custom Authority Office and informal survey, purposive sampling method was used to select rural collectors, retailers and wholesalers from the specified markets. As a result, 32 potato traders were selected and interviewed. Table 4: Distribution of traders and consumers included in the study

Traders	Shukute		Gojjo		Total	
	Available households	Sample	Available households	Sample	Available in both town	Sample
Collectors	4	4	10	7	14	11
Retailers	4	4	9	8	13	12
Wholesalers	0	0	10	9	10	9

Source: District Revenue and Custom Authority Office, and own survey, 2016

2.4. Methods of Data Analysis

The Structure-Conduct-Performance (S-C-P) Approach was used to analyze the data. The Structure-Conduct-Performance (S-C-P) approach sometimes called the traditional industrial organization was a principal approach to study the industrial organization (IO) during the second half of the 20th century. It was recognized as one of the most efficient and reliable means to analyze an industry or more specifically, the market power profitability relationship in an industry.

Market structure

The term market structure refers to the number of buyers and sellers, their size, distribution, the degree of product differentiation, and the ease of entry of new firms into an industry (Cramer and Jensen, 1982).

Market concentration ratio and barriers to entry and exit were used to analyze the structure of the market. The concentration ratio is a way of measuring the concentration of market share held by particular suppliers in a market. It is the percentage of total market sales accounted for by a given number of leading firms. The greater degree of concentration is the greater the possibility of non-competitive behavior existing in the market. For an efficient market, there should be sufficient number of firms (buyers and sellers). It is calculated as:

$$CR = \sum_{i=1}^m S_i \quad i = 1, 2, \dots, m \quad (1)$$

Where S_i represents market share of i^{th} firm and m is number of largest firms for which the ratio is going to be calculated. In this study a four firm concentration ratio was used to analyze the concentration of the market.

Market conduct

Market conduct refers to the patterns of behavior that traders and other market participants adopt to affect or adjust to the markets in which they sell or buy. These include price setting behavior, buying and selling practices. The variables used to capture firm behavior include pricing strategies, collusion, advertising, research and development and capacity investment (USAID, 2008a). In this study, the conduct of the market was analyzed by using traders' pricing strategies, traders' purchasing and selling strategies.

Analysis of potato market performance

Estimates of the marketing margins are the best tools to analyze performance of the market. Marketing margin was calculated by taking the difference between producers and retail prices. The producers' share is the commonly employed ratio calculated mathematically as, the ratio of producers' price to consumers' price. Mathematically, producers' share can be expressed as:

$$PS = \frac{pp}{CP} = 1 - \frac{MM}{CP} \quad (2)$$

Where: PS = Producer's share, Pp = Producer's price, Cp = Consumer price, and MM = marketing margin. The

above equation tells us that a higher marketing margin diminishes producers share and vice versa. It also provides an indication of welfare distribution among producers and marketing agents.

Total Gross Marketing Margin (TGMM): According to Mendoza (1995), the total gross marketing margin is done by using the following formula. Computing the Total Gross Marketing Margin (TGMM) is always related to the final price paid by the end buyer and is expressed as a percentage.

$$\text{TGMM} = \frac{\text{Consumer price} - \text{Producer Price}}{\text{Consumer Price}} \times 100 \quad (3)$$

Net Marketing Margin (NMM): It is the percentage over the final price earned by the intermediary as his/her net income once his/her marketing costs are deducted.

$$\text{NMM} = \frac{\text{Gross Margin} - \text{Marketing Cost}}{\text{Consumer price}} \times 100 \quad (4)$$

3. RESULTS AND DISCUSSION

3.1. Potato Market Structure

Market concentration ratio

In this study, district level market concentration ratio was used to analyze the structure of potato market in the study area as the numbers of traders were limited in their respective villages. It was calculated by taking annual quantity of potato purchased during the survey period. First, the sum of annual quantity of potato purchased by all traders was computed. Then the market share of the four leading traders was calculated by dividing their respective quantity of annual potato purchased by the sum of quantity of annual potato purchased by all traders. Then after, the concentration ratio of the four leading traders was computed by adding their market share during survey period. Accordingly, the district level concentration ratio for potato was found to be 42.69%. This indicates that the market was a weak oligopolistic market during the survey year.

Barriers to entry

In this study, capital requirements, potato trading experience, licensing procedure and lack of continuous supply are considered to know whether there is entry barriers or not in potato market.

Capital requirements: Almost all the traders (local collector, wholesalers and retailers) (93.75%) reported that capital was their major entry barrier during the survey year (Table 3). Hence, it can be concluded that capital was one of the entry barriers in potato trading in the study area.

Potato trading experience: The survey result indicated that traders' experience ranges from 2 up to 14 years with an average experience of 5.3 years. The existence of wider gap between traders indicated that experience was not a barrier to enter into potato trading in the study area.

Licensing procedure: According to the survey result, only 15.63% of the traders have license whereas 84.37% of them have no potato trade license (Table 3). Traders reported that license has no use rather than paying tax as anybody can enter and exit from potato trading.

Lack of continuous supply: According to the survey result, lack of continuous supply throughout the year was one of the entry barriers in the study area. About 37.50% of sampled traders reported that lack of continuous supply throughout the year discouraged them (Table 3).

Table 1: Sample traders' barriers to entry and potato trading license

Barriers	Frequency	Percent
Shortage of capital	30	93.75
Lack of continuous potato supply	12	37.50
Have potato trade license	5	15.63

Source: Own computation results based on survey data, 2016

3.2. Potato Market Conduct

In this study potato market conduct was analyzed in terms of traders' price setting strategy, purchasing and selling strategies.

