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Export Market Linkage via gentleman's agreement: Evidence from French bean
marketing in Kenya.

Kariuki, Isaac Maina

Department of Agricultural Economics and Business Management, Egerton University,
536-20107 Egerton Kenya

waki_gaga@yahoo.de

Department of Agricultural Economics (Market Analysis), Kiel University, 24118 Kiel
Germany

ikariuk@agric-econ.uni-kiel.de

Gideon, Aiko Obare

Department of Agricultural Economics and Business Management, Egerton University,
536-20107 Egerton Kenya

g.obare@cgiar.org

Jens-Peter, Loy

Department of Agricultural Economics (Market Analysis), Kiel University, 24118 Kiel
Germany

jploy@fae.uni-kiel.de

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Abstract

‘Gentleman’s agreements’ involving handshakes or promissory market access possibilities through brokers and middlemen have enabled most small farmers in Kenya to export an extensive array of fruits and vegetables. However, despite rapid expansion into these forms of market linkages, there has been a dearth of empirical information regarding the factors that such marketers consider when linking small farmers to the market. This paper uses data from a 2001 French bean farmers survey conducted in Mwea Tebere Central Kenya to evaluate household and infrastructural factors determining informal linkages for French bean marketing. Logit estimates show that irrigation equipment is a prerequisite for linkage, farm localities further from central crop collection centres and close proximity of farms to source of irrigation waters, and poor accessibility of large farms preferred by brokers in linking small farmers. The results lend credence to the importance of brokers and middlemen as an emerging institution in linking small farmers to export markets in rural regions that have poor infrastructures e.g. roads.

Key Words: verbal agreement, logit, French beans exports, small farmers, linkage, brokers and middlemen

1. Introduction

The inherent uncertainty in the output markets for export crops has been the prime mover toward contractual arrangements between small farmers and exporting firms and or individuals in Third World countries to secure entry into international markets (FAO, 1999). In Kenya, this mode of production and marketing has revolved around private firms, individual sponsors, government run schemes, projects managed by non-governmental organisations (NGOs) and community based organisations (CBOs), with

Arid and Semi-Arid (ASAL) regions being favoured for irrigated horticulture production (Statistical Abstract, 2001).

Empirical evidence show the incidence of contracts in agriculture is a function of various factors including risk in the form of sharing non-land inputs for which markets are not developed and monitoring considerations (Tunali, 1993), profit sharing (Yokoyama, 1995), uncertainty and need for greater control in the supply chain and the negotiated price (Poole *et al*, 1998), and moral hazard on the part of the farmer in the supply of effort and the riskness of the technique of cultivation (Ghatak and Pandey, 2000). McLeay and Zwart (1998) note other factors like farmers' perception of marketing competencies and strategy, farm and farm manager characteristics and the structural characteristics of the industry in which the transaction is taking place. The socio-economic characteristics of farm households e.g. labour, education, assets, farm size and interest rates (Fukui, 1995) are known to influence existence of contracts. Beets (1990) contends that political environment, public utilities and services, physical and social environment and unrestricted access to land resources are essential ingredients for the success of contract farming especially in the formation of associations or trade groups, which play a significant role in determining production yields and quality.

2. Procurement from Small Farmers

Despite the many changes occurring along the Global Value Chain (GVC) in the supply of fresh fruits and vegetables in favour of large farmers and own production by exporters, procurement from smallholders in Kenya is still being used for markets with less stringent quality standards using outgrower schemes (Jaffee, 2003), through organized production (Dolan and Humphrey, 2000) or using verbal agreements (Kariuki, 2003). According to

NRI/IDS (1999) for example, Homegrown¹ in Kenya procures from smallholders by operating an outgrower scheme, consisting of 900 growers with varying holdings. Other exporters under Fresh Produce Exporters Association of Kenya (FPEAK) have also been sourcing from smallholders by bringing together groups of 15 to 20 smallholder growers, within a radius of 1 km to operate as a single commercial entity (*ibid*).

Dolan *et al.*, (1999) find that although procurement has been influenced by UK supermarkets in Kenyan horticultural exporting in favour of large farmers, smallholders supplies made up 18% of total export volumes from four of the largest exporters in 1998 and 11% in 2001. Jaffee (2003) shows that the overall share of smallholders' supplies of fruits and vegetables to the total volume of exports remains substantial at 47% despite the decline precipitated by quality standards and supermarkets dominance in the value chain. HCDA (2004) puts the sourcing of exports of fruits and vegetables from smallholders at between 55-60% of the total volumes exported. Dijkstra *et al.*, (2001) note that most exporting firms source produce from smallholders by engaging them into 'arms length' or contractual production agreements involving provision of inputs and technical assistance. Omosa (2001) also finds the case of procurement from smallholders in practice among three leading exporters involving verbal agreements. Voor den Dag (2003) and Kariuki (2003) also report use of smallholder supplies in the procurement for export mainly among small and medium exporters using 'gentleman's agreements'.

