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Why market institutions disfavor smallholder farmers' compliance with international food safety standards: Evidence from Kenya, Zambia and Ethiopia

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Abstract

This paper examines the high value chains (HVC) for green bean exports from Africa to identify the critical points at which exporters exercise great caution in preventing produce contamination with pathogens and pesticide residues. It then examines the control points that pose greatest threat to continued participation of smallholder farmers in the HVC and discusses the strategies African countries have used to maintain smallholder farmers in the green bean HVC. The paper identifies six critical control points. Among these, smallholders are most threatened with exclusion from HVC at two control points. At those points the farmer must make costly lumpy investments to meet the standards. To overcome the likelihood of smallholders being excluded from HVC at these points study countries have used non market institutions namely collective action and public-private partnerships. These findings imply that the market itself could adopt solutions that exclude smallholder farmers at these most challenging critical control points.

Key words: Smallholder farmers, international food safety standards, critical control points, exclusion, green beans, Africa

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1.0 Introduction

In the past few decades have seen substantial changes in how agricultural products are produced and marketed. Many African countries have gone into the production of non-traditional agriculture products to diversify their agricultural exports aided by high altitude that enable the growth of cool season crops year-round and make it possible for these countries to meet year-demands for produce by major European retailers (Singh, 2002). Most of the non-traditional crops in Africa are produced for exports to the European market. South Africa, Cote d'Ivoire, and Kenya are leaders with leading exports being green beans. Zambia and Zimbabwe also achieved rapid growth in exports of green beans until recently before declining. Traditional major green bean exporters are Morocco and Egypt but Eastern African countries (Kenya and Ethiopia) have increasingly picked up exporting.

Concurrent with the increase in exports in some developing countries, there has been a heightened attention by consumers and governments in Europe and other developed countries on food safety. This has resulted from several factors. First, globalization has led to sourcing of fresh produce from countries where systems of food safety control are weak. Second, as incomes have increased, the demand for safe food rises with consumers willing to pay more for lower risk of microbial contamination, pesticides, and other disease-causing substances. Third, improvement in technology has made it easier to measure contaminants in food and to document their impact on human health. Further, international food scares, including those related to Salmonella and

Listeria in fruits and vegetables, BSE and avian flu, have also played a role by making consumers, producers, and legislators more aware of the risks associated with food safety problems (Freidberg, 2004).

Major European retailers and their developing country suppliers have developed very stringent food safety protocols in response to the heightened attention on food safety by developed-country consumers and governments. Access by farmers to major European retailers (i.e., the supermarkets) is based on compliance with these food safety protocols. Yet production of non traditional exports in developing countries remains with poor smallholder households not necessarily aligned to multinational supply chains (Dolan and Humphrey, 2000; Reardon, 2000). These producers face four distinct problems: 1) how to produce safe food, 2) how to be recognized as producing safe food, 3) how to be competitive with larger producers with economies of scale in compliance with food safety requirements, 4) and how to identify cost-effective technologies for reducing risk (Narrod and Rich 2005).

Consequently many smallholder farmers have found it hard to maintain their participation in the high value chains (HVC) with some exiting. Yet to date there is limited understanding of the points along the HVC at which smallholder farmers face the greatest risk of being excluded from the export business. Participation of smallholder farmers in HVC has major implications for poverty reduction in many developing countries (McCulloh and Ota, 2000). This paper addresses three research questions:

- ✓ What are major food safety control points in the value chain of non traditional fresh exports?

- ✓ At what points are the developing-country smallholder farmers at risk of being marginalized?
- ✓ What strategies have African countries used to overcome the exclusionary effect of IFSS on smallholders at these critical control points?

Knowledge of the critical control points and the value chain segment at which they post the most threat to smallholder¹ farmers is important for the design of policy interventions to keep smallholders in the lucrative export business.

