

Assessing the Competitiveness of Smallholders Chickpea Production in the Central Highlands of Ethiopia

Setotaw Ferede¹, Asnake Fikre² and Seid Ahmed³

¹EIAR, Debre zeit Agricultural Research Center, P.O.Box 32, Debre Zeit, Ethiopia; E-mail:

setotawferede@yahoo.com

²International Crops Research Institute for the Semi-Arid Tropics (ICRISAT-Ethiopia)

³ICARDA, Rue Hafiane Cherkaoui. Rabat, Morocco

Abstract

Chickpea is an important food legume in Ethiopia which provides sources of livelihood for millions of smallholder farmers. Currently, it has become an important high value crop that promotes commercialization. This study attempted to assess the competitiveness of smallholders' chickpea production in the central highlands of Ethiopia. To this end, the domestic resource cost coefficient (DRC) analysis was employed using farm household surveys, price and trade data. Current evidences showed that there has been a significant upswing in the trends of local chickpea prices both in nominal and real terms since the last eight years. As a result, chickpea has become an important cash crop in high potential major chickpea growing areas where farmers dispose the largest proportion of their chickpea production (82%) for marketing purpose. One of the major challenges of Ethiopian chickpea export is related to the bulk of the chickpea trade (84%) being absorbed by the local markets. Moreover, the current Ethiopia's export market share has remained at 4% while the largest proportion (94%) is destined to low value export markets. Despite all those limitations, Ethiopian chickpea exports highly competitive in major export markets as evidenced by the DRC value which was found to be 0.20. Therefore, the competitiveness of Ethiopian chickpea in high value markets could be improved by focusing on quality, volume, and supply continuity.

Key words: chickpea, domestic resource cost coefficient

Introduction

Chickpea (*Cicer arietinum*) is an important food legume mainly produced by smallholder farmers under rainfed condition in Ethiopia. Chickpea provides a multi-functionality to smallholder farmers in terms of sources of nutrition, cash income, animal feed, and soil fertility maintenance (Geletu et al., 1996;

Verkaart et al., 2017). The crop is grown by about over one million households covering 240,000 ha of land while it is the second major food legume next to faba bean by accounting for 17% of the total food legume production in Ethiopia (CSA, 2015a).

Chickpea is widely grown across the vertisol-dominated highlands with

altitude ranging from 1400 to 2300 meters above sea level and mean annual rainfall of 700-2000 mm (Geletu *et al.*, 1996). The major chickpea growing regions include Amhara (Gondar, Gojam, Wello, and North Shewa Zones) and Oromia (East, West, and Northwest Shewa, and Arsi Zones) which account for 49% and 47% of the total chickpea production, respectively, while the contribution of Tigray and SNNP is about 2% (CSA, 2015a).

The current agricultural development strategy of Ethiopia gives a high priority on the commercialization of smallholder farmers by promoting the production of high value crops that are competitive in local and export markets (MoFED, 2016). Chickpea is one of the newly emerging export commodities being promoted for expansion in Ethiopia. Currently, chickpea has become the second pulse export commodity next to common bean in generating foreign exchange revenues (ERCA, 2015; Shiferaw and Hailemariam, 2007).

However, the local market absorbs the largest proportion of the total chickpea trade volume (Shiferaw *et al.*, 2007). Moreover, the integration of smallholder farmers to the market economy still remains very limited. About 56% of the total chickpea production is consumed at farm level while only 25% is sold for cash incomes (CSA, 2015b). The low level of adoption of improved chickpea technologies has been cited as the major factor contributing to high yield

gaps and subsequent limited marketable surplus (Shiferaw *et al.* 2007, Shiferaw and Teklewold 2007). The current average chickpea productivity (1.9 t/ha) still remains below the attainable yield (3-4 t/ha) that could be achieved through adoption of improved chickpea production technologies (Leges *et al.*, 2005; Chilot *et al.*, 2010).

Given the high value of the commodity and its significance for poverty alleviation, several research for development interventions have been made in major chickpea growing areas of the country over the past decades to improve the productivity and profitability of smallholder chickpea production. With this context, the objective of this study was to assess the competitiveness of chickpea production in the central highlands of Ethiopia.

