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VALUE CHAIN ANALYSIS OF SESAME (SESAME INDICUM L.) IN SOUTH OMO ZONE, SOUTHERN ETHIOPIA

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Abstract: Sesame is the main cash crop in Ethiopia and it is mainly produced in northern and southern part of the country especially South Omo Zone. In the zone sesame is highly produced, but its production is not known regionally and at a country level. So this study was aimed to research sesame value chain of the Zone. Simple descriptive statistics and value chain approach were employed for data analysis during this study. It attempts to deal with mapping and identifying sesame value chain actors and their roles, examines marketing channel, cost margin structure and assessing challenges and opportunities within the study area. The results of the study indicated that out 5589.3 quintals were supplied to markets for various actors and five alternative marketing channels were identified to transact the sesame product through intermediaries. The most important volume of sesame (4900.8 quintals) was marketed through channel V and the lowest volume in channel I. Producers get the highest share in channel IV and the lowest in channel II. Barriers to entry traders into the market are that the capital requirement and therefore the wholesalers govern by volume transacted and internal control criteria within the market. Fertile land and high demand for the product were essential opportunity. Pests and disease, Low level of input utilization, Shortage of input supply and high price of inputs were the challenges of sesame production whereas lack of market information, price variability, delay of buyers, low bargaining power and poor product quality were the challenges of sesame marketing.

Keywords: Sesame marketing, Value addition, Value chain and Value chain actors

INTRODUCTION

Globally, the top five largest sesame producers are Myanmar, India, China, Sudan, Uganda and Ethiopia (Girmay, 2018). Evidence also indicated that Ethiopia ranked one of the 3rd highest sesame producer country in Africa (Hagose, 2017). In terms of oilseed export potential, Ethiopia is the third world exporter of sesame seeds after India and Sudan (Temesgen et al, 2017). Among the main export commodity sesame is the second major export cash crop in Ethiopia, next to coffee (Abebe, 2016). But sesame marketing in Ethiopia in general and in South Omo Zone in particular is hampered by a variety of constraints (FAO for United Nations, 2015).

Ethiopia is among the top five producers of oilseeds within the world. Sesame is among one of the oilseeds that Ethiopia is understood for within the international market. Within the previous couple of years, sesame production and marketing have shown very significant growth. Between the years 1998 and 2005- 2006, the entire area of production and therefore the quantity of sesame produced has grown threefold. As a serious producer of sesame, Ethiopia stands fourth within the

global sesame market following China, India, and Burma, respectively and national sesame production has quite doubled within the past 5 years. Ethiopia exports most of its products and is poised to become one among the highest two leading sesame-exporting countries within the world, with a rapidly growing export performance in recent years, destined for markets in middle east like China, Japan, Korea, Israel, and Turkey. Sesame is the major oilseed crop produced in terms of exports in Ethiopia, accounting for over 90% of the values of oil seeds exports (ATA, 2014).

In the Southern Ethiopia Nations and Nationalities Peoples Regional State, specifically, areas located within the gorges of Gibe, Gojob and Omo rivers and Hot to warm sub-moist and rift valleys are identified areas for sesame cultivation in which the production of sesame in South Omo Zone is not known nationwide. (Herald newsletter, September 2004 E.C). This study is especially focused on the sesame marketing value chain analysis within the South Omo Zone within the Southern nation nationalities regional state in which there is the highest production in the region but not known nationwide. The product of sesame from the Zone collected by local

collectors and exported to the central market of Addis Ababa and mixed with the products from other parts of the country. So among the available marketing study approaches, the commodity approach is used thanks to its combination nature of both functional and institutional approaches.

Because the worth chain is beneficial for identifying and categorizing input used, key producers, market players, supporting organizations and final consumers of the produce. The worth chain also illustrates different market channels that a product takes before reaching the ultimate consumer. Therefore this study is aimed to identify and map different actors within the value chain of sesame and various activities they perform, to identify and map the major destinations of Sesame in South Omo Zone and to identify the main constraints and opportunities of sesame production and marketing within the area.

