



Value chain analysis of wheat the case of selected Woreda of Hadiya zone, central regional state of Ethiopia

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Abstract

In developing countries there are different factors which limit capacity of farmers in the marketing of their produce and earn little market margins while other actors along the chain have the power to determine prices paid and thus extract marketing margins. The study was aimed at analysing value chain of wheat the case of selected woreda of Hadiya zone with objectives of identifying wheat value chain actors and defining their roles, analysing market margin of actors, and constraints in the chain. The cross sectional survey design and multi-stage sampling techniques were implemented. The data were collected from both primary and secondary sources. The primary data were collected from randomly selected 180 producers' farmers. The results indicate that the main value chain actors are input suppliers, farmers, collectors, wholesalers, processors, retailers and consumers. The producer's share of the consumer price was found to be the highest in channel-III, with share of 78.9% and lowest total gross market margin was 21.1%. This reflects that channel-III provide producers with better share of value created. Constraints at the production level were shortage of improved seed, weak extension service, prevalence of pest and disease, unseasonal rainfall. The major wheat marketing constraints were weak market linkage, low price during harvesting time, insufficient handling, poor quality wheat and lack of modern storage canters in the production area.

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Introduction

Agriculture is the backbone of the Ethiopian economy, and more than 85% of the national growth domestic product of the country is derived from the agricultural sector (NBE, 2018). Crop production is a major contributor to GDP, accounting for approximately 28% from the sub-sectors of agriculture. Teff, wheat, maize, sorghum and barley are the major cereals that occupy almost three-quarters of the total area cultivated (Taffesse *et al.*, 2012). Bread wheat, with an annual global production of 772.6 million tons, is a main food about 35% of the population in the world. China, India and Russia are the largest wheat producers. Ethiopia is the second largest wheat producers in Sub-Saharan Africa next to South Africa, with a potential expansion to 1.3 million hectare (Statist, 2021; Amentae *et al.*, 2017). The highlands of the central, south-eastern and northwest parts are the main wheat growing areas of Ethiopia; and regionally, wheat production comes from Oromia (57.4%), Amhara (27%), SNNP (8.7%) and Tigray (6.2%) of the national production (Statist, 2021). Wheat is one of the most cereal crops in terms of the area of land allocated (1.6 million hectares), volume produced (3.9 million tons) and the number of farmers engaged in its production (4.7 million farmers) with a productivity of 2.4tone per hectare (CSA, 2014).

Wheat in Ethiopia is an important staple and cash crop in increasing income of the people, food security, employment and national GDP increment. Wheat grain is used in the preparation of traditional foods products and other modern food items. It is an important market oriented commodity and a major source of income for wheat growing farmers. Thus, wheat marketing is a very important factor in economic growth and development. Despite of its importance, there are different problems that hinder the production and marketing of wheat in the country.

The following are some challenges such as lack of market information, low quality of inputs used, weak market linkage, unfair and fluctuated price, low

bargaining power of producer's, diseases and pests, shortage of infrastructures, inadequate of institutional services, storage materials, product quality, low selling price (Adugnaw and Dagninet, 2020; Nigusse *et al.*, 2015). The success of agricultural development depends among others, on the existence of an efficient input supply system, production support system and marketing system. There is gap between the country's production of improved seeds and farmers' demand and usage of these seeds. About 85% of the farmers in the country are dependent on local seed (Dawit, 2010).

The production of wheat is dominated by smallholder farmers that cultivate more of wheat for consumption and less of it for the market (Matouš *et al.*, 2013). Wheat farmers are often disadvantaged by limited access to information, services, appropriate technology and capital. These factors restrict capacity of farmers in the marketing of their produce and earn little margins while other actors along the chain have the power to determine prices paid by the final consumer and thus extract marketing margins. Even though wheat production has increasing, domestic wheat grain and flour shortage (Gebreselassie *et al.*, 2017).

