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The role of smallholder bean farmers in determining farm gate prices for beans in Uganda

George Jjagwe^{1*} , Paul Kibwika², Robert Mazur³ and Haroon Sseguya⁴

Abstract

Background: Like for other agricultural commodities, the bean value chain involves a series of actors including; farmers as producers, middlemen, retailers, wholesalers and exporters. The study explains the common bean (*Phaseolus vulgaris*) marketing constraints faced by smallholder bean farmers and other actors in the bean value market chain that need redress for efficient and effective bean marketing in Uganda. Specifically, the effect of farmer bean production and marketing modes, and limited knowledge about bean market requirements on the final prices received for their beans and their limited ability to demand better prices is explained by the study. A descriptive cross-sectional design was used to collect data from 127 farmers (in strata of trained and non-trained farmers), 34 traders, five input dealers and 40 consumers, using semi structured questionnaires, and interview guides. Quantitative and qualitative data were analysed using SPSS and content analysis, respectively.

Results: Trained farmers produced more beans in the two seasons though the mean difference was not statistically significant from the non-trained farmers. Farmers determine the quantity of beans sold and not the prices. Both trained and non-trained farmers consider the price offered by traders through consultations. Most farmers individually sold their beans with little role in determining prices. Farmers formed groups to better access inputs and improve their bargaining power. Variety, price and quality influenced consumer purchase decisions. NABE 15 K132, NABE4, Yellow and white beans were preferred varieties. Trained farmers sold beans at a higher price of USD 0.505 per kilo gram, while non-trained farmers sold at USD 0.369 per kilo gram. The records kept by majority of the farmers pertain either to dates particular activities were executed or when they received visitors, and could neither be used in determining the bean prices nor costing production.

Conclusions: The constraints faced by the different bean actors provide a basis for developing bean marketing models. Addressing smallholders' marketing challenges will increase their incomes and boost production. Increase in income through increased prices for farmers will improve farmer living standards as they will be able to meet basic needs. The quantity increase in production will partly address the food insecurity problems through direct consumption and selling the excess to buy other desired foods.

Keywords: Farm gate price, Value chain, Smallholder farmers, Beans

Introduction

Uganda is among the leading five producers of common beans in Africa [4] and the second East African producer after Tanzania Akibode & Maredia, [2], Kilimo Trust, [8]. The crop is produced mainly by smallholders for food and the excess is sold to acquire other needs

*Correspondence: jjagwe2009@gmail.com; george.jjagwe@students.mak.ac.ug

¹ Department of Extension and Innovation Studies, College of Agricultural and Environmental Sciences, Makerere University Kampala, P.O. Box 7062, Kampala, Uganda

Full list of author information is available at the end of the article



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[1, 2, 9, 16, 17]. Hence, farmers need to get better prices for their beans. In Uganda, beans are consumed at least three times a week by most households but more consumption can be realized with constant and steady supply [16]. This is partly why only 20% of the total bean production is exported (Kilimo [8]). Beans are among the important non-traditional exports for Uganda [9] which signifies the importance of the crop in rural and urban areas especially among smallholder farmers. Although stress resistant and high yielding bean varieties are available, production is yet to match market demands. There is need, therefore, to increase commercial bean production for both local and export markets through multiple strategies including ensuring a profile and functioning bean value chain. This will certainly increase the income obtained by farmers and the country's foreign earnings.

Like for other agricultural commodities, the bean value chain involves a series of actors including; farmers as producers, middlemen, retailers, wholesalers and exporters (MAAIF, 2011). Under such an environment, the consumers prefer low priced beans propelling traders to search for low valued supply to profit from their businesses [7]. An interactive production and marketing system that is beneficial to all actors is necessary (Brennan, Previte and Fry, 2016) for sustainability Domegan, et al., [6]. Formalized institutions are also needed for actor interactions to be fruitful Kennedy, [7]. Bean prices fluctuate positively every year [2] but majority of the smallholders do not benefit from this fluctuation. In many parts of the country farmers usually sell their beans at low prices and buy expensive seeds at the time of planting. Along the bean value chain, prices are determined using any of the following ways: negotiation, relying on the market forces of demand and supply, sellers' and buyers' decisions (Kilimo [8]). In this regard, this study assessed how farmers influence the farm gate prices they receive for their beans. Additional factors considered by other value chain actors such as the different categories of traders and consumers were also analysed. The study also established the factors considered by different categories of traders and consumers from the farmers' perspective.

