



Value Chain Assessment Study of Groundnut in Northwestern Ethiopia

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Authors' contributions

This field research work was carried out in the collaboration between two authors. Both authors discussed and designed the field study program. Two authors conducted the field experiment by prepared checklists and collected both primary and secondary data from respondents. Author AG conducted data management and analysis. Author AG managed, organized and wrote the first draft and collected literature reviews from different sources. Author ET reviewed and put his constructive comments. Finally, two authors conferred, read and approved the ultimate structure of the article.

Article Information

DOI: 10.9734/BJEMT/2017/28238

Editor(s):

(1) Choi Sang Long, Department of Business Administration, Universiti Teknologi Malaysia, Malaysia.

Reviewers:

(1) Zsuzsanna Bacsi, University of Pannonia, Hungary.

(2) Timothy A. Okeowo, Lagos State Polytechnic, Ikorodu, Nigeria.

Complete Peer review History: <http://www.sciencedomain.org/review-history/18029>

Short Research Article

Received 10th July 2016
Accepted 17th October 2016
Published 3rd March 2017

ABSTRACT

This value chain analysis and assessment research study has been carried out to identify the main casts and their key activities in the product flow of groundnut commodity. In Ethiopia about 40,000 ha of arable land is covered by groundnut per annum and about 70,000 tons of yields have been harvested, but the national average yield was nearly 0.8 ton/ha, still its productivity was very low. Metekel zone is one of the most groundnut growing areas in Ethiopia. In Metekel zone, the main groundnut value chain players/actors were producers (farmers and investors), traders/grain merchants, unions, truck owners, drivers and input suppliers. Service providers of groundnut value chains were Research Centers, Bureau of Agriculture (BoA), Commercial Bank of Ethiopia (CBE), Nongovernmental organizations (NGO's), Unions, Rural saving and credit institutes and other governmental offices. This field research work has been conducted by arranged one-day focus group discussion (FGD) program venue at Pawe town. The FGD program has been comprised fifteen stakeholders brought together from three districts in Metekel zone. Before, the focus group

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discussion program we have interviewed respected respondents from four rural districts; Pawe, Dangure, Mandura and Dibatie by prepared checklists to assess the capacity of local organizations and the roles of groundnut value chain actors at producers and traders level. In our assessment study, results revealed that in Metekel zone 2011, 2012 and 2013 main cropping season 243.805, 308.765 and 458.640 tons of groundnut yield was harvested respectively, among those products more than 76% was produced for market to get cash. The major challenges of groundnut value chain in our study areas; were productivity declining, high amount of rainfall or weather fluctuation, high weed, diseases and insect pest infestation, unavailability of production and post-harvest technologies, price slump down or market inconsistency, lack of infrastructures and so on. During our assessment study, the linkage of groundnut value chain actors was not well organized even the products flow only in one dimension without supporting forces.

Keywords: Groundnut; metekel zone; value chain; business model; production economics.

1. INTRODUCTION

Groundnut or peanut (*Arachis hypogaea* L.) is the sixth most important oilseed crop in the world. It contains 48-50% oil and 26-28% protein and is a rich source of dietary fiber, minerals, and vitamins. Groundnut was grown on nearly 25.45 million ha worldwide with the total production of 45.23 million tons and an average yield of 1.777 tons/ha in 2009 [1]. Groundnut has several uses. For people in many developing countries, groundnut is the principal source of digestible protein (25 to 34%), cooking oil (44 to 56%), and vitamins like thiamine, riboflavin, and niacin [2]. In many countries, groundnut cake and haulms (straw stems) are used as livestock feed. Groundnut is a high-value crop that can be marketed with little processing; however, it is extremely versatile and can be used in a wide range of products. In Ethiopia groundnut is grown and covered nearly about 40,000 hectares of arable land per annum and the major growing areas were; Eastern Hararghe, Metekel zone, and Eastern Wellega but currently this figure was doubled. Groundnut production being expanded due to its high market value and resistance to drought [3]. Under optimum condition, improved groundnut varieties/cultivars in Ethiopian condition give a potential pod yield as high as 6 tons/ha. The national average yield was nearly about 0.829 ton/ha, still, the productivity is very low which compared to America, Asia, and Australia, so it needs breeders' maximum effort to improve productivity. The nuts are eaten raw as a spike at farm gate level, boiled or roasted and also used for confectionery and curries food preparation. The green haulms make excellent fodder and hay for livestock. Benishagul-Gumuz region, Metekel zone is one of the areas of Ethiopia blessed with tremendous potentials for groundnut production both at small scale and at commercial level [3].

Groundnut is nutritious and high-value crop of in the semiarid tropics. It has a high potential in marginal areas where other crops fail to perform well. The area under groundnut cultivation was estimated about 49,603 ha with a production of 71,606.80 tons with an average dry pod yield of 1.44 t ha⁻¹ in 2010/11 main cropping season [4]. Nevertheless, this figure was grown to 79,947.03 ha and annual production of 112,088.724 tons with a productivity of 1.402 tons per ha in Ethiopia during 2013/2014 cropping season [5]. However, this amount is far lower than the country's demand of groundnut seeds for food, oil processing and export. To fulfill this demand, the country concerted effort should be made in different systems. The current research areas of groundnut in Ethiopia is northwestern Ethiopia Benshangul Gumuz region (Metekel, Kemashi and Asossa zones), Eastern Harargie, Gojjam, SNNP, Oromia (Wellega, around Awash), Gambella, Afar (Wrerer) and other similar areas of the country. Haramaya University had a mandate of groundnut national project coordinating with the collaboration of Pawe, Werer & Asossa Research Centers. Pawe and Asossa research centers now doing various research activities in collaboration with Haramaya University viz; variety development, variety adaptation trials, breeder seed maintenance and rejuvenations, technology demonstration, multiplication of breeder, pre-basic and basic seeds of already existing and new released varieties, providing technical support and consulting services for small scale farmers and other respected stakeholders in the region. In Metekele zone at previous time almost no value chain assessment research study has been carried out in the groundnut commodity, therefore, we understood that this area needs value chain research work to benefit respected stakeholders. The objectives of this study were

(1) to identify the main groundnut value chain actors and their key roles and (2) to make a set up for further integrated value chain research in the future.