Value chain analysis helps to identify leverage points and make improvements in weaker links where returns are low (Schmitz, 2005). Value chain is constrained by high input price, inappropriate delivery system, and poor harvesting technology, limited knowledge about post-harvest handling, lack of market information, and lack of integration among chain actors (Assefa *et al.*, 2021; Dubale, 2018). Found that shortage of improved varieties, poor seed supply systems, high cost of inputs, poor agronomic practices, weeds, pests, and diseases, weak farmers' organizations, and climate change are major constraints wheat production. Output markets are characterized by an insufficient transportation access and market infrastructure, farmers' poor bargaining power, and underdeveloped industrial sectors (Mamo *et al.*, (2018).

Hadiys zone is one of the major wheat producing area in Ethiopia and it recognized as one of the wheat belts in the country. Wheat is the most common crop in this zone where this study was conducted, the overall potential for wheat production and marketing, existing challenges across the value chain not well identified in order to assess possible value chain development strategies for upgrading wheat value chain. Wheat value chain analysis is an interesting process that has not investigated much in the study areas. Therefore, this study aimed to find the wheat value chain actors and their roles, to analyse benefit shares of the major actors along different channels to identify constraints and opportunity in the wheat value chain.

Materials and methods

Study areas

This study was undertaken in selected woredas of Hadiya Zone Central Ethiopia (Misha and Lemo). Hossana is the capital of the zone and it is 232 km South of Addis Ababa. The major crops produced are wheat, teff, sorghum, maize, barley, field-pea, bean, haricot bean vegetables and fruits.

Research design

A cross sectional survey research design was used for the study. Wheat growing farmers were taken as sampling frame and simple random sampling method specifically lottery method were used to sample respondents. Both quantitative and qualitative research data were collected from primary and seconder sources. The primary data was collected from wheat growing smallholder farmers, traders, processors and consumers.

Sampling procedure and sample size determination

Multi-stage sampling technique was implemented to select sample households from wheat producer kebeles. In the first stage, the Misha and Lemo Woreda were selected purposively based on high production. In the second stage, out of total kebeles of two woredas three rural kebeles were selected from each of two woredas randomly. In the third stage, from the selected rural kebeles, sample households

were selected randomly based on proportional to the population size of wheat producers of respective kebeles. Total sample size of producers was 180. Further, samples were randomly selected from the traders, and consumers. Total sample size of traders and consumers was 24 and 14 respectively (Table 1).

Table 1. Sampling frame

Data source	Total house holder		Sample		Total sample
	Misha	Lemo	Misha	Lemo	
Farmers	1732	1926	85	95	180
Traders			10	14	24
Consumers			6	8	14
Total	1732	1926	101	117	218

The numbers of respondents were determined by using a formula developed by (Yamane, 1967) at 10% level of precision the following formula was applied:

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

Where: n = is the sample size for the research use

N = is total number of producers farmers in the selected Kebeles

e = is the level of precision (0.1)

Data collection

The trained interviewers collected data from producers. Data was collected under continues supervision of the researchers. Key informant interview and focus group discussion was conducted to collect important data on constraints and challenges in production and marketing.

Data analysis

Descriptive statistics, inferential statistics were employed to analyse the data collected from wheat producers, trades, and consumers. This method of data analysis refers to the use of percentages, frequencies, means, ratios and standard deviations. The following four steps of value chain analysis were applied to this study: (a) Mapping the value chain to understand the characteristics of the chain actors and the relationships among them and amount of supply. (b) Analyse the distribution of actors' benefits in the chain. This determined who benefits from the chain and who would need

support to improve performance and gains. (c) By assessing profitability within the chain and identifying chain constraints, upgrading solutions can be defined. (d) Emphasizing the governance role. By focusing on governance, the analysis identified actors that may require support to improve capabilities in the value chain.