Marketing structure for Uganda's beans

Although liberalizing trade and agriculture mainly aimed at improving livelihoods, poverty levels in agricultural households are still high, partially due to low farm gate prices received by farmers [3]. This has propelled government to look for strategies to address marketing constraints at all levels, since the inability for farmers to access lucrative markets hampers the development of the agricultural sector (MAAIF, 2011). Like in many other parts of the country, smallholder farmers in Kamuli

district market their produce mainly through middlemen, but also directly to traders/processors or even consumers, where they often obtain very low profit margins compared to other players in the market value chain [11]. The competitiveness of smallholder farmers in bean markets can be enhanced if farmers are linked to lucrative markets to benefit from high prices. It should be noted that the beans are prone to several physical and chemical hazards that affect quality and safety along the value chain [1]. There is potential for bean farmers in Kamuli district to meet marketing requirements for consistent supply and quality of beans; however, this potential has to be boosted.

Despite the fact that farming is their major source of livelihood, the set of factors that explain the limited ability of smallholder farmers in Kamuli district to actively participate in and benefit from lucrative markets are not well articulated. Therefore, a bean value chain analysis was conducted to create a better understanding of factors that will enable smallholder farmers in Kamuli to benefit from lucrative markets and achieve better livelihoods. In view of the above, the study assessed the determinants of farm gate prices for beans and the role played by farmers in influencing these prices for improved bean production and productivity. The factors that determine farm gate prices offered to farmers and bean market prices to other value chain actors were also assessed.

Materials and methods

Study area

The study was conducted primarily in Kamuli district in eastern Uganda, with complementary activities conducted in Busia specifically targeting exporters. Kamuli District is one of the areas in Uganda, where beans are grown for both food and cash [12]. The district is a multi-ethnic and multi-cultural society. Over 63% of households in the study area produce beans, but only few save for commercial purposes (Uganda Bureau of Statistics (UBOS), 2017). The population of Kamuli District is estimated at 486,319 people (UBOS, 2020) of which 236,389 are males (www.kamuli.go.ug) with farming as their main economic activity [15]).

Sampling techniques and data collection

A cross-sectional survey research design was used employing both quantitative and qualitative data collection methods (interviews, and focus group discussions) to gather primary data from several value chain actors. Structured face-to-face interviews were conducted with the following bean value chain actors: bean farmers, traders and consumers. This was done to establish how the bean value chain functions, and to identify the roles played mainly by bean farmers in determining the farm

gate prices. One hundred thirty-six (136) farmers from Butansi and Bugulumba sub counties were randomly selected using the lists provided by the extension officer from a local non-government organization, Volunteer Efforts for Development Concerns (VEDCO). VEDCO is the organization that was responsible for implementing field activities mainly training for bean farmers as part of the USAID Pulses CRSP project. Out of the 136 farmers selected, 127 participated in the study; 64 of whom were trained and supported for bean production, use and marketing and 63 were non-trained farmers. In addition, randomly selected thirty four (34) bean traders and forty (40) consumers also participated in the study.

The traders that participated were of three categories; middle men, retailers and wholesalers. In addition, two categories of consumers participated in the study; household and institutional consumers. The institutional consumers for the study included five schools and five restaurants which were conveniently selected from urban Kamuli.

A pretested questionnaire was used to collect data on; farmer demographics, criteria for setting farm-gate bean prices, marketing challenges and opportunities, and what has been done by farmers to address the marketing challenges. Different questionnaires were used to assess the traders pricing criteria when buying and selling beans as well as for consumers when buying the beans. Two focus groups were conducted separately for farmers and traders for triangulation purposes. Additional, information was obtained from two key informants; the District Commercial Officer (DCO) and District Education Officer (DEO) to get more information regarding bean marketing in the district. The DEO was selected, because schools are the major institutional consumers supplied by farmers. Secondary data on bean marketing were obtained through reviewing existing literature.

Data analysis

Qualitative data from the survey were coded and together with the quantitative data collected entered in Statistical Package for Social Sciences (SPSS) and analyzed. Descriptive statistics and inferential statistics were used to explain farmer demographics, bean production, pricing, marketing and market information access and associations between the trained and non-trained farmers. Independent sample *t* test was used to compare the mean yields and prices obtained by trained and non-trained farmers. Excel computer software was used to generate figures. To validate the quantitative data from the survey, data from focus group and key informant interviews was analyzed as follows; field notes were filed chronologically and several readings conducted to familiarize with the data. A literal reading was then conducted to make

interpretive sense of the generated data, build explanations and arguments. Interpretive and reflexive readings were then carried out to further interpret the explanations and arguments by constructing and documenting a version of what data meant and represented.

