Marketing Arrangements Used by Small Scale Bean Farmers in Kenya: What Needs to Change for Sustainable Trade Volumes?

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Abstract

This case study assessed marketing arrangements used by small scale farmers in the Lake Basin and Lower Eastern bean corridors of Kenya to determine which markets work for rural producers and what changes are needed to produce and supply sufficient quantities for trade. Using exploratory research, data was collected through focus group discussions with six farmer groups representing a total of 1255 bean farmers and key informant interviews with extension staff.

The results indicated that 94% of the farmers produced beans before identifying buyers with only 6% participating in group marketing. Though spot-market transactions with brokers and traders provided ready cash for the farmers, formal buyers were perceived to be more reliable but difficult to find and, operated stringent requirements which were a barrier to entry. A theory of change to integrate smallholders into formal markets to sustainably produce and supply sufficient volumes for trade should entail a transformation agenda at four levels of the value chain: intensification of production through pure stand models with greater use of certified high yielding varieties; stable price guarantees; a market-driven research and extension service and; an enabling political, policy and business environment in the bean value chain. Further research is needed to pilot these changes in a case control study.

Key words: Small-scale bean farmers, marketing arrangements, formal and informal marketing, intensification models

1. Introduction

Common bean (*Phaseolus vulgaris* L.) is a major staple food in Africa where it is recognized as the second most important source of human dietary protein and third most important source of calories of all agricultural commodities produced in the region [1, 2]. It is the most important legume in Kenya, valued as a cheap source of protein especially for the low income population and consumer institutions such as schools, colleges, hospitals, prisons and food relief agencies [3]. Common bean is grown by more than three million households majority of whom are small-scale farmers in Kenya [4]. It has a short growth cycle which permits production when rainfall is erratic, provides food and income to the household before harvesting of other long season crops such as maize. It is cultivated twice a year in March to April and September to October at altitudes between 600-2000 meters above sea level.

Besides being a potential food insecurity and rural poverty exit strategy, common beans play an important role in the soil fertility enrichment through biological nitrogen fixation [4]. Rhizobium bacteria in bean nodules supply the plant with fixed nitrogen in form of ammonia and get carbohydrates in return. This presents another important cost-effective means of replenishing declining soil fertility in smallholder farms accelerated by inadequate use of inorganic fertilizers due to high costs.

About 3% of the World's beans are produced in Kenya [5], mainly in the Lake Basin, parts of Rift Valley, Central highlands and Lower Eastern regions as intercrop by small scale farmers, majority being women [6]. Kenya has one of the highest consumption of beans in Africa which far exceeds supply and the deficit is supplemented through cross-border imports from Uganda, Tanzania, Rwanda, Eastern Democratic Republic of Congo and Ethiopia [7]. The country produces about 613 000 MT against a demand of 748 000 MT [3]. Despite the research efforts to enhance its productivity and clear benefits of common bean production for smallholders, its production remains low, despite the availability of several high yielding varieties with special attributes such as resistance to abiotic and biotic stresses, and market preferences released by research institutions (Table 1).

Table 1: Released dry bean varieties in Kenya developed by different institutions

Variety name/code	Year of release	Owner(s)	Optimal production altitude range (masl)	Duration to maturity (Months)	Grain yield (t ha-1)	Special attributes
Kat/Bean 1	1987	KARI	1000-1800	2.5	1.2-1.5	Drought tolerant, quick cooking, no flatulence
KK 8	1997	KARI	1500-1800	2.5 – 3	1.8-2	High yielding, Tolerant to root rot
New Rose Coco	2008	University of Nairobi	1100-2000	2.5 – 3	1.3 – 2.3	Large grains, Moderate resistance mosaic virus
Miezi Mbili	2008	University of	1000-2000	2.5 – 3	1.2 – 2.26	Large grains, Resistant to floury leaf

		Nairobi				spot, halo blight
Kenya Sugar Bean	2008	University of Nairobi	1000-1900	2.5 – 3	1.08 – 1.81	Large grains, Resistance to common bacterial blight
Chelalang	2008	Egerton University	1800-2200	2.5 – 3.5	1.2 – 2.2	High yielding
Tasha	2008	Egerton University	1500-2000	2.5 – 3.5	1.1 – 2.1	High yielding
EMBEAN14 (MWENDE)	2014	KARI	1200-2400	3	2.5	Tolerance to most fungal diseases, Marketable seed type
MN6 (Kenya Cheupe)	2015	University Of Nairobi	Central, Eestern Eastern	3	1.1-2.8	- Low flatulence; Biofortified with Iron, zinc and Calcium
Nyota	2017	KALRO	900-1800 MSAL	65-70 days	1.4-2.2	Drought tolerant, Micronutrient rich bean, Cooks fast
Angaza	2017	KALRO	1200-1900 MSAL	75-80 days	1.4-2.5	Sugar bean, cooks fast, Micronutrient rich bean, Cooks fast