Methodology

Description of the study areas

The study was conducted in East Shewa Zone of Oromia National Regional State. It is bordering Addis Ababa in the East where its main town, Adama, is situated in the Rift Valley at 98 km east of the capital on the highway to Djibouti. The total population of the zone was 1.36 million where 75% of them are living in the rural areas (PCC, 2008). The total zonal area coverage is estimated to be over 526,000 ha where cultivated land accounted for 90% of the total land mass of the zone (CSA, 2014). The

average cultivated land per household is 1.7 ha higher than the national average land holding of 0.95 ha (ibid.). The farming system is generally characterized by mixed crop-livestock production system where livestock provides sources of draught power, cash income, food, transport, and fuel. The livestock population includes 1.15 million cattle, 949.33 thousand sheep and goats, 353.20 thousand equines, and over 3000 camels (CSA, 2015c).

East Shewa Zone is normally considered as one of the high potential agricultural areas in the region with suitable agro-ecology for the production of different cereal and food legume crops. Chickpea is the major crop which accounts for 32% of the total food legume production in the zone (CSA, 2015a).

In terms of infrastructure, the zone is situated relatively in a better accessible parts of the country due to its proximity to Addis Ababa. The main highway linking the capital to the East, Southeast and Southern parts of the country crosses the zone while it has also a recently built express highway linking Addis Ababa to its main town, Adama. Despite the availability of some intra-zone all-weather roads connecting different districts, rural inaccessibility still remains a major development challenge in rural Ethiopia.

Data Sources and Collection

Methods

Primary data were generated from Tropical Legumes II (TL-II) farm household surveys updated with rapid market assessment survey. The TL-II farm household surveys (baseline and adoption) were conducted in three project intervention districts, namely Gimbichu, Lume-Ejere and Minjar-Shenkora involving 700 randomly selected sample farmers in three rounds (2008, 2010, and 2014) to establish a panel dataset. To supplement and substantiate the farm household data, a rapid market assessment survey was also conducted in November 2016 in the Zone with additional terminal markets in Addis Ababa and Adama cities. The rapid market assessment survey involved Focus Group Discussion (FGD) and Key Informant Surveys using semi-structured questionnaires to generate data on chickpea production (input and technology use), marketing and trade. Farmers, cooperatives, agricultural experts, traders, and exporters were interviewed during the survey. In addition, weekly chickpea prices which were collected at Bishoftu and Arerti markets during 2009-2013 were also used for price analysis.

The secondary data collected were monthly chickpea price data for Addis Ababa and Adama (2012-2015) from Ethiopian Grain Trade Enterprise (EGTE) while chickpea trade data were obtained from the Ethiopian Revenue and Customs Authority (ERCA). Other published and web-

based data sources were used in this study.

Data Analysis

The Domestic Resource Cost ratio (DRC) analysis was employed for assessing the competitiveness of chickpea production in export markets using the Policy Analysis Matrix (PAM) framework. The analytical framework involves the estimation of chickpea enterprise budget in terms of private and social (economic) values for computing the DRC values which measure chickpea competitiveness. The application of the DRC methodology is widely documented in the literature (Morris, 1990; Masters & Winter-Nelson, 1995) while an elaborative explanation of the analysis using PAM is given in Monke and Pearson (1989).

The PAM structure has four columns (Table 1). The first column is for revenue, the second and third are for costs and the last is for profitability. The two cost columns are consisting of tradable inputs and domestic factors. Furthermore, PAM has three rows. The first two rows represent the two different versions of the profit equation where the first row (D) is evaluated using actual (market) prices while the other (H) is evaluated at shadow (social prices). The third row measures the effect of government policy (market failure) where each entry is simply the difference between its value in the first and second rows, i.e. as the difference between observed parameters and parameters that would exist if the distortions were removed.

Table 1. General structure of Policy Analysis Matrix (PAM)

	Revenues	Costs		Profits
		Tradables	Domestic Factors	
Private Price	A	B	C	D = (A-B-C)
Social Price	E	F	G	H = (E-F-G)
Divergences	I = (A-E)	J = (B-F)	K = (C-G)	L = (D-H) = (I-J-K)

Source: Monke & Pearson (1989)

The DRC value was computed using the returns to land and management obtained from chickpea enterprise budgets in both private and social

prices. The DRC for chickpea was calculated by dividing the costs of domestic factors by value added at social prices:

$$\text{DRC} = \frac{(\text{labor cost} + \text{capital cost}) \text{ in social prices}}{(\text{revenues} - \text{cost of tradable inputs}) \text{ in social prices}}$$

Here, if the DRC value exceeds one, then it indicates that the country does not have a comparative advantage in

chickpea production. However, for values less than one, the local chickpea production is considered to

be competitive in export markets, i.e. the value added measured in social prices exceeds the costs of domestic resources in social prices used in chickpea production.