2. MATERIALS AND METHODS

2.1 Study Area Description

Metekel zone is one of the three administrative zones in Benshangul Gumuz region of Ethiopia, which is the former name Metekel province. It is bordered on the south and southwest by Kemashi, on the west by Sudan, and on the north and east by the Amhara region. The Abay River divides the zone's boundaries with Kemashi, while the Dinder River defines part of its boundary with the Amhara region and the administrative center of Metekel zone is Gilgil Beles. Based on the Central Statistical Agency of Ethiopia (CSA) [6], this zone had a total population of 276,367, of whom 139,119 are men and 137,248 women. 37,615 or 13.61% of population are urban inhabitants. 58,515 households were counted in this zone, which results in an average of 4.72 persons to each household and 56,734 housing unit. The five largest ethnic groups reported in Metekel zone were Gumuz (36.78%), Shinasha (21.6%), Amhara (17.39%), Awi (11.33%), a subgroup of Agew and Oromo (11.09%); all other ethnic groups made 1.81% of the population. Main

languages are Gumuz (36.31%), Oromo (19.89%), Amhara (18.21%), Shinasha (12.81%) and Awigna (10.91%). Majority of the people worshiped Ethiopian Orthodox Tewahido Christianity (54.49%), Muslim (20.31%), traditional religions followers (17.65%) and Protestant (6.36%) [7], the following geographical map indicates value chain studied areas.

The major farming systems being applied in Metekel zone were mixed type; both crop-livestock husbandry and the crop production was rain fed based and zero-tillage being practiced by Gumuz community. During the previous decades most of farmers practiced shifting cultivation system. However, currently this shifting cultivation agriculture has been changing to mixed farming systems with both crop and livestock cultivation. In this area, the majority of households were very poor. Now farmers 'struggle to achieve food security and self-sufficiency by pushing and supporting capacity building programs of the government and other aid organizations. Small scale farmers currently producing high amounts of groundnut & other cash crops, however, were not fairly benefited because, most of the produced grain yields were sold in their local market to traders and grain collectors at unfair price due to lack of sufficient infrastructures like; roads and market access [8].

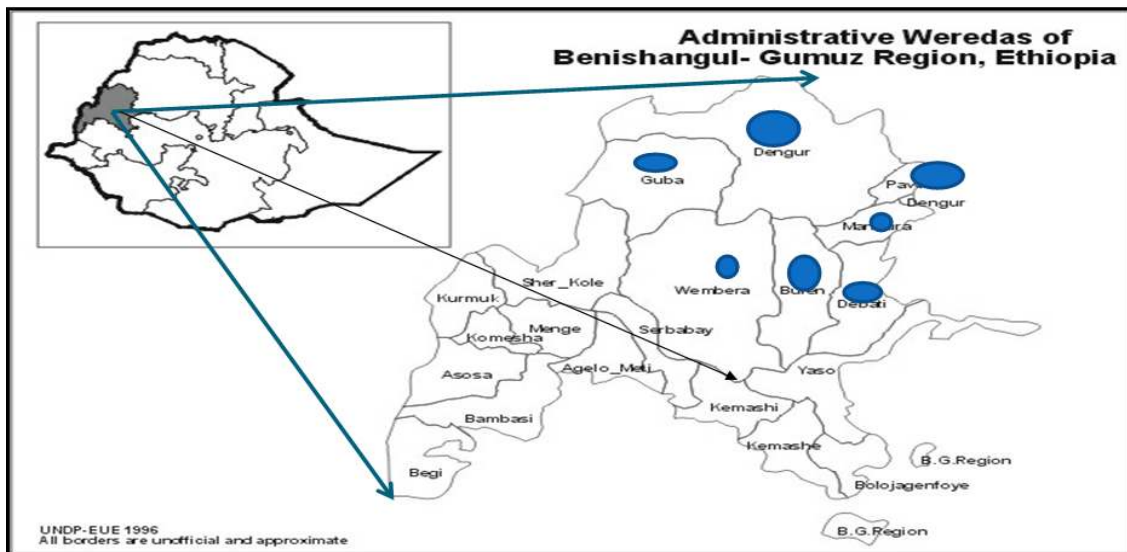


Fig. 1. Benshangul Gumuz National Regional State, Metekel zone geographical map
The blue dot on the map indicates Metekel zone districts

