

Kariuki, Isaac Maina; Loy, Jens-Peter; Herzfeld, Thomas

Article — Accepted Manuscript (Postprint)

Farmgate Private Standards and Price Premium: Evidence From the GlobalGAP Scheme in Kenya's French Beans Marketing

Agribusiness

Provided in Cooperation with:

Leibniz Institute of Agricultural Development in Transition Economies (IAMO), Halle (Saale)

Suggested Citation: Kariuki, Isaac Maina; Loy, Jens-Peter; Herzfeld, Thomas (2012) : Farmgate Private Standards and Price Premium: Evidence From the GlobalGAP Scheme in Kenya's French Beans Marketing, Agribusiness, ISSN 1520-6297, Wiley, Hoboken, Vol. 28, Iss. 1, pp. 42-53, <https://doi.org/10.1002/agr.20286>

This Version is available at:

<https://hdl.handle.net/10419/149574>

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.

**Farmgate private standards and price premium:
Evidence from GlobalGAP scheme and Kenya's French beans marketing**

Isaac M. Kariuki^a, Jens-Peter Loy^b, Thomas Herzfeld^c

This is the peer reviewed version of the following article: Kariuki, I. M., Loy, J.-P., Herzfeld, T. (2012): Farmgate private standards and price premium: Evidence from the GlobalGAP scheme in Kenya's French beans marketing, *Agribusiness* 28 (1); pp. 42-53, which has been published in final form at: <http://dx.doi.org/10.1002/agr.20286>. This article may be used for non-commercial purposes in accordance with Wiley Terms and Conditions for Self-Archiving.

Abstract

The proliferation of private quality and assurance schemes in international trade is defining market access in high value chains. The prime concern for small-scale producers is whether price premiums are realizable due to compliance. Using French beans marketing, this paper finds that GlobalGAP certification, produce traceability, number of suppliers, competition for supplies, direct procurement, a good road network and supply contracts have positive farmgate price effects for smallholders. Potential policy implications are drawn. [EconLit citations: L110; L230]

^a Department of Agricultural Economics, Egerton University, Kenya

^b Department of Agricultural Economics, Christian-Albrechts-University Kiel, Germany

^c Department of Social Sciences, Wageningen UR, The Netherlands

1 INTRODUCTION: GLOBALGAP QUALITY ASSURANCE SCHEME IN KENYA

GlobalGAP (GGAP) has received much attention in the literature on food safety and quality as a standard of choice among retailers in the European Union (EU) since its formation as shown in Glasheim and Nagel (2006). GGAP is a so-called business-to-business standard which is not communicated to final consumers by, for instance, labeling. GGAP, initially EurepGAP, was formed in 1997, and entered Kenya with the first certification of five Kenyan farmer groups in 2005. Through the Kenyan umbrella horticultural association, Fresh Produce Exporters Association, the Kenyan good agricultural practices, KenyaGAP was benchmarked to GGAP in 2007. Currently, there are approximately 400 GGAP certified farms in Kenya; 34 individual farms and 352 farmer groups. It is among the widely used certification program facing the fruit and vegetables sub-sector in Kenya. At the same time it might have a negative impact on resource poor smallholder producers. Certification requires compliance with a catalogue of standards regarding the production process. Annual farm audits aim at checking continuous compliance. In most cases the costs associated with auditing and GGAP certification have to be paid by the farmer. GGAP allows for certification according to two options: one for single farmers (Option 1) and one for a group of farmers (Option 2). Most farmers in Kenya are certified under Option 2. Major concerns relate to the complexity and transparency of the scheme given their numerous control points and the necessary technical and administrative capacity in a small-scale farming situation (e.g., Food and Agriculture Organization, 1999, Hobbs, 2003). For instance, compliance requires complete records of pesticide application protocols, evidence of training on crop hygiene, testing of soil and irrigation water, and assessment of on-farm and off-farm crop handling facilities (GLOBALGAP, 2007). Quantitative estimates of the cost of initial compliance and certification ranges from US\$6000 to US\$8000 (Jaffee, 2003). Continuous compliance and renewal of certificates is estimated to cost US\$ 200 per month. Graffham et al. (2007) have

shown that the costs of certification and audits for organized smallholder producers are about US\$ 632 and US\$ 154, respectively. More recently, Muriithi et al. (2010) indicate that input costs (fertilizers and other agro-chemicals) though not standardized, heavily weigh on initial adoption of GGAP for smallholders. To help small farmers cost sharing systems are in place where organized smallholders, the buyer or exporter, and non-governmental organizations contribute to an arrangement to establish GGAP certification, while GGAP maintenance is shared between organized producers and exporters. The bulk of maintenance costs, following Graffham et al. (2007) 86%, are paid by the exporter. Although compliance and certification might result in improved on-farm processes, lower transaction costs, or a higher product quality, monetary benefits are less explicit. Some studies conclude that the most important barrier for smallholder producers is the lack of visible rewards for GGAP certification (e.g., Chia-Hui Lee (2006), Commission of European Communities (2006), Graffham et al. (2007), Minae et al. (2006) and Thiagarajan et al. (2005)). Similarly, Glassheim and Nagel (2006) argue that farmers are not able to quantify the impact of being GGAP certified on their farm business. Interviewing exporters of fresh fruit and vegetables, not a single respondent in Ouma (2010) claimed to have received a price premium from retailers for GGAP certified products.