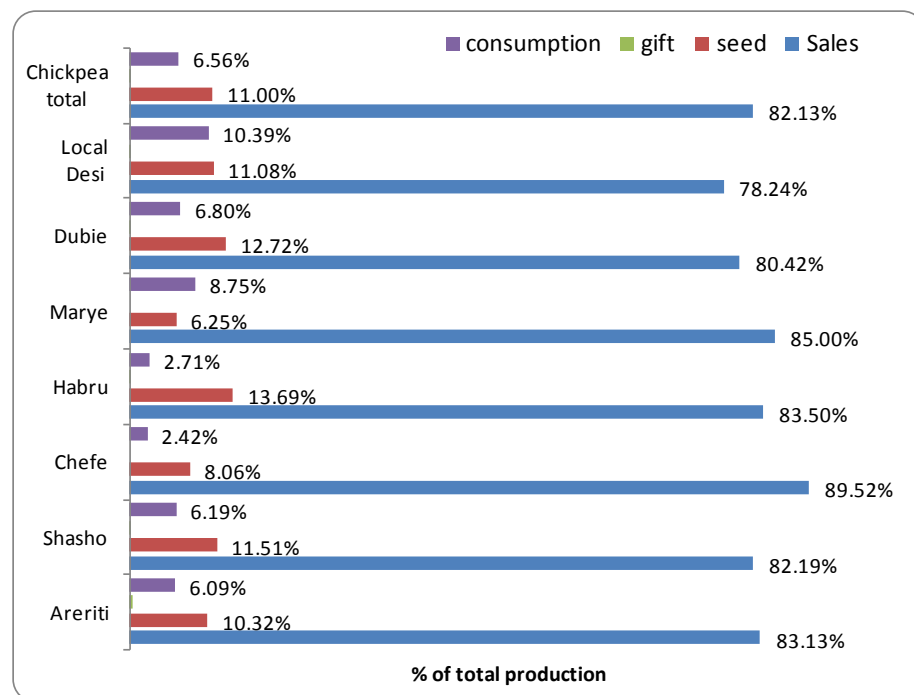
Results and Discussion

Chickpea Market Participation

The integration of Ethiopian smallholder farmers to the market economy still remains very limited and at subsistence level. Evidences have showed that pulses have been increasingly becoming an important source of cash income to farmers for the high demand from local and export markets. It is estimated that nearly

25% of the total chickpea production in Ethiopia is delivered to the market while the remaining 75% is consumed at farm level (CSA, 2015b).

However, farmers who have better access to the market were observed to have better productivity and market linkage where significant proportion of their chickpea production is delivered to the market. TL-II project intervention areas were relatively located in high potential areas with better access to the market. As a result, farmers, on average, sold 82% of their total chickpea production while household chickpea consumption is limited to 7% (Figure 1).



Source: TL-II Adoption Survey, 2014

Figure 1. Utilization of chickpea, 2013/14 cropping season

Our rapid assessment survey conducted in December 2016 showed

similar results where about 85% of the total chickpea production was destined

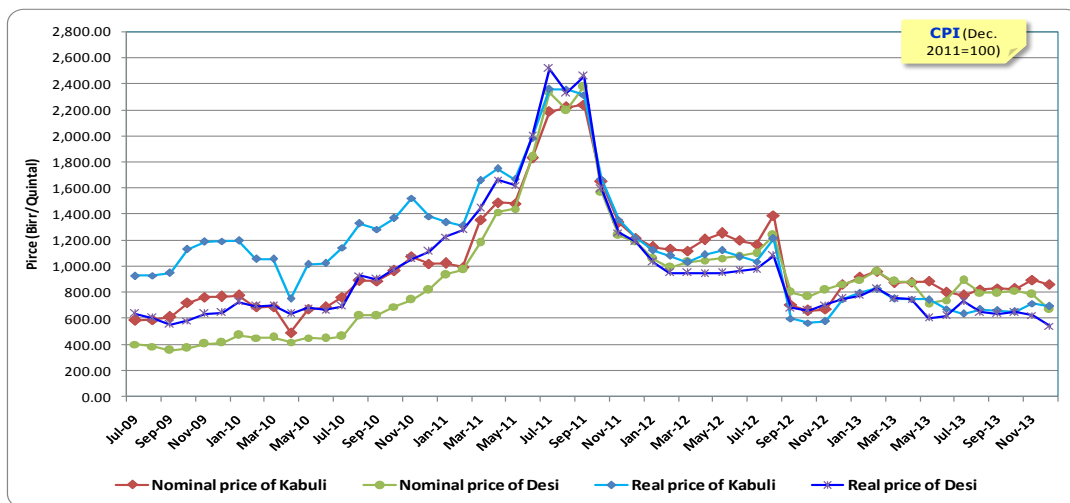
for market and the rest for home consumption.