Source: http://www.kephis.org/images/VarietyList/april20170525.pdf

Inadequate production of sufficient volumes for trade may partly be attributed to the widespread belief among farmers that bean markets are unreliable. A study by USAID [5] reported that farmer linkages to formal markets such as processors and institutional buyers in the country were very weak. In addition, data from market actors indicate that there is, in fact, significant unmet demand for common beans in Kenya. The deficit is expected to increase given the increasing population, rising costs of animal based proteins and health conscious consumers shifting to plant proteins. Studies done in the East African region indicate that beans are sourced from small scale farmers and marketed through long informal channels consisting of many intermediaries along the value chain [8- 10]. These studies further indicate that although farmers determine the proportion of beans marketed, it is the traders who determine the prices offered.

1.1 Overview of smallholder marketing arrangements

There are mainly two types of marketing arrangements often cited in literature: Spot market transactions and collective action [11, 12]
Spot market transactions: This is the informal marketing pathway consisting of many intermediaries and where local assemblers, brokers and traders are the main buyers of common beans from small scale farmers. It is the most important marketing channel for common beans in Eastern, Central and Southern Africa [13].

Collective action: In this arrangement, smallholders market farm produce through farmer organizations, contract farming or out grower schemes to formal institutions. It is a vertically coordinated chain relationship in which large buyers such as Cereal marketing Boards, Food processors, Wholesalers, Supermarkets, Schools, Hospitals, Exporters, Relief agencies enter into formal or informal agreement [12]. Cook and Chadad [14] observed that collective action among smallholder farmers can enhance agricultural production, bargaining power, reduction of transaction costs, formation of social capital, gender inequalities, provision of technical assistance and input services, acquisition of techno-managerial skills and advocacy. Nevertheless, several studies report that the challenges of operating agricultural enterprises in a highly dynamic and competitive global economic and technological environment have seen many farmer cooperatives or contract arrangements world-wide decline or exit due to free rider, portfolio, horizon, control and influence problems [14, 15]. In Africa, contract farming for staples, especially cereals has had limited success [11, 16]. With Africa's population set to double to 2.5 billion by 2050, the need to develop appropriate market linkages and models for smallholders as a pull factor for increased food production is urgent [17].

For the Kenyan case, given the national deficit and increasing demand on one side; and the seeming disconnect between farmers' perceptions of unreliable markets on the other, the objective of this study was twofold: First, to assess the type of marketing arrangement which work for small scale farmers and secondly, interventions needed to produce and supply sufficient volumes to the market, using a case study of the lake basin and lower Eastern bean corridors of Kenya.

2. Methodology

2.1 Study Area

The study was carried out in Homa Bay County in the Lake Basin and; Machakos and Makueni Counties in Lower Eastern Kenya between March and June 2017. The Lake Basin and Lower Eastern Kenya represent an important bean corridor in Kenya. Homa Bay lies between $0^0 15$'S to 0^0 52'S and 34^0E to 35'E at an altitude of 1240 metres and 1580 metres above sea level, while Machakos and Makueni lie between 0^0 31'S to 3.00^0 S and 36.45^0 to 38^0 30 E. Rainfall in both regions is bimodal (March-May and September - November and ranges between 300 mm to 1300 mm annually. Homa Bay has 31000 Ha under beans while both Machakos and Makueni have a combined area of 113,000 Ha under bean production [3].

2.2 Study variables, data collection and analysis

Data for this study was collected through a review of secondary information and interviews with key informants. Additionally, six focus group discussions (FGDs) representing a total of 1255 bean farmers, three FGDs from each region, were carried out with farmer groups to gain a deeper understanding of production characteristics and marketing arrangements; Strengths, Weaknesses, Opportunities, and Threats (SWOT) of the bean value chain; which marketing arrangements work for smallholder farmers; and what changes are needed to produce and supply sufficient volumes of beans to the market. Each FGD comprised 12 participants stratified in each group and randomly selected [18]. The participants per FGD were male, female and youth in the ratio of 5:5:2

respectively. During discussions, participants talked among themselves on every key topic or question before a consensus was reached. They also ranked important issues through pair-wise ranking method [18]. All combinations were done and responses were recorded and visualized on flipcharts. Key informant interviews were also done with extension staff to triangulate information from FGDs. The exploratory research approach was more suitable for this study for identifying the real nature of the phenomenon under investigation in order to formulate relevant hypothesis for future empirical studies [19, 20]. Data were analyzed using cross-case analysis by examining similarities and comparing incidents across groups.