Mwea Tebere of Central Kenya has been a leading producer of French beans for export market since the late 1970s. Production is initiated through verbally agreed contractual arrangements between farmers and exporting firms' agents (brokers and middlemen), individual entrepreneurs and even Horticultural Crops Development Authority (HCDA).

¹ Homegrown is a subsidiary of Flamingo Holdings Ltd of United Kingdom at www.flamingoholdings.com. As of 2003, the company had 1000 smallholders in Thika and Machakos.

This establishes an assumed market linkage since buyers virtually commit to buy the end produce. Some exporters e.g. Homegrown, may provide farmers with seeds, fertilizer, chemicals, extension and credit in varying proportions. Others simply offer extension services to farmers on what chemicals, seeds, and fertilizers to use or link producers with accredited input suppliers. However, credit is provided as an advance to offset harvesting costs. This relationship is usually based on repeated transactions built over the years with farmers. Some farmers may choose to be independent sellers in order to exploit the spot market opportunities that arise from the sporadic entry of part time exporters (Dijkstra *et al*, 2001). This study seeks to evaluate what local brokers and middlemen look for when linking small farmers to export markets using the gentleman's agreements with special reference to French bean marketing in Mwea Tebere.

3. Conceptual Model

Conceptually, a farmer is considered risk averse and a buyer risk neutral in export marketing. The buyer uses brokers or middlemen to advance certain terms of agreement to attract supplies from potential farmers. The terms may involve provision of credit, seeds, fertilizer, chemicals, extension, crop price, or mode of payment etc. A farmer aligns own farm production and marketing capabilities with those terms of agreement that maximize farm income. If the terms are unfavourable, depending on own factor endowments, the farmer opts to be independent i.e. participate in purely spot market. Through these intermediaries, the buyer may choose who to verbally contract through 'take or leave it' mechanism or by self-selection with the aim of reducing costs or maximizing profits. Therefore the buyer seeks in a particular farmer those cost reducing or profit maximizing enhancing traits. Such factors may include a farmer's experience in farming, area of the farm under French bean crop, ownership or value of irrigation equipment, and distances of farm-to-source of irrigation water and farm-to-main French bean collection centre.

Consequently, in a given area in the study region, there exist those farmers selling either under handshake/promissory arrangement or independently. If we denote a gentleman's agreement by, Y , we can express the behavioural model used to examine the factors influencing the existence of a gentleman's agreement in the region as:

$$Y_i = g(I_i) \tag{1}$$

where Y_i is the observed response for the i th observation (i.e. the binary variable, $Y_i = 1$ for existence of a gentleman's agreement, $Y_i = 0$ for no existence), and I_i , is an underlying

unobserved stimulus index for the i th observation, where $I_i = b_o + \sum_{j=1}^n b_j X_{ji}$.

Conceptually, there is a critical threshold I_i^* for each farmer; if $I_i < I_i^*$ the farmer is observed not to have been in a gentleman's agreement, if $I_i \geq I_i^*$ the farmer is observed to have been in a gentleman's agreement. g is the functional relationship between the field observation (Y_i) and the stimulus index (I_i) which determines the probability of choice of gentleman's agreement and $i = 1, 2, \dots, m$, are observations on variables for the choice model, m being the sample size. X_{ji} is the j th explanatory variable for the i th observation, $j = 1, 2, \dots, n$. b_j is an unknown parameter, $j = 0, 1, \dots, n$, where n is the total number of explanatory variables.

The logit model as extensively reviewed in Amemiya (1981) based on the cumulative logistic probability function was used for this study due to its computational easiness compared to other types (Pindyck and Rubinfeld, 1981). The logit assumes that the

underlying stimulus index (I_i) is a random variable that predicts the probability of existence of a gentleman's agreement:

$$P_i = \frac{e^{I_i}}{1 + e^{I_i}} \quad 2$$

Therefore, for the i th observation the logit is given as:

$$I_i = \ln \frac{P_i}{1 - P_i} = b_o + \sum_{j=1}^n b_j X_{ji} \quad 3$$

The relative effect of each explanatory variable (X_{ji}) on the probability of existence of a gentleman's agreement in a region is measured by differentiating with respect to X_{ji} , i.e.

$\frac{\partial P_i}{\partial X_{ji}}$. Using the quotient rule:

$$\frac{\partial P_i}{\partial X_{ji}} = \left[\frac{e^{I_i}}{(1 + e^{I_i})^2} \right] \left[\frac{I_i}{X_{ji}} \right] \quad 4$$

In aggregate, the predicted changes in the probabilities of an agreement being in existence can be used to estimate the change in the number of small farmers opting for such a linkage relationship.