Therefore, this study aims at quantifying the monetary reward to certification at the farm level. It does so by estimating a hedonic function of French beans producer prices econometrically using a panel of 249 Kenyan farmers. Our analysis contributes to the literature by providing a first quantitative assessment of the implicit price premium attached to GGAP certification. French beans have been cited by Minot and Ngigi (2004) as a success story in the horticultural export sector. The vegetable has higher financial gains per acre compared to traditional crops like maize and enjoys path-dependent benefits of specialization having first featured in fresh produce

exports since the mid-1980s, wider acceptability among producers, easy agronomic practices and short growing period and established European markets. Local consumption is modest standing at 6.6 % of all food items for the upper income consumers and at 11.9 % for the middle income consumers as indicated by Central Bureau of Statistics (2000). Internationally, computed figures from EU trade database show considerable penetration of French beans exports from Kenya to the EU market between 2002 and 2007 with remarkable 26.88 % share by value and 12.64 % share by volume respectively (EUROSTAT, 2009). The major export destination remains the United Kingdom which receives more than 60 % of its total French beans imports from Kenya. Although Reardon and Farina (2002) argue that the EU market is a challenge for imports from developing economies due to the dominance of European continental supermarkets and supply chain standards that demand quality certification and traceability, Jaffee (2003) states that French beans face minimal phytosanitary sanctions in the UK and Dutch markets. In addition, FAOSTAT (2009) shows that the export price per kilo of French beans increased over the years from US\$ 0.81 in 1990 to US\$ 3.21 in 2007.

The following section develops a conceptual framework of producer price formation and third-party certification. Section three specifies the econometric model. The methodology, data and descriptive statistics are introduced in Section four. Section five presents the results of the econometric analysis. Finally, in Section six the results are discussed and some potential conclusions drawn.

2 CONCEPTUAL FRAMEWORK

From the foregoing, compliance with third-party certification schemes might be motivated by monetary, i.e., higher and/or more stable product prices, and non-monetary attributes, e.g.,

reduced transaction costs, higher stability of business relationships with exporters and strategic issues like market access. As GGAP has become the standard in EU retailing, we cannot easily assess whether a premium is paid by final consumers or not. As compliance with GGAP is not communicated to consumers but rather among intermediate channel participants, it might well be that the premium at this stage is small. Nonetheless, there might be other advantages in the value chain (e.g., less controlling etc.) that allow for reimbursing producers for their extra costs of complying with GGAP. In this paper we test whether producers generate a price premium for the compliance with GGAP. We borrow much from the literature on product prices which reveals that commodity prices vary with quality characteristics (e.g., Waugh, 1928, Estes, 1986, Goodwin et al., 1988, Espinosa and Goodwin, 1991, Tronstad et al., 1992, Tronstad, 1993, Parker and Zilberman, 1993, Bierlen and Grunewald, 1995, Estes and Smith, 1996, and Carew, 2000). More recently, Wollni and Zeller (2007) have found that nature of production, e.g., organic, state of origin or regional differences, and participation in marketing organizations to be significant factors affecting market prices.

Following Hobbs (2003), Graffham et al. (2007) and Okello and Swinton (2007), certification costs are disincentives to adopt GGAP. If we use Humphrey's (2005) argument that small scale level of production, low level of coordination and cooperation among smallholders may lead to high unit costs of compliance and certification for individual producers, then those not willing or not able to obtain certification face two options: They may opt for the local or export markets for non-certified products as shown in Jaffee (2003) and Ouma (2010). Alternatively, they can opt out of production as argued by Graffham et al. (2007). For non-certified producers it may be construed that they face lower production costs but also lack a price premium compared to their certified counterparts. However, Waweru (2006) contends that the costs of certification may be

absorbed more easily by way of amortization through group marketing where smallholders pool land and financial resources. Economic theory indicates that, assuming high quality induces higher costs and buyers are willing to buy the high-quality product, in order to reach equilibrium, additional costs must be covered by a higher market price (Unnevehr, 2000). The benefits that smallholder producers achieve through joint producer marketing constitute incentives. For instance, Bellefi et al. (2005) identify market access and premium prices, Moll and Igual (2005) mention higher cost efficiency and Giraud-Héraud et al. (2006) cite reduction of failure in product safety as some of the benefits of product differentiation through labeling. However, in the business-to-business GGAP scheme costs may not necessarily be covered by a corresponding higher price.

Nevertheless, farm gate buyers might have an incentive to offering higher prices to GGAP certified French bean producers to mitigate quality uncertainty and honor reduced transaction costs. As described by Okello (2005), the observed farm gate producer price is derived from the export market price less transaction costs faced by a farm gate buyer. On each market day, buyers purchase beans from producers in a given shed following some criteria reflecting the market served. We assume the prices offered to be auction prices based on quality and other factors facing the buyer on the market day. Hence, smallholder producers are price takers. Consequently, assuming that small producers pursue the goal of monetary gain, the observed farm gate producer prices can be attributed to the production method used by the farmer, spatial, seasonal, quality variations and other factors.

Conceptually, assume an exporter i is sourcing fresh produce directly at farm level in order to ship it to export markets in Western Europe. All exporters face the same export market price of

French beans P_{ep} . However, transaction costs might vary across exporters TC_i . Therefore, the observed farm gate prices differ due to the exporter's characteristics: $P_{fi} = P_{ep} - TC_i$. This equation implies that an exporter facing increasing transaction costs will offer a lower price P_{fi} to the farmer. Introducing third-party certification like GGAP might cause two different effects. On the one hand, depending on the demand from export markets, exporters might be more or less forced to look for certified producers. In such a case, the exporter needs to offer higher prices to secure supply. Similarly, exports of certified products might result in savings on transaction costs which the exporter might channel through to producers. On the other hand, exporter-sponsored training and monitoring of GGAP may lead to the problem of hold-up and subsequently offers exporters the possibility to exercise market power. However, as long as a market for non-certified produce exists, such behavior appears to be less realistic.

Following the conceptual framework, farm gate buyers procuring from certified producers may face lower information, monitoring and enforcement costs compared to procuring from non-certified producers. Further, a buyer is assured to get produce of a certain high and safe quality. Thus, if lower transaction costs and high product quality generate market efficiencies, then farm gate buyers may offer higher farm gate prices. We hypothesize that certified farmers impose lower information and transaction costs on buyers and presumably supply higher quality produce. Such producers will be offered higher French bean prices than non-certified producers.