In Ethiopia, there is a high and growing demand for pulses in local markets which is closely associated with the deep-rooted values of these crops in the diets of the population. Chickpea is an important staple food legume used for the preparation of various traditional foods in Ethiopia. Currently, there has been a growing trend in the processing and marketing of chickpea in local markets by medium and small-scale processors which are locally called *Baltina*. They are engaged in the processing and marketing of chickpea in the form of husked and split chickpea (*Kik*) or dhal, chickpea flour for sauce (*Shiro*), and roasted (*kollo*). The desi types are highly preferred for *Kik* and *Shiro* while the Kabulis are for roasted chickpea (*Kollo*). Chickpea is also used for the preparation of unleavened bread.

Domestic chickpea price trends

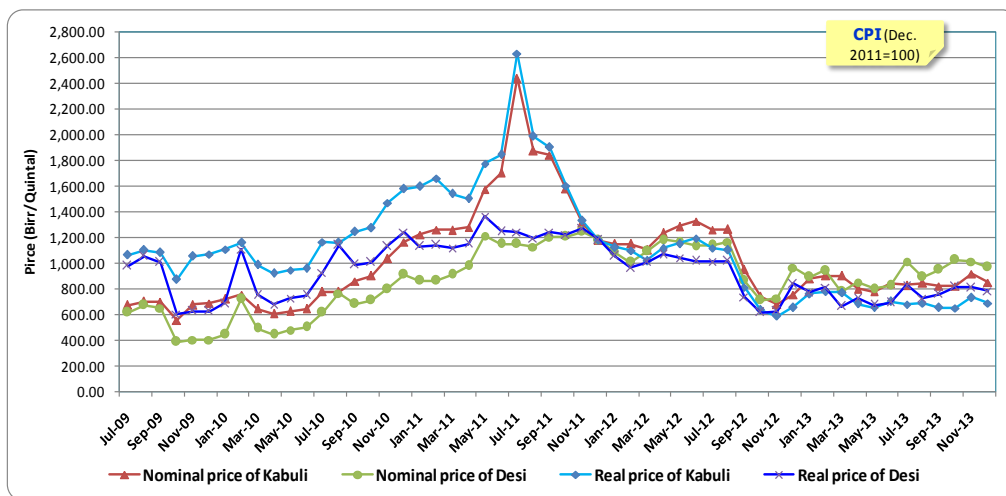
Although the local prices of most food grains have generally increased since 2006, there has been a significant upswing in the trends of local chickpea prices both in nominal and real terms since late 2009 (Figures 2&3). Nominal and real chickpea price trends were calculated based on a weekly price data collected by DZARC from Bishoftu (Ada'a district) and Arerti markets (Minjar-Shenkora district). In general, the nominal chickpea prices increased significantly during the period from September 2010 to September 2012. Chickpea hits a historical high price level during the year 2011 where the nominal chickpea (both Kabuli & Desi types) prices exceeded Birr 2000 per 100 kg during July-August 2011. This price increment was equivalent to 189% for Kabuli chickpea and 431% for Desi chickpea in December 2009.

The real prices of chickpea also showed a similar trend indicating that much of the price increment was not closely associated with the high inflation rate in the country (Figures 2 & 3).



Source: Socioeconomics DZARC & CSA Monthly CPI Report (2009-2013).

Figure 2. Nominal and real price trend of chickpea, Bishoftu (DebreZeit) Market, Ada'a District (July 2009-December 2013).