Using the logit, equation 3 and equation 4, we evaluate the effects of various factors on the likelihood of a household linking through the gentleman's agreement to market French beans. The estimating equation was specified as follows:

$$GAGR_i = b_0 + b_1 CCD + b_2 WSD + b_3 IEV + b_4 YP + b_5 AREA$$

$GAGR$ indicates existence of a gentleman's agreement. Distance of the farm to the crop collection centre CCD signifies transport, assembly and crop wastage costs. Farms located further inland attract high transport costs due to poor road networks, the need to invest in numerous assembly sheds and possible post farm crop deterioration during

transfer. Brokers operate in such areas avoided by direct buyers. Thus a positive sign is anticipated. Distance of the farm-irrigation water source *WSD* indicates immediate dependability of such farm owners to offer continuous cheap supplies due to lower irrigation costs. Farms located further away from irrigation water sources may attract heavy investors with necessary capital and hence such farm operators may opt for direct linkages. Thus, a negative sign is expected. Ownership or the value of irrigation equipment *IEV* is a sign of readiness to engage in long-term horticulture farming. Horticultural farming in the study area depends on irrigation and therefore owning or having more of the equipments is a prerequisite to export crop production. Hence, this variable is expected to be positive but independent of linkage. Experience *YP* represents a farmer's management abilities in the production of perishable vegetables. Farmers with more experience may opt to by-pass brokers in favour of direct marketing because of long established contacts compared to new entrants and less experienced producers. Hence a negative sign is expected. The size of farm under crop *AREA* is a measure of the extent of production operations. Large farm sizes attract need for independence due to expected high outputs from large operations. Since brokers handle small quantities a negative relationship with linkage is expected.

4. Surveyed French bean growers

Data for this study was extracted from a farmer survey in Mwea Tebere of Central Kenya. Structured questionnaires were administered to 60 French bean small farmers over a period of one and a half months in 2001. The farmers were randomly selected within clusters characterized by villages. The principal aim of the study was to evaluate the factors determining the incidence of a gentleman's agreement in linking small farmers to the export market throughout the region. Data on the variables included in the model are presented in Table 1.

The average area of farm under French beans in the study region was about 1.03 acres which is similar to those in other parts of Kenya where irrigated horticultural production is practised (Muiruri and Nyoro, 1999). The average number of seasons in production of French beans (9.55) shows that intensive entry into French bean exports in the region dates around the early 1990s horticultural boom years. The average farm-to-irrigation water source distance of 206.2 metres shows close proximity of farms relative to water accessibility with preference placed on farms near or along water canals. The mean farm-to-central collection centre distance of 13.2 kilometres indicates relatively far location of farms to the centre. Farms located nearest to the centre are 2.5 kilometres away and are easily accessible through either tarmac road or Mwea Irrigation Settlement Scheme' (MISS) maintained feeder roads. The mean value of irrigation equipment (water pumps and knapsacks) (48223.4 KES) shows farmers' high dependence on agricultural waters for production and need to produce quality crops.

5. Results

The equation specifying the determinants of a gentleman's agreement being in place was estimated using SPSS 10.0 econometric software. The log likelihood estimates obtained are reported in Table 2. The results show that the distance of farm-to-central collection centre is significant at 5% and has the expected positive sign. Distance of farm-to-irrigation water source is significant at 10% and has the expected negative sign. The value of irrigation equipment is significant at 1% and has the expected positive sign. Experience was not significant but had the expected negative sign. Area of farm under French beans was significant at 12% and had an unexpected positive sign.

Linkage through gentleman's agreement in French bean marketing thrives the further the farms are from the central collection centre at Ngurubani². This indicates that as the distance from the collection centre increased, farmers were more likely to sell through brokers and middlemen than direct to major buyers. Compared to brokers and middlemen, major buyers have critical consideration of transport, assembling and post farm costs and that favours farmers on the periphery of Ngurubani. This is so since poor or impassable roads link most of the farms located away from Ngurubani, which makes it favourable for proliferation of brokers and middlemen. For example, McCulloch and Ota (2002) cite sparse location of small farms and poor accessibility as a major cause of the observed reduction of procurements from small farmers by major exporters. The transaction cost considerations have led to the control of linkages by brokers and middlemen, of those farmers located far from Ngurubani perhaps to take advantage of coordination and infrastructure inefficiencies in horticultural marketing (Nyoro, 2004).

