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IFPRI Discussion Paper 00737

December 2007

## **Food Safety Requirements in African Green Bean Exports and Their Impact on Small Farmers**

Julius Juma Okello, University of Nairobi

Clare Narrod, International Food Policy Research Institute  
and

Devesh Roy, International Food Policy Research Institute

Markets, Trade and Institutions Division

## **INTERNATIONAL FOOD POLICY RESEARCH INSTITUTE**

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**INTERNATIONAL FOOD POLICY  
RESEARCH INSTITUTE**

2033 K Street, NW  
Washington, DC 20006-1002 USA  
Tel.: +1-202-862-5600  
Fax: +1-202-467-4439  
Email: [ifpri@cgiar.org](mailto:ifpri@cgiar.org)

**[www.ifpri.org](http://www.ifpri.org)**

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## **ABSTRACT**

Many African countries have moved into the production of non-traditional agricultural products, in an effort to diversify their exports and increase foreign currency earnings. However, in order to access developed country markets and urban domestic markets, these products must meet food safety requirements, including protocols relating to pesticide residues, field and pack house operations, and traceability. Faced with stringent food safety requirements, companies that establish production centers in low-income countries might exclude poor farmers, thus negatively impacting the poor. We herein study this issue in the case of the green bean export sectors in three African countries: Ethiopia, Kenya and Zambia. In the short-term, stringent food safety standards have screened out smallholders in all these countries, excluding them from the green bean export chain. However, some institutional arrangements have helped support the smallholders who continue to function in the export-oriented green bean supply chains. In particular, public-private partnerships have played a key role in creating farm-to-fork linkages that can satisfy market demands for food safety while retaining smallholders in the supply chain. Furthermore, organized producer groups capable of monitoring their own food safety requirements through collective action have become attractive to buyers who are looking for ways to ensure traceability and reduce transaction costs.

**Keywords: international food safety standards, smallholders, supply chains**



## 1. INTRODUCTION

The past few decades have seen substantial changes in how agricultural products are produced, processed, consumed, and marketed. Many countries in Africa (and other developing areas) have begun producing non-traditional agriculture products in an effort to diversify their agricultural exports and increase foreign exchange earnings. High-altitude regions in some African countries, such as Ethiopia, Kenya and Uganda, enable the year-round growth of cool season crops that can be exported to developed countries. Currently, most non-traditional crops in Africa are produced for export to the European market. South Africa, Cote d'Ivoire, and Kenya are leaders in non-traditional crop exports to the European Union (EU) with Zambia and Zimbabwe showing rapid recent growth in such exports. Green beans are a leading export; while they were initially exported largely from North Africa (Morocco and Egypt), Eastern and Southern African countries (Kenya, Zambia, Ethiopia, and Zimbabwe) have shown recent increases in green bean exports.

Concurrent with increased exports from some developing countries, the EU and other developed and developing countries have begun scrutinizing food safety (Unnevehr, 2003). This has resulted from the following factors: 1) as incomes increase, the demand for safe food rises as consumers become willing and able to pay more for lower risks of microbial contamination, pesticides, and other disease-causing substances; 2) trade liberalization has increased opportunities for agricultural exports with greater flows from developing countries (with less developed food safety systems) to developed countries; 3) technological improvements have made it easier to measure food contaminant and document their impact on human health; and 4) various international food scares, such as Salmonella and Listeria contamination of fruits and vegetables, as well as BSE and avian flu, have made consumers, producers, and legislators far more aware of the risks associated with food safety problems.

Though all countries share similar concerns about food safety, the relative importance of risks vary with factors such as climate, diet, income, and public infrastructures (Unnevehr, 2003; Regmi and Gehlhar, 2005). In the case of labor-intensive high-value agricultural products, the high endowments of cheap labor have prompted firms to set up shops in many less developed countries (LDCs). These companies have high standards and provide technical assistance to their suppliers to ensure the delivery of food with certain safety attributes to high-end markets (for a general discussion of this, please see Humphrey and Schmitz, 2000). However, despite the location of several developed country companies in LDCs, the majority of agricultural production in LDCs remains the realm of poor households that are not necessarily aligned with multinational supply chains (see for example Dolan and Humphrey 2000).

One of the main reasons that many small- and medium-sized producers do not participate in the growing export markets for high-value agricultural commodities is that they cannot meet the strict food

safety and quality requirements of the rich country markets.<sup>1</sup> These producers face four distinct problems: 1) how to produce safe food, 2) how to gain recognition as producing safe food, 3) how to compete with larger producers (who benefit from economies of scale in production and marketing) while complying with food safety requirements, and 4) how to identify cost-effective technologies for reducing risk (Narrod and Rich 2005). This is not strictly an export issue, either; as incomes increase in LDCs and formal markets (including foreign retailers) become increasingly important there, food safety standards are turning stricter in domestic markets as well.