Table 1. Groundnut value-chain main actors and functions

Actors	Functions
Producers	<ul style="list-style-type: none"> ⇒ Manage farm level production process ⇒ Determines quality of oilseeds during seed selection and production process especially threshing ⇒ Pack and stored ⇒ Deliver it either to local collector or local wholesalers ⇒ Commercial farmers deliver their product to central market traders in Addis Ababa or exporters
Collectors or local traders	<ul style="list-style-type: none"> ⇒ Collect, measure and pack the oil seeds` ⇒ Pay cash on delivery ⇒ Store grain ⇒ Deliver to local wholesalers ⇒ Sell oilseeds to local consumers
Local/Regional wholesalers	<ul style="list-style-type: none"> ⇒ Provide loan to paid when oilseeds are harvested: The products are sold to the wholesaler at the harvesting price and the rest of the product will be sold to the wholesaler at the prevailing price when the Farmer wants to sell. ⇒ Pay cash on delivery to the collectors or farmers who sell oilseeds to them ⇒ Deliver the product to central markets in Addis Ababa or sell it to processors in the regional market
Brokers	<ul style="list-style-type: none"> ⇒ Receive oilseeds transferred to them by the local/regional wholesaler. Such a transfer is arranged by telephone whereby the driver name, the plate code number of the truck, type of product and quantity is informed to the commission agent; ⇒ Facilitate the selling of the oilseeds; ⇒ Negotiate the price and effects of the selling ⇒ Deduct unloading cost and own services from sales values; ⇒ Transfer the balance to the local/regional wholesaler through commercial Bank of Ethiopia and other available banks
Central wholesalers in Addis Ababa	<ul style="list-style-type: none"> ⇒ Negotiate with the commission agents. ⇒ Pay cash to the commission agents on delivery of the product when received ⇒ Export or sell to processor factories
Exporters	<ul style="list-style-type: none"> ⇒ Maintain the quality of the product and pack it ⇒ Deal with export clearance ⇒ Pay necessary fees for export ⇒ Export the product and remit the income
Processors	<ul style="list-style-type: none"> ⇒ Buy the oilseeds from producers or wholesalers ⇒ Process the seeds (extract oil/roast, etc.) ⇒ Sell the processed product to retailers/supermarkets or directly to consumers
Consumers	<ul style="list-style-type: none"> ⇒ At farm gate level consumers mostly farmers start to consume in the form of raw ⇒ Farmers in their house eating groundnut in the form of raw, boiled and roasted ⇒ Ultimate or final users of the processed product, both urban and rural people buy and consume



Fig. 2. Focus group discussion (FGD) workshop participants drawing business model map and crop calendar in March 2014

2.2 Stakeholder's Selection

Groundnut value chain assessment focus group discussion (FGD) workshop has been performed at Pawe town 17 March 2014 venues at Green hotel. This legume value chain development workshop comprised 15 stakeholders; viz; small and large scale producers, traders, cooperatives, unions, district and zonal bureau of agriculture (BoA) expertise, microfinance officers, research centers and aid Nongovernmental organizations (NGO's). During the focus group discussion workshop the participant members have been organized as follows; two farmers from Mandura district, three traders and producers from Pawe district, two traders from Pawe district, three government expertise (district BoA, Microfinance and Unions) from Pawe district, two expertise from Metekel zone BoA (Agricultural Extension's and Cooperative officer), one private farm 'New hope' and two NGO's Gilgal ICEP and Mizizgo Mandura district project were gathered and actively participated during the focus group discussion program and the following pictures showed participants during discussion.

In groundnut value chain analysis study seven actors are clearly seen very active those are: Original producers, local grain assemblers/collectors, wholesalers/ dealers, retailers, cooperatives, processors and exporters [9]. Moreover, each value chain stakeholders play their own vital roles in the production and marketing flows of the crop, in some case service providers act as a part of value chain players [10].

3. RESULTS AND DISCUSSION

3.1 Production

In Ethiopia groundnut is predominantly grown in Hararghe, Metekel, Wolega and Gojam. Although, the country has the potential to produce close to 500,000 tons per year, according to an estimate made by the Central Statistics Agency (CSA) [11], 40,000 ha of land in the country was covered by groundnut and nearly about 70,000 tons was produced annually. According to Babile Agricultural and Rural Development Bureau report, from the total farmland of 21,500 hectares, 8,600 hectares (more than 40%) were covered by groundnut in the fiscal year of 2009/2010. The other districts near to Babile are Gursum and from its total agricultural land, 35% (5,750 hectares) were covered by groundnut. According to these two districts, Agricultural Bureaus report 1ton/ha were expected production, which implies these two districts alone can produce more than 15,000 tons annually. On the other hand, another two districts found in the northwestern Ethiopia called Guangua (Chagni) and Pawe showed that 3,759 and 5,000 hectares of land were covered by groundnut in 2009/10 main cropping season respectively and expected to produce about 17,000 tons and productivity has been expected 1.94ton/ha, almost doubled in northwestern Ethiopia compared to the eastern part of the country. In general, the study areas alone produced more than 65,000 tons of groundnuts per annum of the total production of the country [12].

In Metekel, zone groundnut is a cash crop produced by small-scale farmers. In this region small-scale household farmers, produce groundnut for income generation and household consumption. BoA reports [13] indicated that groundnut production increased year after year, which were 243.805 ton in 2011; 308.765 tons in 2012 and 458.640 ton in the 2013 main cropping season (pre harvest data) respectively. In northwestern Ethiopia Benshsngul Gumuz region especially in Metekel zone and Awi zone (Jawi and Zigum districts) groundnut production was estimated to give about more than 50% of the whole production in Ethiopia; for example in Metekel zone 46,000 tons and in Guangua (Chagni), Zigum and Jawi districts about 24,300 tons, a total of 703,000 tons of groundnut were produced in 2013 main cropping season. The interviewed farmers said that “groundnut was very feasible and productive crop in the northwestern belt of the country, but it has production constraints like; high weed infestation, poor market access, declining of production and productivity due to reduction of soil fertility, lack of awareness for household consumption”. The main actors of groundnut production were input suppliers

like; seed sources from Pawe Agricultural Research Center, district and zonal BoA offices, cooperatives, NGOs, traders etc. In this area groundnut farmers used 7.1% of their output for household consumptions, 16.6% for seed purposes and the rest 76.3% for sale in their local market or to villager traders; wholesalers for example; Pawe district farmer's sale their products at Pawe town mostly on Saturday market.