The location of the farm relative to agricultural water source³ in horticultural farming shows a negative relationship with linkage through brokers and middlemen. This means that as the distance from the farm to source of water increased, so decreased the chances of verbal agreements in the procurement of French beans. According to Kariuki (2003), most small farms producing small crop quantities are located along water canals, or near water wells compared to large farms that produce large quantities. Since agricultural water means high potential for production during the year, farms that are further away need more investments in irrigation equipment. Farmers on such farms may prefer direct marketing by virtue of their large-scale operations and this may render brokers and middlemen to procure from small farmers.

² This town centre is the axis of transactions for all major buyers i.e. companies and an assembling point before beans are transported to Nairobi.

³ This is mainly National Irrigation Board water canals although there are cases of farmers using wells.

There is positive and independent relationship between the value of irrigation equipment and linkage through brokers and middlemen. Ideally, as the value of irrigation equipment increase, the chances of farmers using the often unreliable, seasonal verbal agreements would decline probably by virtue of having so much capital stock tied in production equipment. The plausibility here is that a farmer would seek to produce under more certain conditions especially if investments losses would be enormous when production is interrupted. However, equipment value is independent of linkage, which underscores the importance of irrigation and the unreliability of seasonal rains in the region. Therefore, investment in irrigation equipments is a pre-condition to export market entry whether linkage is through brokers and middlemen or otherwise.

More farming experience could mean more crop and agronomic knowledge and informed choice of market channels for French beans and hence a move away from a gentleman's agreement. Again, there is a tendency by more experienced small farmers to build market relationships based on trust and recognition. This may lead to need for commitment to relationships where decisions are highly controlled as in formal contracts (Dijkstra *et al*, 2001) and consequently direct linkage. There is a high probability that youthful farmers or new entrants find brokers and middlemen as an alternative market link perhaps to avoid experience conditionality used by major buyers in selecting suppliers

The area of farm under French beans was positive with the likelihood of linkage to export markets through brokers and middlemen for small farmers in Mwea Tebere. This result was not expected. As the area under French beans increased, a rational farmer would opt for a reliable buyer to avoid income fluctuations occasioned by exposure to falling prices and production risks. However, farm sizes in Mwea increase with distance from the

central collection centre and are located in the lower regions dominated by elderly farm owners and have poor irrigation possibilities (Kariuki, 2003). These factors could be some of the causes of proliferation of brokers and middlemen since they conversely deter large buyers. Large buyers avoid considerable transport costs, wear and tear. Therefore, as area under French beans expanded, the activities of middlemen and brokers in such regions increased.

6. Conclusions

The development of the horticultural sub-sector in Kenya has been necessitated by the involvement of the private sector especially in the farming of French beans in Mwea Tebere. Since the sector has had no controls over the years and the fact that land tenure in the study area is mainly government controlled through NIB with small pockets of private landowners, private firms and or individual sponsors link small farmers to export markets through contractual arrangements. Local brokers and middlemen play a significant role in assembling export crops from many sparsely located small farmers using verbal or promissory agreements. This study's aim was to evaluate the factors determining the use of gentleman's agreement to link farmers to export markets. We make special reference to French beans marketing.

Logit estimates show that irrigation equipment is a prerequisite for linkage; farm localities further from the central crop collection centre and close proximity of farms to source of irrigation water and poor accessibility of large farms are preferred by brokers in linking small farmers. Consequently a farm's location and attendant transaction costs considerations play a major role in the development of market linkages in rural semi-commercial economies.

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Table 1: Selected Farmer, Farm and Infrastructural Characteristics (n=60)

Variable	Description	Unit	Mean	Min	Max
CCD	Farm-to-collection centre distance	Kilometres (Kms)	13.2	2.5	32
WSD	Farm-to-irrigation water source distance	Metres (m)	206	10	1000
IEV	Value of water pumps and sprayers	Kenya Shillings (KES)	48223.4	3000.00	181400.00
YP	Experience in French bean farming	Seasons	9.55	2	30
AREA	Proportion of land under French beans	Acreage (Acre)	1.03	0.25	2.5

Source: Computations using SPSS 10

Table 2: Logit Estimates (Local Broker=1, independent=0)

Variable	B	S.E.	Wald	Sig.	Exp (B)
* CCD	0.101	0.050	4.068	0.044**	1.106
WSD	-0.004	0.002	3.356	0.067*	0.996
S					
IEV	0.000	0.000	6.974	0.008***	1.000
o					
YP	-0.014	0.081	0.030	0.862	0.986
u					
AREA	1.433	0.928	2.386	0.122*	4.191
r					

Source: Estimates using SPSS 10.

Significance levels: * 10%, ** 5%, *** 1%.

Model Summary: -2 Log Likelihood 56.671; Cox & Snell, 0.312; Nagelkerke, 0.416

Hosmer and Lemeshow Test: Chi-square 10.14; df 7; Significance 0.181