Estimates of the marketing margins are the best tools to analyse performance of market. The producers' share is the commonly employed. Mathematically it can be expressed as:

$$PS = \frac{Pp}{Cp} = 1 - \frac{MM}{Cp} \text{------(1)}$$

Where: PS= Producer's share

Pp= Producer's price

Cp = Consumer price and

MM = marketing margin

To find the benefit share of each actor, first the Gross Marketing Margin (GMM) will be calculated. This is the difference between producer's price and consumer's price. Gross Market margin was computed as:

$$GMM = \frac{\text{Consumer price}-\text{Marketing gross margin}}{\text{Consumer price}} \times 100 \text{--- (2)}$$

Where, GMM = Gross market margin

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 (Mendoza, 1995). The higher marketing margin diminishes the producer's share.

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

Where, TGMM is Total gross marketing margin.

Net Marketing Margin is the percentage over the final price earned by the intermediary as his net income; once his marketing costs are deducted. Higher NMM or profit of the marketing intermediaries reflects unfair income distribution, which depresses market supply of smallholder farmers. An efficient marketing system is where the net margin is near to reasonable profit.

$$NMM = \frac{\text{Gross marketing margin}-\text{Marketing costs}}{\text{Consumer Price}} \times 100 \text{--- (4)}$$

Where, NMM is net marketing margin

Results and discussion

Demographic characteristics of sample households

The total sample size during the survey was 180 of which, 14% were female-headed households and 86 were male headed. With regards to level of education 17% were illiterate 28% non-formal education whereas 37% were attended primary and 16% attend secondary school and 2% college (Table 2).

Table 2. Demographic and socioeconomic characteristics (categorical variables)

Variable	Items	Number	%
Sex	Male	155	86
	Female	25	14
Marital status	Unmarried	1	0.6
	Married	173	96.1
	Widowed	6	3.3
Education	Illiterate	30	16
	Non-formal Education	51	28
	Primary	67	37
	Secondary	30	17
	College	2	2

Source: Own survey result (2022)

An average household heads age was 46 years. The average years of farming experience related to wheat production was 20 years. The average family size of the total sample respondents was found to be 7 persons. An average land holding of the sample respondents was 1.4 ha per household (Table 3).

Table 3. Demographic and socioeconomic characteristics (continuous variables)

Variables	Minimum	Maximum	Mean	SD
Ag	20	76	46	8.7
Experience	3	48	20	9.7
Family Size	1	12	7	2.9
Land size	0.5	3	1.4	0.7

Source: Own survey result (2022)

Wheat production and market supply

Amount of market supply of wheat is depending on different demographic and socioeconomic characteristics of farmers. Table 5 shows that total amount of production and total and average market supply of wheat in 2022 production season were 2398.25 and 1443.50 quintal and its mean average was 13.3 and 8 quintal respectively. The total amount of production 60.2% were supplied to the market (Table 4).