This paper focuses on green bean production in Kenya, Zambia and Ethiopia for export to EU markets. Green beans are among the most important fresh vegetables exported from developing countries. Also, green bean production has been predominantly in the hands of small farmers in Africa. There are important variations among the three countries studied with regard to the impact of international food safety standards on smallholder farmers. Part of the difference is attributable to their time of entry in the export markets with Kenya having a long history in these export markets while Zambia and Ethiopia are fairly new to this market. Further, Kenya started exporting to EU and developing the infrastructure and institutions (involving smallholders) before the standards were in place while Zambia and Ethiopia entered with the IFSS system already set in.

The rest of the paper is organized as follows. Section 2 lays out the conceptual and empirical framework. Section 3 presents the standards and identifies the critical control points. Section 4 discusses the enforcement of standard at these points while section 5 concludes.

¹ The definition of smallholders differs for different countries. In both Ethiopia and Kenya, smallholders are farmers with up to 2 acres of beans while in Zambia, smallholders have up to 5 acres of beans.

2.0 Conceptual and empirical methods

This paper uses the transaction cost theory to examine response to IFSS by African green bean exporting countries. The emergence of IFSS has resulted in development of networks of relationships aimed at coordinating procurement of beans from developing country sources (Fulponi, 2005). The development of close relationships can result in transaction dependency and opportunism, especially where the transaction needs specific assets or is characterized by uncertainty. The literature identifies four types of asset specificity namely; temporal, physical, human, and locational. Asset specificity can lead to market failure following ex-post opportunism from the party not investing in such assets. Where assets are lumpy, the smallholders are disadvantaged because of diseconomies of scale (Poulton et al, 2005). The disadvantage of the smallholders is exacerbated by the poor public infrastructure that aggravates the need for private provision (like unreliable electricity leading to need for private generators). Geographical dispersion of farmers further drives up costs of enforcing buyer requirements hence screening out some farmers.

Theoretically, a number of institutional mechanisms for integrating smallholder farmers into the HVC exist. First, smallholder farmers could orient their product to target markets that are less demanding by shifting from the demanding supermarket chain to the less stringent wholesale chain and domestic markets. Second, smallholders can, through collective action, invest jointly in lumpy/costly assets together hence take advantage of economies of scale and reduce per farmer costs of such investment. Third, public sector could partner with the private sector to help smallholders overcome the challenges of

market requirements by investing on infrastructural requirements that are lumpy or have public good characteristics (training and extension, road, supply of safe water).

The research in this paper entailed interviews with various participants in the green bean HVC conducted between January and February 2006 in Zambia, Kenya and Ethiopia. The interviewees included smallholder farmers, farmer group leaders, horticultural industry association leaders, exporters, domestic green bean buyers, EU importers and EU supermarkets and certification companies. The interviews were supplemented with secondary information and data from household survey conducted in 2004 by the author.

3.0 Food Safety standards and the critical control points

In order to identify segments of the value chain where smallholder farmers are most at risk of being marginalized by food safety standards, we discuss the requirements of IFSS on farmers at each segment/stage of the HVC involving smallholder farmers. The identification of these control points was based on code of practice documents (i.e., food safety protocols) and complemented with discussion with exporters' agronomists, group technical assistant and also field observations. A given exporters' food safety protocol is based on the requirements of its destination market which include but often exceed GlobalGAP.

This study identified three value chains through which smallholder farmers market their beans namely the super market chain, the continental European wholesale chain, and the domestic value chain. We however limit our discussion to the supermarket chain since it is within this chain that IFSS are strictly controlled (Singh, 2002; Jaffee,

2003). The requirements of the supermarket chain include the type and quality of inputs used in production and absence of pests and diseases prohibited by the importing countries. Green beans marketed through this chain must be third party certified as meeting standards (e.g., GlobalGAP, Nature's Choice and Farm to Fork). In addition, the beans must be accompanied by a phytosanitary certificate issued by a competent authority guaranteeing absence of prohibited pests and more importantly follow a traceability system.