3.2 Consumption

In Metekel, zone groundnut consumption is started at farm gate level in the fresh form as a spike. Farmers locally consume groundnut raw, boiled and roasted. In Metekele zone 7% of groundnut products consumed in household level, especially in the Gumuz community the product was highly consumed at fresh level. This showed that groundnut is affordable a good source of protein rich food and cash/ income generation, directly contributing to the food security. Consumers in both local and international markets purchase oilseeds for consumption both processed and unprocessed forms.

Table 2. Projected demand for groundnut commodity

Year	Projected demand (Tones)			Market share of envisaged plant
	Domestic demand	Export demand	Total	
2005	3952.50	500.97	4453.47	132.67
2006	4067.13	533.53	4600.66	230.03
2007	4185.07	568.21	4753.28	237.66
2008	4306.44	605.15	4911.59	245.58
2009	4431.33	644.48	5075.81	253.79
2010	4559.83	686.37	5246.21	262.31
2011	4692.07	730.99	5423.06	271.15
2012	4828.14	778.50	5606.64	280.33
2013	4968.16	829.10	5797.26	289.86
2014	5112.23	882.99	5995.23	299.76
2015	5260.49	940.39	6200.88	310.04
2016	5413.04	1001.51	6414.55	320.73
2017	5570.02	1066.61	6636.63	331.83
2018	5731.55	1135.94	6867.49	343.37
2019	5897.77	1209.78	7107.54	355.38
2020	6068.80	1288.41	7357.21	367.86
2021	6244.80	1372.16	7616.96	380.85
2022	6425.89	1461.35	7887.25	394.36
2023	6612.25	1556.34	8168.58	408.43
2024	6804.00	1657.50	8461.50	423.08
2025	7001.32	1765.24	8766.55	438.33

Source: [14]

3.3 Marketing Systems

The domestic demand of groundnut was influenced by population size and income, the 2.9% population growth rate is used in projecting the domestic demand of the product. Based on the proportion of the region's population amount taking into account the significant potential of the region, the region's share is estimated to be 5% of the total projected demand for the product. The following Table 2 showed the projected demand of groundnut commodity in Ethiopia from 2005-2025 fiscal years.

3.4 Product Distribution and Transaction

According to the marketing interview survey indicated, that the average price of groundnut for the region especially in Metekel zone; Pawe district was minimum ETB 7.75/kg and maximum ETB 13.25/kg. In Metekel zone, a huge amount of groundnut was produced in each year and the product was being sold in local markets for local grain collectors. Those traders collect groundnut grains from 20 villages of Pawe district and finally they were sending to Bahir Dar, Gondar, Wello, Mekele and Addis Ababa Central Market Mesalemia, Merkato and Ehil berenda. The transporting system of traders was by used ISUZU FSR, FVR and EURO TRUKERS. In Pawe district cooperatives and unions are available in each village but; still they could not give enough services to connect farmers with markets; especially soybean and groundnut commodities. The major partners of traders were; farmers, different level traders, processors, consumers, exporters, supermarkets, vehicle owners, drivers, Commercial Bank of Ethiopia (CBE). In Benshangul Gumuz region, there were no processors and exporters, due to this reason all groundnut products should be transported and sold for regional and central market Addis Ababa traders, exporters and processors.

3.5 Local Traders

In Metekel zone; Pawe, Mandura and Dibate districts more than 140 groundnut grain assemblers are found, for instance; in each three districts over 20-30 local traders were available. The collectors most often reside the benefits of the producers; while the local traders are resident in the district towns or shires. Both collectors and local traders have limited capital and business skills to collect adequate amount of

grain, due to this case, they must depend and rely on the wholesalers who live in the district town or neighboring big towns like, Chagni (for Guba, Dibate, Zigem and Mandura districts), Gilgelbeles and Pawe (Pawe, Dangur and Jawi). Although the functions of local traders and collectors were almost similar, but, their status is different: All the local traders are licensed while not all the collectors were licensed. Collectors/local traders had lack of capitals especially; in terms of finance and storage, they highly depending on the wholesalers. Based on the price information delivered to the collectors, they were to determine the buying prices of grains, so advanced traders covered their operation costs and profit margins. The interviewed respondent farmers stated, "the local traders and collectors earned a profit margin of ETB 2000-3000/ton". In Metekel zone, Pawe district in each 20 shire communities at least one and more than one local traders were found, those local trades collect the produced grain yields of groundnut and other crops by used Mule wagon and head carry, after gathered they sell the products in village-7 town to advanced grain traders/wholesalers. Village-7 traders collect groundnut grains from each community; finally, the collected grains amount 9-40 ton; then the traders call ISUZU FSR, FVR or EURO TRUCKS for transporting to regional and central market through their receiver brokers.