Beside transaction costs, a buyers' price offer might vary due to characteristics of the export destination and additional services. For instance, retailers' interest on product variety might result in varying buying behavior and varying prices at the export market level (Jaffee, 2003). Furthermore, buyers seek minimal production and distributional risks and, therefore, may have an

incentive to offer producers with a functioning traceability system, higher prices (Brousseau and Codron, 1998; Reardon and Farina, 2002; Golan et al., 2004).

In Jaffee (2003) and Graffham et al. (2007), the role of intermediaries in horticultural procurement in Kenya has received much attention. Intermediaries are argued to have local expertise and could possibly face lower produce assembling costs compared to exporting firms. However, intermediaries will generally add transaction costs to the farm gate price. Therefore, export firms may prefer direct procurement of French beans from smallholder producers in order to control quality, produce identification and segregation. Traders that choose intermediaries over direct procurement may be argued to be small investment firms seeking to minimize transaction costs. On the contrary, firms procuring directly from smallholder producers could be large. Frequently, large horticultural farms involved directly in exporting source additional quantities from small farmers to fill gaps. If quality and safety benefits motivate a buyer to source directly, such a firm could be in a position to trade-off arising transaction costs for product quality. To sum up, it is hypothesized that shorter supply chains with direct procurement offer higher French bean prices to producers than intermediaries.

On the buyer's side, Graffham et al. (2007) note that organized production reduces logistic, monitoring and enforcement costs arising from sparse distribution of farms in a rural set up. Additionally, organized producers have some sort of bargaining power. It is thus hypothesized that organized producers will receive higher French bean prices.

The farm gate price for French beans will be influenced by site and time specificities. Martinez and Poole (2004) have identified the perishable nature of fresh vegetables as key to quasi-rents by

buyers. For example, French beans are harvested early in the morning and collected between 10 a.m. and noon every day. This time specificity may expose farmers to post-harvest crop handling opportunism on the part of buyers through delayed French beans collection during the market day. Assuming smallholder producers to be rational suppliers, it is expected that farmers would seek to sell their harvested crop as soon as possible to avoid product deterioration from strong heat. Furthermore, the quality of collected beans will vary with each harvesting day as the season progresses since beans will lose vigor and turgidity as the number of harvestings increase. French beans quality will also be affected by on- and off-farm crop handling activities such as grading and transportation through bruising and breakages. Another potential influence on observed price would be the emerging supply of beans from Southern Europe during the June-October season. Those changing market conditions will affect prevailing buyer practices such as whether the purchasing behavior is consistent or intermittent and whether the buyer-producer exchange relationship is strongly or weakly enforceable. Therefore, the arising buyer opportunism, quality and market information asymmetries, adopted marketing practices and on-season for European suppliers may generate varying prices over the season.

Jaffee (2003) indicates that sparse location of small farms and poor roads require logistic investments such as pre-cooling facilities, packing houses, vehicles and basic collection stations to reduce on and off-farm crop losses. Omamo (1998) finds that the presence of road or marketing infrastructure e.g., producer groups and central collection points etc, increases the efficiency of both marketing and production through reduction of transaction costs and ensures more competitive pricing conditions in marketing. Thus, good quality roads may decrease trader's transportation costs and, subsequently, the cost per unit of commodity traded. Economically growing regions subject to good quality roads are thus hypothesized to have lower

logistic and post-harvest crop handling costs and, subsequently, are characterized by higher French bean producer prices. Previous studies show that producer groups with 15 to 20 homogeneous producers within a radius of 1.5 km are subject to reduced costs of assembling produce (Natural Resources Institute, 2002; Nyaga, 2007). However, whether such cost reduction translates into higher producer prices is an empirical question.

3 SPECIFICATION OF THE ECONOMETRIC MODEL

In order to test the existence of GGAP price premium at producer level, the following model is estimated:

$$P_{fik} = \gamma_0 + \delta C_k + \chi X_k + v \tag{1}$$

where P_{fik} is the farm-level price paid to producer k by exporter i . C is a dummy variable representing GGAP certification, and X is a vector of spatial, seasonal, marketing and quality factors that may influence producer prices. The estimated coefficient δ represents the price premium of certification. Due to the time-series cross-sectional nature of the data set, a fixed-effects or a random-effects estimator can be used. However, the time-invariant nature of almost all explanatory variables forces us to stick to the random-effects model. That is, the error term v is assumed to be randomly distributed over producers and uncorrelated with the explanatory variables. But when time-series cross-sectional data have a short time series and large panel, heteroskedasticity and autocorrelation of the error terms v related to a specific panel or producer, k arise. Our data have 6 observations for each of the 249 producers. Consequently, feasible generalized least squares model which takes account of short time series and allows estimation in the presence of autocorrelation across panels is preferred. Because we assume the existence of a GGAP price premium independent of the French beans' grade, the dependent variable, P_{fik} , represents the average of extra fine and fine grades. Equation (1) has been estimated using a

semi-log linear approach for simplicity purposes. This allows us to interpret estimated coefficients as percentage changes. Further, considering that certification premium may not be constant given changing availability of beans in competing production regions of Southern Europe, GGAP is interacted with the time variable to capture the variation of certification premiums over the season. Additionally, producers in certain administrative locations may be favored by locality differences such as good road networks. Thus location and type of road are interacted in the final model to generate a coefficient of quality road networks.

