



Research Article

Value chain analysis of vegetables (*onion, tomato, potato*) in Ethiopia: A review

Desalegn Wondim*

Department of agribusiness and value chain management, Debre Markos University, Ethiopia

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*Corresponding author: Desalegn Wondim, Department of agribusiness and value chain management, Debre Markos University, Ethiopia, E-mail: desalegnw.2321@gmail.com

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Abstract

Even though different studies were taken place, none of them can address the effective production constraints, marketing and its constraints and gender issues of vegetables as vegetables are one highly perishable agricultural products. Therefore, the reviewer wants to assess the production status and its constraints, marketing condition and value chain actors including the gender aspects helps for policy makers to prepare intervention policies which helps to develop its contribution from the agricultural sector. From production perspective low yield, due to lack of production and marketing skill, lack of capital, Adulteration (poor quality of seed) are found to be the constraints of production and productivity. Through the identification of value chain actors the commonly involved actors found to be producers, the middlemen/brokers, traders and consumers along with supporters and influencers. In marketing of vegetables, small holders in rural areas are often poorly linked to markets and do not adequately access functional market information. Often middlemen do make much higher marketing margins than the producers, limiting the motivation of farmers to expand vegetable production, lack of storage facilities as vegetables are highly perishable product affects marketability of the product. And finally gender issue is one of an important area which is not addressed in vegetable production and marketing (value chain) and thus future researchers should take comprehensive (value chain) approaches to address multi Sectoral constraints of vegetables in production and marketing.

Introduction

According to [1] vegetables are defined in culinary terms to include vegetables "proper", that have fruit and leafy herbaceous parts eaten raw or cooked (i.e., lettuce, head cabbage, Ethiopian cabbage/kale, tomatoes, green and red peppers, Swiss chard, celery, green beans, etc.), root and tubers which include beetroot, carrot, potatoes, sweet potatoes, taro/ godere and bulb crops (onion, garlic, shallot). vegetables in human nutrition and health through its provision of antioxidants such as vitamin A, C and E that are important in neutralizing free radicals (oxidants) known to cause cancer, cataracts, heart disease, hypertension, stroke and diabetes [2].

Fruits and vegetables are the largest component of high-value exports, with world-wide exports of US\$ 21 billion in 2001. Fruit and vegetable exports have grown 4.4 percent annually over the 1990s, and developing countries accounted for almost two-thirds of this growth [3]. Vegetables are sources of vitamins, minerals and income for those involved in production and marketing [4]. Vegetable production is

an important economic activity in Ethiopia. The production system ranges from home gardening, smallholder farming to commercial farms owned both by public and private enterprises [5].

Smallholder vegetable farms are based on low input-low output production systems. The use of improved seeds and planting material of high yielding varieties and other inputs such as fertilizer and plant protection materials is not common in the smallholder sector. Technical training and extension services on improved crop husbandry techniques are not available. As a result average productivity levels are low in the small scale farming sector [6]. According to World Bank [7], Ethiopia involves in horticultural crops production and exports to Europe and has mainly been of fresh vegetables, with less comparative advantage in fruits due to the higher weight to value ratio and among sub-Saharan Africa exporters to Europe, Ethiopia ranks 6th.

Varieties of vegetable crops are grown in Ethiopia in different agro ecological zones, as a source of income and food.



Exports of vegetable products from Ethiopia have increased from 25,300 tons in 2002/03 budget year and it's doubled in 2009/10 [6]. The expansion of irrigation agriculture in different parts of the country has enabled smallholders to produce vegetable even in dry season. Through irrigation, farmer's per capita production as well as area under vegetable coverage has been increasing and these conditions enable smallholders to have better surplus for market (MoA 2014).