Results

A number of actors are involved in Uganda's bean marketing value chain as illustrated in Fig. 1.

Accordingly, Uganda's bean market value chain has three primary actors; farmers, traders and consumers. Critical to note is that some farmers play all the three roles of the primary actors. Most consume part of what they produce and also sell and very few mainly produce for only marketing purposes. The secondary actors including; government, NGOs, financial institutions and media influence bean production and marketing. The government regulates production and marketing, financial institutions support production and marketing in form of loans. The NGOs support the smallholder farmers during production, while the Agro-dealers provide inputs including production information to farmers. Media especially radios help in dissemination of production and marketing information.

Bean production in Kamuli

Bean varieties grown by farmers in Kamuli

Beans were one of the major crops grown in Kamuli, and several bean varieties were grown by farmers. Table 1 presents the varieties grown at the time of the study and the proportions of farmers that cultivated the respective bean varieties.

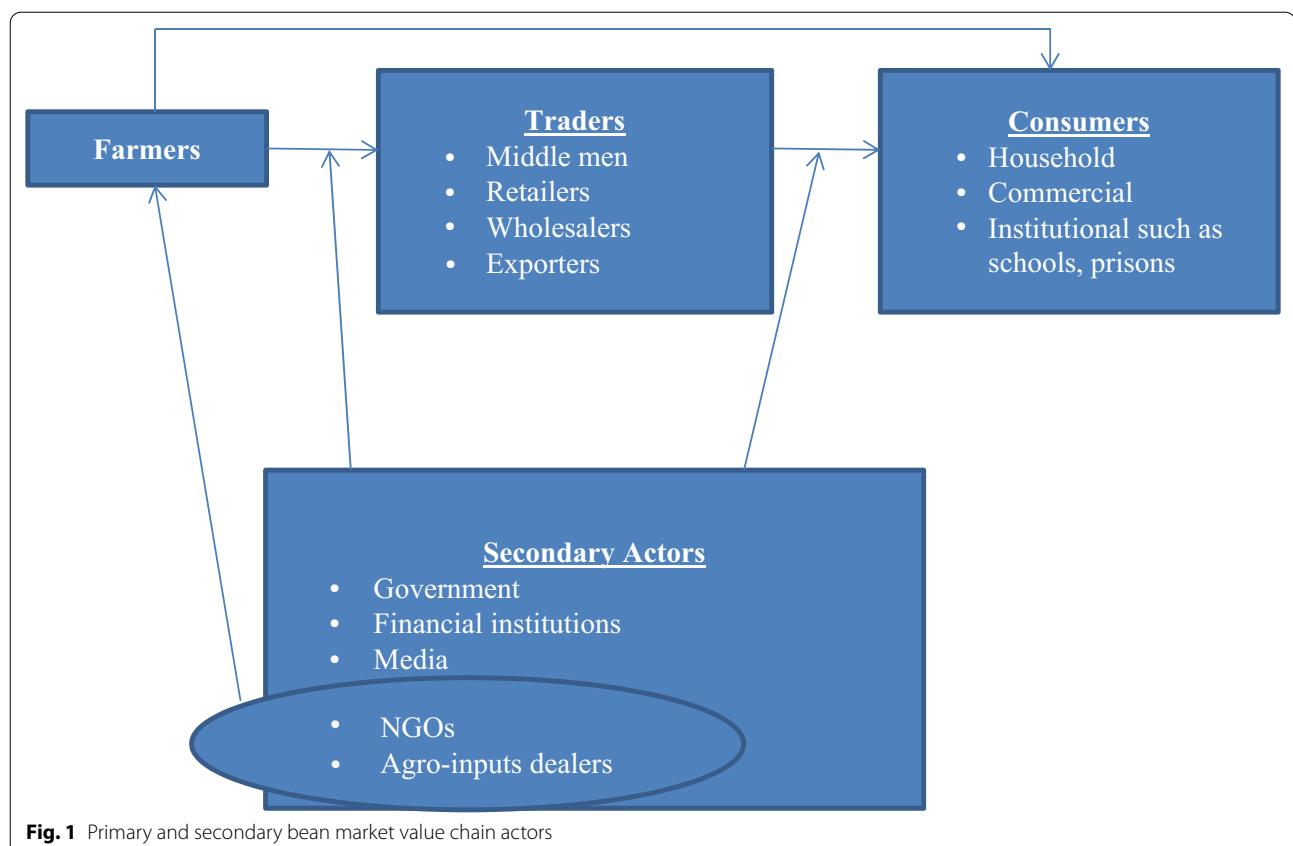
NABE 15 (farmers' seed), was the most commonly grown variety, followed by K132 and NABE4. Farmers also grew the new varieties in the area recently introduced in 2009 by NACRRI in conjunction with VEDCO. These included; NABE 4, yellow beans and K132.

