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Value chain analysis of community-based chickpea seed the case of selected districts of Gurage Zone, southern Ethiopia

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Abstract

The study was aimed at analysing seed value chain of community-based chickpea in Selected Districts of Gurage zone. The objectives of the study was identifying chickpea seed value chain actors and defining their roles, analysing the market margin of actors, determinant factors and identifying constraints in the chain. A multi-stage sampling technique was implemented. The data were collected from both primary and secondary sources. Descriptive statistics, value chain and econometric analysis were employed to analyse data. Primary actors in the study were input suppliers, seed producers, collectors, wholesalers, South Seed Enterprise and final-use. The producer's share is highest in channel-IV, which is 83.3% and net market margin is 53.7% when producers sell their seed to South Seed Enterprise. The result of the multiple linear regression model indicates that market supply was significantly affected by level of education; quantity of seed produced, frequency of extension contact, district. Shortages of improved seed, climate change, and weak extension contact were main constraints in production. The major marketing constraints were weak market linkage, low price at harvesting time, insufficient handling and poor quality seed and lack of modern storage centres in the production area.

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Introduction

Chickpea is the third-largest produced legume in the world, next to faba bean and field pea (Gaur *et al.*, 2010). Ethiopia is the largest producer of chickpeas in Sub Saharan Africa accounting for over 90% of production and is ranked seventh globally (Kassie *et al.*, 2009). Chickpea is one of the major pulse crops grown in Ethiopia next to faba bean and haricot bean. In 2018, 683,814 farmers were produced chickpea and it covers 1.91% of the crop area and 1.63% of grain production (CSA, 2018). It is an excellent source of protein and improves soil fertility. Chickpea provide an enormous economic advantage to smallholders as an alternative source of protein and food security. With regard to economic importance, are used as source of foreign currency, means of employment and source of cash (Ferris and Kaganzi, 2008, Malunga *et al.*, 2014, Sarker *et al.*, 2014). Despite the importance, the national average yield is low, 19.69 quintal/ha for chickpea (CSA, 2018). The adoption of improved varieties was low mainly due to insufficient seed production and limited availability of quality seeds (Asfaw *et al.*, 2011).

The main reasons of chickpea production and marketing are insufficient seed production and marketing systems that limit the availability of quality improved seeds, lack of credit, late delivery, low performance of extension services, poor linkage between different actors involved in seed supply system, and farmers' socio-economic situation (Haile, 2010; Zewdie *et al.*, 2009). The main bottlenecks that hinder seed access are untimely delivery and inadequate supply of seed of improved varieties (Dawit, 2010). The government controls the seed industry, even though parastatal seed production and distribution has usually proven to be an ineffective system of seed supply (Bekele *et al.*, 2007).

Seed is one of the most important yield-enhancing inputs in crop production; provides the maximum limit of crop yield of all other production inputs, without seed farmers cannot be in production (Louwaars and De Boef, 2012). Seed system is complex organizational, institutional and individual operations associated with the development, multiplication, processing, storage, distribution and marketing of seed (Abebe and Lejalem, 2011). In Ethiopia relatively few farmers have the access to seeds of the improved varieties. Unavailability of quality seeds of improved pulse crops varieties in time, space and amount are among the major factors that contribute to low access to improved varieties. The participation of the private sector in the pulse seed business is negligible; serving less than 7% of seed demand (Asnake *et al.*, 2014). The supplies of certified grain legume crop seeds are less than 5% in Ethiopia (Zewdie *et al.*, 2008).

The seed system in Ethiopia classified in to three these are formal, informal and community-based seed system. The formal sector includes agricultural research institutions, the seed enterprises and a few private companies; while the informal sectors encompass large number of farmers, who continue to practice seed selection and preservation. The formal seed sector covers only 15% of the total national demand and is highly dominated by the public enterprises. Production of seed by ESE is dominated by cereals The capacity of the formal sector is unsuccessful in meeting farmers' needs and not well developed in many developing countries and mainly dominated by maize and wheat; the privet sector also not functioning competitively. The informal system is also incapable of producing improved quality seed. Thus, the informal seed system dominates the in African seed market. Therefore, investing in improved, higher quality, higher yielding seeds can be a primary strategy for raising productivity in Ethiopian smallholders (Dawit, 2010, Dawit *et al.*, 2010)

The third seed system in the country is community-based seed system; though not well developed the community-based seed system is an intermediate one between the formal and informal seed system. In this system seed multiplication is owned and managed by farmers for commercial intent and supported by NGOs and research centres. The roles of NGOs are to provide the financial assistance to community-based

seed Enterprises. This increase availability, accessibility and affordability of improved seed (Abebe and Lijalem, 2011; Thijssen *et al.*, 2008).