4 DATA AND DESCRIPTIVE STATISTICS

Data on producer prices have been selected from 249 Kenyan French bean producers surveyed from 24 villages of Mwea Tebere, Kirinyaga District in 2006. The identification and selection of respondents started in April 2006 through village administrators (headmen) and 6 trained enumerators. During this period farmers already planted French beans and anticipated harvesting in June 2006. Due to unequal distribution of villages within the administrative location, the study area was divided into 4 sub-regions: Tebere, Nyangati and Murinduko in upper Mwea and Mwea in lower Mwea based on their demarcation along Rivers Nyamindi, Murubara, Project Murubara and Mwea Canal. Villages were listed and a random sample of six villages selected per region. Producers were then selected conditional on the existence of French bean crop due for harvesting in June. Villages had between 1 and 37 smallholders, 100 organized in producer groups and 149 independent farmers. In May 2006, all producers were interviewed on socio-economic, production and marketing aspects using a short questionnaire. Specific data included producer identity, farm area under beans, social networks, GGAP certification, supply contracts, and nature

of road networks. Collection of price data⁴ involved farm visits and interviews during harvesting, sorting and grading. This procedure achieved two things: one, observing post-farm crop handling practices such as sorting, washing, grading and packaging etc. and two, identifying exchange transactions like receipting, trace-back elements, type of buyers and linkages etc. French beans yield two grades: extra and fine differentiable through size. Extra is the smallest. French beans are harvested over a period of three to four weeks. Therefore, over a three-week period prices were collected for each grade on 2 days per week, Monday and Wednesday.

Table 1 shows price related descriptive statistics based on the factors hypothesized to influence farm gate producer prices. The prices are stated in Kenya shillings (KE) per 3 kg which is the standard farm gate packaging weight. The first two columns show the variables and their definitions. Column three presents the number of producers for which the respective variable is equal to one and their share on the total sample. Twenty nine percent of all producers are GGAP certified. Forty percent of the smallholders are organized into 6 producer groups with an average size of 17 producers. All but two groups are GGAP certified. Furthermore, the data shows that the number of producers in a village varies from 1 to 37. Obviously, larger villages might be potential hubs of marketing activities for buyers. Additionally, on average 9 buyers compete for French beans supplies in a given village. Our data has one buyer that sources exclusively from 61 of the organized producers. Fifty one percent of the smallholders are directly linked to exporters and 22 % of the smallholders use a full trace-back system carrying farmer's name, plot, and group name and produce collection date. The data show that 69 % of producers sold beans to the same buyer all season. Verbal and informal arrangements dominate marketing exchanges as only

⁴ Mwea has had running research projects which makes it easier to get trained research data collectors. However, it makes it difficult to obtain information from farmers who complain of too many questionnaires from the numerous projects. Thus, in order to elicit price information during harvesting and subsequent follow up for un-clarified non-price related data, each respondent was given a mobile phone card worth 2.5€

31 % indicate to have a, usually written, supply contract. Thirty four percent of the producers farm in upper Mwea, with most located in the lower region with better access to irrigation. Only 13 % of farmers have access to graveled or tarmac roads. Although producers sell both French beans' grades, 94 % report to aim for extra fine grade.

Turning to the dependent variable, our data show wide between-producer price differences with a minimum of KE 20 and a maximum of KE 200 per 3kg. These prices are similar to those reported in earlier studies (Graffham et al., 2007). However, the mean declines continuously over the six times of sampling from a high of KE 93 to a low of KE 53. It has been observed that buyers adopt differing price regimes between producers, within and between marketing days. GGAP certified producers receive on average higher prices and face a smaller variation compared to non-certified producers.

5 RESULTS OF THE ECONOMETRIC ANALYSIS

The estimated coefficients are presented in Table 2. Multiplying the coefficients by 100 gives the percentage change in the price of a 3 kg carton of French beans as a result of a change in the explanatory variable. Coefficients attached to log number of buyers and producers can be interpreted as elasticities. The signs on most of the variables in the model are as expected *a priori*. The variables are jointly statistically significant.

Results of the first specification in column one of Table 2 indicate that certified producers receive a 9.4 % higher price than non-certified producers. However, the second specification clearly indicates that this estimate is not robust to the inclusion of interaction effects. Controlling for seasonal effects shows that certified producers experience a lower reduction of prices over the

season. The econometric analysis suggests that certified producers receive between 12 % and 25 % more per 3kg carton compared to non-certified producers. That is, the trend of declining prices over the season is less steep for certified producers. In an earlier study Asfaw et al. (2007) find that GGAP certified producers have a by KE 5,271 higher net income compared to non-adopters. Further, Graffham et al. (2007) find some certified producers to have received an extra KE 5 per kg. These results indicate that farm gate buyers are providing incentives for smallholders to improve quality and safety of produce through compliance with export market's product quality schemes. The result contradicts the finding in previous literature that a price premium for farmers is non-visible in farm gate certification schemes (e.g., Chia-Hui Lee, 2006; Commission of European Communities, 2006; Minae et al., 2006; Thiagarajan et al., 2005).

The time dummy variables (Week_*) indicate distinct price patterns. Prices decrease continuously from the first to the third week. Thus prices are time-dependent and variation in time is significant. Martinez and Poole (2004) find temporal specificity to be critical in fresh produce markets. When the new harvest starts, producers receive the highest premium. The variation in prices might be explained on one hand by quality differences arising from physical attributes. On the other hand, there is a possibility that exporters are adopting tactical buying behavior during the season. This could either be by purposely setting producer prices high to attract supplies from smallholders selling to competitors or by exploiting the perishable nature of French beans through delaying acceptance so as to appropriate lower prices since producers would rationally want to avoid economic losses from wasted beans. Finally, the decline of prices over time may also reflect possible fluctuations in foreign exchange rates since export market prices are quoted in foreign currency.