In both Kenya and Zambia, and increasingly in Ethiopia, input supply, quality and usage as well as technical advice to the growers is closely monitored and coordinated by the exporters supplying to the supermarket chain. In particular, the dosage and kind of pesticide, and the growth stage of the beans at which the pesticide can be used is closely supervised by the exporters (through their field staff). Exporters allow only the use of pesticides authorized by the destination market. Consequently farmers that formerly used toxic pesticides have had to shift from them to safer pesticides. The shift to safer pesticides usually implies higher costs of pest control since the new safer pesticides tend to be more expensive. The new safer pesticides are also often less effective in controlling pests.

Handling and hygiene practices during the harvesting, grading and packing of green beans sold through the supermarket chain are also closely coordinated. In both Kenya and Zambia², exporters have adopted the hazard analysis and critical control points (HACCP), good manufacturing practices (GMP), and good agricultural practices (GAP). These practices have been extended to the farm level. In both countries, growers

² Although Ethiopian exporters also had a system of monitoring hygiene their system was far less rigorous than those found in Kenya and Zambia.

must have clearly labeled toilets, pesticide storage unit, pesticide disposal pit, waste disposal and facility for washing hand on the farm or in grading shed. Leading exporters also closely monitor the quality of water and soils used for growing beans. Such exporters test the water and soil they and their outgrowers use twice a year for pathogens (especially Coli forms and Salmonella). For majority of smallholder farmers these requirements are too expensive owing to the large capital outlays involved.

The exporters also require that farmers keep records of the type and quality of inputs used. Each farmer must keep records relating to crop movement, pesticide stock movement and pesticide applicator's spraying records. These records accompany green beans to the exporter's packhouse with duplicate copies, which are available to the exporter. Keeping majority of these records requires special skills and functional literacy, and therefore drives off farmers that find record-keeping difficult (especially the illiterate and low-skilled).

The harvesting practices closely monitored by the exporter mainly relate to the hygiene and aesthetic qualities. The farmer is required wash their hands before start of harvesting, to have a headscarf when harvesting and not to wear a perfume. They are also required to keep small children away from the bean plot during harvested. The beans must be harvested into clean crates, devoted specifically for the exercise, as a hygiene requirement but also to ensure that the beans are not bruised during harvesting.

Harvesting beans into specific crates is intended to avoid cross-contamination of beans with pathogens. Farmers are required to buy their own crates. Smallholder farmers who can't afford such crates individually buy them collectively as a group through interlinked credit arrangement that allows exporter recovers the credit from farmers' sales. The crate

is kept at the collection center from where farmers can borrow them out during harvesting.

Another major requirement during harvesting is the possession of a hessian cooler. The crates when filled with beans must be kept under moistened hessian cooler to protect the beans from the harsh tropical heat. There are hygiene-related specifications regarding the location of the hessian cooler in the field and/or how the crates of beans ought to be stored. Farmers are required to locate hessian cooler away from toilet, manure/compost pit, and dusty road or open dusty grounds in order to reduce likelihood of contamination with pathogens or dirt. These field-level postharvest handling practices are standard in both Kenya and Zambia, but were less strictly enforced in Ethiopia. In Ethiopia, farmers are allowed to keep the beans under a tree shade. However, this happens because the beans from Ethiopia are sold through the wholesale markets.

The transportation of beans from the field to the collection point/center is also tightly controlled, with control tightest in Zambia. The crates of beans are normally transported from the field to the collection point in crates using bicycles and ox-carts in Kenya and trucks in Zambia. The food safety (hygiene) requirements farmers must comply with during the transportation stage include covering the crates with clean dry material (i.e., cloth or paper) to screen off dust and sun. Farmers must also ensure that transport medium (ox-cart or truck) is thoroughly washed before the crates are loaded into it to prevent accidental contamination of beans with pathogens.