Distribution of bean harvests/outputs obtained by farmers in Kamuli in the first season of 2011 and second season of 2010

For purposes of comparison, *T* test results show that trained farmers produced more beans in the two seasons but the mean difference was not statistically significant from the non-trained farmers as shown in Table 2.

Record management

Only ten per cent of the farmers took note of the total harvests and only two per cent determined the net income. Majority of the farmers who kept records, stopped at noting the dates a given operation was conducted and did not record the costs incurred, since family labour was mainly used. This is illustrated in figure 2.



For the traders, over half (58%), kept purchase and sales records only as these were considered to be the most critical in calculating profitability of their business. Some claimed they relied on their memory and some accepted that they didn't know how to keep records.

Bean marketing in Kamuli

The findings indicate that the farmers determine how much beans are sold as majority consume most of their produce. This is also the case for Uganda's neighbour, Kenya as cited by Wanjala et al., [17].

Marketing arrangements and modes used by bean farmers

More than half (55%), of the farmers sold their beans individually, while some (45%) sold collectively. Fig. 3 depicts the bean marketing modes used by farmers.

The trained farmers sold beans at a higher price [Uganda shillings (ugx) 1766.7 equivalent to half a dollar (USD 0.505)] than the non-trained farmers [ugx, 1290.0, equivalent to less than half a dollar (USD 0.369)] and the mean difference between the prices was statistically significant $p < 0.02$. In addition, most trained farmers collectively sold their beans, while others stored the beans and sold at a higher price.

Table 1 Bean varieties grown by farmers in Kamuli in first season (2011) and second season of 2010

Bean variety	First season		Second season	
	Number of farmers	%	Number of farmers	(%)
NABE15 (Farmers' seed)	98	35	88	34
K132	94	34	97	38
NABE4	44	16	45	17
Yellow beans	25	5	12	5
White beans	13	9	13	5
Black beans	2	1	3	1

Marketing arrangements for consumers

A majority (67%) of households interviewed in rural Kamuli consumed beans from their own farms, 23% from other farmers and 10% procured beans from traders. However, of the fifteen institutional consumers interviewed, all five restaurants procured solely from traders, five of the ten schools interviewed procured from both farmers and traders, four bought from only farmers and one school from only traders. Only traders who could raise at least 500 kg supplied schools. Only a few parents

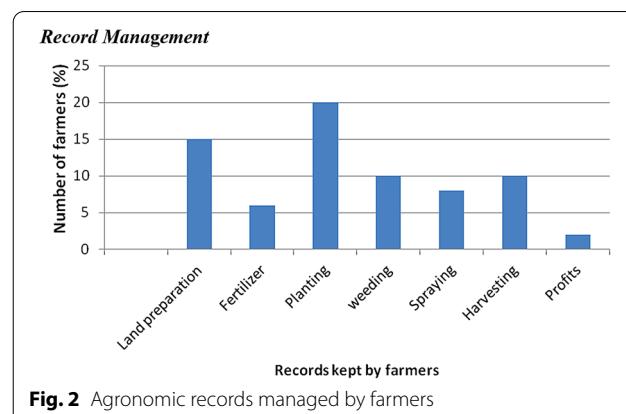
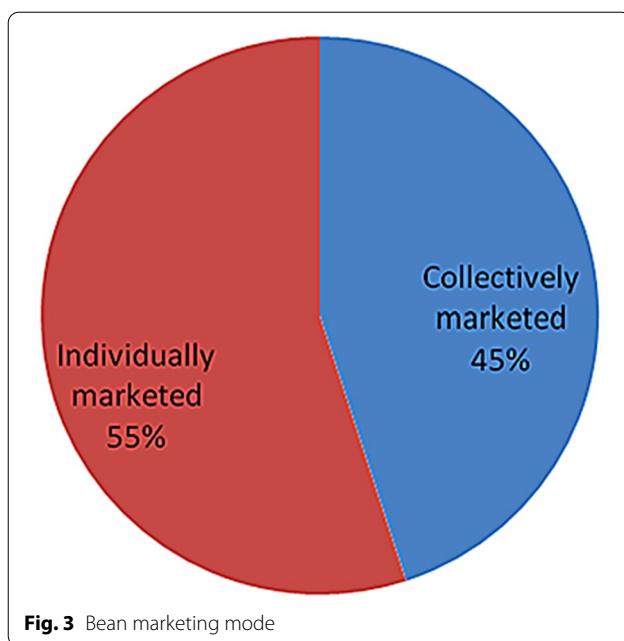