MATERIALS AND METHODS

Study area and data collection

The study was conducted in two potential sesame producing districts of South omo zone. The study areas were namely Salamago and Bena-Tsemay districts. Salamago district is comprised 37% midland altitude and 63% of the area is low land with annual temperature which ranges from 20 to 37.5°C. The average altitude of the district is 971 m and receives bi-modal rainfall, in which the long rainy season is in the months of March to June, while the short rainy season occurs in the months of August to October (Alemayehu Mulugeta and Tezera Getahun, 2002).

Whereas Bena-Tsemay district is comprised (19%) Wey-nadega, (78%) kola and (3%) semi-arid with the mean annual temperature ranges between 17.6 °C and 27.5 °C. The altitude of the district ranges between 500m.a.s.l and 1558 m.a.s.l. and receives bi-modal rainfall distribution; the first peak, from mid-March to the end of April, is important for crop production, and the second peak, from mid-October to the beginning of November, is short and important only for pasture (Admasu et al., 2010). The two districts are the main potential producers of sesame in the Zone, in which their product is exported to Addis Ababa and then to foreign countries, but the product from the area is not differentiated and known at the national level.

Data type and source

Both Qualitative and quantitative data were collected from primary and secondary data sources in the study area. Primary data were collected from sesame producer farmers, traders, and processors. Whereas Secondary data were collected from the districts Agriculture and Natural Resource Management offices, Jinka Agricultural Research Center (JARC), Ethiopian Commodity Exchange (ECX) authority, nongovernmental organizations involved in sesame research in the study area as well as works of literature, reports, documents both from published & unpublished data sources.

Sampling procedures and Sample size

Multi-stage sampling techniques were employed to draw sample respondents. In the first stage, potential sesame producing districts were selected purposively from the Zone. In second stage, from each selected districts, two Kebeles were selected purposively supported sesame producing potential. Following to the present, sample size determination formula of Yamane (1967), which described below was wont to determine the sample size

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

Where, n = the sample size, N = total number of households, e = acceptable sampling error and therefore the value of 'e' is determined assuming 95% confidence level and it is e = 0.05. Sample size from each kebele was taken by using stratified sampling technique to the population size and eventually N = 126 sample respondents were selected using simple sampling method.

Method of data collection

Both formal and informal survey techniques were wont to implement this study. Regarding the formal survey, a structured questionnaire was developed and employed over the sampled households to gather data. On the opposite hand, some informal survey tools like FGD, KII were wont to generate data from the elders who know deeply the world during which he/she lives in it. In each Kebele, a complete of about 8-12 elder members participated in FGD during the survey time.

Methods of data analysis

The collected data were analyzed by simple descriptive data analysis methods. The descriptive methods such as mean, percentage, frequency and chain map were used. Analysis specifying the functions of each actor across sesame value chain described under the map. Economic parameters were used to analyze gross margins and producers share across the chain.

Marketing margin

Marketing margin of a given agricultural commodity is referred as the difference between purchase price and sale prices of the commodity through its marketing channel. Gross margin is calculated by dividing the gross income of the commodity or gross profit to the revenue earned from sales of the commodity. Then, multiply by 100 to give a percentage. The gross marketing margin (GMM) of sesame is given as:

$$GMM = \frac{\text{End buyer price} - \text{Seller price}}{\text{End buyer price}} \times 100 \quad \dots \quad (1)$$

The net marketing margin (NMM), which is the percentage of the final price earned by the intermediaries as their net income after their marketing costs are deducted, and is calculated as:

$$NMM = \frac{\text{Gross margin- Marketing costs}}{\text{End buyer price}} \times 100 \quad \dots \dots \dots (2)$$

The above equation tells us that a higher marketing margin along the chain diminishes the final producer's share and vice versa. This also provides information about welfare distribution among producers and marketing agents in the chain.

RESULTS AND DISCUSSION

Sesame production

In the year 2010/2011 cropping season, the total land under sesame production reaches 384,682 hectare and a total of 327,740.92 ton of benniseed has produced within the country (CSA, 2011). Despite, the production trends of sesame in 2011/2012 production year, its production and area under cultivation has declined by from 25.31% to 12.26%, compared to the preceding year. Accordingly, only 337,505.41 hectare of land has covered under sesame production and only about 2,447,833.59 quintal of output was produced, (CSA, 2012). This means not only the area under sesame cultivation and its production volume was decreased, but also the crop yield too decreased from 8.52 quintal/hectare in the year 2010/2011 to 7.25 quintal/hectare in the year 2011/2012, it declined by 14.9% (CSA, 2012).