Surprisingly, organized producers (*Group*) experience lower prices compared to independent producers. Across both specifications the estimated coefficients suggest approximately 30 % lower prices. There might be two explanations: First, organized producers probably receive inputs and technical assistance from buyers. Second, “low quality” farmers might self-select into collective marketing. Obviously, buyers appropriate the attendant costs (i.e., inputs, technical, assistance and low quality) to the product price with a consequent reduction in the expected final price. For instance, in Graffham et al. (2007) producers pay KE 3 per kg to offset group costs and investments. In some cases a management committee overseeing group production and marketing may also charge each producer a small fee to cover administrative and organizational costs (Narro et al., 2009) which may be subsumed in the groups costs although whether buyers cooperate to deduct the costs from output prices is unclear.

Combining the two results for certification and organized production suggests that organized producers face a higher incentive to comply with GGAP in order to compensate for a negative price premium of organized production. This finding implies that independent producers, the reference group, might serve different markets or use established long-term personal relations with buyers. Furthermore, since 61 % of all organized producers sold to one buyer, the coefficient could reflect oligopsonistic market power use by the respective buyer.

French beans prices respond positively to the size of the market. Looking at the supply side, prices are predicted to be higher in villages with a larger number of suppliers ($\ln(\text{Sellers})$). The prices tend to increase by 6.2 % for a percentage change in the number of producers in a village. A higher number of producers in a given area might benefit buyers with lower costs of produce assembling and transportation. Similarly on the demand side, buyers’ competition for French

beans is predicted to result in a positive effect on farm gate prices. A percentage increase in the number of buyers ($\text{Ln}(\text{Buyers})$) leads to a 3.3 % higher price. This means that many buyers may yield fair and competitive gains to smallholder producers. Our results underline the relevance of competition on markets (Pirrong, 1993). The two estimates should however, not be compared directly as they might measure two separate issues. Whereas the size of the population of producers here might rather indicate local spots of specialization and scale externalities, the number of buyers relates to competitive behavior on the market.

Selling directly to an exporter (*Exporter*) has a positive effect on prices. Producers that deal directly with exporters gain between 12.4 % and 14.6 % per 3 kg carton of French beans. This result shows that by surpassing intermediaries, producers could reap a considerable premium. It seems economically reasonable for buyers to reward exchange relationships devoid of numerous post-farm crop handling practices. Quantitatively, direct procurement shows the second largest positive coefficient after use of a supply contract.

A fully implemented trace-back system (*FullTrace*) endows small producers a premium of approximately 5 % to 6 %. Identifiable farm produce (i.e., producer, farm plot, and production system and collection date) is rewarded by buyers. A trace-back system improves the certainty and assurance of buyers on product quality and safety from numerous smallholder producers and offers an opportunity to enforce sanctions following noncompliance. Producers' willingness to be traced is enough evidence that "due diligence" has been exercised during crop production and post-harvest crop handling. Golan et al. (2004) argue that trace-back systems also reduce attendant risks in the market chain such as loss of reputation for low quality deliveries, costs of produce rejection on grounds of detected pesticide residues, possible liability costs, and yield

distribution efficiencies. Our finding indicates that reduction in distribution costs has the potential to improve product value and market access for marginalized smallholder producers. This is especially critical in markets for quality and safety.

Furthermore, the results show that producers selling to one buyer over the whole season (*OneBuyer*) receive a higher price compared to producers selling to different buyers. The estimated coefficient suggests 8 % higher prices. Delayed collection or lacking produce collection arrangements might force producers to sell their perishable product at lower prices in order to avoid or limit loss through dehydration. The finding could suffer from the possibility that producers receiving lower prices change buyers within one season. Unfortunately, the underlying reasons remain unknown. .

In addition, use of a supply contract (*Contract*) generates 29 % higher French beans prices. Quantitatively, this estimate is the single largest positive coefficient. As expected, this result indicates that solidifying exchange relationships through pre-arranged contracts enhances marketing efficiencies. A supply contract that may entail controlled input use and pre-arranged produce collection render accrued benefits to the buyer such as guaranteed supply consistency and reliability (Jaffee, 2003). On their part, producers benefit from the knowledge of product quality and safety management and access to inputs at preferential terms. The resulting long term mutual and trustworthy trading relationship increases coordination and exchange efficiencies. Our results suggest that a balance of produce consistency and reliability as well as coordination and exchange efficiencies have a positive price effect for producers. Consequently, close production and marketing arrangements between buyers and suppliers seem essential in minimizing marginalization of smallholder producers in their bid to access strict quality markets.

Surprisingly, the estimated coefficient attached to better roads (*AllRoad*) has a negative sign. However, the interaction effect with location points to a positive impact on prices for producers in Upper Mwea (*UpperMwea*AllRoad*). Producers in Upper Mwea whose farms are accessible through all weather roads (*UpperMwea*AllRoad*) get 12.2 % higher prices, offsetting the negative effect of the all-weather road dummy. One possible explanation of the negative effect of better roads could be the attraction of added costs of marketing bureaucracies like horticultural fees which are collected at designated roadblocks. Such transaction costs deter buyers from using such routes and may cause low realization of the benefits of accessibility thus exacerbating marketing inefficiencies.

6 DISCUSSION AND CONCLUSIONS

The proliferation of private quality and assurance schemes in international trade is increasingly determining market access in high value chains. Beside market access, the prime concern for producers is whether price premiums are realized due to compliance. This is more important, especially, for smallholders in developing economies where farm gate private standards might impose relatively higher risks due to financial, investment and organizational pressure. GlobalGAP is a key standard in Kenyan horticulture farming and its implementation could have potential market access implications for the numerous smallholders involved in export marketing. Using data from a survey of 249 Kenyan French beans producers, this paper presents an econometric model to test the existence of a GlobalGAP price premium in observed farm gate producer prices. The paper finds that GlobalGAP certification, the use of supply contracts, direct procurement by exporters, and size of markets in a village, have a positive effect on producer prices. Organized producers receive significantly lower prices. However, the GlobalGAP

premium is not very large and less important than supply contracts and direct procurement. Of particular importance is that GlobalGAP premiums are not constant over one season. The fact that no independent producers in our sample have been certified, might indicate the existence of alternative marketing channels without requiring investments in a demanding certification process. Therefore, further research should center on the question of how a farm governance structure, independent or organized production, affects the willingness to apply for GGAP certification.