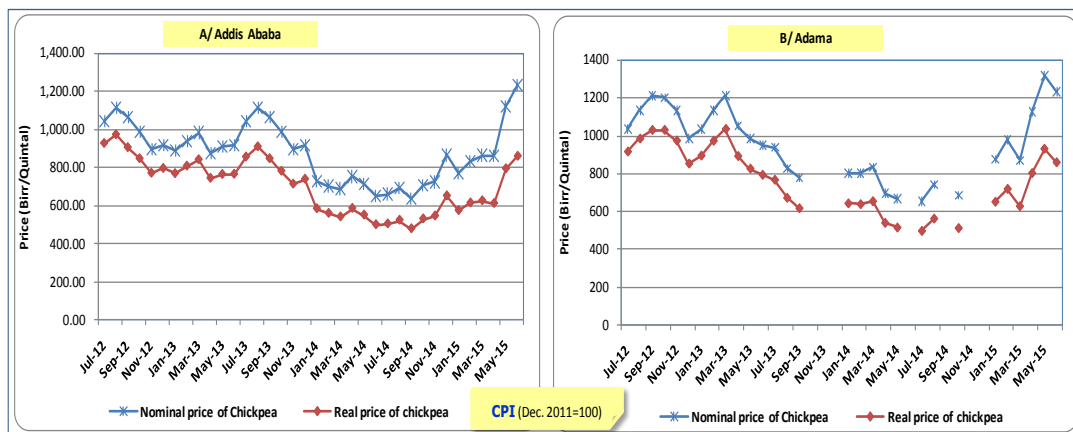


Source: Socioeconomics DZARC & CSA Monthly CPI Report (2009-2013).

Figure 3. Nominal and real price of chickpea, Arerti Market, Menjar-Shenkora District (July 2009-December 2013).

Chickpea prices started sharply declining since the last quarter of 2011 while sustaining a declining trend until the third quarter of 2014 (Figure 4). The price percentage change showed that the average prices in December 2013 have been much lower than their values in the same month since 2010 and even less than their average values in the first month of the last quarter in

the same year. For instance, the average prices of Kabuli and Desi chickpeas in December 2013 were 29% and 44% lower than their values in the same month in 2011, respectively. The declining trend was much worse for Desi than Kabuli types. And yet, chickpea price started showing an increasing trend since the first quarter of 2014.



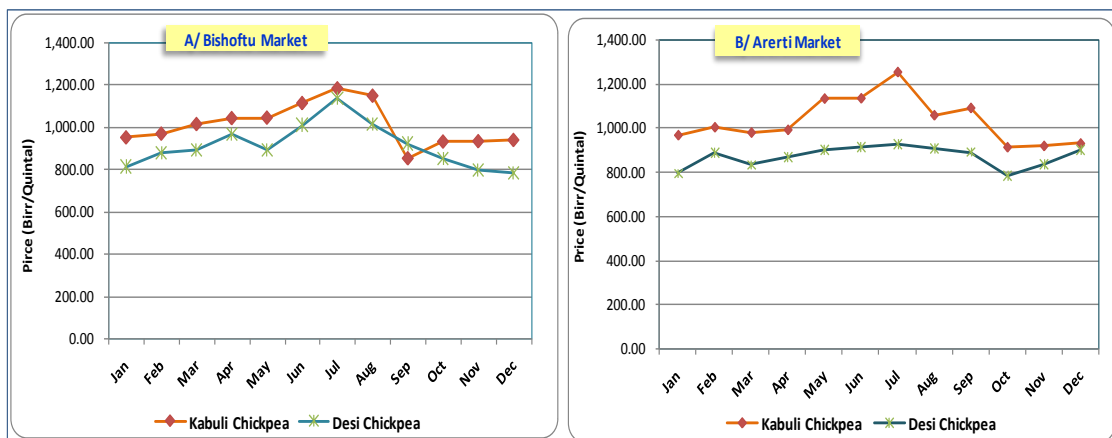
Source: EGTE & CSA Monthly CPI Report (2012-2015).

Figure 4. Nominal and real prices of chickpea in Addis Ababa and Adama (2012-2015).

The sharply increasing local chickpea price trend observed during 2010-2011 was closely associated with the increasing global chickpea price trends. Studies showed that the dramatic rise in local pulse prices since the past few years have been largely driven by persistent growth in export demand mainly from Sudan, Pakistan, United Arab Emirates, India and Turkey (Shiferaw and Teklewold, 2007; Shiferaw *et al.*, 2007; FAO/WFP, 2012; USAID, 2013).

Similar to other food grains, chickpea markets are also characterized by high

seasonal price fluctuations due to the very nature of Ethiopian rainfed farming system. Normally, chickpea prices are getting high during the planting season (June-August) when grain supply is limited in the market while prices reach at their low level during the harvesting season (December-May) when there is high inflow of grain supply in the market (Figure 5). It was found that the prices of Kabuli and Desi chickpeas increased by 16% and 21% during the cropping season, respectively.