Sesame is usually grown as a smallholder crop, and a serious aim was to extend yield or oil-content selectively within local cultivars within the context of sesame's place in local crop rotations. A serious drawback of local cultivars is that the mixture of colors in any seed sample, which reduces its commercial value. Selection within local sesame in Sudan showed that within a kind producing seed of 1 predominant color several strains might be isolated. These gave a highly variable yield, indicating that separation not only ensured the purity of seed color but by eliminating low yielding elements appreciably increased potential yield. Cultivation required for other crops like wheat, sorghum or similar small grains is suitable for sesame. Level lands are important to make sure even depth of planting, and lands could also be ridged to help drainage in areas where high-intensity storms are common. Seed quality is seldom a serious factor limiting yield and doesn't become important until the overall agriculture is raised. A serious agronomic factor-influencing yield is plant population, and for optimum yield, this must accurately be determined by trials with local cultivars and can differ if rain-grown or irrigated. Smallholder sesame is sown by hand and therefore the small seeds are often mixed with sand, soil or ash to extend the quantity and assist even distribution.

Figure 1: Production trend of sesame



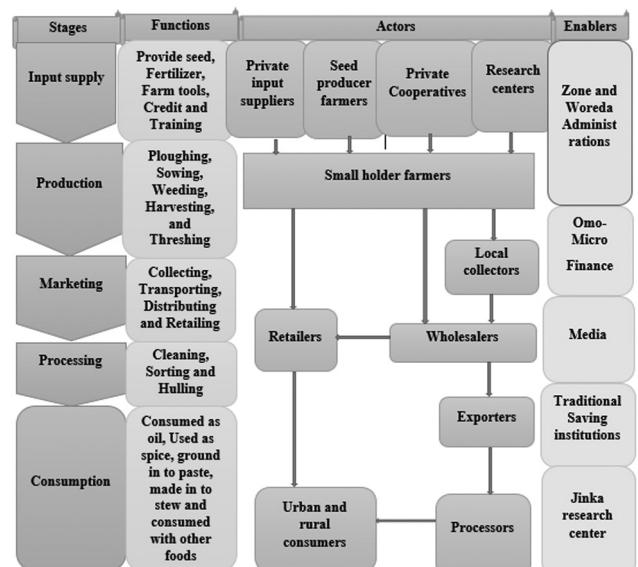
Source: Zonal agriculture and natural resource management office, 2020

The production of sesame in six consecutive years ranging from the year 2004/2012 up to 2009/2017 is shown in (Fig 1) above, supported this the quantity of sesame produced in 2004/2012 production year is 1733700 kg, which is that the lowest and within the years 2005/2013, 2006/2014, 2007/2015, 2008/2016 and 2009/2017 production years were 2845359 kg, 9564886 kg, 4855365 kg, 5391886 kg and 3163000 kg respectively. The very best amount of sesame was produced within the year 2006/2014 production year (unpublished Zonal agriculture and natural resource management office, 2020).

Sesame value chain map of the south omo zone

Value chain map is a potential starting point for the inclusion of actors in the chain such as; producers, traders, consumers, and other stakeholders in the chain (Lundy et al., 2014). Hence, value chain map used to start to present our results by mapping of the sesame value chain in the study area. The value chain map described in (Fig 2) cannot only applied to the study area but also be for the nation as a whole because sesame production, processing, and marketing situations are almost similar in all regions. The map involves functions undertaken by the actors and other service providers in the whole value chain.

Figure 2: map of the sesame value chain



Source: Survey data result, 2020

Main actors in sesame value chain

There are various actors in the sesame value chain. These include actors such as; producers, small traders (collecting middleman), Wholesalers/brokers, oil millers, retailers, local consumers, and exporters. They can be those that are directly involved in the value chain or indirect actors who provide financial or non-financial support services.

Input suppliers: - Input suppliers are those including private input suppliers, seed producers, primary cooperatives and research centers that supply essential agricultural inputs such as seed, fertilizers, farm tools, credit and training to the small scale farmers to increase the production and productivity of sesame.

Producers: - Producers are those small scale farmers who receive input from input suppliers, plow their farm properly, sow seed, weed their farm, harvest, thresh and sell their product to retailers, local collectors and wholesalers.