Major European retailers (e.g. Tesco, Mark and Spencer, and Carrefour) have responded to increased food safety concerns and changing regulatory requirements by developing and disseminating private (in-house) protocols relating to pesticide residue limits, packer hygiene and traceability (Okello, 2005a). Most green beans are exported to European supermarkets in a prepacked, precut form. This requires a large investment to coordinate supply and maintain hygienic conditions at the farm and processing area (packhouse), and often requires third party certification (Hatanaka, et al., 2005). To comply with the international food safety standards (IFSS), producers must switch to safer but more costly pesticides, invest in expensive medium and long-term assets (e.g. grading/packing and cooling facilities), and keep technical records of pesticide usage and application. The capital required to meet these requirements has generated concerns that IFSS will exclude poor farmers from the lucrative fresh export business.

Green beans are among the most important fresh vegetables exported from developing countries, and several African countries have focused on exporting green beans to high-value European markets. Historically, green bean production (mostly for export) has come predominantly from small- and medium-scale farmers in Africa, although imposition of food safety standards has more recently reallocated market shares away toward larger holdings. In this paper we study the compliance of small-scale producers with increased food safety requirements for exporting green beans from three countries: Kenya, Zambia and Ethiopia. We analyze the green bean supply chains in the three countries and relate their organizations to the food safety requirements. Following this, we examine which points in the supply chain either create entry barriers for small farmers or account for their exit from the chain. We then identify the critical control points along the supply chains that are required to ensure the delivery of safe green beans. At each of these critical control points, the market itself might adopt solutions that discourage small farmers. Lastly, we examine various institutional arrangements that have emerged to keep smallholders in the fresh green bean business.

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<sup>1</sup> In both Kenya and Ethiopia, we define the smallholder farmer as one with 0-2 acres of green beans, the medium-scale farmer as one having between 2 and 10 acres, and the large-scale farmer as having more than 10 acres under beans.

The three countries offer interesting variation with regard to the impact of food safety requirements and the resulting coping mechanisms. Part of the difference is attributable to their time of entry into the export markets. Kenya has a long history of smallholder-based systems exporting to the EU, whereas the exporting of green beans by smallholders from Zambia and Ethiopia is a fairly recent occurrence (Harris, 1992; Harris, et al., 2002; Freidberg, 2004 McCulloh and Ota, 2002). Furthermore, Kenya began exporting to the EU and developing the infrastructure and institutions (involving smallholders) before the inception of private food safety standards and traceability guidelines. In contrast, Zambia and Ethiopia entered the supply chain after the IFSS system was already in place.

The paper is organized as follows. Section 2 lays out the background of world green bean production and trade, particularly as it relates to Africa. Section 3 discusses the conceptual framework that determines the structure of the supply chains in a buyer-driven production and marketing system. Section 4 looks at the emergence of food safety standards in green bean markets. Section 5 discusses the different types of supply chains operating in the study countries, in the context of their food safety standards. Section 6 examines the effects of food safety standards on small-scale farmers. Section 7 discusses institutional responses to the emergence of stricter standards, especially in relation to smallholder participation. Section 8 concludes.

## 2. BACKGROUND OF GREEN BEAN PRODUCTION AND TRADE

Many developing countries have joined the green bean export trade. Different varieties and types of beans are produced for export, with the main varieties being monel, amy and paulista. The choice of variety is determined by the geophysical characteristics (soils, climate, and disease and pest prevalence<sup>2</sup>) in the producing country, as well as the preference of the end markets.<sup>3</sup> The three most common types of green beans traded on the world market are extra fine, fine and bobby beans.<sup>4</sup>

The top 5 producers of green beans in the world are China, Indonesia, Turkey, India and Spain, together accounting for 68% of the world production of green beans in 2004. In Africa, the major green bean producers are Egypt, Morocco, South Africa and Kenya (Table 1). Egypt is the African leader, but its production growth has stagnated over the last 5 years. By comparison, Morocco's green bean production increased by 286% over the same period. Morocco enjoys lower freight costs, since it is closer to its major markets and ships its beans by sea, whereas the other countries must ship by air.

**Table 1. Green bean production (in ten thousand tons) by four major African producers, 1990-2004**

	1990	1995	2000	2004
World	349.02	492.87	555.62	638.39
Kenya	3	1.5	2.2	3.7
Egypt	12.3	16.50	20.16	21.5
Morocco	3.26	1.17	3.33	12.89
South Africa	3.04	3.43	3.59	3.53
Sum	181.15	310.79	364.67	436.80
Share	12	7	8	10

Source: FAO (Various Years), [www.fao.org](http://www.fao.org), accessed on February 23, 2006

The green bean industries in the studied countries show marked differences. In Zambia, the green bean industry began in the late 1980s following declines in the copper industry and liberalization of foreign exchange controls (Freidberg, 2004). Initial trade consisted of UK-bound shipments of whatever produce (typically green beans, avocados and melons) the few exporters could fit on British Airways flights to London (Freidberg, 2004). As the demands of the supermarkets began to take effect in the Zambian fresh export industry, exporters concentrated on green beans, mangetout peas, and baby corn (Freidberg, 2004). Trade also shifted from loose to prepacked beans, in order to meet the growing demand for ready-to-eat (prepacked) products.

<sup>2</sup> Susceptibility to diseases and pests is crucial, as IFSS restrict the use of pesticides. Hence, even though monel remains preferred by major retailers, developing country farmers shun it due to higher susceptibility to pests and disease.