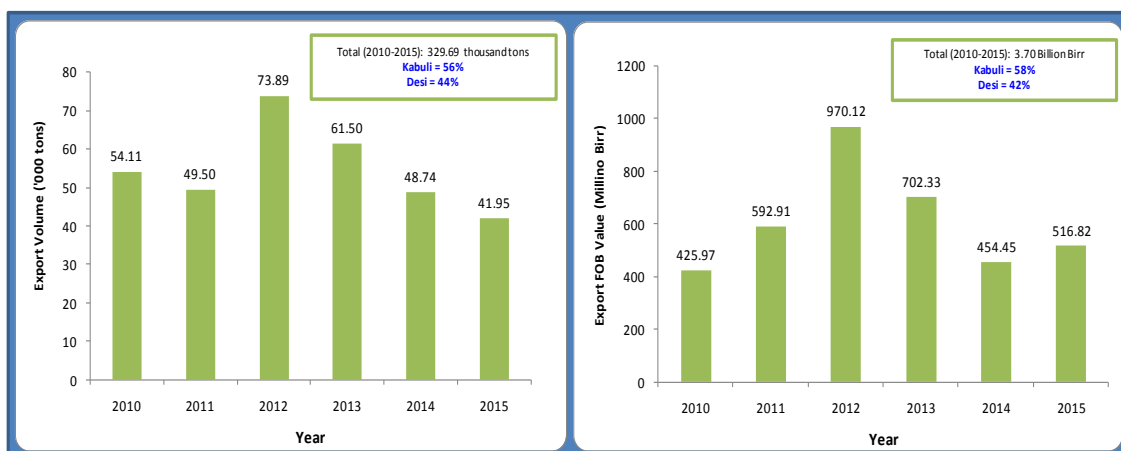


Source: Socioeconomics, DZARC (2009-2013).
 Figure 5. Seasonal Chickpea nominal price patterns (average 2009/2013).

In general, kabuli chickpea types are marketed at higher prices as compared to the desi types. The price of Kabuli types was, on average, 15% higher than that of the Desi types. Similar finding reported 36% high price of Kabuli over Desi type chickpea (Shiferaw and Teklewold, 2007).

Ethiopian Chickpea Trade

The total chickpea trade volume in Ethiopia is estimated at 339 thousand tons where 84% is supplied to the local market while the export market absorbs 16%. Chickpea is the second major export commodity among pulse crops by generating nearly 25% of the total pulse export earnings. Ethiopia has exported a total of 329.70 thousand tons chickpea during the period 2010-2015 with a total income of 3.70 Billion Birr (Figure 6).



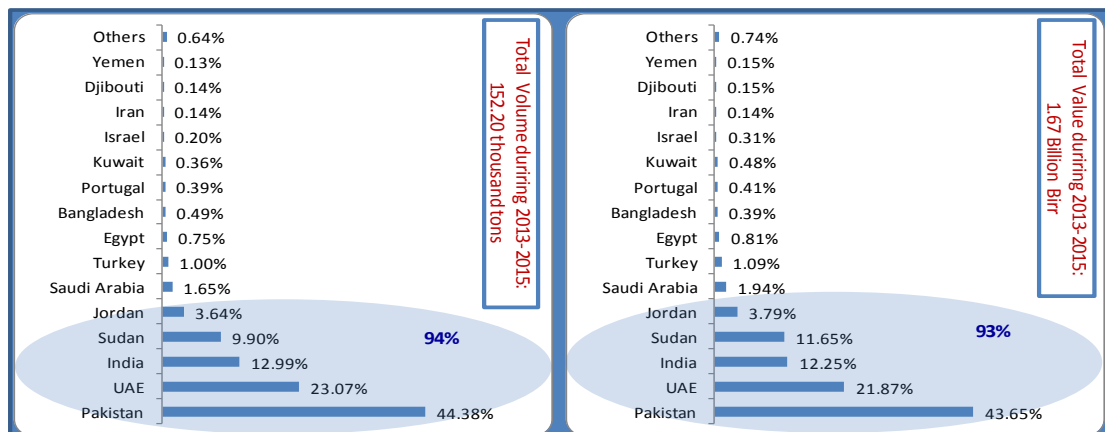
Source: Computed from ERCA Data, (2015).
 Figure 6. Ethiopian Chickpea Export Trade

Kabuli types chickpeas accounted for 56% of the total export volume while

the remaining was Desi types. One of the major limitations of Ethiopian

chickpea export arises from the fact that the largest proportion has been sent to low value chickpea export destination markets (Figure 7). Evidences showed that about 94% of the total Ethiopian chickpea export during 2013-2015 was sent to Pakistan (44.4%), UAE (23.10%), India (13%),

Sudan (10%), and Jordan (3.64%). Moreover, yearly export fluctuation has been an apparent feature where export performance is highly influenced by weather condition in South Asia and Australia and demands in South Asian markets.