Local collectors: - Are small scale trading individuals, who collect the product directly from small scale farmers and resell to wholesalers. They act as a middleman between producers and wholesalers who do not add value to the product. This includes farmer's cooperatives and unions who involved in sesame collection.

Wholesalers: - Wholesalers are larger suppliers who have better capacities in terms of finance and other facilities. They resell the sesame seeds to exporters and processors.

Retailers: - Retailers buy the final products produced from sesame like oil and distribute to the customers or final consumers. They are registered officially for a certain line of products.

Exporters: - Exporters are business professionals who prepare and manage the shipment of sesame products produced domestically to other countries. In most cases, an exporter work with the buyer to process the order, then schedules the shipment and ensures that all the relevant paperwork associated with the process is properly filled.

Processors: - processors are those who participate in the Cleaning, Sorting, Hulling and extraction of Oil and other by-products from sesame.

Consumers: -consumers are the final or end-users of the sesame product in the form of Oil.

Sesame market channel

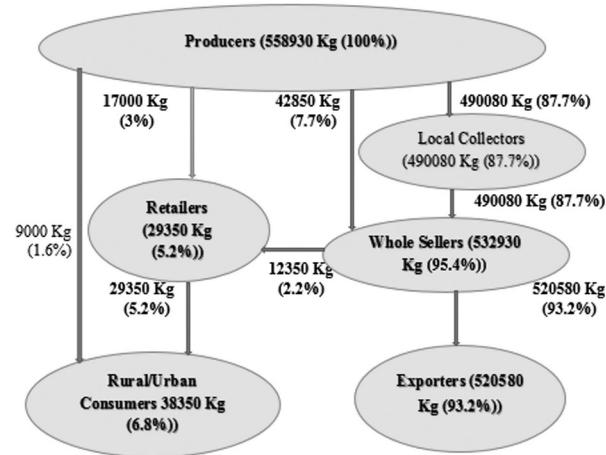
In the study area 5 alternative frequently transacted marketing channels were identified. The identified market channels were:

Channel I Producers → Consumers (90 quintals)
 Channel II Producers → Retailers → Consumers (170 quintals)
 Channel III Producers → Wholesalers → Retailers → Consumers (123.5 quintals)
 Channel IV Producers → Wholesalers → Exporters (428.5 quintals)
 Channel V Producers → Local collectors → Wholesalers → Exporters (4900.8 quintals)

Regarding channel comparison using volume of transaction from farmers' hand through traders as shown above, channel V carried the most important volume 4900.8 quintals thanks to the high capacity of local collectors directly purchased from farmers and passes through whole sellers' intermediaries to exporters. The littlest volume of sesame was

skilled channel I about 90 quintals. This was thanks to the tiny capacity of consumers in rural village markets purchased smaller quantity for consumption. Farmers sold 428.5 quintals of sesame to their wholesalers and 170 quintals passes through retailers to consumers and 123.5 quintals passes through retailers' intermediaries to consumers.

Figure 3: Map of the sesame market chain



Survey data result, 2020

Marketing costs and margin

Market channel comparisons in margin distribution were mad among major value chain actors. Consistent with Mendoza (1995) computing the entire Gross Marketing Margin (TGMM) is usually associated with the ultimate price paid by the top buyer and expressed as a percentage.

Table 2: Marketing costs and margins analysis at different marketing channels

Marketing margin analysis	Sesame marketing channels			
	Channel II	Channel III	Channel IV	Channel V
Producers price	2140	2600	3210	2720
Traders Price	3026	3445	3852	3625
Gross margin	886	845	642	905
Marketing cost	45	85	105	115
Net market margin	841	760	537	790
Producers share	70.72%	75.5%	83.33%	75.03%