Vegetable production is becoming an increasingly important activity in the agricultural sector of Ethiopia following the development of irrigation and increased emphases given by the government to small scale commercial farmers. A report indicated that the major share of an estimated 1.4 million tons of vegetable and fruits is consumed locally and only 4.5% of the total is exported. Ethiopian vegetable and fruits are mainly destined to the regional markets especially neighboring countries like Djibouti and Somalia. About 90% of Ethiopian vegetable and fruit is exported to Djibouti and Somalia even though the value generated from this is too small [8]. Vegetables are also used as a source of raw material for the local processing industry. Processed products such as tomato paste, tomato juice, and oleoresin and ground spice of hot pepper/chili (Capsicums.) are produced for exports making a significant contribution to the national economy [5].

Value chain is the full range of activities required to bring a product from conception, through the different phases of production and transformation. A value chain is made up of a series of actors (or stakeholders) from input suppliers, producers and processors, to exporters and buyers engaged in the activities required to bring agricultural product from its conception to its end use [9]. According to Bezabih and Hadera [2], in onion and tomato value chain categorize actors in the marketing channel as producers, intermediaries/ rural assemblers, traders and consumers.

Value chain analyses encompass issues such as organizational, coordination, power relationship between actors, linkages, and governance aspects. According to Adugna (2008), the marketing functions or activities involved in onion marketing system on exchange between buyers and sellers in Ethiopia are; Financing, Storage, Transportation, Processing, Risk bearing, Packaging and Market information.

Statement of the problem

Even though different studies were takes place none of them can address the effective production constraints, marketing and its constraints and gender issues of vegetables as vegetables (tomato, potato and other vegetables) are highly perishable, they start to lose their quality right from harvest and continue throughout the process until it is consumed and therefore, knowing the production status and its constraint, marketing condition and value chain actors including the gender aspects helps for policy makers to prepare intervention policies which helps to develop its contribution from the agricultural sector (Almaz, et al. 2014).

Objective of the paper

- ✓ To review vegetables (*onion, tomato, potato*) production and market channels
- ✓ To review vegetable value chain and the value chain actors and major constraints and opportunities within vegetable marketing.
- ✓ To review and understand gender issue in vegetable value chain.

Vegetables production and marketing in Ethiopia

Although production in value chain system is an important component, in Ethiopia, Onion and tomato value chain is complicated by substantial problems including; low yield, lack of production and marketing skill, lack of capital, Adulteration (poor quality of seed), lack of market information, brokers hindering fairness price, unable to have good vegetable marketing policy, problem of rural road access, storage problem that leads to loses, improper shading and lack of demand (Almaz, et al. 2014).

According to Bezabih, et al. [4] Despite the increasing importance of vegetables in the Eastern part of Ethiopia, there is inadequate knowledge on improved production systems and marketing, especially in the humid tropics of Ethiopia and further their study shows that staggering trend between 2010 and 2012, increasing from 6.7 tons/ha in 2010 to 7.6 tons/ha in 2011 and then declined to 6.4 tons/ha in 2012 and finally increased to 11.3 tons/ha in 2013. For non-root type vegetables, the average yield over the four year period were 4.0 ton/ha in 2010, 5.3 ton/ha in 2011, 4.7 ton/ha in 2012 and 4.4 ton/ha in 2013, showing a relatively stagnant and low yield trend over the periods.

This finding support the finding of Abay and Tesfaye (2011), which revealed that the average potato, one of the major vegetable, production throughout Ethiopia is 8- 10 t/ha. According to Kassa and Alemu, especially when considering the potential of Ethiopia, this is relatively low average, with its favorable climate at higher elevations, soils and irrigation potential. Further, they supported the findings above as, the main production constraints are related to the narrow genetic basis of the varieties and the poor seed quality (Kassa T and Alemu 2015).

According to Ketema, et al. 2016 [10], in Eastern Ethiopia Potato production plays an important role in improving household income and nutrition and thereby contributes to food security. Despite of this, the current productivity of the crop is below the potential. To analyze the problem they used a two-limit Tobit model and access to irrigation, farm size, membership to cooperatives, and annual income of the households were found to significantly affect the production of potato by adopting technology packages.