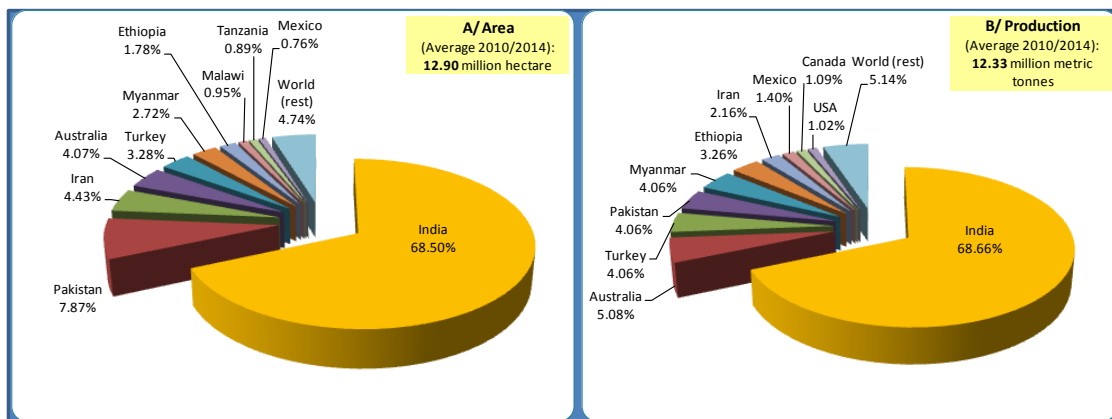
Source: Computed from ERCA Data, 2015).

Figure 7. Major Ethiopian Chickpea Export Destinations Markets (2013/2015).

Major competitors in Global Chickpea Markets

Chickpea is the second major pulse crop in the world with a total production of 12.33 million tons from 12.90 million ha of land (FAOSTAT, 2017). While there are no precise data showing global chickpea production disaggregated into desi and kabuli types, some estimates showed that Kabuli types account for 15 to 30% of world chickpea production while the desi type accounts for the remaining proportion (Knights *et al.*, 2007;

Reddy *et al.*, 2007). Globally, India is the leading chickpea producer contributing 68.7% of world chickpea production followed by Australia (5.10%), Pakistan (4.1%), Turkey (4.1%), and Myanmar (4.1%) (Figure 8). Here, the top-10 producing countries all together covered 95% of the world chickpea production. Ethiopia stands sixth among the major chickpea producing countries by accounting for 3.26% of global chickpea production.



Source: Computed from FAOSATA.

Figure 8. Major Chickpea Producing Countries in the world (average 2010/2014)

Unlike production, the scenarios for global chickpea export trade are completely different. For instance, the average global chickpea export trade during 2010/13 was estimated at 1.8 million tons per annum worth of 1.12 Billion USD where Australia was the leading chickpea exporter contributing 41.53% of global chickpea export volume (Figure 9). The other major chickpea exporting countries are India, Russia, Mexico, Argentina, Ethiopia, USA, Canada, Myanmar and Tanzania. The top 10

chickpea exporting countries alone accounted for 94% of the world chickpea export market share. Russia has been emerging as the new strong competitor next to Australia in terms of price and volume of chickpea export and it is important to note that although Ethiopia's chickpea export market share still remains very limited, it has been improving and reached 4% of global chickpea export market share which is much better than early 2000s below 2% export share.