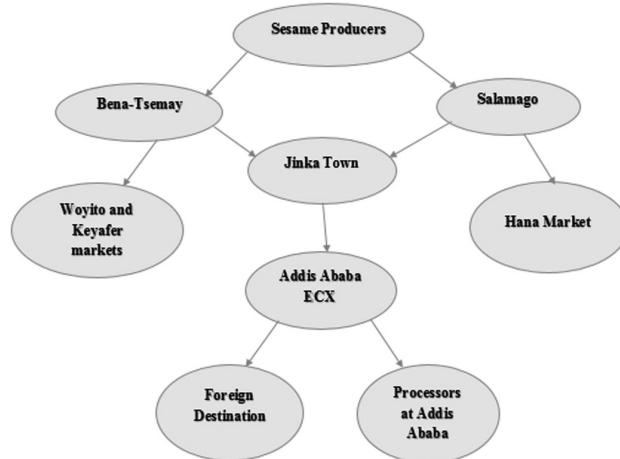
Source: Survey data result, 2020

Marketing costs and margins were calculated for the channels through which sesame were passes. The producers share in channel II, III, IV and V were 70.72%, 75.5%, 83.33% and 75.03% respectively. Producers get the highest share in channel IV which is 83.33% and the lowest share in channel II which is 70.72%. This means the involvement of intermarries between producers and wholesalers or exporters lower the share of producers, so the producer sells their product through the right channel from which they get the highest share. This means producers sell their produce to whole sellers, then directly from whole sellers to exporters.

Marketing destinations of sesame

Farmers in Ethiopia mainly produce sesame for the export market (Alemu and W.Meijerink, 2010). Salamago and Benatsemay districts are the main sesame producing areas in South Omo Zone (Fig 4).

Figure 4: Market Destinations of Sesame in South Omo Zone



Source: Survey data result, 2020

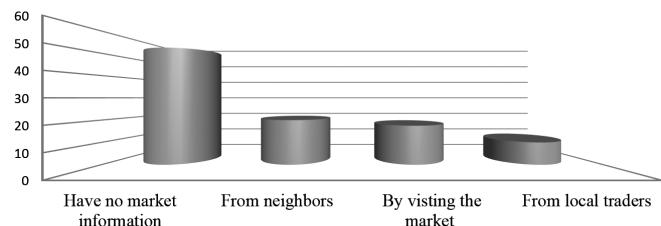
At the point of production sesame were collected by local collectors and transported to Jinka town, then traders transport from Jinka to Addis Ababa ECX warehouse. Currently, the main Ethiopian sesame imported countries are China which is the largest import market for Ethiopia's sesame followed by Israel, Turkey and Jordan in 2011, respectively (Ethiopia Revenue and Custom Authority, 2012), and some of the sesame seed processed at Addis Ababa in domestic industries. At the point of production small amount of sesame were also sold at local markets to consumers, who locally consume in different forms.

ACCESS TO MARKET INFORMATION AND OTHER SERVICES

Access to market information

Market information is crucial for agricultural products marketing. So reducing information gap and uncertainties that exist in the agricultural sector is very important. It's required by producers in their planning of production and way of marketing the product.

Figure 5: farmers access to market information



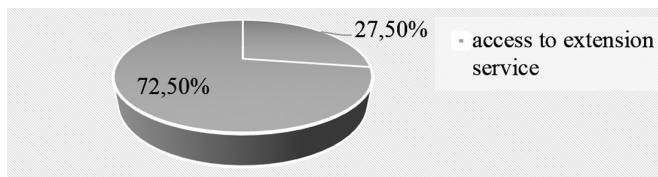
Source: Survey data result, 2020

Out of the total respondents, 52.5% do not have market information, while 20%, 17.5% and 10% of the sample respondents get market information from their neighbors, by visiting the market, and from local traders respectively. As indicated the majority of sample respondents in the study area have no market information. This has resulted in the low bargaining position of farmers due to lack of adequate market information. Sesame is the main export commodity that requires the dissemination of regular market information on regular bases.

Access to extension service

Access to agricultural extension services is expected to have a direct influence on the production and marketing behavior of the farmers. The higher farmers have access to extension service, the more likely that they adopt new technology and innovation.

Figure 6: farmers access to extension service



Source: Survey data result, 2020

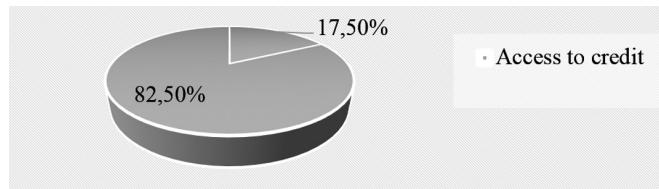
The result of this study indicates that out of the total respondents of sesame producing sample households, about 27.5 % of sesame producers had access to extension services provided by development agents of the kebele. The remaining 72.5% of sesame producing sample households responded that they did not receive any extension services from development agents.