3.6 Retailers/Dealers

Those traders in this region play vital roles acting as a bridge for commodity exchange, especially cash crops like groundnut and sesame. The major activities of retailers were to collect grains from each locality traders in Metekel zone from different districts and rural community traders; after finishing of collections/gathering they try to communicate with their regional and central market brokers to know about the current prices given for that commodity, if the price is fair they try to sell; but when the current prices are not attractive, the traders try to hold the product. The main functions of retailers were distributing cash to local traders, give loans for farmers and community traders and take grains during production season, and store them within their own warehouses. After collection, they sell for regional processors like Bahirdar, Gondar, Mekele and Wolo traders and processors or in Addis Ababa through their own agreed brokers and received the cash through

Commercial Bank of Ethiopia (CBE). The major partners of retailers were small grain traders, farmers, large-scale traders, processors, whole sellers, exporters, vehicle owners and drivers.

3.7 Wholesalers

In northwestern Ethiopia, wholesalers are most probably found in Pawe, Jawi, Dangur, Gilgelbeles and Chagni. Those wholesalers buy groundnut products from local traders and collectors and they could sell it in different regions and Addis Ababa central market. Sometimes the products were also sold to Mekele, Gonder (for edible oil extraction), Addis Ababa and Sudan. Most of the oil seeds traded in Chagni come from the Benshangul Gumuz (BG) area including Awi zone like; Jawi & Zigem places. The key informant wholesalers of grain in Chagni market estimated that the average supply of products marketed in Chagni was 300 ton/year, all of which were coming from Metekel zone (Bulen, Mandura, Dibate and Guba districts). Wembera district products were usually transported and sold to west Wellega zone in Oromia region by crossing Abay rivers, some Guba district groundnut products sold to Sudan through Alimhal Monday market, and some part of Guba and Pawe district product sold to Bahir dar, Gondar, Wello, Mekele and Addis Ababa. The 2009/2010 market assessment survey indicates that; about 63% of groundnut product was transported to Gonder for cooking oil extraction. Some 12% was exported to Sudan through the western border Alimehal market while the rest (25%) is sold in Addis Ababa [8].

3.8 Cooperatives and Unions

Ethiopian government established a lot of cooperatives and unions but most of them had weak capacity to implement their responsibilities. In Benshangul Gumuz National Regional State, cooperatives are established in each zonal administration and district level. In Metekele zone in each seven district cooperatives are established and in each community administration level unions established to assist local farmers. The purpose of the two organizations was to supply inputs and create market linkages between farmers and traders, processors or even exporters. In Metekel zone, six districts (Pawe, Mandura, Dangur, Dibatie, and Bullen & Wembera) have their own markets

but in Guba district still there is no market, people of this district sell their products without any fixed market places. In Pawe district, there are five market days within a week; in each market day, groundnut marketing takes place throughout the year. And other five districts had more than one market day a week. In Guba district there is a small market place near to Sudan border which is called Alimehal Monday market, in this market, the citizens of Ethiopia and Sudan exchange goods. Farmers of Metekel zone probably have no sufficient market access. Cooperatives and unions of this area have not enough capacity to create a marketing network due to poorly organized systems, financial limitations, lack of supporting organizations, and lack of well-organized human resources. It is strongly recommended that any aid organizations try to help those government offices to reduce the above-mentioned problems. Currently Asossa cooperatives have had a tremendous progress by getting an imported oil processor power plant, but in Kemashi and Metekel zone cooperatives have no modern processors power plant except some private processors like Pawe town Abewa edible oil processing and Chagni town volunteers group organized private oil processor.

3.9 Commission Agents/Brokers

Oil seed marketing in Addis Ababa was solely through commission agents or brokers who are sometimes not physically known with local traders. Without any official agreement between local traders and commission agents, this activity established through the mutual agreement or trust worked. The traders send their collected products to commission agents in regional and central market, the brokers received this product without any guarantee and sell to central market traders or processors or exporters in Addis Ababa. When the commission agent sold the product they charge ETB 50-100 /ton depending on the condition, sometimes they are charged ETB 50 and another time ETB 100/ ton for commission fee and unloading costs. After deduction of those costs, the brokers send money for regional wholesalers through Commercial Bank of Ethiopia Chagni, Gilgelbeles and Pawe branches. The proxy or agents also communicate the price information to the regional wholesalers to determine the purchasing prices in the local market. The information transfer is not systematic and consistent. The wholesalers sell groundnut products to

consumers, oil seed processors, sometimes to exporters.

3.10 Processors

Groundnut processors could be located in the region as well as outside the region. Groundnut produced in Benshangul Gumuz Region (BGR) and some parts of Amahara region like; Chagni, Jawi and Zigem areas were increasing. From the produced grain, a little amount was processed in local processors with mixing to noug and sunflower seeds like; Pawe town Abewa local oil processing, but currently this processor does not process enough edible oil because of poor feasibility due to the import of palm oils and consumers shifting to the cheap imported oil. Other local processors are found in Chagni town (Guangua district); this processor still processes groundnut grains mixing with sunflower and noug seeds for milling edible oil. Northwestern groundnut products sold to Gonder, Bahirdar, Wello and Mekele for local processing into cooking oil. Some groundnut was also sent to Addis Ababa for processing into different food items and sold for supermarkets. Oilseed processing like groundnut creates additional values in terms of employment creation, maintaining price of oilseeds by creating competitive market environment, import substitution which also saves foreign currency expenditure. Currently, cooking oil used in the country in general and in BGR (Benshangul Gumuz Region), in particular was imported from Asian countries, especially Malaysia.

According to the major traders in Assosa, cooking oil sold in the supermarket was imported from Malaysia and arrives formally via Addis Ababa and informally through Sudan border. Assosa town farmers' cooperatives and unions imported an oil extraction machine, which can use different oilseeds as raw materials. It has the capacity of milling 10ton/day of oilseeds to process and create employment opportunity for about 19 persons and also important for local producers they can easily access oil seeds in a potential markets in their locality. The oil supply modalities, standards, and quality assurance, labeling and packing size should be determined and adequately promoted. But; in Metekel zone, no processors are available to process groundnut and other oil seeds.