Table 3 Criteria used by traders when buying and selling beans

Criteria	Percentage of responses ^a (n = 34)	
	Buying	Selling
Grade / quality	65	62
Variety /type	82	65
Market price	59	65
Accessibility	12	3

^a Percentage of responses are based on total number of respondents

Table 2 T test results of bean harvest obtained by trained and non-trained farmers for the two seasons

	Trained	Non-trained	P value
Mean harvest (kg) 2nd season 2010	129.56	99.07	0.274 ^a
Mean harvest (kg) 1st season 2011	103.54	101.37	0.90 ^a

Source: Survey

^a implies not significant

(farmers) supplied small quantities to schools as school fees in kind. Schools tended to stock more beans usually at the harvesting period (May–July) when prices were low.

Market criteria for value chain actors

The value chain actors considered several factors in their bean trade business. Some factors were considered by specific type of actor, while others were critical to all. Hence, suppliers at different levels established associations/groups to collectively meet the market requirements and establish strategies to maximize profits. The customers and/or consumers often raised complaints to achieve desired products.

From production, farmers formed groups to improve on bean quality and quantity, and collectively market to buyers who offer better prices. Traders also formed associations to improve market efficiency and effectiveness.

Regarding bean marketing, farmers were always price takers. This is because farmers could not influence/set

the prices, since most lacked alternative markets. Farmers sold beans at prices offered though based on; the urgency of their needs, and perceived accuracy of the scales used by the traders/buyers, and the ease of accessing the buyer as well as the mode of payment. Most traders other than middlemen based on variety, grade (quality) and the prevailing market prices when making purchase decisions. Middlemen bought with minimal quality consideration but, thereafter, sorted and graded and sold at better prices. The traders, especially the wholesalers, were strict on quality of the produce and hence required sorted and graded beans. However, according to farmers, traders paid almost similar prices for sorted and unsorted beans from farmers. The ease of accessing the farmer also influenced the trader purchase price and decisions—remote farmers were usually offered lower prices, partly because of the associated transport costs but also such farmers were less aware of the prevailing market prices of beans. Whereas the traders considered several aspects of quality when they bought the beans, the farmers did not seem to be aware of variety as a major determinant of market price. Farmers paid higher prices when buying seeds (grain from shops) and received less at the time of selling grain. Because farmers were not aware of the market quality requirements, the traders took advantage of this to buy the unsorted beans from farmers at low price and thereafter sold to consumers at a higher price, depending

on the variety. Table 3 show the criteria used by farmers when buying and selling beans.

After procuring the beans, traders sorted and graded them according to variety. Traders were aware that consumers, especially urban consumers mainly base on variety when making purchase decisions. Over half (58%), of the traders believed that their criteria (requirements) were fair to all actors, including small scale farmers and all (100%) claimed that bean trade was profitable. Some traders (42%) believed that their criterion was not fair, because farmers received the lowest profit margin in comparison to other actors in the chain. This can be explained by noting that of the farmers who sold beans, 45% received between UGX 700–1000/kg (\$0.2–0.286/kg), 13% received UGX1100–1400/kg (\$0.314–0.4/kg), while 22% were able to sell at UGX 1500–1800/kg (\$0.429–0.514), 10% at UGX2000/kg (\$0.571), and 10% at UGX4000 (\$1.143)/kg. According to key informants, those who received UGX1500–4000/kg (\$0.429–1.143 sold their beans as seed to NaCCRI, which were redistributed to farmers for planting through VEDCO extension agents. Most traders paid UGX700–1000/kg (\$0.2–0.286), and few bought at UGX1100–1400/kg (\$0.314–0.4/kg) (during scarcity). The retail prices of beans at the time of the study ranged from UGX1800–2000/kg, (\$0.514–0.571)/kg (see Table 3).