3. Results and Discussion

3.1 Formal and informal markets: which ones work for rural small holders?

The results of focus group discussions identified and ranked two types of bean markets commonly used by farmers: Informal markets consisting of brokers, traders, individual consumers; and formal markets, mainly local schools, hospitals and food processors. Using the End Market analysis tool kit [21], from the parameters shown in Table 2, formal markets ranked much higher than informal markets in all the five variables. This result contrasts the existing practice and findings from a number of studies which show most of the beans in Kenya are marketed through informal channels [7, 9]. Additionally, the results in Table 3 suggest that farmers prefer informal marketing because market agents are readily available in the rural areas and more over it is a cash market. On the other hand, farmers reported that though formal markets are more reliable, they are difficult to find and operated rigorous standards which were a barrier to entry. Thus these findings seem to suggest that in small holder bean farming systems, informal markets seem to work for farmers despite their imperfections.

Table 2: Prioritization and ranking of bean markets

Parameter	Informal Market	Formal Market
Quantity	2	3
Quality	0	5
Price	1	4
Reliability	1	4
Availability of governance structure	0	5
Total weight	4	21
Rank	2	1

Legend: weights 1= very low, 2= low, 3= average 4= high, 5 = very high

Table 3: Reasons why farmers prefer marketing arrangement

Attribute	Informal marketing (brokers, retail traders)	Formal marketing (schools, hospitals)

Advantages	• Cash market	• Bulk purchase
	• Buyers readily available	• Bulk payment
	• Does not choose variety	• Reliable
	• Regular trading relationship	• Transparent weighting system
	• Own transport	
Disadvantages	• Price exploitation	• Delayed payment
	• Low volumes purchased	• High quality demanded
	• Lack of standard measurement scale	• Difficult to find
	• Unreliable (spot market transaction)	• Weak relationship

Source: Focus group discussion and interviews

3.2 Producing and supplying volumes for trade: what needs to change?

With bean consumption trends estimated to be 748 000 MT.700 000 MT per annum against a production of 613 000 [3], there is urgent need for models that can sustain production and supply of sufficient quantities for trade. Results obtained in this case study suggest the following options:

3.2.1 Intensification models

The ranking of formal markets far above informal ones by farmers in this study calls for the need to re structure the bean value chain at four main nodes (Table 5) if sufficient volumes have to be produced and supplied to formal buyers comprising institutions, processors, retail supermarkets, exporters and importers. Smallholder farmers have been over studied in Sub Saharan Africa by different groups of actors including: knowledge institutions - universities and research, development agencies, NGOs and national agricultural investment plans. However, after decades of investments, there are indeed very few successful cases of commercialization in food staples among small scale farmers [22, 23]. One of the reasons why small scale farmers have not taken off on a commercialization path is the lack of clear segmentation, targeting and positioning strategy to identify and work with a homogenous category. In this study three categories were evident: Subsistence-oriented bean farmers (19%); Spot-market farmers who produce and only market when there is surplus (70%), and a few market-oriented farmers 11% (Table 6). About 94% of the farmers grow beans before identifying a buyer. The multi objective nature of smallholder bean farming operating in a fast changing production, marketing and policy environments driven by forces of supply and demand, suggests markets that work for smallholders producing staple foods should have a dualistic marketing arrangement with greater integration in formal markets, while allowing participation to smaller extent in spot-market transactions which offer immediate cash important for smallholder household needs. There is therefore need to develop models to upgrade spot market farmers into market oriented producers and ultimately shareholders into value chains. AGRA report on the Status of Africa Agriculture argues that, "Agricultural assistance aimed at commercializing more small farms needs to be targeted to those farm households that have viable farm business prospects and capabilities. Alternative types of assistance should be given to other types of small households if resources are not to be wasted, or farm household misled into unsustainable livelihood strategies" [17]. Commercialization and globalization of agriculture has opened opportunities to supply products to markets. However, access to these markets has stringent requirements which rural producers must re organize to comply [24].
 To integrate rural smallholders into formal markets, the production stage of the chain must be transformed into a market-facing entity that guarantees quantity, quality, safety, reliability,

traceability, and governance structures demanded by these markets. Production needs to change from current practice where most farmers allocate less than one acre to bean production usually intercropped, to intensification through pure stand models (Table 6), with increased use of improved technologies [25]. From using grain, to using certified seeds and growing high yielding varieties demanded by the market (Tables 1, 2 and 5); from growing beans before identifying buyers (Table 6) to producing for specific buyers; from individual marketing (Table 7) to collective marketing through village aggregation centres; from spot-market transactions to contract farming. Advantages and benefits of contract farming for smallholders have been demonstrated in several studies including Poole and Freece [11], Costales and Catelo [26] and Prowse [27].