Vegetable crops are suitable for production under intensive systems, where some farmers produce two to three times within a calendar year in Ethiopia. However, vegetable production



in the country is constrained by several challenges among them, postharvest loss of vegetables such as tomato is of critical importance [11]. In order to alleviate this problem they suggested that, serious interventions are needed, including skill building to improve pre-harvest crop management practices, capacity for postharvest handling including cool storage, improving market information, facilities and services.

Furthermore, Bezabih and Hadera [2], further identified pest, drought, shortage of fertilizer, and price of fuel for pumping water as the major constraints of horticulture production in Eastern Ethiopia. Other problems which they reported also include poor know how in product sorting, grading, packing, and traditional transporting affecting quality of the product. And finally they advised that improve the existing production system by introducing vegetable varieties that best fit into the crop calendar pattern, the rotation and enable efficient utilization of the crop production cycle used by the farmers, Upgrade the knowledge, skill and experience of key actors in the chain.

Vegetables marketing and their constraints in Ethiopia

According to Abay [12] found that out of vegetable passing through several intermediaries, little value being added before reaching the end users. Furthermore, the market chain is governed by wholesalers and exporters who have capital advantage over the other chain actors. Hence, farmers are forced to obtain a lower share of profit margin. Market distortions are common activities of middlemen in price setting. Some vegetable are not creating time value due to their perishability. This enables actors particularly middlemen to cut price, which further reduce producers bargaining power to sell their vegetable at a price convenient for them.

Bezabih and Hadera [2], further identified other problems and they reported include, poor knowhow in product sorting, grading, packing, and traditional transporting affecting quality in turn marketability of the product. Those findings were relevant with the problems that associated vegetables marketing in different parts of Ethiopia.

Vegetable marketing is also constrained by lack of market information systems, poor market linkages, low institutional support, lack of value chain development to ensure participation and benefit to the smallholders [4]. Further they suggested that this necessitates looking into the whole vegetable system development via a value chain upgrading/development approach which is in line with the findings of (Almaz, et al. 2014).

And further it is supported by Reddy and Kanna [13] in Ethiopia vegetable marketing is constrained by lack of market information systems, poor market linkages, low institutional support, lack of value chain development to ensure participation and benefit to the smallholders.

According to Bezabih E [14], in the Eastern part of Ethiopia market of vegetables are constrained by lack of markets to absorb the production, low price for the products, large number

of middlemen in the marketing system, lack of marketing institutions safeguarding farmers' interest and rights over their marketable produces (e.g. cooperatives), lack of coordination among producers to increase their bargaining power, poor product handling and packaging, imperfect pricing system, lack of transparency in market information system mainly in the export market and this finding is also supported by [13] and (Almaz, et al. 2014).

Finally he advised, Bezabih E [14], The most crucial action to be taken is organizing the traders (local and exporters) and the producers to work as partners not as rivals so as to mutually benefit from participation in horticulture value chain. Building their business capacity and overcoming their constraints and capacitating them to use market information are important. Putting the market right through institutionalizing the commission agents' functioning, grading and standardizing, improving the export system by improving the transparency in the price setting and credit system are crucial interventions.

In addition to 2008, Bezabih, et al. [4], again found that in the humid areas of Ethiopia, Smallholders in rural areas are often poorly linked to markets and do not adequately access functional market information. Often middlemen do make much higher marketing margins than the producers, limiting the motivation of farmers to expand vegetable production. For this reason, he suggested that extension workers should have strong demonstration site to teach and encourage producers to build individual or communal storage in farmers' vicinity so that households can be saved from selling potato at lower prices and face lots of losses.

Main value chain actors and their linkage along the vegetable value chain in Ethiopia

The value chain describes the full range of activities which are required to bring a product or service from conception, through the different phases of production (involving a combination of physical transformation and the input of various producer services), delivery to final consumers, and final disposal after use [15].

Value chain include direct actors which are commercially involved in the chain (producers, traders, retailers, consumers) and indirect actors which provide services or support the functioning of value chain. These include financial or non-financial service providers such as bankers and credit agencies, business service providers, government, researchers and extension agents [16].

Common actors involving in vegetable (onion, tomato) value chain are input supplier, producers, brokers, traders (Wholesalers and retailers) and consumers (Almaz, et al. 2014).