Bean varieties preferred by consumers

Variety was the most important factor for consumers. This is because desired consumption attributes, such as: taste, cooking time, bean colour, shape and price all depended on variety. This justified why traders were sensitive to variety, when procuring from farmers and/or other traders (middlemen). Both household and institutional consumers most preferred the NABE 15 (Farmers' seed); followed by K132, white beans, yellow beans and NABE4. This is because of their good taste and fast cooking attributes.

However, some consumers were more attracted by the colours and shape of the beans. White beans were mainly consumed by households, because they were believed to have more nutrients than any other variety as they "surge"

like milk on cooking. According to consumers, Yellow beans easily go stale and give "transparent" sauce, while NABE 4, a recently introduced variety gives the preferred red sauce. However, NABE 4 was yet to gain widespread popularity among consumers. Despite multiple forms of consumption, consumers enjoyed best dry beans, and as a mixture with other foodstuffs. Few enjoyed fresh beans, as availability is short lived. Dry beans are readily available and affordable than fresh beans. Variety preference in institutions differed from that of households in that only three varieties were associated with institutional consumption unlike for households, these included; NABE 15 (farmers' seed), NABE 4 and yellow beans. Yellow beans were preferred in restaurants mainly because of its good taste and fast cooking attributes.

Market information channels used by actors

Several communication media were used by different actors to access market related information, such as bean prices offered by different clients, varieties preferred, as summarized in Table 4.

The table indicates that friends and radios were the most used channels common to all actors. However, friends eclipsed radios, because it is more reliable and efficient, since people get first-hand information. Half (50%) of the farmers relied on extension workers for market information. However, traders relied on phones for market information mainly.

Price determination by farmers

There was no fixed price for beans set by the farmers. Different traders offered different prices with different considerations and with limited farmer influence. Most farmers sold their beans for the first season of 2011 at approximately UGX1000 (\$0.286) per kg. For that season, the lowest price was UGX700 (\$0.2)/kg and the highest price was UGX4000 (\$1.143)/kg. Table 5 Shows the criteria used by farmers to determine the bean prices.

Table 4 Information channels used in bean marketing

	Farmers (n = 127)	Traders (n = 34)	Household consumers (n = 30)	Institutional consumers (n = 15)
Radios	8	22	12	27
Friends/neighbours	41	15	88	64
Phones		33		5
Extension agents	50	30		
Newspapers	1			4

Table 5 Differences in criteria used by trained and non-trained farmers when determining prices

Criterion	Trained farmers (%)	Non-trained farmers (%)
Bean variety/quality	2	4
Prevailing market prices	11	4
Consult buyers	61	77
Immediate needs	9	4
VEDCO manuals	4	2
Season	2	2
Input cost	11	7

Chi-square = 5.208 (not significant)

Discussion of results

Being the cheapest source of protein and a major sauce that accompanies multiple foods, the common bean is an important crop that is grown by almost all households in Kamuli. Farmers grew almost similar varieties for the two seasons, because these give high yields, suit local conditions and preferred by consumers given their good taste. The most cultivated varieties were also preferred because of other important attributes such as cooking time, colours that make red soup and a long shelf life. Beans that make red sauce were most preferred by consumers and farmers as they believe that these are more nutritious than other varieties, such as black beans. This conforms to the findings of the Brennan et al. [5] that most actors focus on satisfying the needs of the consumer than any other actor. Results further support this argument as the farmers grew varieties preferred by traders and consumers. However, farmer knowledge of the preferred varieties is not sufficient for them to get better prices as findings revealed that few institutional consumers bought beans from farmers. Factors such as quantity and quality of farmers' produce also have an important bearing on the type or category of traders accessible to farmers. The institutional consumers such as schools in the area procure from traders because of the potential to raise quantities required, compared to individual farmers. The limited production from farmers is the main reason why traders especially wholesalers and exporters buy from middle men. This is because middlemen use bicycles to collect the limited quantities from individual farmers. The middlemen ease the work of wholesalers and exporters by bulking beans in easily accessible centres.