The Central groundnut processor in Addis Ababa is Hlina Belete Enriched Food Processing Plc., is one of those the main player in the value addition of groundnut. It produces plumpy nut and groundnut splits. It introduced the Sheba groundnut splits with three flavors salted, paprika and pepper, in April 2013, eight years after it started producing the plumpy nut. Hlina Enriched Foods Processing Centre Plc. was established in 2003 by six shareholders, with ETHB 1.6 million capitals, the company was one of the organizations selected by World Food Program (WFP) and UNICEF to supply 16.5 million dollars' worth of supplementary plump nuts, during the 2011/12 fiscal year. It also exports the Sheba groundnut splits to the Middle East and Yemen. The Company processes 1,800 tons of groundnuts per year. It imports close to 11% of its annual demand, which is 200 tons, from India and China, when the local supply decreases in summer. The growing price of groundnut in the international market is due to the quality of groundnut supply both domestically and internationally. The company gets its local supply directly from groundnut farmers in Harar, Gambela, Pawe and Gojam, over 40,000 groundnut producer farmers.

Another groundnut processing company found in Addis Ababa city is Moon Packed Foods plc. The company processes 6 tons of groundnuts per year, which is only 20.8% of its capacity. Moon Packed used to buy its groundnut product from Harar, four years ago. The involvement of brokers in the supply chain makes it difficult for small scale companies, like Moon Packed, to buy groundnuts at an affordable price, however, the general manager of Moon Packed Plc. said that 'brokers are buying groundnut yield from the local traders, who collect it from the farmers and sell it to exporters or for the wholesalers in Merkato,'. This system makes it difficult to find groundnut yield in fair prices, most of the groundnut is exported, reducing the volume of groundnut available to local processors, said that the company. The export data obtained from the Ethiopian Revenues and Customs Authority (ERCA) supports local processors claim. During the 2011/12 fiscal year [11], Ethiopia exported 42,250 tons of groundnuts, which is 57.8% of the total production, earning ETB 7.2 million. However, the country imports 25,000 tons of groundnuts during the same period. Brokers, who

are involved in the market chain process, prefer to supply the product to exporters, rather than to local processors, because they can fetch a highest price in the international market.

3.11 Exports

Groundnuts produced in Benshangul Gumuz Region (BGR) are ultimately sold to local traders, consumers or exported official and unofficial bodies in different parts of the country. The trend of the oil seeds export is increasing. The international price of groundnut was increased from ETB 7 in 2005 to ETB 12.2 in 2010 and ETB 20-39 in 2012/2013, but in 2013/2014, the price fell to ETB 12-15 in central market Addis Ababa. Groundnut export declined between 2005 and 2008 and then increased 2009 [14]. In 2009; 134.9ton of groundnut was exported and generated ETB 1.5 million. Since 2005, Djibouti has imported about 63% of groundnut from Ethiopia followed by Yemen, which was imported

about 29 % of Ethiopian, export. The remaining 8% was imported by the Sudan, Netherlands, Saudi Arabia, United Arab Emirates and Italy. Ethiopia Pulse, Oil and Spice Processor Exporter Association (EPOSPEA) are one of the official groundnut and other cash crop exporter. This association exports groundnut both unshelled and shelled. Currently the groundnut exportation system was almost stopped due to the occurrence of aflatoxin and contamination on grain yields. The problems of aflatoxin occurred due to poor agricultural practice and post-harvest treatments leading to an infection by mould fungus *Aspergillus flavus* and *A. parasiticus* releasing the toxic substance aflatoxin (AFs). In Ethiopia, groundnut producer farmers spilt their products by soaking in to water to avoid hardness of shells for easy splitting. In addition to this, farmers assumed soaked nuts increase weight when sold to in the market and other reason of soaking groundnut in to water is that farmers have no post-harvest splitter/Sheller machines.

Table 3. Groundnut value additions, margins and production economics

Product cost	Unit	Groundnut	Sesame	Finger millet
Producer's margin				
Yield	ton/ha	1.5	0.6	2.8
Production cost	ETB/ha	10,950	7,450	12,350
Unit cost	ETB/qt	730	1,241.60	441
Selling price	ETB/qt	1050	3,500	600
Farmer's margin	ETB/qt	320	2,258.4	209
Gross profit	ETB/ha	15,750	21,000	16,800
Farmer's net profit	ETB/ha	4,800	13,550.4	4,450
Trader's margin				
Purchase cost	ETB/qt	1,050	3,500	600
Labor cost	ETB/qt	15	15	15
Taxes	ETB/qt	40	110	6
Transport	ETB/qt	100	100	100
Commission cost	ETB/qt	10	20	2
Loading costs	ETB/qt	8	8	8
Other costs	ETB/qt	20	20	20
Total cost of trader	ETB/qt	1,243	3,773	751
Wholesalers prices in Central market A.A	ETB/qt	1,350	3,850	850
Trader's margin	ETB/qt	107	77	99
Value added	ETB/qt	300	350	250