To put smallholder bean farmers on a commercialization path, all the weaknesses identified in the SWOT matrix (Table 4) can be turned into strengths to take advantage of the growing demand.

Thus a theory of change [28] focusing on transforming common bean production into a commercial enterprise linked to large national buyers and export markets is key to increasing volumes for trade, and can help reduce reliance on imports to meet the growing demand in Kenya.

Table 4: SWOT of bean value chain

Strengths	Opportunities
• Many bean farmers	• Growing demand nationally and regionally
• Soils appropriate for bean production	• Availability of support institutions for seed and agro chemicals
• Individual land ownership	• Existence of technologies to increase yields
Weaknesses	**Threats**
• Use of grain of different varieties as seed	• Pests and diseases
• Lack of knowledge on varieties demanded by market	
• Lack of collective marketing	• Unreliable rainfall
	• Competition from cross border imports
• Lack aggregation centres	
• Brokers and middlemen determine price	
• Inadequate agronomic practices	
• Inadequate financial capital for inputs	
• Weak policy / political environment for bean production and commercialization	
• Weak horizontal and vertical linkages among actors	

Table 5: Farmer perceptions on changes needed for producing and supplying volumes to the market

Small scale farmers	Service Institutions	Buyers	Policy
Group production and marketing	Dissemination of varieties demanded by market	Reliable institutional buyers (supermarkets, processors, exporters, Food agencies, schools)	National and County government support and Promotion of bean production and trade for incomes, food and nutritional security
Increased acre rage under beans	Technical advice and training of farmers on GAP	Contractual engagement	
Grow common variety	Avail credit for farm priority inputs		
Contract farming			
Common aggregation centre			

Source: Focus group discussion and interviews

Table 6: Production characteristics

	Region	Lake Basin			Lower Eastern			
	County	Homa Bay			Makueni		Machakos	
Parameter	Description	Rangwe	Wiga	Ndhiwa	Kima Kiu	Kasikeu	Mua	Overall
		% (N=125)	% (N= 275)	% (N=55)	% (N=300)	% (N=200)	% (N=300)	% (N= 1255)
Land allocated for bean production (acres)	< 0.5	60	15	40	5	0	10	22
	0.5-1	30	54	60	15	50	80	48
	>1	10	31	0	80	50	10	30
Production system	Intercrop	90	77	100	30	30	15	57
	Pure stand	10	23	0	70	70	85	43
Yield	Average yield per acre (Intercrop)	2.5	2.5	3	3	3	2.5	2.75
	Pure stand	-	-	-	7	6	4	5.5
Objective for bean farming	Subsistence only	19.5	15	60	20	0	0	19
	Subsistence + surplus marketing	80	85	40	75	42	100	70
	Marketing	0.5	0	0	5	58	0	11
Proportion of farmers growing beans	After identifying buyer	10	10	0	10	5	0	6
	Before identifying buyer	90	90	100	90	95	100	94

Table 7: Marketing arrangements

	Region	Lake Basin	Lower Eastern

County		Homa Bay			Makueni		Machakos	
Parameter	Description	Rangwe	Wiga	Ndhiwa	Kima Kiu	Kasikeu	Mua	Overall
		% (N=125)	% (N=275)	% (N=55)	% (N=300)	% (N=200)	% (N=300)	% (N=1255)
Contract farming	Linkages to formal markets 1= Yes, 0= No	0	0	0	0	0	0	0
Marketing arrangements	Individual marketing	90	95	100	80	100	100	94
	Group marketing	10	5	0	20	0	0	6
Market outlets	Brokers/ middlemen	70	85	80	65	45	80	71
	Institutions (schools)	5	0	0	30	50	10	16
	Individual consumers	25	15	20	5	5	10	13
Aggregation centre	availability of collection centre 1= Yes, 0= No	0	0	0	0	1	0	0.2
Side selling	When contracted would you sell to informal actors following marginal price increase? 1= Yes, 0= No	1	1	1	1	1	1	1