Value chain analysis is the process of breaking a chain into its constituent parts (value chain actors) in order to better understand its structure and functioning. The analysis consists of identifying chain actors at each stage and discerning their functions and relationships; determining the chain governance, or leadership, to facilitate chain formation and

strengthening; and identifying value adding activities in the chain and assigning costs and added value to each of those activities (UNIDO, 2009).

According to Reddy and Kanna [13] in Ethiopia, value chain actors in vegetable (onion, tomato) value chain are identified as input supply (improved variety, fertilizer, pesticides, farm implements), producers, Brokers, Marketing (retailers, collectors, and small traders and regional wholesalers) and finally consumers.

In general, The marketing channel in the horticulture marketing system can be broadly categorized into four levels, namely the producers, the middlemen/brokers, traders and consumers. Along the marketing channels, there are different actors contributing to complementary marketing functions including production, facilitation, buying and selling, transporting, packing, sorting and processing [14] which is supported by Almaz, et al. 2014 (Figure 1).

Production and marketing Opportunities in vegetable value chain

Ethiopia has diverse agro-ecological condition which is suitable for diversify crop production. Having a potential arable land, it is very suitable for irrigation. Irrigable land potential we have around 4.26 million ha. But the existing irrigation under used is 247, 470 ha. (5.8%) with different capacities. In Ethiopia there are cheap human laborers to use in different activities of production and marketing of vegetables crops [13].

According to Bezabih, et al. [17], existence of vegetable seed importers and distributors, increasing registration of

commercial vegetable varieties in Ethiopia, Existence of institutions supporting the development of the horticulture sector. Existence of suitable agro-climatic conditions for production of horticultural crops, including vegetables, Increasing demand for horticultural products, Human capital and Presence of an enabling policy environment.

However, the opportunities from policy and institutional aspects are still underutilized as explained by different researchers like [13].

Gender in vegetable value chain

According to Almaz, et al. (2014), from production perspective the average yield of onion and tomato for male head household and female head household was about 130.5 and 95.3 quintal, respectively. This indicates that Male-headed households had higher yielded per ha of land compared to Female-headed households. This result is supported by, Pender and Gebremedhin (2006) found that female-heads of household achieve 42 percent lower crop yields than male-heads of household. And also a similarly a study by GTZ, 2009 also confirm that land Productivity on female farms is slightly lower that of men.

Furthermore, Almaz, et al. (2014), explained that the two households have different perceptions on tomato and onion value chain constraints. Social and institutional factors created barriers for both Female-headed households and Male-headed households' actors in respect to tomato and onion marketing and production in each stage of the value chain. And finally they advised that tomato and onion production and marketing policies in the country need to take into account determinants