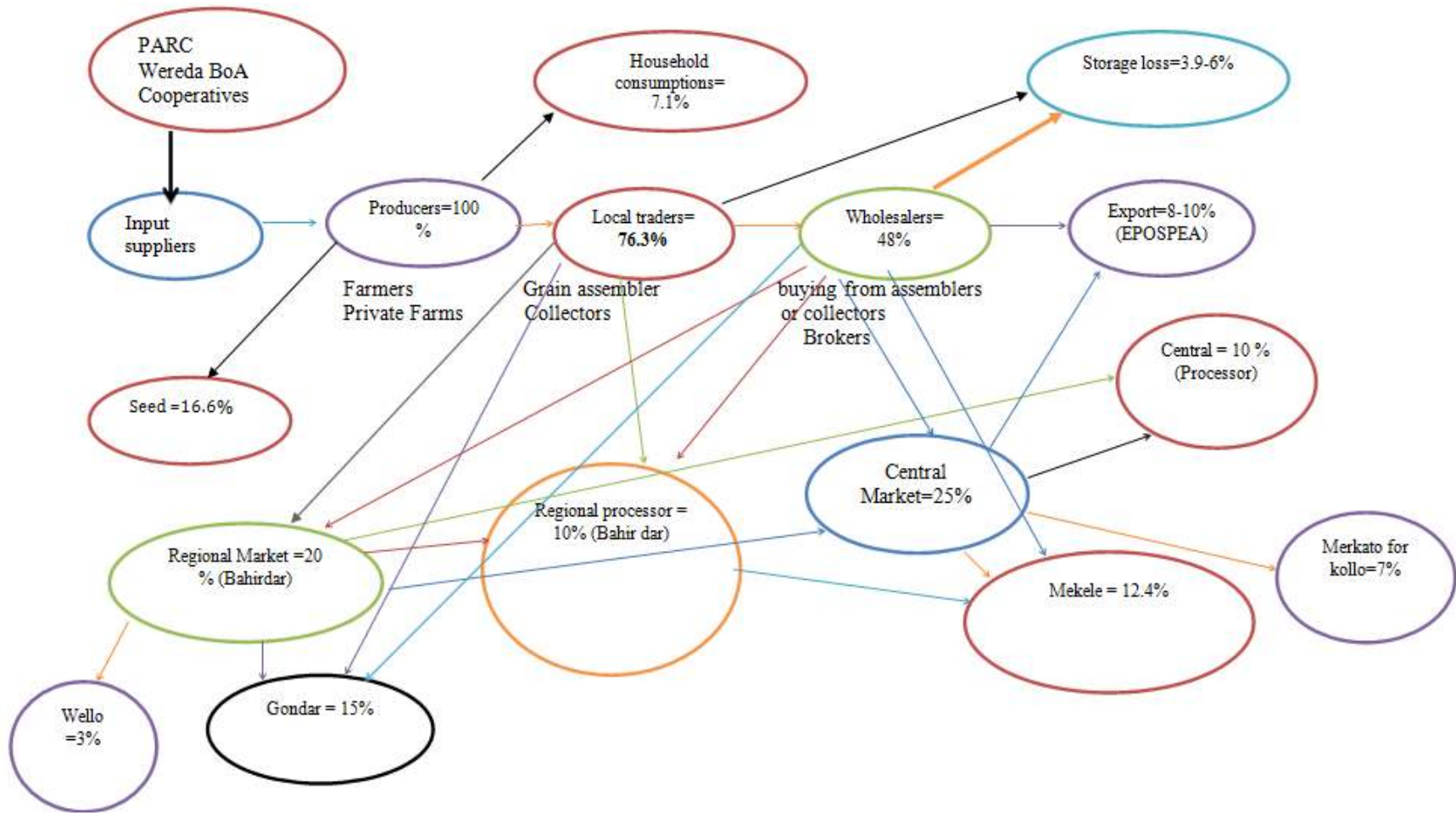


Fig. 3. Groundnut value-chain map

Table 4. Groundnuts trading business model canvas

<p>1. Customers segments: a. Intermediate trader b. Wholesalers c. Central traders</p>	<p>2. Value propositions: a. Produce quality seeds b. Packing, labeling c. Deliver high quality products</p>	<p>4. Channels: a. Cell phone b. Mule wagon/cart c. Lorry d. ISUZU FSR,FVR e. 10 Wheel VOLVO f. 20 Wheel EURO TRUCKS</p>	<p>5. Revenue stream a. Income generation from groundnut sold (ETB 7.25-13.25/kg) b. Commission fee (50-100 ETB/ton). c. Gain foreign currency when we export to other foreign countries d. Processing local industry (oil milling) use to reduce foreign exchanges.</p>	<p>7. Key activities: a. Prepaid and distribute funds for local traders/pity traders b. Collect grains from local farmers and pity traders c. Cost pro-forma collection d. loading and unloading e. Accumulate and arrange grains within own warehouses f. Cleaning, winnowing and sorting g. After gathering of 90-400 quintals, check the current prices from regional and central market brokers through cell phone. h. Finally send to central market Ehilberenda</p>
	<p>3. Customer relationships: a. Give seed loans for local farmers b. Give cash loans for customers c. Give sacks and other materials as a loan d. Deliver quality products for wholesalers, exporters and processors.</p>		<p>6. Partners: a. Farmers b. Pawe district and Metekel zone BoA c. Pawe district revenue and customs d. Pawe district microfinance e. CBE Pawe Branch f. Other traders g. Accountants h. Brokers</p>	
<p>8. Key resources: a. Cash on hands b. 50 or 100 kg balances / grain weight measures c. Linings d. Warehouses/stores e. Insecticides/pesticides</p>		<p>9. Cost structure: a. Commission fee(ETB 50-100/ton) b. Temporary and permanent hired labor costs/salary(ETB 1000-1500/month) c. Warehouse/storehouse and grain balance rent(ETB 1300-1500/month) d. Transporting cost (ETB 750-1000/ ton) e. loading and unloading cost (ETB 40/ ton) f. Tax fee g. Cell phone/phone cost (ETB 300-500/month) etc...</p>		