3.2.2   Market actors: Reliability and Price guarantees

Interviews with farmers and extension agents revealed that perhaps the biggest challenge faced by farmers producing for formal buyers pertains to difficulties in finding these markets, delayed payments, weak relationships and compliance with high quality standards or even arbitrarily raising standards to reduce intake (Table 3). On the other hand, smallholders easily break contracts with formal markets through side selling whenever there is a marginal increase in prices occasioned by forces of supply and demand (Table 7). Building mutual trust is essential in fostering long term trading relationships. To ensure a win-win situation, reliability and stable price guarantees should be the key features of negotiated agreements with formal buyers. Establishing a strong market institution with double-facing back ward linkages to provide farm supply services and; forward linkages responding to consumer needs for quality, safety, product diversity and affordability will make formal buyers attractive to rural smallholder bean producers. Poku et al [12] and Barrett [29] in their review of case studies in Sub Saharan Africa also suggest that contracts with embedded support services are essential in fostering smallholder market participation and the long-term sustainability of trading relationships.

3.2.3 Market-driven institutional services: Research and extension, Interlocked financing

Farmers and extension agents identified three institutional issues necessary to support bean productivity and market orientation. These are: dissemination of bean varieties demanded by the market, technical advice on Good Agricultural Practices (GAP) and credit for priority inputs (Table 5). The first two issues relate to research and extension services, which are public good aimed at improving the agricultural sector. Institutional failure still limits access to the much needed productivity enhancing services. However, liberalization policies which swept much of Africa in the 1990s ought not to be an excuse for institutional voids [30]. In Kenya, the national and county governments which are responsible for policy and implementation of agricultural programmes should re structure research and extension into modern, market-driven, globally competitive institutions that respond to the technological needs of smallholder farmers' quest to access formal markets.

Access to credit for farm priority inputs is another area worth special focus. From the interviews, financing is needed by bean farmers to support land preparation and expansion and purchase of seed and fertilizer. With linkages to formal markets, these costs could be recovered from farm sales through interlocked financing arrangements with credit institutions [31.

3.2.4 Political, policy and business enabling environment

Although bean production has a multiplier effect on the socio-economic well-being of rural producers, consumers, and the national economy, it has not received sufficient policy attention compared to other staple foods such as maize. Neither is there significant investment by commercial seed companies. In pursuit of the national development goals [32] and key Sustainable Development Goals [33] which are anchored on food and nutritional security, employment and incomes, empowerment of women and youth, promotion of sustainable agriculture and building partnerships; an enabling policy and business environment for bean production and trade should be promoted. An affirmative action that compels learning institutions to accept beans in lieu of cash for school fees as is the case in Zimbabwe, in addition to preferential government tenders; Aid agencies and food manufacturers actively purchasing beans directly from farmer organizations would have great impact on rural economic development. Indeed, the Africa Agriculture Status Report (AGRA, 2017) acknowledges that an inclusive agricultural agenda requires that governments support and guide the transformation through a stable and enabling economic and policy environment, adequate rural infrastructure, investment in agricultural research and development. Governments must also work with the private sector and non-governmental organizations (NGOs) in undertaking targeted interventions to help commercialize many more smallholders, and assist the development of Small and Medium Enterprises along value chains.

 Thus the changes outlined in this study could be useful in supporting smallholder bean farmers produce volumes for trade. The agenda for further research should entail piloting these changes in a case control study.

4. Conclusions

This study sought to assess which marketing arrangements work for rural smallholder farmers in the bean corridors of the Lake Basin and Lower Eastern Kenya. The findings reveal that though spot-market transactions with brokers and traders provided ready cash for the farmers, formal buyers were more reliable but difficult to find and had rigorous requirements. The multi objective nature of smallholder bean farming operating in a fast changing production, marketing and policy

environments driven by forces of supply and demand, suggests markets that work for smallholders producing staple foods should have a dualistic marketing arrangement with greater integration in formal markets, while allowing participation to smaller extent in spot-market transactions which offer immediate cash important for smallholder household needs.

A theory of change to integrate smallholders into formal markets to sustainably produce and supply sufficient volumes for trade, should entail a transformation agenda at four levels of the value chain. First, intensification of production through pure stand models; secondly, Stable price guarantees; Third, a market- driven research and extension service and; lastly, an enabling political, policy and business environment in the bean value chain. Further research should entail piloting these changes in a case control study.

Acknowledgement

Author Contributions: W.S.P.O and K.D conceived and designed the study; W.S.P.O., K.D., W.S., O.G. and O.C participated in data collection and analysis; W.S.P.O, K.D and B.E. wrote the manuscript.

Conflicts of interest

The authors declare no conflict of interest.

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