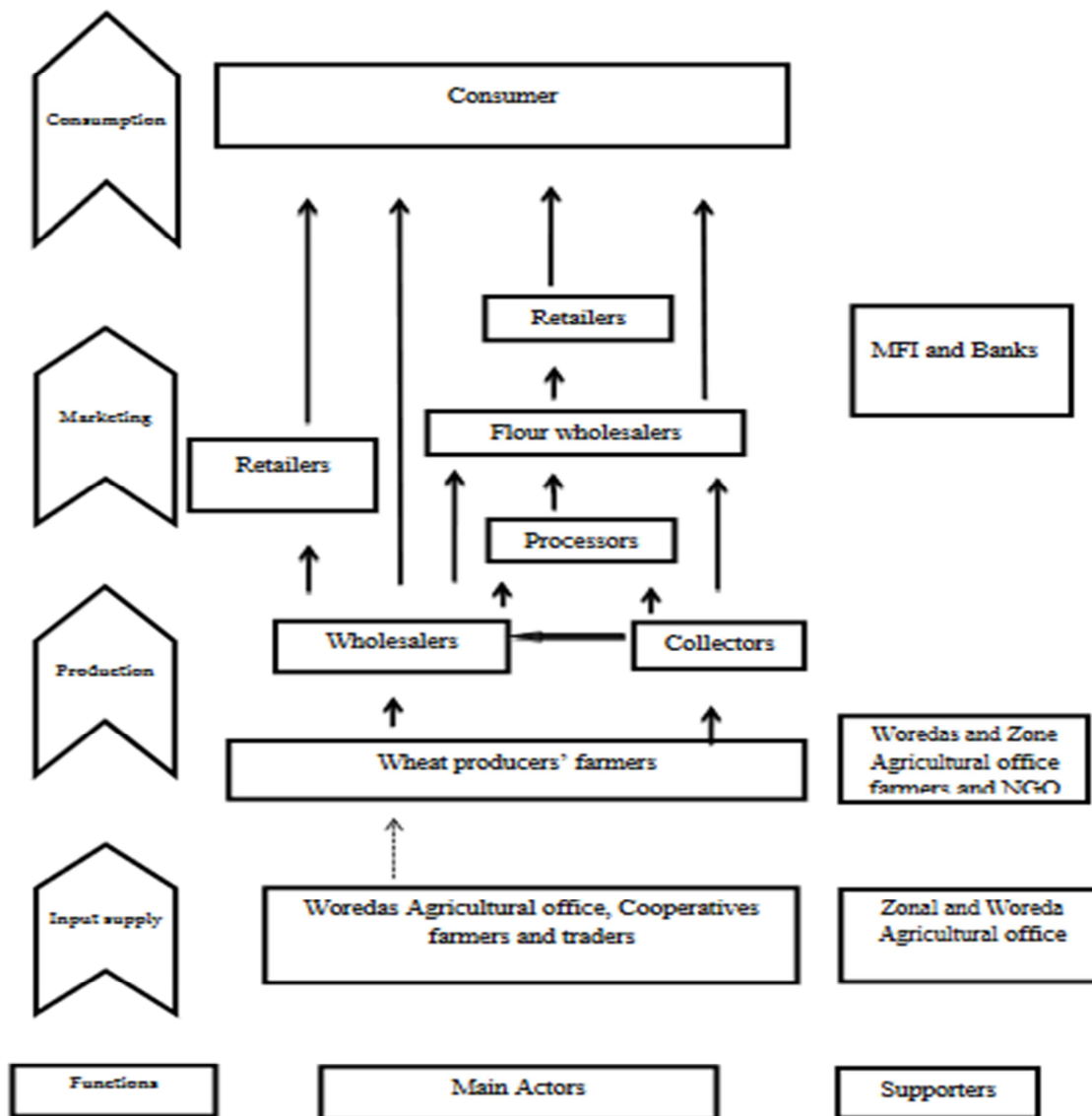


Fig. 1. Value chain maps of actors and their role in wheat value chain

-----> Represent flow of input

————> Represent flow wheat and its flour producers were collectors and wholesalers

Table 4. Mean market supply of wheat in quintal in 2022

Wheat in quintal	Total in quintal	Mean	SD
Production	2,398.25	13.3	9.5
Market supply	1443.50	8	7.9

Source: Own survey result (2022)

Value chain analysis

The value chain actors and the activities carried out of the input supply, production, and marketing and distribution stage were identified. Supporting service and governance including their links and interaction was analysed (Fig. 1).

Chain actors and their role in the wheat value chain

According to (KIT, 2006) the direct actors are those involved in commercial activities in the chain and indirect actors are those provide financial or non-financial support services. The primary actors in wheat value chain were input suppliers, producers, collectors, wheat wholesalers, wheat retailers, flour mill processors, flour wholesalers, flour retailers and flour consumers. The main actors in wheat value chain and their roles are discussed below.

Input suppliers

At this stage of the value chain, currently woreda agricultural office, cooperatives and farmers were source of inputs. Kebeles agricultural development agents are playing facilitation role during input distribution.

Producers

Wheat producers in study area were small-scale farmers. These farmers are the major actors who perform most of value chain functions right from farm preparation to post-harvest handling, and marketing. Most of the farmers use sacks to store produced wheat in their residential house.