In the study area there is insufficient seed production and marketing systems that limit the availability of quality improved seeds, late delivery of input. There are unbalanced demand and supply of improved chickpea, insufficient supply of improved chickpea seed, poor linkages among actors and lack of appropriate marketing system. Producers' motivated by profit making. Improving input supply system, production, and marketing system and strengthening farmers' participation in seed supply to the market are key elements for proper functioning of community-based seed value chain. In study areas seed of improved varieties of chickpea have been supplied to the selected seed farmers by (Canadian International Food Security fund) CIFSRF.

The purpose of community-based seed value chain is to address problem of availability and access of improve seed. This operation is strengthened by value chain system; the value chain approach will help to transfer technologies that are needed by the final users. Forward and backward linkages among actors along in value chain will be required to bring better result for whole community-based seed value chain. Successful value chains depend on, coordination and cooperation between partners. In response of this fact, this study has been undertaken to narrow the research gap that has been observed in community-based chickpea value chain. It focused on identification of actors, their role in the value chain, analysing market margins along the value chain, analysing the determinants of chickpea supply to the market in the seed value chain by community-based seed producers and identified constraints and opportunity in the seed value chain.

Materials and methods

Description of the study areas

The research was conducted in to two district of Gurage zone namely Abeshge and Sodo districts. Abeshge is one of the Districts of Southern Nations, Nationalities and People's Region State (SNNPRS), in Gurage zone. It is located about 158 km southwest of Addis Ababa and 258.5 km northeast of Hawassa town, the capital of SNNPRS. The district is bordered on the south by the Wabe River which separates it from Cheha District, on the west and north by the Oromia Region and on the east by Kebena District. The District has 26 rural and 3 urban kebeles and has total population of 61,424 people, of which 32,450 (52.8%) are men and 28,974 (47.2%) women (CSA, 2007). The altitude of the District is varies between 1001 and 2000 m.a.s.l. The District has two agro climatic zones, Woina-dega (10%) and Kola (90%). Its annual rainfall varies between 801-1400 mm. The economy of the District is based on crop-livestock mixed farming system. The major crops produced in the District include maize, teff, sorghum, common bean.

Sodo is other District in Gurage zone and located at 100km to the southwest of Addis Ababa. The District bordered on the south by Meskan and on the west, north and east by the Oromia Region. Based on the 2007 Census conducted by CSA, the District has a total population of 134,683, of these 67,130(49.8%) were men and 67,553(50.2%) were women (CSA, 2007). The altitude of Sodo District is 1800-3400 m.a.s.l. The Agro-ecology classified into Woina-dega (65%) and Dega (35%) agro climatic zones and annual rainfall varies from801to1200 mm. The economy of the District is dominated by mixed farming. The major crops of include wheat, sorghum, barley, common bean, pea and chickpea

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Data type and sources of data

The study employed both qualitative and quantitative data and the sources of data were primary and secondary sources. The qualitative approach used Focused Group Discussion, key informant interview and whereas the quantitative approach employed questionnaire survey. The primary data were collected from seed producers, collectors, wholesalers, South Sees Enterprise (SSE) and end users. The survey was conducted through personal interview with randomly seed value chain actors by

using questionnaire. The Key Informant Interviews and focused group discussion was carried-out after survey data collection completed. Secondary data were collected from Districts Agriculture and Natural Resources office, SNNPRS Agriculture Bureau and Natural Resources, Hawassa University Canadian International Food Security Research Fund (CIFSRF) project. Relevant literature and documents were reviewed to provide theoretical background.