Once at the collection point, the beans are usually sorted and arranged into labeled crates. The grading shed within which sorting is done is required to have a cement floor, washable tables, crate store, facility for washing hands and an office for filing. The crates

are labeled for traceability purposes with each farmer using crates bearing his/her unique identification. The crates must then be stored in a cool place awaiting collection by the exporter. The system used for storing beans at the collection points differ among the study countries. In Kenya, the beans are kept inside a charcoal cooler (with moist charcoal) while farmers in Zambia used electricity-powered cold stores³ to chill the beans. In both cases, beans are kept at or just below room temperature, and the goal is minimize damage from tropical heat. In Ethiopia, farmers used makeshift collection points and had neither charcoal coolers nor cold rooms.

Beans are transported from the collection center to the exporter's packhouse in exporters' truck in Kenya or farmers' truck in Zambia. In both countries the trucks are non-refrigerated but usually take a short time from loading at the farm to off-loading at the packhouse. Same standards apply for farmer owned trucks as those for transport from the field to collection center. That is the trucks must be clean and covered.

The most careful attention to the control of contamination with pathogens occurs in the exporters' processing facilities (packhouses). Leading exporters in both Zambia and Kenya have invested in state-of-the-art equipments that wash (with chlorinated water) and chill the beans before packing. The workers wear special clothes and rubber boots in the packhouse and are required to wash hands at regular intervals or whenever changing a shift to avoid cross contamination of beans with pathogens. A leading export company in Kenya randomly takes swabs from workers' hands and tests them for pathogens. When the swab tests positive for pathogens, that worker is penalized. All containers used at various stages of the processing are color-coded to avoid mixing and

³ The cold stores used in Zambia was donated to the smallholder farmer organizations by the government of Japan through JICA.

hence cross-contamination with pathogens. In addition to requiring strict adherence to hygiene during processing (sorting, chopping, and arranging into trays and pallets), packing and bar coding (in the case of high care prepacked beans) are done under temperature-controlled conditions. Similar situation exists in the EU importers' warehouses except that there is not much processing done there with main activities being repackaging and bar coding. While farmers are not typically involved at the packhouse stage, rejection of their produce for failure to meet physical or hygiene standards has direct effect on their continued participation in the market.

There are clear differences in the way exporters in three countries treat beans sourced from smallholder. In Zambia, there is intense focus on reducing chances of produce contamination in the field with exporters and farmers clearly aware that pathogens originating from the farm can be carried over to the market. In Kenya, on the other hand, more intense efforts at controlling pathogen contamination is at the packhouse where the produce is moved through state-of-the-art cleaning and decontaminating equipments.

In summary, there are six critical control points in the supermarket HVC namely preharvest field level activities, the harvest, transport from field to collection center, the collection center, transport from collection center to packhouse, and the packhouse. The extent of the threat to smallholders at each of these points varies depending on the nature and cost of investment required to meet the hygiene and pesticide residue standards.