Collectors

These are traders who collect wheat from farmers for the purpose of re-selling it to wholesalers or processors. They use their financial resources and their local knowledge to bulk wheat from the surrounding area. The activities of collectors include purchasing and collecting, packing and selling.

Wheat wholesalers

These are traders who purchase wheat from farmers and collectors for the purpose of re-selling it to retailers or processors. The activities of wholesalers include purchasing, storing, packing and selling to retailers and processors.

Processors

Processors purchase wheat from producers, collectors and wholesalers. The role of processors includes processing, packaging, distribution of flour for wholesalers and consumers.

Flour mill wholesalers: These are traders who purchase wheat flour from processors for the purpose of re-selling it to retailers or consumers. The activities of flour wholesalers include purchasing, transporting, storing, and selling wheat flour to retailers or consumers.

Retailers

They are two types of retailers (wheat retailers and flour retailers). Wheat retailers are traders who purchase wheat from wholesalers and resale to consumers. Their role is purchasing, transporting and selling small amount of wheat for consumers. Flour retailers are also traders who purchase flour from wholesalers and resale to consumers. Their role is purchasing, transporting and selling small amount of flour for consumers.

Consumers

Consumers are those who purchase wheat or flour for consumption. The main consumers in the study area were households, bakery, university, cafe etc. In general consumers have their quality criteria to purchase wheat or wheat flour.

Supporting actors

Value chain supporters or enablers provide supportive services such as research, financial, extension and information services. They remain outsiders to the regular business process and restrict themselves to temporarily facilitating a chain upgrading strategy. Research service was done by Wachemo University. Hadiya zone and Woreda agricultural experts provide capacity building training for agricultural development agents and farmers. Microfinance institutions and individual lenders have been identified as source of credit for producer farmers and traders. Furthermore, sample farmers indicated that they are getting information particularly of input availability from agricultural development agents.

Value chain governance

The wheat wholesalers were key value chain governor. Therefore the wheat value chains were highly influenced by the wheat wholesalers. Wheat wholesalers also use to outside zone markets for sell and they set purchasing price. The smallholder farmers are not formally organized and due to bargaining power linkage they were not governing the value chain; farmers are forced to sell their product at the price offered by traders. There is weak linkage between producers and traders.

Performance analysis in wheat value chain

The performance of wheat value chain was evaluated by considering associated costs, marketing channel and marketing margins.

Wheat marketing channel

The analysis of marketing channels is intended to provide a systematic knowledge of the flow of the goods and services from their producer to the final consumers. Seven main alternative channels were identified for wheat marketing. The main marketing channels are illustrated (Fig. 2). Main receivers from producers were collectors and wholesalers.

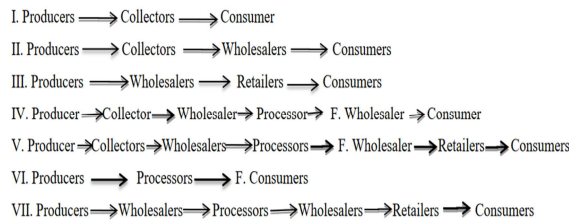


Fig. 2. Wheat marketing channel

→ Show that flow of wheat and its flour

Source: Own sketch from survey (2022)

Distribution of benefit in wheat value chain actors

The marketing cost of the wheat mainly involves the cost of post-harvest activities incurred before reaching the final consumers. Table 5 and 6 shows cost and price related to the transaction of wheat by producers, traders and processors respectively. Marketing margin can be used to measure the share of the final selling price that is taken by a particular actor in the value chain. Thus gross marketing margin can be used to measure benefit taken by each actor in the chain. Benefit distribution among wheat value chain actors for marketing channels. The Total Growth Market Margin (TGMM) was highest in channel-VI which is 62.7% and the lowest in channel III which is 21.1%. The producers share was found to be the highest in channel-III which was 78.9%. This indicates that channel-III provides producers with better share of value created. The net market margin (NMM) of producers found to be the highest in channel-III which was 26.8%. This indicates that channel-III provides producers with better profit when they sell their product directly to wholesalers (Table 7).