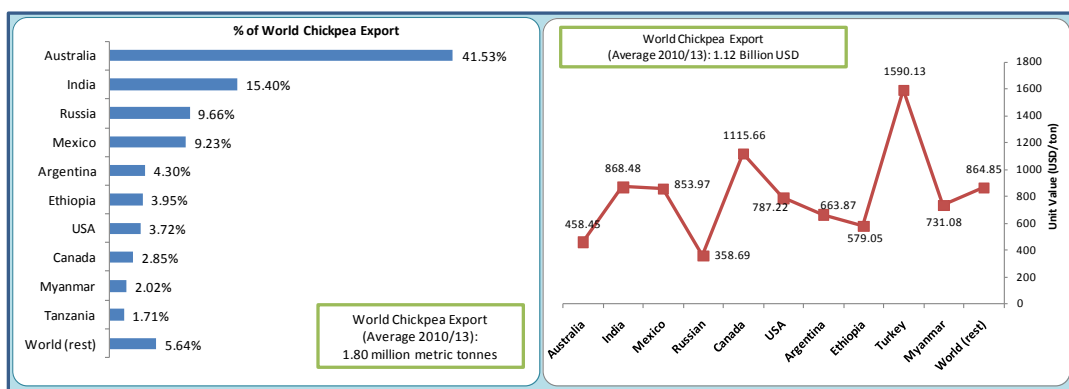


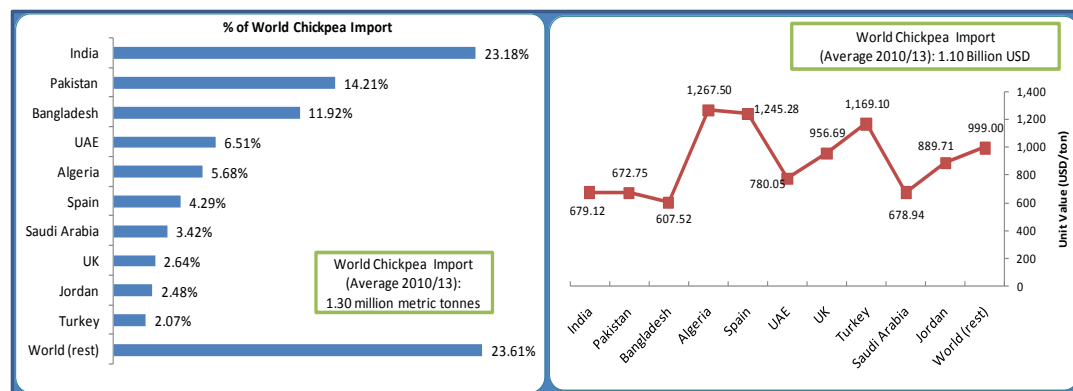
Figure 9. Global Chickpea Export Trade (2010-2013). (Source: Computed from FAOSATA)

The largest global chickpea destination markets are India, Pakistan and

Bangladesh accounting for 49.31% of the world chickpea import (Figure 10).

Other major chickpea importing countries are in Middle East, North Africa and some European countries. The largest chickpea destination market, the Indian sub-continent, pays

lower unit value (between 600 and 700 USD ton⁻¹) as compared to those high value markets in North Africa and Europe (Figure 10).



Source: Computed from FAOSATA
Figure 10. Global Chickpea Import Trade (2010-2013).

Competitiveness of Ethiopian Chickpea Export

While Ethiopia is listed to the top-10 chickpea producing countries, its export market share has been very low (<4%). So, it is important to understand whether Ethiopian chickpea production is competitive in export markets or not. Accordingly, the DRC value (0.20) indicated that Ethiopian chickpea is highly competitive in major chickpea export markets (Table 2). This further implies

that Ethiopia's resource endowments in terms of soil, agro-ecology and labor enable the country to produce chickpea at comparatively lower costs than other countries. Therefore, Ethiopian chickpea is highly competitive in external markets. This is in conformity with the largest proportion of Ethiopian chickpea export trade to low value export markets in Asia and the Middle East.

Table 2. Policy Analysis Matrix for chickpea, 2015 (values in Birr/ha)*

Price	Tradables		Domestic Resources		Profits
	Output	Inputs	Labor	Capital	
Private Price	21,500.00	2,855.50	7,670.00	380.81	10,593.69
Social Price	32,750.00	3,059.89	5,752.50	45.84	23,891.77
Divergences	-11,250.00	-204.39	1,917.50	334.97	-13,298.08

*The DRC value was computed using the returns to land and management obtained from chickpea enterprise budgets in both private and social prices

Conclusion

Chickpea is a strategic commodity that could greatly contribute to the commercialization of smallholder farmers and generation of foreign exchange revenues. There has been a significant upswing in the trends of local chickpea prices both in nominal and real terms since the last eight years. As a result, chickpea has become an important cash crop in high potential major chickpea growing areas where farmers dispose the largest proportion of their chickpea production for marketing purpose. And yet, price fluctuation is also an apparent problem which is closely associated with the export market influenced by the production situation in major chickpea growing countries. Since Ethiopia is a price taker in export market, high export demand usually causes to increase the local price and vice versa. One of the major challenges of the chickpea sector is related to the bulk of the chickpea trade being supplied to the local markets. Moreover, while the trend of chickpea export has been on the increase, the largest proportion was sent to low value chickpea export markets in the Indian subcontinent and Sudan. Yearly fluctuation has also been an apparent feature of Ethiopian chickpea export where export performance is highly influenced by external factors from major chickpea export markets. Despite with all those challenges, Ethiopian chickpea export

is highly competitive in international markets. However, concerted efforts should be made to improve the competitiveness of the chickpea value chain in terms of quality, volume, and continuity.

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