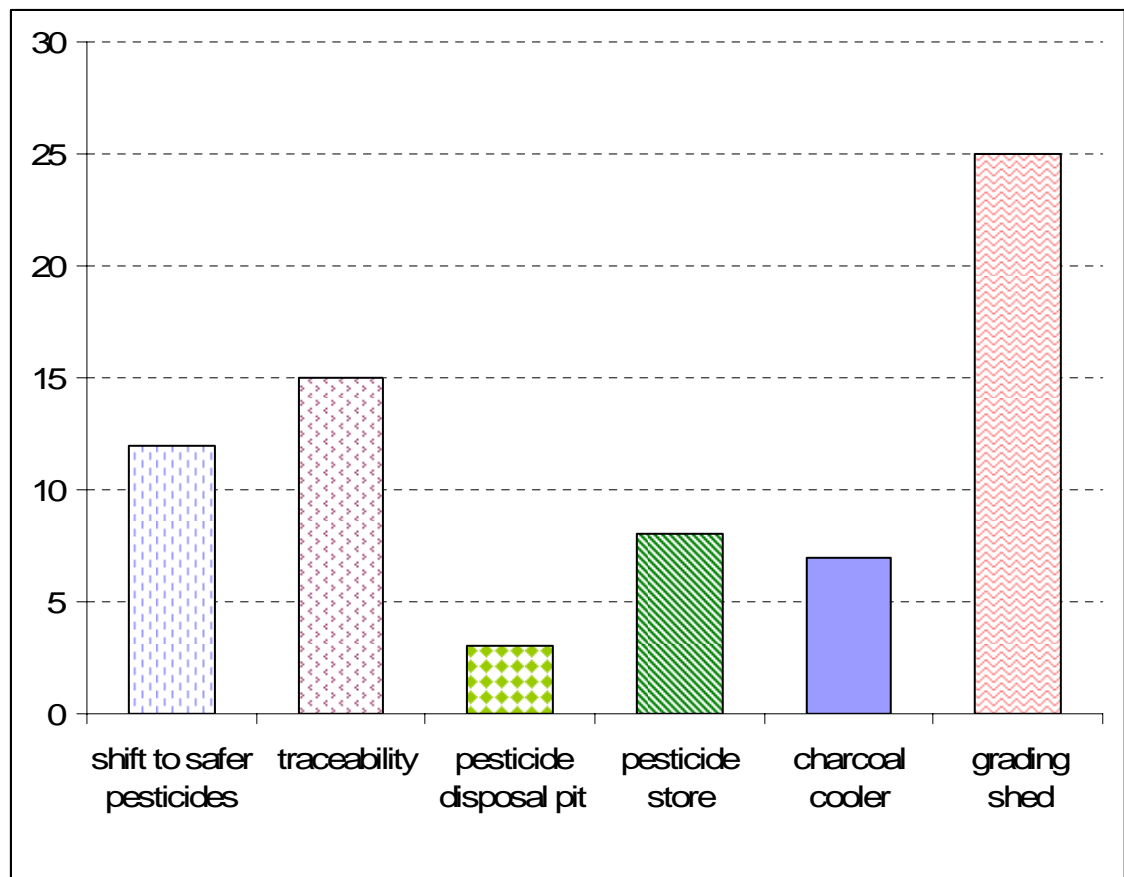
4.0 Enforcement of IFSS and smallholder farmer participation in HVC

Enforcing the IFSS has led tightly coordinated HVC for bean in both Kenya and Zambia. A tightly coordinated supply chain, however, works against the smallholder for three reasons: i) information asymmetry and transaction costs, ii) organizational constraints, and iii) regulatory failure (Rich and Narrod, 2005). As the chains have become more coordinated in the three study countries with the imposition of IFSS, it has created an entry barrier for the smallholders or has screened them away from the more safety-discerning chains. The exact number of smallholders that have been marginalized by the IFSS at each of the above critical control points (CCPs) is not documented. Evidence however does exist in Kenya on the response of few leading exporters where in some cases, as an immediate response to the imposition of IFSS, more than half of the small outgrowers were dropped. Consequently, while smallholders in Kenya produced over 60% of green beans in 1980s, their share had dropped to about 30% by 2003 (Jaffee, 2003, Kimenye, 1993).

The degree of exclusion of smallholder farmers has depended on the type of investments they are required to make to meet the food safety requirements at each of the critical control points highlighted above. At pre-harvest the field level CCP, individual smallholder farmers have found investment in facilities and skills needed to assure safety (hygiene and pesticide residue limits) unaffordable (see Figure 1). Such investment include employing a technical assistant to keep records needed to demonstrate traceability and advice on pesticide use, constructing a pesticide storage unit and shifting to safer but often more costly pesticides. These investments are quite expensive as shown by Figure 1. Figure 1 also demonstrates that the collection center CCP also poses a

serious challenge to farmers in terms of cost of facilities required meet IFSS. Under this CCP farmers need to invest in a grading shed with cement floor and washable tables, crate store, filing office, pit latrine, charcoal cooler, and a facility for washing hands. Some exporters also require farmers to have waste disposal pit.