Sampling procedure and sample size
Multi-stage sampling technique was implemented to select sample households. In the first stage, two districts purposively identified out of total districts of Gurage zone. In the second stage, community-based chickpea producer *kebeles* were selected randomly. In the third stage, four *kebeles from Abeshge* and three *kebeles* from Sodo districts were selected randomly. In the fourth stage, out of the sampled *kebeles* community-based chickpea seed producers farmers were separated from none producers. In the fifth stage, out of the identified producers 136 community-based chickpea seed producer farmers were selected randomly (Table 1). Names of sample *Kebeles were Hudad-7, Boketa, Tewul-gefersa and Fenta from Abeshge and Gogetie-2, Kela-zuria and Negassa from Sodo District.*

Table 1. Sample frame

Data source	Sample size		Total sample size
	Abeshge	Sodo	
Producers	75	61	136
Collectors	7	6	13
Wholesalers	4	4	8
Consumers	8	6	14

The numbers of respondents were determined by using a formula developed by Yamane (1967). To determine the required sample size at 5% level of precision the following formula was applied:

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

Where: n = is the sample size,
N = is total number of seed producers farmers (210) in the selected *Kebele*
e = is the level of precision (0.05)

Methods of data collection
Development agents in each of study *kebeles* were trained for data collection. The questionnaire was pre-tested in each *kebeles*. Data were collected under intensive supervision and follow up of the researcher. Key informant interview was employed to get the supplemental information that shows current community-based seed value chain in the study areas. Focus group discussion was conducted in each selected *kebeles*.

Methods of data analysis
Descriptive statistics, inferential statistics and econometric analysis were employed to analyse the data. Thus; descriptive statistics, used percentages, means, so as to describing seed value chain actors, marketing function and household characteristics in the value chain. Whereas econometric analysis was used to analyse determinates of seed supply in the study areas.

Analysis of marketing margins
As products move successively through the various stages, transactions take place between multiple chain actors, money and information are exchanged along product flow (Kaplinsky and Morris, 2001). The four steps of value chain analysis were applied in this study:

1. Mapping the value chain to understand the characteristics of the actors and their relationships.
2. Analyse the distribution of benefits in the chain or market margin. This involves analysing the margins within the chain; who benefits from the chain and who would need support to improve performance and gains.
3. Defining upgrading needed within the chain. By assessing profitability within the chain and identifying chain constraints, upgrading solutions can be defined.
4. Emphasizing the governance role. Governance defines the structure of relationships and coordination mechanisms that exist among chain actors.

Estimates of the marketing margins are the best tools to analyse performance of market. Marketing margin

was calculated by taking the difference between producers and consumer prices. Mathematically, produces' share can be expressed as:

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

Where: PS= Producer's share, Pp= Producer's price, Cp = Consumer price and MM = marketing margin

Computing the Total Gross Marketing Margin (TGMM) is always related to the final price paid by the end buyer and is expressed as a percentage (Mendoza, 1995)

$$TGMM = \frac{Consumer\ Price - Producer\ Price}{Consumer\ Price} \times 100 \qquad (2)$$

Where, TGMM=Total gross marketing margin.

In analysing margins, first the Gross Marketing Margin (GMM) was calculated. This is the difference between producer's price and consumer's price (price paid by final user).

Gross Market margin will be computed as:

$$Y = X'ß + U$$

$$GMM = \frac{Consumer\ price - Marketing\ gross\ margin}{Consumer\ price} \times 100 \qquad (4)$$

Where, GMM = Gross market margin.

Net Marketing Margin (NMM) is the percentage over the final price earned by the intermediary as his net income; once his marketing costs are deducted. The higher marketing margin diminishes the producer's share.

$$NMM = \frac{Gross\ marketing\ margin - Marketing\ costs}{Consumer\ Price} \times 100 \qquad (3)$$

Higher NMM or profit of the marketing intermediaries reflects reduced downward and unfair income distribution. An efficient marketing system is where the net margin is near to reasonable profit.

Econometric analysis of market supply model
Multiple linear regression was used to analyse factors affecting community-based chickpea seed supply to the market in the study areas. This model is also selected for its simplicity and practical applicability (Green, 2003). The multiple linear regression model was specified as

Where Yi= Amount of seed supplied to the market, X'= a vector of explanatory variables, ß = a vector of parameters to be estimated and U = disturbance term (Table 2).

Results and discussion
Demographic characteristics of sample households
The gender representation of the respondents indicates 88% male and 12% female. With regards to level of education; 14.6%, 51.4% and 34% were attend non formal education, primary and secondary school, respectively. The average age of the respondents was 40 years and average years of farming experience in seed production were 2 years. The average family and land size of household is 5.5 and 2.2 ha, respectively (Table 3).