Access to credit

Access to credit is one way of improving smallholder farmer's production and productivity. Farmers' ability to purchase inputs such as improved seed and fertilizer is tied with access to credit. Farmers having access to credit service can minimize their financial constraints and buy inputs more readily than those with no access to credit. Thus, it is expected that access to credit increases the production of crops in general and sesame in particular. Farmers access to credit from for-

mal institutions (banks, MFI, and cooperatives) and informal sources (Iqub, trader friends, relatives, and money lenders). Governmental and non-governmental institutions also provide credit to farmers.

Figure 7: farmers access to credit service



Source: Survey data result, 2020

Figure 7 above shows that only 17.5% of sesame producing farmers reported that they had access to credit while the remaining majority (82.5% of sesame producing sample respondents) reported that they have no access to credit to buy input that can be used for production like improved seeds and fertilizer. According to the sample respondent's response, access to credit is influenced by a lack of awareness creation and a negative attitude of farmers for credit access.

Transportation and access road

Ethiopia has a good main road infrastructure, although with 21 to 31 km/ 100,000 ha the road density is quite low considering the African average of 50 km/ 100,000 hectare (Winands, 2007). However, in the study area a little investment is made to improve further the road infrastructures.

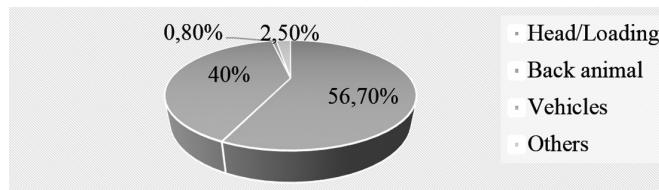
Table 3: Access road

Variables	Mean	Std. Dev
Distance to main road (in hours)	2.28	2.69
Distance of your residence to the nearest market (in hours)	2.50	2.93
Distance of your residence to the nearest development center (in hours)	2.67	2.95

Source: Survey data result, 2020

The mean distance in hours from the producing area to the main road, to the nearest market, to the nearest development center is 2.28 hours, 2.50 hours and 2.67 hours respectively with corresponding standard deviation 2.69 hours, 2.93 hours, and 2.95 hours respectively.

Figure 8: Means of sesame transportation



Source: Survey data result, 2020

The mean distance in hours from the producing area to the main road, to the nearest market, to the nearest development center is 2.28 hours, 2.50 hours and 2.67 hours respectively with corresponding standard deviation 2.69 hours, 2.93 hours, and 2.95 hours respectively.

According to the survey 56.7% of total sample respond that the transport of sesame from the producing area to the nearest market and woreda market of the zone, is mainly done by head/loading, 40% respond that they transport by pack animal whereas 0.8% by vehicle and 2.5% by others

Barriers to entry

The commonly known barriers to entry in the market in the study area are lack of capital, licensing and lack of access to road. From the respondents of sesame traders, trading license is the main important factor to enter in to trading of sesame. The traders residing in the town have grain trade license whereas the farmer traders, who reside in rural markets had no grain trade license. According to the survey result 77.5% of the sample traders indicated that lack of capital is one of the major constraints to enter trading. Lack of access to credit has been the single most constraint in startup. More over the remaining 22.5% of traders said that lack of access to road is the main problem, which needs series attention.

MAJOR CHALLENGES AND OPPORTUNITIES IN SESAME PRODUCTION AND MARKETING

Major challenges in sesame production and marketing

The major challenges in sesame production and marketing are identified as follows in the study area. Pests and disease during production, Drought, and Shortage of rainfall, Low productivity, Flood, Lack of improved seed or Low level of input utilization, Shortage of input supply, High price of inputs, Unexpected rain during harvest, Buyers come only during harvest, The need for cash during harvest, Price declines later, Fear of weight loss if stored, Fear of color change if stored, Thefts, Storage Pests, High postharvest loss, Lack of information on quality standard, weed problem, price fluctuation, Lack of loan service, Lack of updated market information, Insufficient or limited rural roads and transports, Limited modern market centers and Insufficient postharvest technologies, are the major problems faced by producer households in sesame production and marketing in the study area. Besides this, Lack of advanced value addition technologies and Lack of awareness and skill of value auditing activities are some of the problems related to sesame value addition