Figure 1: Cost ('000 Kenya Shilling) of complying with food safety standards in Kenya, 2005-2006



The tight control aimed at preventing produce contamination with pathogens and pesticides in the field, during transportation, and in the collection points and the difficulties smallholder farmers have investing in facilities needed to meet requirements

at each of these points has tended to work against them. In all the three countries exporters have shunned working with smallholder farmers, often keeping a few for ethical reasons (Dolan and Humphrey, 2000). In Kenya, the enforcement of food safety standards at the critical control points outlined above led major supermarket suppliers to abandon sourcing from smallholder farmers instead integrating backwards to start up own estate farms (Dolan and Humphrey, 2000).

In Zambia, the first exporter (York Farms) initially sourced exclusively from own estate farms or from larger better off outgrowers. Small farmers began participating in the Zambian green bean business when Agriflora Limited entered the green bean export business. Agriflora had to undertake over the activities needed to comply with pesticide residue standards including keeping records for traceability while farmers used group employed clerks to enforce hygiene at the collection center. Agriflora collapsed⁴ in 2004 but York Farms would not accept beans produced by the smallholders for fear of violation of hygiene and residue requires. Consequently smallholder farmers are no longer involved in green bean production for export market in Zambia.

In Ethiopia where smallholders grow 20% of green beans, the exporters undertake pesticide handling and application for the farmers just as Agriflora did in Zambia. The farmers' roles are limited to planting, weeding and harvesting the beans. However, the exporters working with smallholders still face significant challenges in enforcing hygiene standards.

⁴ Agriflora limited collapsed because of management reasons and not due to problems with the meeting of the food safety standards.

Strategies for maintaining smallholder participation in the supermarket chain

The upshot of the above discussion is that farm-level IFSS requirements have had a strong screening effect on smallholders especially at the pre-harvest field and collection center CCPs. Smallholders and the governments have adopted two non-market institutional arrangements for overcoming the screening effects of IFSS namely collective action and public-private partnerships.

Smallholder industry in Kenya and Zambia responded to challenges of meeting IFSS through institutional innovation in form of collective action and public-private partnerships. As a group, smallholders reduced their per person costs of setting up the facilities needed to meet the IFSS and also of demonstrating compliance through certification. This allows them greater access to market and hence higher incomes.

Public-private partnerships (PPPs) for maintaining the participation of smallholder farmers in the supermarket chain have mainly focused on provision of information, financial support, and capacity building (through financing audits and certification for GlobalGAP compliance and the construction of grading facilities) to smallholders. Donors and NGO have also jointly established Africa's only indigenous certification company aimed at making GlobalGAP certification cheaper and hence accessible to smallholders. PPPs have also been instrumental in lobbying for the recognition of the ability of smallholders to meet GlobalGAP standards and the benchmarking of GlobalGAP to Kenyan conditions through the formulation of KenyaGAP.

5. Conclusion and implications

This paper identifies six critical points along the green bean HVC at which exporters enforce strict compliance with IFSS to avoid produce contamination with pathogens and pesticide residue. These are pre-harvest field level activities, harvest stage, transport from field to collection center, the collection center, transport from collection center to packhouse, and the packhouse. Among these, the points at which smallholder farmers are most threatened with exclusion from HVC are pre-harvest field level and the collection center control points. At these points the costs of investing in the facilities needed to meet IFSS are too high for most smallholder farmers. Consequently a number of smallholder farmers have been screened off.

The study countries have used two strategies to overcome the challenges smallholder face at these control points namely collective action and private-public partnerships. Through collective action smallholders have been able to jointly invest in the costly facilities while public-private partnership has enabled farmers to access training and achieve the third party certification needed to demonstrate compliance.

The implication of this study is government, private sector and donor intervention in keeping smallholder farmers in the HVC should not ignore the field and collection center control points. Although a number of investments at these levels are private, they involve lumpy investments that are too costly for smallholders. The study also implies that at the two most challenging control points the markets itself could adopt solutions that marginalize smallholder farmers.

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