Table 5. Key challenges and opportunities of groundnut production, utilization and marketing

Supply chain	Challenges	Opportunities
Production	⇒ Poor production system	⇒ Pawe and Assosa Agricultural Research Centers established in BGR (Benshangul Gumuz Region) and they attempt to support or delivered improved groundnut varieties like; Manipeter, Bulki, Loti, Roba and etc... which were suitable for Metekel zone agroecology ⇒ Government policy was supported to increase production and productivity in the region ⇒ The area is the most potential for crop production especially oil crops ⇒ Farmers interested to engage in production of groundnut and other high value crops is encourage; ⇒ Most of farmers willing to expand and produce high market value crops especially sesame, groundnut and soybean ⇒ Local consumers market demands increased from time to time. ⇒ Increasing trends in export shows an increasing demand; ⇒ Demand for processed products with good quality has good demand in the local market
	⇒ Only use traditional agricultural inputs	
	⇒ High weed infestation	
	⇒ Lack of improved technologies	
	⇒ Productivity declining	
	⇒ Poor working habits	
	⇒ Lack of awareness about modern agronomic practices	
	⇒ High diseases and insect pest (termite) infestations	
⇒ Unavailability of input access		
⇒ Lack of post -harvest technologies		
Marketing	⇒ Low Market prices & demand	⇒ Increasing of locally supplied grains ⇒ Since large quantity of cooking oil in Ethiopia is imported, the local demand is high; Interest to access loan to overcome financial shortage is high. ⇒ In BGR Asossa farmer’s cooperatives and unions were created oil seed processors but in Metekele zone still no processors.
	⇒ Poor market information system	
	⇒ Lack of legal procedures between commission agents and traders	
	⇒ Poor product quality/grain deteriorations	
	⇒ Declining of Market prices	
	⇒ High Market fluctuation and instability	
	⇒ Poor storage shelf life and high weight loss	
	⇒ Poor financial capacity of local unions and cooperatives	
⇒ Lack of quality groundnut grains supply from local farmers and traders, it contains high inert matter		
Processing	⇒ Value addition along the supply chain is limited and most value addition is related to space utility	⇒ Increasing of locally supplied grains ⇒ Since large quantity of cooking oil in Ethiopia is imported, the local demand is high; Interest to access loan to overcome financial shortage is high. ⇒ In BGR Asossa farmer’s cooperatives and unions were created oil seed processors but in Metekele zone still no processors.
	⇒ Locally supplied grains are infected by fungus like aflatoxin	

3.12 Cost Benefit Analysis

Groundnut production in Metekel zone is common but in this area, the humid tropic leads to high level of weed infestation, so it increases production cost. The difference between the retailer and farmer's price represents the value added by the different market actors. The farmer's share in the marketing margin is represented by the ratio of the farmer's price and the retailer's price. The farmer's margin is the farmer's price less the production and marketing cost. The marketing margin of the other market actors was computed by deducting their costs from their sales prices. The contribution of the market actors were computed in a relative term. The cost benefit analysis or production of groundnut is good which compared to cereal crops like finger millet but it was worse than sesame. The producer's margin of groundnut production in Metekel zone was ETB 320 and trader's margin was ETB 107, but: the finger millet production margin was less than groundnut, which is ETB 209. Finger millet trader' margin was ETB 99. Sesame production margin was ETB 2,258.4. Trader's margin of sesame was ETB 77. The following Table 3 revealed that groundnut production was feasible in terms of productivity ranked first compared to sesame and finger millet, while in terms of production and traders' margin groundnut was worse than sesame and better than finger millet.

4. CONCLUSION

Groundnut is one of the oil crops grown in Ethiopia mainly in low land areas of the country. Different governmental and nongovernmental organizations try to support farmers in Metekel zone in different sectors particularly deployed on cash crops and food security crop production. Pawe Agricultural Research center and other organizations try to improve agricultural production and productivity through technology generation, demonstration and popularization, scaling up, scaling-out, and capacity building training, consulting, and market link on groundnut and other commodities and deliver other services in the region. According to Metekel zone BoA report productivity of groundnut was being increased, which was 1.3 ton/ha in 2011, 1.4 ton/ha in 2012 and 1.79ton/ha in 2013 in main cropping seasons respectively. Groundnut production and market business were feasible in our study areas but: it needs better technologies to improve its economic value. In Metekel zone

the production and marketing margin of groundnut implies that it is a feasible crop to produce and use for household consumption, income generation, the research did nothing about this aspect. So we conclude that in this area further groundnut value chain research will be needed to address the gaps and challenges of the value chain and to enhance the economic merit of this commodity for national economy improvement as well as to eradicate malnutrition problems of local residents.

ACKNOWLEDGMENTS

The authors would like to thanks:

- (1) Bill and Melinda Gates Foundation for financially supported this work.
- (2) The Embassy of Netherland Addis Ababa, Ethiopia Agri-business department for their endeavor effort and contribution.
- (3) Shay shone PLC. Addis Ababa, Staffs for their great contribution for the success of this report both financially and technical support.
- (4) Pawe Agricultural Research Center, for great commitment to support and provided valuable information for this report.
- (5) Assosa Agricultural Research Center, by offering technical resource person.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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Peer-review history:

*The peer review history for this paper can be accessed here:
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