Table 2. Summary of dependent and independent variables used

Variable	Explanation	Category	Code and unit of easurements	Expected sign
Dependent variable				
VSSM	Seed supply to the market	Continuous	Quintal	
Independent explanatory variables				
Age	Age of Household Head	Continuous	Year	-/+
Sex	Sex of the Household Head	Dummy	0=Female 1=Male	
DMkt	Distance to Market	Continuous	Kilometre	-
Credit	Credit Access	Dummy	1=HH take loan 0=Otherwise	+
FoEC	Frequency of Extension Contact	Categorical	Number of contact	+
LEdu	Level of Education	Categorical	Number of year of schooling	+
Land	Land Size	Continuous	Total area of land in hectare	+
SFExp	Seed Farming Experience	Continuous	Year	+
QSPro	Quantity of Seed Produced	Continuous	Quintal	+
Family	Family Size	Continuous	Number	+/-
District	District of Household Head	Dummy	0=if Abeshge 1= Sodo	

**Table 3.** Demographic and socioeconomic characteristics of sample households

Variables	Items	Number	%
Sex	Male	120	87
	Female	18	13
	Illiterate	20	14.5
Education	Primary	72	52.2
	Secondary	46	33.3
		Mean	SD
Age		40	9.2
Experience		2	0.43
Family Size		5.5	2.1
Land size		2.2	0.9

Source: Own survey result (2020)

Value chain analysis

Mapping actors and identifying their role in the chain

According to UNIDO (2009), value chain mapping helps to identify the different actors involved in the value chain and understand the existing roles and responsibilities. Mapping seed value chain used qualitative and quantitative terms identified actors and map their roles and responsibilities. Hence, three major actor categories primary actors, chain supporter and chain influencer were identified. Four major roles and function was identified: input supply, production, and marketing and consumption. The value chain map of community-based chickpea seed in study area is shown in Fig. 1.
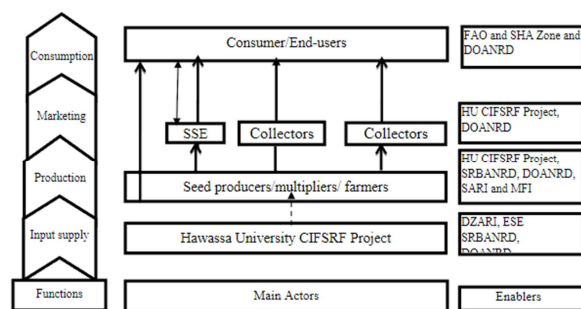
- - - ⇒ Represents physical flow of inputs

⟷ Two way flow of information and technology

⟶ Represent flow of seed

Fig. 1. Value chain maps of community-based common bean seed

Primary actors

Input suppliers

Hawassa University Canadian International Food Security Research Fund (CIFSRF) Project is the only input supplier and financial source for seed producers. The project cover input expenses. Farmers repay seed in kind during harvesting season without interest.

Producers

All community-based seed producers in Abeshge and Sodo Districts are small-scale seed farmers. Producers are the major actors who perform most of production functions from farm preparation to post-harvest handling and marketing of seed.

Local seed collectors

Seed collectors collect chickpea seed from producers for the purpose of re-selling it to final-users. The activities of collectors include purchasing and collecting and selling seed either to grain producers or wholesalers.

Wholesalers

Wholesalers purchase seed from producers and collectors during harvesting time and re-sell during production season at high price to grain producer farmers. The activities of wholesalers include purchasing and transporting, stocking and selling seed to grain producers.

South seed enterprise

South Seed Enterprise (SSE) purchase seed from producer farmers who can supply quality seed. Farmers submit seed to SSE with in specified day and the Enterprise purchase seed by premium price, 15% above grain price. The SSE purchase unclean seed and then transport, clean, and package, store and sell of clean and package at amount 25 kg and finally sold to grain producers.

Seed Users /Grain producer Farmers

Consumers or final-users are those purchasing the certified seed for grain production. About three types of seed consumers were identified: grain producer farmers, investors and NGOs. Grain producer farmer's purchase certified seed directly from producers, collectors, Wholesalers and South Seed Enterprise. In general final-users (grain producers) have their quality criteria to purchase seed.

Chain supporters

Hawassa University CIFSRF Project provides training and capacity building for experts on production and marketing of seed. Districts Agriculture and Natural Resource office provides extension and market information. SNNPRS Bureau of Agriculture and Natural Resources and District office of Agriculture and Natural Resources are playing facilitation role during input distribution. Deburezait Research Institute supplies early generation seeds to CIFSRF project.