Traders' price setting strategy

Survey result indicated that 65.60% of the sample traders' purchase price setting strategy was the force of demand and supply. They reported that they negotiate with sellers and negotiation is based on the existing market price. The remaining 34.40% reported that they set purchasing price by themselves. Further, about 62.50% of the sampled traders reported that they set selling price through negotiation with the buyers. The remaining 37.50% of the sampled traders reported that they set selling price through negotiating slightly with the buyers (Table 4).

Table 4: Traders' price setting strategy

Purchase price setting strategy	Number of traders	Percent
Negotiating with sellers	21	65.60
Set the price independently	11	34.40
Selling price setting strategy		
Negotiating with buyers	20	62.50
Slightly negotiating with buyers	12	37.50

Source: Own computation results based on survey data, 2016

Traders' purchasing and selling strategies

According to the survey result, 71.80% of the sampled traders bought their produce from sellers directly by themselves. The remaining 28.20% reported that they bought their produce from sellers by themselves and using daily labourers. The survey also indicated that all traders sold their produce directly by themselves. It is also learnt that potato traders have used different methods to approach their clients. Accordingly, 50% of the traders attracted their suppliers by paying better price. The remaining 37.50% and 12.50% of the traders attracted their suppliers by using fair weighting scaling and offering credit services, respectively (Table 5).

Table 5: Traders' purchasing and selling strategies

Description	Number of observations	Frequency	Percent
Who purchase potato?	32		
Own		23	71.80
Own and daily labours		9	28.20
Who sell potato for you?	32		
Own		32	100
Methods to approach your clients	32		
Offering better price		16	50.00
Fair weighting scale		12	37.50
Offering credit services		4	12.50

Source: Own computation based on results of survey data, 2016

3.3. Market performance analysis

In this study production costs, marketing costs and marketing margins and profit were calculated to evaluate the performance of potato market in the study area. About five potato marketing channels were identified during the survey year in the study area. Marketing margin and profit share of the major potato market actors under various marketing channels were portrayed in Table 6.

Accordingly, Total Gross Marketing Margin was highest (57.14%) in channel IV and lowest (22.22%) in channel II. Producers' share (GMMp) was highest (77.78%) in channel II and lowest (42.86%) in channel IV. From traders, wholesalers received the highest (52.86%) marketing margin in channel III and 47.14% in channel IV. Local collectors received the lowest marketing margin which was 11.11% and 10% in channels V and IV, respectively.

Table: 6 marketing margin and profit share of major potato market actors

Actors	Cost/profit (birr/Qt)	Marketing channels				
		I	II	III	IV	V
Producers	Cost of production	178.67	178.67	178.67	178.67	178.67
	Selling price	410	350	330	300	300
	Marketing cost	49	39	29	32	32
	Gross profit	182.33	132.33	122.33	89.33	89.33
	GMM (%)	100	77.78	47.14	42.86	66.67
Local collectors	Purchase price				300	300
	Selling price				370	350
	Marketing cost				39	16
	Gross profit				31	24
	GMM (%)				10	11.11
Wholesalers	Purchase price			330	370	
	Selling price			700	700	
	Marketing cost			174.35	174.35	
	Gross profit			195.65	155.65	
	GMM (%)			52.86	47.14	
Retailers	Purchase price		350			350
	Selling price		450			450
	Marketing cost		26			36
	Gross profit		74			64
	GMM (%)		22.22			22.22
TGMM (%)		0	22.22	52.86	57.14	33.33

Where TGMM and GMM represents Total Growth Marketing Margin and Growth Marketing Margin respectively.

Source: Own computation results based on survey data, 2016

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5. REFERENCES

- Bezabih Emana and Mengistu Nigussie. 2011. Potato Value Chain Analysis and Development in Ethiopia. The Case of Tigray and SNNPR Regions, Ethiopia. *International Potato Centre (CIP-Ethiopia)*, Addis Ababa, Ethiopia. *Website: www.cippotato.org*.
- CIP (International Potato Center). 2013. Wealth Creation through Integrated Development of the Potato Production and Marketing Sector in Kenya, Uganda, and Ethiopia, Final Report.
- Cramer, G. L. and Jensen, W. 1982. *Agricultural Economics and Agribusiness*. 2nd Edition. McGraw Hill Book Company, USA.
- CSA (Central Statistics Agency of Ethiopia). 2008. Summary and Statistical Report of the 2007 Population and Housing Census Results. Addis Ababa, Ethiopia.
- Getachew Biru. 2015. Analysis of Potato Seed Tuber Value Chain: The Case of Small Scale Farmers in Jeldu District of West Shawa Zone, Oromia, Ethiopia. MSc Thesis, Haramaya University, Haramaya, Ethiopia.
- Gildemacher P.R. 2012. Innovation in Seed Potato Systems in Eastern Africa. PhD Dissertation, Wageningen University.
- Jerven, M. 2013. *Poor numbers: how we are misled by African development statistics and what to do about it*. Ithaca, Cornell University Press.
- Mendoza, G. 1995. A primer on Marketing Channels and Margins. P257-275. In G.J. Scott (ends). *Prices, Products, and people; Analyzing Agricultural markets in Developing Countries*. Lynne Rienner Publishers, Boulder, London.
- Tsakok, I. 2011. *Success in Agricultural Transformation*. Cambridge: Cambridge University.
- USAID (United States Agency for International Development). 2008. *Structure-Conduct-Performance and Food Security, FEWS NET Markets Guidance, No2*.
- USAID (United States Agency for International Development). 2011. *The Competitiveness and Trade Expansion Program: Staple Foods Value Chain Analysis. Country Report, Ethiopia*.
- WB (World Bank). 2013. *Agri-business in Africa: Removing Barriers to Regional Trade to Food Staples*. Washington, dc: World Bank.
- Yamane, T. I. 1967. *Statistics: An Introductory Analysis, 2nd Edition*. Harper and Row, New York.