More buyers in a given village are found to increase prices paid to producers. The converse, which is a decline in the number of buyers in certain regions, may be of great concern for local regulators since it may expose smallholder producers to opportunistic buying behavior. For instance, buyers could exploit time specificity and the perishable nature of French beans to delay collection, collude or falsify grading and later derive quasi-rents by offering low prices. Anecdotal evidence shows that small exporters sporadically offer high prices to attract produce and, subsequently, exploit the log-in effect. Opportunistic practices (i.e., diverting contracted produce to competitors, collusion, delayed collection and falsifying grades etc.) have received attention in the works of Kariuki (2003) and CARE-Kenya (2003). Thus, Local authorities should be trained to develop appropriate capabilities to survey the functioning of markets. Indirectly, antitrust policy on local farmers markets can be a contribution to agricultural development.

Better roads are not found to lead to higher prices in the econometric analysis. One possible conclusion is that bureaucratic practices on roads such as horticultural fees and corrupt charges in police guarded roadblocks prevent the realization of efficiency gains. Whether this is the case cannot be finally answered with the data set at hand. Therefore, the link between institutional

quality and the realization of expected efficiency gains due to infrastructure improvements requires future research.

Finally, marketing practices such as a direct linkage to exporters, use of a supply contract, and non-switching selling to one buyer could increase producer's revenues. Informing producers of these findings is a relevant step to realize an impact of this analysis.

ACKNOWLEDGEMENTS

We acknowledge funding from the German Academic Exchange Service (DAAD), provision of facilities by University of Kiel (Germany) and Egerton University (Kenya) and the valuable suggestions and comments by two anonymous referees.

REFERENCES

- Asfaw, S., Mithöfer, D., & Waibel, H. (2007). What impact are EU supermarket standards having on developing countries export of high-value horticultural products? Evidence from Kenya. Paper presented at the 105th EAAE Seminar. Bologna, Italy.
- Belletti, G., Burgassi, T., Marescotti, A., & Scaramuzzi, S. (2005). The effect of certification costs on the success of PDO/PGI. Paper presented at the 92nd EAAE Seminar. Göttingen, Germany.
- Bierlen, R & Grunewald, O. (1995). Price incentives for commercial fresh tomatoes, *Journal of Agricultural and Applied Economics*, 27 (1), 138-148.
- Bredahl, M. E., Northen, J., Boecker, A., & Normile, M. A. (2001). Consumer demand sparks the growth of quality assurance schemes in the European food sector - Changing Structure of Global Food Consumption and Trade, Economic Research Service/USDA
- Brousseau, E., & Codron, J. M. (1998). The combination of governance structures: supplying French supermarkets with off-season fruit. Working Paper 1998-05 Paris, University of Paris X, FORUM and ATOM.
- CARE-Kenya. (2003). A strategy for the commercialization of small holder agriculture in Kenya. Accessed June 2010, available at <http://www.care.or.ke/cashstrat.pdf>.
- Carew, R. (2000). A hedonic analysis of apple prices and product quality characteristics in British Columbia. *Canadian Journal of Agricultural Economics/Revue canadienne d'agroéconomie*, 48(3), 241-257.

- Central Bureau of Statistics, (2000). Economic Survey, Ministry of Planning and National Development, Nairobi, Kenya.
- Chia Hui-Lee, G. (2006). Private food standards and their impact on developing countries. European Commission, DG Trade Unit G2.
- Commission of European Communities. (2006). Case Studies: EUREPGAP. A report prepared by Schneider, A., and Gay, S. H., for Directorate-General Joint Research Centre, Institute for Prospective Technological Studies (DG JRC-IPTS).
- Espinosa, J. A., & Goodwin, B. K. (1991). Hedonic price estimation for Kansas Wheat characteristics. *Western Journal of Agricultural Economics*, 16(1):72-85.
- Estes, E. A. (1986). Estimation of implicit prices for Green Pepper quality attributes using an hedonic framework. *Journal of Food Distribution Research*, 17(2), 5-15.
- Estes, E. A., & Smith, V. K. (1996). Price, quality and pesticide related health risk considerations in fruit and vegetable purchases: A hedonic analysis of Tucson, Arizona Supermarkets. *Journal of Food Distribution Research*, 27(3), 59-78.
- EUROSTAT. (2009). Trade data on imports of vegetables and fruits into EUR-25. Accessed June 2010, available at <http://madb.europa.eu/mkaccdb2/statistical.htm>.
- FAOSTAT, (2009). Food and Agriculture Organization of the United Nations Production and Trade data. Accessed June 2010, available at http://www.fao.org/waicent/portal/statistics_en.asp.
- Food and Agriculture Organization. (1999). The importance of food quality and safety for developing countries. Committee on World Food Security, 25th Session, Rome, 31 May-June 3. Accessed June 2010, available at <http://www.fao.org/docrep/meeting/x1845e.thm>.
- Giraud-Héraud, E., Rouached, L., & Soler, L-G. (2006). Private labels and public quality standards: How can consumer trust be restored after the mad cow crisis? *Quantitative Marketing and Economics*, 4, 31-55.
- Glassheim, E & Nagel, J. (2006). Globalgap's Emerging Dominance in Pre-Farmgate Protocols: Implications for regional farmers. *Northern Great Plains Inc Plains Speaking*, 9(3),1-5.
- GLOBALGAP. (2007). GLOBALGAP and the Kenya's Horticultural industry agree on a common approach in getting equivalence between KENYAGAP and GLOBALGAP: In; KenyaGAP started the process to benchmark with GLOBALGAP. Accessed June 2010, available at <http://www.GLOBALGAP.org/fruit/Languages/English/news/182.html>.
- Golan, E., Krissoff, B., Kuchler, F., Calvin, L., Nelson, K., & Price, G. (2004). Traceability in the U.S. Food Supply: Economic Theory and Industry Studies. Economic Research Service, U.S. Department of Agriculture, Agricultural Economic Report No. 830.
- Goodwin, Jr., H. L., Fuller, S. W., Capps, Jr., O., & Asgill, O. W. (1988). Factors affecting fresh potato price in selected terminal markets. *Western Journal of Agricultural Economics*, 13(2), 233-243.
- Graffham, A., Karehu, E., & MacGregor, J. (2007). Impact of Globalgap on access to EU retail markets by small-scale growers of fruits and vegetables in Kenya. National Research Institute & International Institute of Environmental Development, DfID project. Accessed June 2010, available at <http://www.agrifoodstandards.net>