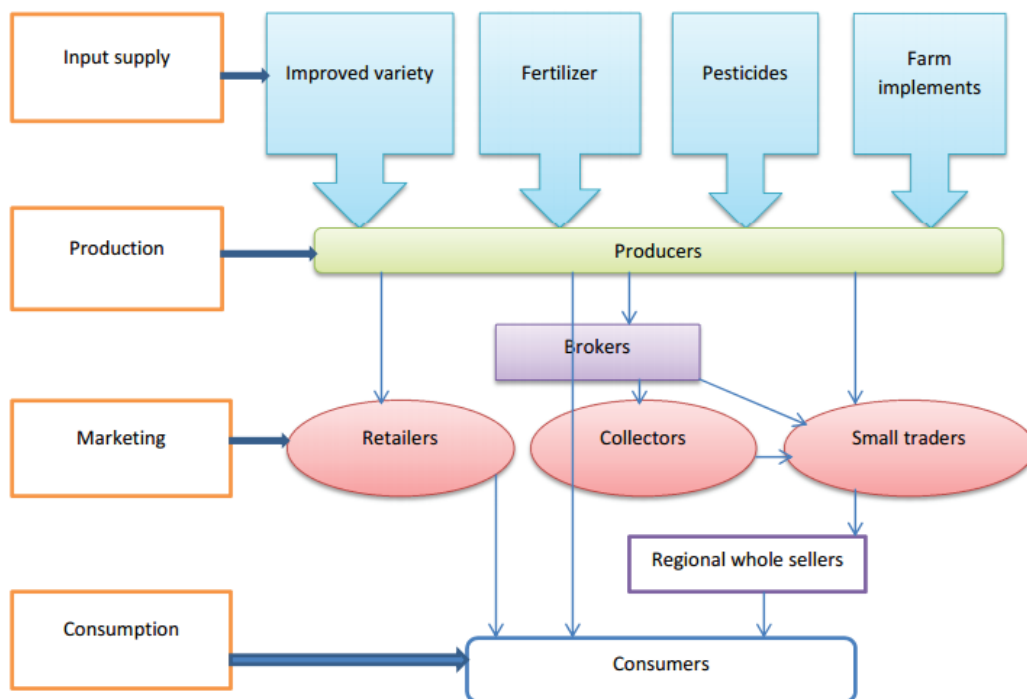


Figure 1: Vegetable value chain map.

Source: Adopted from Reddy and Kanna 2016 [13].

of severity of production and marketing constraints to enhance efficiency, quality and linkages among actors. And finally they conclude that to address the existing gap of women in terms of low agronomic practice, low yield and financial problem, specialized programs and intensive training efforts need to be designed and executed for them.

On similar issue Mahlet, et al. [18], found that the extent of participation in production activities are varies among the households. In most of the cases, male headed households are very efficient and effective in production as well as supply where economically active labor force is much higher and dependency ratio are lower as compare with female headed households which is again in line with the findings of (Almaz, et al. 2014). Finally they suggested that [18], there should be gender focused interventions that support, encourage and give priority for increasing production, supply and minimize differences among the household heads [19].

Summary and recommendations

Summary

Vegetables are sources of vitamins, minerals and income for those involved in production and marketing. Vegetables are also used as a source of raw material for the local processing industries. Various types of vegetables can grow in Ethiopia and an important economic activity in the country. However, Smallholder vegetable farms are based on low input–low output production systems because of unable to use of improved seeds and planting material of high yielding varieties and other inputs such as fertilizer and plant protection materials in the smallholder sector are among other factors affecting production.

Poor knowhow in product sorting, grading, packing, and traditional transporting affecting quality in turn marketability of vegetable products. Vegetable marketing is also constrained by lack of market information systems, poor market linkages, low institutional support, lack of value chain development to ensure participation and benefit to the smallholders. As value chain is a serious of activities starting from conception to consumption, value chain analysis is the process of breaking a chain into its constituent parts. In general, The marketing channel(actors) in the horticulture marketing system can be broadly categorized into four levels, namely the producers, the middlemen/brokers, traders and consumers and the rest of the two external but important levels in value chain actors are supporters and influencers. Conducive agro ecology, existence of vegetable seed importers and distributors, increasing registration of commercial vegetable varieties in Ethiopia, easy accessible human labor force are some of an important opportunities in the country which still making the sector attractive.

Finally gender issue is one of an important area in any value chain which is not addressed in vegetable value chain in the country that attracts many researchers' suggestion for policy intervention.

Recommendations and future direction

Government or other private organizations should create conducive environment for extension workers and multipurpose farmers' cooperative to cop up small holder vegetable producers in production and management of their produce by giving appropriate training. Here firstly training of the trainer (extension workers) must give for each particular issue by higher professionals from multidisciplinary approach.

Creating good and smooth linkage and interaction between producers and the rest of the chain actors by using information sharing devices like mobile and crating forward and backward linkages can overcome pre as well as post–harvest losses in the value chain.

After identification of value chain actors, government give emphasis and create value chain platforms to bring solidarity and trust between and among the entire value chain actors.

The government should develop and introduce gender sensitive policy for smallholder producers in general and vegetable producers in particular to strengthen the sector. To do so gender mainstreaming i.e. including women in each development program along the value chain as they are one of the wings of value chain.

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