In line with the above, farmers who received training on bean production, obtained slightly higher yields perhaps due to use of agronomic knowledge recommended by extension agents and the various inputs especially pesticides to prevent and control pests and diseases. Some farmers, especially those with livestock, used farmyard

manure to improve soil fertility. However, the mean difference in yield was not statistically significant partly because of spill over effects, where farmers learn from each other and as such technologies got passed on to other farmers who were not trained. In addition, trained and non-trained farmers suffer from the same socio economic problems of limited labour, expensive inputs and land among other factors.

Regarding bean marketing, more than half of the farmers sold their beans individually due to the nature and urgency of cash related needs or problems, which differ from one household to another or from farmer to farmer.

This could not enable farmers to store and wait for better prices or sell in groups to lucrative markets. This conforms to Steenbergen et al. [14] who found that the financial needs often influenced when a farmer sold produce and the price obtained. Farmers with urgent financial needs might not opt for collective marketing which requires beans to be first stored and then sold in the future at relatively higher prices.

Although the difference in yields was not significant between the two categories of farmers, trained farmers sold their beans at higher prices, because VEDCO linked them to better markets, such as National Crop Resource Research Institute (NaCRI). The study agrees with Steenbergen et al., [14] findings that involvement of smallholders in marketing is influenced by many other factors besides farm size, such as infrastructure development. Lacking such assets constrain farmers' market participation. Therefore, trained farmers were able to directly and/or indirectly overcome the above constraints with the help of VEDCO. Farmers who sold in groups were able to access lucrative markets. The variations in the bean prices offered to farmers can also be attributed to how price is determined; over half of the farmers determined the prices they sold their beans by consulting buyers—meaning that buyers had a huge influence on the prices they received. Where VEDCO operated, some farmers relied on advice by VEDCO extension agents. Few farmers including those trained considered; bean variety and the prevailing market prices, which were mainly considered by traders. Under these circumstances, only 21% of the farmers were satisfied with the price at which their beans were bought. Traders had more influence on the prices, since most farmers lacked knowledge regarding reliable markets and their location. Though some farmers were aware of lucrative markets in towns and other areas, it was expensive for them to transport their limited quantities and also lacked direct contacts in such markets. Important to note is that factors such as keeping records, mode (individual/collective) of marketing beans and primary value addition (proper

drying, sorting among others) were rarely used by farmers to determine or set the prices for their beans.

Although through collective marketing and primary value addition, farmers can access lucrative markets this remains a challenge. Very few farmers also have the ability to store and wait for better prices. In addition, farmer groups play limited role in influencing prices set by traders. Farmers are also expected to keep records to cost production but the incentive to do so is minimal as the prices are not dependent on cost of production. Indeed most farmers do not keep production records; most commonly visitors' books were kept by farmers yet not important for costing production.

All (100%) of the traders interviewed acknowledged that bean trade was profitable. Similarly, Mauyo et al. [10] discovered that all terminal traders (middlemen, wholesalers, retailers and exporters), obtain higher marketing margins. He attributes this to the fact that traders operate at a low level of technical efficiency due to market imperfections. In addition, the study found out that traders have the liberty to, search for better quality beans, offer low prices to farmers and/or pay at a later date after selling the beans in case of poor quality.

Many farmers relied on extension agents for production and marketing information, since they were perceived to provide free, reliable and accessible information especially regarding prices of the different bean varieties. The information provided by extension agents is amplified by farmer-to-farmer interaction leading to more sharing of information. Therefore, extension agents should be empowered to be in position to access timely and accurate market information. The variation in channels used by farmers can be attributed to inequalities in infrastructure development, education level differences and affordability. Most areas had no electricity; hence farmers in such localities could not rely on televisions. Apart from newspapers being expensive for farmers, their literacy levels did not suit using this channel. Few farmers have phones, radios and television sets. The aforementioned signify that extension agents and friends are important sources of market information for farmers. Traders mainly relied on phones, while few consulted fellow traders. Phones were commonly used, because they are fast and efficient compared to other channels, such as radios. Traders hardly consulted others perhaps because of the stiff competition existing among them.