- Hobbs, J. E., (2003). Incentives for the Adoption of Good Agricultural Practices. Background Paper for the FAO consultation on Good Agricultural Practices, Rome, Italy.
- Humphrey, J. (2005). 'Shaping value chains for development: global value chains in agribusiness'. Research Paper for GTZ, Eschborn, Germany, pp. 22-25. Accessed June 2010, available at www.gtz.de/trade.
- Jaffee, S. (2003). From Challenge to Opportunity: Transforming Kenyan Fresh Vegetable Trade in the Context of Emerging Food Safety and Other Standards. Agriculture and Rural Development Working Paper 1; The International Bank for Reconstruction and Development, Agriculture and Rural Development Department, Washington DC.
- Kariuki, I. M. (2003). The effects of informal marketing contracts on the production of French beans in Mwea Tebere, Central Kenya. Unpublished Msc. Thesis, Egerton University.
- Martinez, M. G., & Poole, N. (2004). The development of private fresh produce safety standards: implications for developing Mediterranean exporting countries. *Food Policy*, 29, 229-255.
- Minae, S., Casey, S., Poisot, A. S., Santacoloma, P., & Termine, P. (2006). Capacity building and awareness-raising on SARD and GAP to contribute to food safety and quality and integrated natural resources management in Kenya and Uganda. FAO Mission Report.
- Minot, N., & Ngigi, M. (2004). "Are horticultural exports a replicable success story? Evidence from Kenya and Cote d'Ivoire". A Paper Prepared for the IFPRI Workshop on "Successes in African Agriculture", Lusaka, June 10th–12th, 2002, MTID Discussion Paper No. 73. Washington: IFPRI.
- Moll, E. M. P., & Igual, J. F. L. (2005). Production costs of citrus growing in the Comunidad Valenciana (Spain): EUREPGAP protocol versus standard production. Paper presented at the 92nd EAAE Seminar. Göttingen, Germany.
- Muriithi, B. W., Mburu, J., & Ngigi, M. (2010). Constraints and determinants of compliance with EurepGap standards: a case of smallholder french bean exporters in Kirinyaga district, Kenya. *Agribusiness*, 27(2), 193-204. doi: 10.1002/agr.20261.
- Narro, C., Roy, D., Okello, J., Avendaño, B., Rich, K., & Thorat, A. (2009). Public-private partnerships and collective action in high value fruit and vegetable supply chains. *Food Policy*, 34: 8-15.
- Natural Resources Institute. (2002). Smallholders in export horticulture: a guide to best practices. Natural Resources Institute, Kent, UK.
- Nyaga, R. (2007). EurepGAP strategy development-Analysis and recommendations for Kenya BDS. USAID Business Development Services Program, Contract No. 623-C-00-02-00105-00.
- Okello, J. J. (2005). Compliance with International Food Safety Standards: The case of Green bean production in Kenyan Family Farms. Unpublished PhD dissertation, Department of Agricultural Economics, Michigan State University.
- Okello, J. J., & Swinton, M. S. (2007). Compliance with International Food Safety Standards in Kenya's Green bean industry: Comparison of a small- and a large-scale farm producing for export. *Review of Agricultural Economics*, 29(2), 269-285.
- Omamo, S. W. (1998). Transport costs and smallholder cropping choices: An application to Siaya District, Kenya. *American Journal of Agricultural Economics*, 80, 116-123.

- Ouma, S. (2010). Global Standards, Local Realities: Private Agrifood Governance and the Restructuring of the Kenyan Horticulture Industry. *Economic Geography*, 86(2): 197-222.
- Parker, D. D., & Zilberman, D. (1993). Hedonic estimation of quality factors affecting the farm-retail margin. *American Journal of Agricultural Economics*, 75(2), 458-466.
- Pirrong, S. C. (1993). Contracting Practices in Bulk Shipping Markets: A Transactions Cost Explanation. *Journal of Law and Economics*, 36, 937-76.
- Reardon, T., & Farina, E. (2002). The rise of private food quality and safety standards: Illustrations from Brazil. *International Food and Agribusiness Management Review*, 4, 413-421.
- Thiagarajan, D., Busch, L., & Frahm, M. (2005). The relationship of third party certification (TPC) to sanitary/phytosanitary (SPS) measures and the international agrifood trade. Case study: EUREPGAP. RAISE SPS Global Analytical Report No. 7.
- Tronstad, R., (1993). Importance of melon type, size, grade, container and season in determining melon prices. *Journal of Agricultural and Resource Economics*, 20(1), 32-48.
- Tronstad, R., Huthoefer, L, S., & Monke, E. (1992). Market windows and hedonic price analyses: An application to the apple industry. *Journal of Agricultural and Resource Economics*, 17(2), 314-322.
- Unnevehr, L. J. (2000). Food safety issues and fresh food product exports from LDCs. *Agricultural Economics*, 23(3), 231-240.
- Waugh, F. W. (1928). Quality factors influencing vegetable prices. *Journal of Farm Economics*, 10(2), 185-196.
- Waweru, A. (2006). Testing a generic quality management system for smallholders in Kenya. In EUREPGAP's Prague presentation on small scale farmers. Accessed June 2010, available at www.eurep.org/pcspecials.html.
- Wollni, M. & Zeller, M. (2007). Do farmers benefit from participating in specialty markets and cooperatives? The case of coffee marketing in Costa Rica. *Agricultural Economics*, 37(2/3), 243-248.