Chain influencers

Field supervision, monitoring and quality controlling services were done by SNNPR Bureau of Agriculture and Natural Resources and in collaboration with Wolkite plant seed quality controlling centre. Decision on seed purchasing price by South Seed Enterprise was made by the committee established for buying price setting purpose. The smallholder farmers are not formally organized and due to low bargaining power they cannot governing the value chain, thus, farmers forced to sell their product at the price offered by collectors during harvesting time. There is weak linkage between producers and South

Seed Enterprise. Most producers' seed were failed because of poor quality of seed; however, produce sold to the collectors were mostly sold in food grain market with low prices. SSE was key value chain governor and seed market performance dependent on SSE, thus, the community-based seed value chains influenced by the South Seed Enterprise.

Represent flow of seed

Fig. 2. Chickpea seed marketing channel
Source: Own survey result (2020)

Chickpea seed marketing channel

In the agricultural production year total amount of chickpea seed production by sample respondents were 298.05 quintals. Out total production, 206.5quintals (69.3%) were supplied to the market. Four main alternative channels were identified for chickpea seed marketing (Fig. 2).

Table 4. Costs of chickpea seed value chain in Birr per quintal

Items	Producers	Collectors	Wholesaler	SSE
Purchase price	-	1650	1800	2500
Production costs	1130	-	-	-
Total marketing costs	53.25	50	150	193
Total cost	1183.25	1700	1950	2693

Source: Own survey result (2020)

Table 5. Marketing margin of chickpea seed in the value chain

Actors	Margins	Marketing channels and price quintal			
		I	II	III	IV
Producers	Selling price	1600	1650	1800	2500
	Value added	376.25	516.75	541.75	1330
	TGMM	-	25	21.7	16.7
	GMMp	-	75	78.3	83.3
	NMMp	26	28.3	34.3	52.7
Collectors	Purchasing price		1650		
	Selling price		2200		
	GMMcl		25		
	NMMcl		22.6		
Wholesalers	Purchasing price			1800	
	Selling price			2300	
	GMMcl			21.7	
	NMMcl			15.2	
SSE	Purchasing price				2500
	Selling price				3000
	GMMe				16.7
	NMMe				10.23

Costs and benefits of value chain actors

Farmers incur costs during production and marketing of their produce. The marketing cost of the chickpea seed mainly involves the cost of post-harvest activities. Table 4 indicates production and marketing costs related to the transaction of chickpea seed by producers, collectors, wholesalers and SSE.

Marketing margin can be used to measure the share (benefit) of the final selling price that is taken by a particular actor in the value chain. Gross Marketing Margin (GMM) is the percentage over the price earned by the producer/seller once his/her selling price is deducted. The producers share was found to be the highest in channel-IV which is 83.3%. This indicates that channel-IV provides producers with better share of value created. NMM also highest in channel-IV (53.7.6%) this is because seed enterprise directly purchases seed at highest price (Table 5).

Econometric model outputs

Determinants of volume of seed supply to seed market

Eleven explanatory variables were hypothesized to determine market supply of community-based chickpea seed in the study area. The numbers of significant variables were four. Level of education was significant at 10% significance level. District and frequency of extension contact were significant at 5% significance level. Amount of seed produced was significant at 1% significance level (Table 6).

Table 6. Determinants of volume of seed supplied to the market

Variables	Coef.	std. Err	p-value
District	.963	.450	0.037**
Age	-.011	.021	0.601
Sex	.402	.319	0.213
Leduc	.468	.269	0.088*
DMarket	-.119	.075	0.116
SFExp	.082	.265	0.757
FSize	.018	.069	0.789
LSize	.039	.165	0.813
ASProdu	.339	.102	0.002***
ACredit	.344	.382	0.372
FExt	.418	.176	0.021**
_cons	-.505	1.09	0.645
N		136	
R²		0.89	
Adj. R²		0.87	

Note: ***, ** and * are statistically significant at 1%, 5% and 10%, respectively. Source: Own survey result (2020)

District

The volume of chickpea seed supply in Abeshge District was less than by 0.963 quintals as compared to Sodo District, being other variables held constant.

Level of education (Leduc)

Education of household had been positively and statistically significant effect on chickpea seed supply to the market at 10% level of significance. As the sample household head education status increases by one level, the quantity of chickpea seed supplied to the seed market increases by 0.47 quintals, all other factors held constant.