Conclusions

Kamuli is a typical traditional rural area, producing beans mainly for home consumption. Production is seasonal (during February to May and June to August), and demand is throughout the year. Some farmers are able to access advisory and at times financial support to improve

bean production in the district from government and non-government organizations. Farmers also have access to preferred varieties that are adapted to local conditions. The farmers' field is the starting point of marketing. Though farmers don't have a formal list to help them segment the market, they talk to several traders before selling their produce. However, some sell to same traders every season, because they are perceived to be honest. Besides, no benchmarking is done by farmers, because traders determine the price due to limited market information accessed by farmers. Hence, most of the market requirements for farmers are unmet. For collective marketing, surplus is collected from individual farmers to the collection centre. Selling is only done when there is surplus. However, due to urgency of financial needs, most sell their beans individually.

Bean value chain actors have clear roles and/or functions, but lack mutually beneficial relationships. On one hand the flow of beans from the source to the sink is fairly smooth; traders have first-hand information regarding producers/farmers and their location. Consumers are well informed about the location of the traders who tend to determine the chain parameters. On the other hand, most farmers have limited knowledge regarding the traders' location and market requirements, and limited role in influencing the chain parameters. This implies that actor interactions still enhance trader profits.

Middlemen perform most marketing operations. This is because farmers lack knowledge of other traders/markets, transportation to towns is costly, and farmers lack facilities to store and sell later at better prices. The extension agents, the major providers of market information, have insufficient knowledge regarding traders to aid farmers. Hence, farmers are still constrained in accessing actual buyers (consumers/traders), to get better incomes from beans.

Critical to note is that the groups are still of little relevance in improving farmer incomes from beans. The groups have not been utilised in accessing lucrative markets (regional and global) as well as influencing the prices for beans set by traders.

The records managed by farmers limit them to appraise their enterprises. Groups need to be strengthened and upgraded from village firms to sub-county level, where they can increase volumes and win contracts. In general, there is no significant difference between trained and non-trained farmers regarding; production mode and yield obtained, as well as group benefits, challenges and solutions cited. This is because of the spill over effect, where farmers learn from each other.

In chain governance, traders mainly set and enforce marketing parameters for farmers. This is done to meet consumers' preferences and profit from the business.

Farmers play little or no role in influencing the market parameters. This is because the majority have limited surplus for market, most cannot store to sell in future at better prices, have limited knowledge for lucrative markets and access to markets is also limited. Hence, perfectly regarding the determinants of farm gate prices for beans, it is the traders.

Recommendations

There is a need to improve the capacity of farmer groups to influence the marketing system, with specific orientation on characteristics of formal groups. This will not only improve the individuals within the respective groups but also non-members due to spill over effect as realised.

There is a need to develop bean value chain partnerships for better information access, cooperation, funding and market opportunities. Through partnerships, information channels will be established thereby enabling partners to have access to products, knowledge and expertise, increase awareness and research opportunities. This is because the new era requires a strong focus on market demands and a joint development of marketing opportunities. Actors especially farmers will be able to collaboratively conduct business, coordinate use of resources and access support network.

Actors should promote collaboration along the market chain, among different stakeholders to: increase efficiency in the market chain by lowering the production and transaction costs which occur between the different market chain actors. They can also enhance the value of the products and services generated along a market chain.

Government and other actors such as VEDCO should work together to develop institutional capacity of farmer association to compete in markets against economic forces that confound their traditionally bureaucratic and unresponsive structures and strategies. This is the ultimate goal of social marketing that can foster positive system change.

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Author contributions

GJ: collected data, analysed and wrote the manuscript. PK, RM: Supervised the data collection and analysis. HS: reviewed and guided manuscript development. All authors read and approved the final manuscript.

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Availability of data and materials

Not applicable.

Declarations

Ethics approval and consent to participate

The study followed all the ethical principles of research. No single principle was violated and participants enjoyed all their rights. Participation in the study was voluntary; farmers, traders, agro-input dealers and consumers all verbally consented before participating in the study.

Consent for publication

All the participants verbally consented.

Competing interests

The authors declare that they have no competing interests.

Author details

¹Department of Extension and Innovation Studies, College of Agricultural and Environmental Sciences, Makerere University Kampala, P.O. Box 7062, Kampala, Uganda. ²Department of Extension and Innovation Studies) College of Agricultural and Environmental Sciences, Makerere University Kampala, P.O. Box 7062, Kampala, Uganda. ³Department of Sociology and Criminal Justice, Iowa State University, 103 East Hall, 510 Farm House Lane, Ames, IA 50011, USA. ⁴International Institute of Tropical Agriculture (IITA), Eastern Africa Hub, P.O. Box 34441, Dar es Salaam, IITA, Tanzania.

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