Table 1: Descriptive Statistics for the Model Variables with Unconditional and Conditional Distribution of French beans Prices (N=249)

Variable	Defined as	Obs.	%	Mean	S. D.	Min	Max
<i>Price</i>	Price/ 3kg carton	249	-	69.50	22.28	20	200
<i>Ln(Price)</i>	Log of price	249	-	4.18	.35	2.99	5.29
<i>Week_1_M</i>	Monday 1 st week	249	-	93.24	15.89	30	200
<i>Week_1_W</i>	Wednesday 1 st week	249	-	79.59	13.40	30	150
<i>Week_2_M</i>	Monday 2 nd week	249	-	71.11	14.32	25	135
<i>Week_2_W</i>	Wednesday 2 nd week	249	-	62.38	18.27	20	135
<i>Week_3_M</i>	Monday 3 rd week	249	-	57.72	19.49	20	135
<i>Week_3_W</i>	Wednesday 3 rd week	249	-	52.93	22.39	20	135
<i>NoGap</i>	Non certified producers	177	71.1	68.68	24.06	20	200

<i>Gap</i>	Certified group producers	72	28.9	71.49	17.00	25	100
<i>Independent Group</i>	Independent Producers	149	59.8	67.62	25.36	20	200
<i>Sellers</i>	Organized producer groups	100	40.2	72.29	16.29	25	100
<i>Ln(Sellers)</i>	No. of producers in a village	249	-	9.10	6.08	1	37
<i>Buyers</i>	Log of no. of producers	249	-	1.86	0.97	0	3.61
<i>Ln(Buyers)</i>	No. of buyers in a village	249	-	8.94	2.59	2	12
<i>Intermed</i>	Log of no. of buyers	249	-	2.13	.38	.69	2.48
<i>Export</i>	Intermediaries in marketing	121	48.6	62.65	23.43	20	200
<i>PartialTrace</i>	Exporter used in marketing	128	51.4	75.97	19.00	25	135
<i>FullTrace</i>	Partial trace-back system	194	77.9	68.79	23.35	20	200
<i>SwitchBuyer</i>	Full trace-back system	55	22.1	71.99	17.81	25	100
<i>OneBuyer</i>	Several buyers/ season	76	30.5	61.52	23.85	20	150
<i>NoContract</i>	One buyer/season	173	69.5	73	20.61	20	200
<i>Contract</i>	No supply contract used	171	68.7	66.33	23.77	20	175
<i>LowerMwea</i>	Supply contract used	78	31.3	76.44	16.63	40	200
<i>UpperMwea</i>	Farm located in Lower Mwea	164	65.9	68.44	22.19	20	200
<i>EarthRoad</i>	Farm located in Upper Mwea	85	34.1	71.53	22.33	20	150
<i>AllRoad</i>	Access road earth surfaced	216	86.7	70.48	21.38	20	135
<i>Fine</i>	Access road all weather	33	13.3	63.08	26.64	30	200
<i>ExtraFine</i>	Fine grade target harvested	14	5.6	66.38	22.39	15	200
	Extra fine grade target harvested	235	94.4	72.61	23.28	20	200

Source: Own calculations based on survey data using STATA version 9.0. French beans price survey, Mwea Tebere April-June 2006.

Table 2: Determinants of French beans price

Variable	Without interaction effects			With interaction effects		
	Coef.	S. E.	z	Coef.	S. E.	z
Gap	0.095**	0.025	3.88	-0.042	0.027	-1.55
Week_1_W	-0.167**	0.009	-19.44	-0.211**	0.010	-20.40
Week_2_M	-0.306**	0.011	-29.26	-0.363**	0.012	-29.88
Week_2_W	-0.480**	0.011	-42.73	-0.562**	0.013	-44.21
Week_3_M	-0.596**	0.012	-51.39	-0.664**	0.013	-51.25
Week_3_W	-0.716**	0.012	-59.77	-0.773**	0.013	-57.78
Gap*Week_1_W				0.122**	0.018	6.85
Gap*Week_2_M				0.172**	0.022	7.81
Gap*Week_2_W				0.249**	0.024	10.44
Gap*Week_3_M				0.243**	0.025	9.78
Gap*Week_3_W				0.233**	0.026	9.05
Group	-0.308**	0.043	-7.24	-0.300**	0.041	-7.33
Ln(Sellers)	0.054**	0.008	7.12	0.062**	0.008	7.60
Ln(Buyers)	0.033 ⁺	0.018	1.87	0.033*	0.016	2.05
Export	0.146**	0.021	6.92	0.124**	0.020	6.36
FullTrace	0.060*	0.024	2.46	0.046*	0.022	2.10
OneBuyer	0.076**	0.015	4.97	0.083**	0.015	5.56
Contract	0.283**	0.029	9.94	0.293**	0.027	10.70
UpperMwea	0.039*	0.018	2.16	0.045*	0.019	2.32
AllRoad	-0.047*	0.020	-2.38	-0.069**	0.021	-3.35
UpperMwea*AllRoad				0.122**	0.033	3.70
ExtraFine	-0.001	0.019	-0.07	-0.001	0.018	-0.08
Constant	4.251**	0.047	90.83	4.282**	0.045	94.72
Log-likelihood		881.96			934.71	
Wald chi2 (df)	4275.5**	(16)		5038.08**	(22)	

+ Significant at 10%; * significant at 5%; ** significant at 1%;