Amount of seed produced (ASProdu)

Amount of seed produced significantly and positively affected volume of seed supplied to the market at 1% significance level. Thus, a quintal increase in the amount seed production has caused an increase of 0.34 quintals of chickpea seed supply to market and this was significant at 1% significance level.

Frequency of extension contact (FoEC)

It was positively and significantly associated with chickpea seed market supply at 5% significance level. This indicates that as the number of contacts of farmer with Development Agent increases by a time, the quantity of supplied to the market increased by 0.42 quintals of seed.

Constraints in the value chain

Production constraints

Amount of seed supplied to producers is inadequate and producers are not expanding production and supply of seed in the study areas. Accordingly, about 63.2% of the respondents responded that, as there is shortage of improved seed; the result has similar find as Dawit (2010) (Table 7). Due to involvement Agricultural development agents non-extension activities, the development agents not properly provide extension service for seed producers and some of development agents have no enough technical capability to support the seed producers; is similar as Zewdie *et al.* (2009).

Table 7. Major Constraints of community-based chickpea seed in production

Types of constraints	Response	Number	%
Late delivering of seed	No	-	-
	Yes	136	100
Shortage of seed	No	50	36.8
	Yes	86	63.2
Pest	No	94	69.1
	Yes	42	30.9
High rain-fall	No	112	82.4
	Yes	26	19.1

Source: Own survey result (2020)

Marketing constraints

Most of farmers need to sale early to cover their needs. However, purchase of seed by South seed enterprise is not conducted on time. Due to this reason seed purchased by collectors and wholesales at the price of grain during harvesting time. About 83.8% respondents mentioned the weak market linkage in the study area; the finding is in line with Zewdie *et al.* (2008; 2009). Poor farm management and post-harvest handling practice results poor quality seed, most of farmers produce poor quality seed and sold the product to by grain price. The collection centres are vital for marketing and quality preservation; however, poor storage result in poor quality seed. About 51.5% of respondents have no proper storage place for the produced seed (Table 8).

Table 8. Major marketing constraints of community-based chickpea seed

Types of constraints	Responses	Number	%
Low price at harvesting time	No	88	64.7
	Yes	48	35.3
Lack of storage	No	66	48.5
	Yes	70	51.5
Market Linkage Problem	No	22	16.2
	Yes	114	83.8
Seed quality	No	60	44.1
	Yes	76	55.9

Source: Own computation from survey result (2020

Conclusion

The major seed value chain actors in the study areas were input suppliers, seed producing farmers, collectors, wholesalers, South Seed Enterprise and final users. Hawassa University CIFSRF Project supply inputs while community based chickpea seed producers members involved in seed production. Farmers are small-scale and formally unorganized; Efforts should be made by government and CIFSRF Project to strengthen the yet infant seed producers to become organized seed producing and commercial seed producing Enterprise. Hawassa University CIFSRF project, Bureau of Agriculture and Natural Resources, Districts Offices are chain supporters. Seed regulatory authority, seed laboratory (Wolkite plant seed controlling centre) and research centres are chain influencers as they influence the quality and quantity of seed marketed.

The producer's share is highest in channel-IV, when producer farmers sale to SSE which is 83.3% and they get highest net market margin (53.7%) from channel-IV. The collectors and wholesalers purchase seed from the farmers at a lower price and sell to grain producers at higher price. The main reasons farmers sell seed to traders were due to late purchasing of seed by SSE and when rejected due to low quality of seed. The strong market linkages between producers and South Seed Enterprise needs to be enhanced by designing contract farming arrangements for mutually benefit and sustainability of production and marketing quality seed.

Market supply of chickpea seed is significantly affected by district attributed to agricultural potential which is related to environmental condition, seed production experience, amount of seed produced, and frequency of extension contact. Shortage of improved seed, weak extension service. The major seed marketing constraints are weak market linkage, low price, insufficient handling and poor quality seed that cannot meet standard and lack Modern storage facilities and this reduce market supply of seed and finally reduce profit of seed producers' farmers.

Production of seed should be according to Agro-ecology of Districts. Increasing the use of improved seed and farm management practices could increase productivity and amount of market supply. To maintain quality access to improved storage facilities should be enhanced at farm gate level and educating

producers on post-harvest handling activities of seed is the right pathway. Strengthen of linkages among community-based seed value chain actors shall be done. Strengthening extension contact by providing continuous capacity building and separating extension providers from other administrative activities should be done by Districts Agricultural and Natural Resources office.

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