Major opportunities in sesame production and marketing

In the study area the better Opportunities for producers were; Availability of fertile land, less usage of chemical fertilizer, Low cost of production, Suitability of the environment, High demand for the product for traders or local collectors were Availability of the production and Better supply and

Market potential for domestic and export. Sesame is the most important oil seed export crop in Ethiopia and its contribution to foreign exchange earnings in the country has been increasing over the years. High demand for the product, Market potential for exports are better opportunities for sesame Exporters and High demand for processed products and Employments, High demand for quality oil is better opportunities for sesame Processor.

CONCLUSION AND RECOMMENDATION

Conclusion

Results from value chain analysis approach showed that input suppliers, sesame producers, local collectors, retailers, wholesalers, processors and consumers were the main sesame value chain actors identified in the study area. These actors play their significant roles in the value chain. Producers in the study area have different alternative marketing channels, but disproportional flow of costs and benefits was observed. Among alternative marketing channels the producers share is highest in channel IV which is 83.33 % and lowest in channel II which is 70.72% respectively. In channel IV producers sell their produce directly to exporter but in channel II there is the interference of local collectors that lowers the producers share.

On the other hand the highest volume of product were pass through channel V which is 490.08 quintals when producers sell their product to local collectors, local collectors collect the product and sell it to wholesalers then wholesalers sell to exporters and the lowest volume pass through channel I when producers directly sell to consumers. The market destinations of sesame is local collector collect from farm gate and transport to woreda cities, then from woreda cities to zonal city Jinka, the from Jinka to Addis Ababa, then finally they mixed with the products that game other places in Ethiopia and export to foreign countries. The problem here is the zone is potentially known in sesame production, but nationally not known do to mixing up of the product with products from other at Addis Ababa. The main barrier to entry traders into the market is the capital requirement and the wholesalers govern by volume transacted and quality control criteria in the market. Production and marketing opportunities were identified include conducive environment, fertile land and reduce use of chemical fertilizers as well as presence of potential sesame producers and suppliers in the study area, High demand for the product and Market potential for exports were the basic opportunity for traders business in the value chain. Pests and disease during production, Shortage of rainfall, low productivity, Low level of improved input utilization, Shortage of input supply and high price of inputs were the main challenges of producers and suppliers whereas lack of market information, price variability, delay of buyers, low bargaining power, weight loss and poor product quality were the main challenges sesame marketing.

Recommendation

Basing on the research findings the following recommendations were forwarded to improve the sesame value addition in the study area.

- In the study area there is no enough and timely supply of improved agricultural inputs, due to this sesame producer's use improve technologies under recommended rate. So the government and other relevant stakeholders should give more emphasis to the availability and use of improved seeds, fertilizer and other yield enhancing technologies, improved post-harvest practices and handling, options access to credit, possibilities to consolidate land for technology use and economics of scale, and further support sesame value chain. Such information may be included in state extension programs for dissemination to all stakeholders in the sesame seed value chain.
- As the production sites are agro-pastoral and pastoral area and there are no weather roads in the area the producers and traders experience transportation problems. So the expansion of weather road infrastructure to reduce transport costs, to attract private investment in the area and to facilitate the supply of labor as the production system is highly labor-intensive.
- As it is stated previously the study area are the main potential sesame producers in the Zone as well as in the region because trader transport it to the central markets and mix the product with that of other areas and in the study area there is no storage facilities. Due to this strengthening the currently started sesame marketing at district level market centers through the provision of the warehouses in the major producing areas, establishing an efficient supply chain that can benefit most to producers, Establishing branch ECX at regional level and create public awareness through different media and providing training producer to sell directly to the ECX.
- Producers sell their product at low price because traders come to farm gate and buy the product at the farm gate level and also producers do not get the central markets price information. Based on this the provision of updated and timely market information to the farmers will enable them to increase the bargaining power, value chain development intervention practitioners in sesame producing area should take in to account the main value chain actors in the study area while devising initiative strategies and awareness creation between producers to sell their product through a right channel in which they get the highest share.

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