Table 5. Production and marketing costs of actors

Items	Producers	Collectors	Wholesalers	Retailers	Processors	Flour wholesalers	Flour retailers
Production costs	1,742	-	-	-	-	-	-
Total marketing costs	240	223	210	80	1040	95	50
Total cost	1,982	223	210	80	1040	95	50

Table 6. Actors and their price in Ethiopian birr per quintal

Actors	Activity	Marketing channels						
		I	II	III	IV	V	VI	VII
Producers	Selling price	2300	2300	3000	2300	2300	3000	3000
Collectors	Purchasing price	2300	2300		2300	2300		
Wholesalers	Purchasing price		3000	3000	3000	3000		3000
Retailers	Purchasing price			3600				
Processors	Purchasing price				3400	3400	3000	3400
Flour wholesalers	Purchasing price				5200	5200		5200
Flour retailers	Purchasing price					5400		5400
Grain consumer	Purchasing price	3500	3600	3800				
Flour consumers	Purchasing price				5400	6000	5200	6000

Source: Own survey result (2022)

Constraints of wheat production and marketing

Shortage of improved seed, weak extension service, prevalence of pest and unseasonal rainfall were major constraints of wheat production. Lack of an adequate seed industry in Ethiopia created shortage wheat improved seed. Because of this

reason producers could not expand production and supply of wheat in the study areas. Developments agent due to their involvement in many non-extension activities and some of development agent has no enough technical capability to support the farmers.

Table 7. Marketing margin of wheat value chain

Market margin	I	II	III	IV	V	VI	VII
TGMM	34.3	36.1	21.1	57.4	62.7	42.3	50
GMMp	65.7	63.9	78.9	42.6	37.3	57.7	50
GMMcol	34.3	19.4		13	11.7		
GMMwh		16.7	15.8	7.4	6.7		6.7
GMMrg			5.3				
GMMprs				33.3	30	42.7	30
GMMfwh				3.7	3.3		3.3
GMMfr					10		10
NMMp	9.1	8.8	26.8	5.9	5.3	19.6	17
NMMcol	27.9	13.3	10.3	8.8	8		
NMMwh		10.8	23.4	3.5	3.2		3.2
NMMrg			3.2				
NMMprs				14.1	12.7	22.3	12.7
NMMfwh				2.7	2.4		1.8
NMMfr					8.6		9.2

Source: Own survey result (2022)

Prevalence of pest, unseasonal rainfall was the problems frequently encountered in the production season. Inadequate farm management and post-harvest handling practice. Because of poor practice, some producers produce poor quality wheat and this hinder hinders farmers from getting the expected benefit. The major marketing constraints are related with weak market linkage, low price at harvesting time and lack of modern store in the production areas. These constraints are reducing level of market supply and profit of farmers from their produce.

Conclusion

The main value chain actors are input suppliers, farmers, collectors, wholesalers, processors, retailers and consumers. The producer's share of the consumer price was found to be the highest in channel-III, with share of 78.9% and lowest total gross market margin was 21.1%. This reflects that channel-III provide producers with better share of value created. Constraints at the production level were shortage of improved seed, weak extension service, prevalence of pest and disease, climate change. The major wheat marketing constraints were weak market linkage, low price during harvesting time, insufficient handling, poor quality wheat and lack of modern storage canters in the production area. Farmers are small-scale and formally unorganized; this needs intervention. Efforts should be made by government to strengthen wheat producers to become organized producers. Strengthening extension systems and

capacity building trainings. Increasing amount of improved seed, controlling pests and good farm management practices should be done to boost quality of wheat. Short linkages between production and marketing should be established. Strong linkages between producers and traders will lead to a more efficient value chain and sustainability of wheat production and marketing.

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