<sup>3</sup> Some markets (e.g. the French) prefer the bobby type of beans mainly produced from the paulista variety, while others (e.g. UK supermarkets) prefer fine and extra fine beans from the monel and amy varieties (Freidberg, 2004).

<sup>4</sup> Suppliers to wholesale markets such as Francophone African countries and the canned green bean exporters produce mainly the bobby type. Suppliers of major retailers (such as Zimbabwe, Kenya and Zambia) grow mainly the extra fine and fine types. Bobby beans are produced mostly in large plantations, as they are less labor-intensive than the extra fine beans, which tend to do better in smallholder farms due to high labor requirements.

The Zambian green bean export sector got a major boost when the large company, Agriflora Limited, entered the industry in 1999. However, when this company collapsed in 2004, due to management problems, there was a significant drop in green bean exports, and the company-established smallholder green bean production scheme collapsed completely. The Lubulima Agricultural and Commercial Cooperative Union (LACCU), the remnants of Agriflora's smallholder scheme, has subsequently tried to diversify into high-value fresh exports such as baby corn and paprika, while also focusing on national and regional markets. However, the weakening of the dollar against the Kwacha, driven largely by the strengthening of the copper trade, has undermined the green bean industry even further in Zambia.

In Ethiopia, the green bean trade started around 1982, with small quantities being shipped to the Netherlands and Italy during the European winter. Initial production was done on state farms, but this changed in the 1990s with the entry of private exporters following liberalization and the government's aggressive promotion of export horticulture. The industry is gradually shifting focus towards the supermarket-based high-end pre-packed green bean business, and some exporters are currently building or upgrading their processing/packing facilities towards this end.

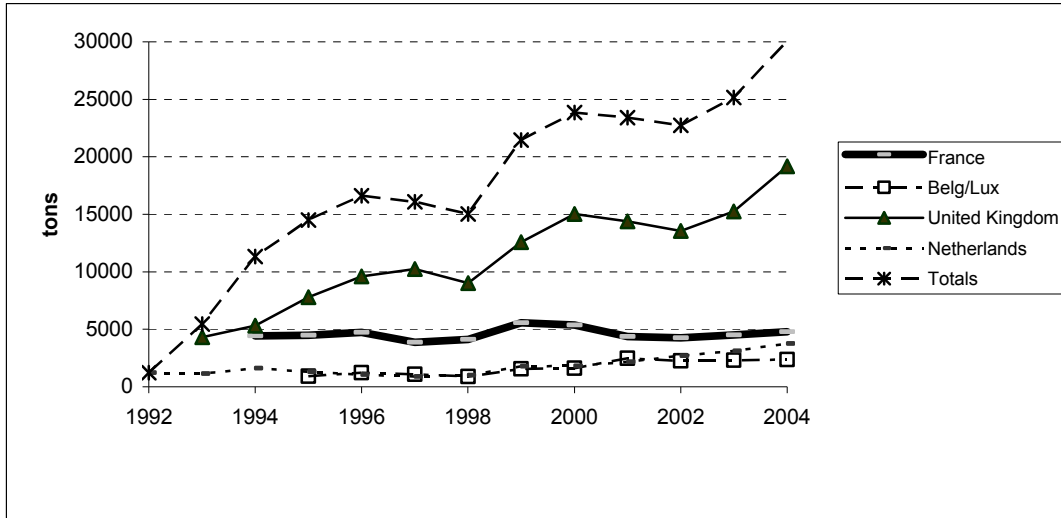
The entry of private sector players in the green bean export trade in Ethiopia was marked by a series of initial setbacks. Private exporters initially faced difficulties getting the smallholder farmers to meet even the most basic production practices, such as timely planting, weeding and harvesting. In order to obtain reliable supplies of green beans from their contracted smallholder outgrowers, the exporters were forced to provide certified seeds, and in some cases even take over production activities such as land preparation and harvesting. Ethiopian green bean exporters have also suffered from logistical difficulties getting cargo space on the international airlines, due to the relatively small volumes involved.

Kenya's green bean industry is the oldest of the three; it started in the 1960s and expanded rapidly during the 1980s and 1990s (Okado, 2001; McCulloh and Ota, 2002). The expansion in trade slowed down in the 1990s as the industry adjusted to the imposition of the IFSS but has since recovered and even increased its volume of exports.

In terms of importers, Belgium, France, the Netherlands, US, Spain and the UK are the dominant importers of green beans, accounting for 64% of the world's green bean imports. Belgium and the Netherlands have increased shares because they act as the entry points for green beans coming into Europe. The UK absorbed more than 60% of Kenyan-grown green beans in 2004, while France and the Netherlands absorbed 15 and 12% respectively. Ninety-five percent of Zambian green beans went to the UK markets in 2004, with the remaining 5% going to Germany and the Netherlands (Figures 1, 2 and 3). For Ethiopia, the major destinations (in terms of direct imports) were Belgium, Italy and the Netherlands, corresponding to shares of 81, 13 and 2%, respectively, in 2004. Although the major destination for

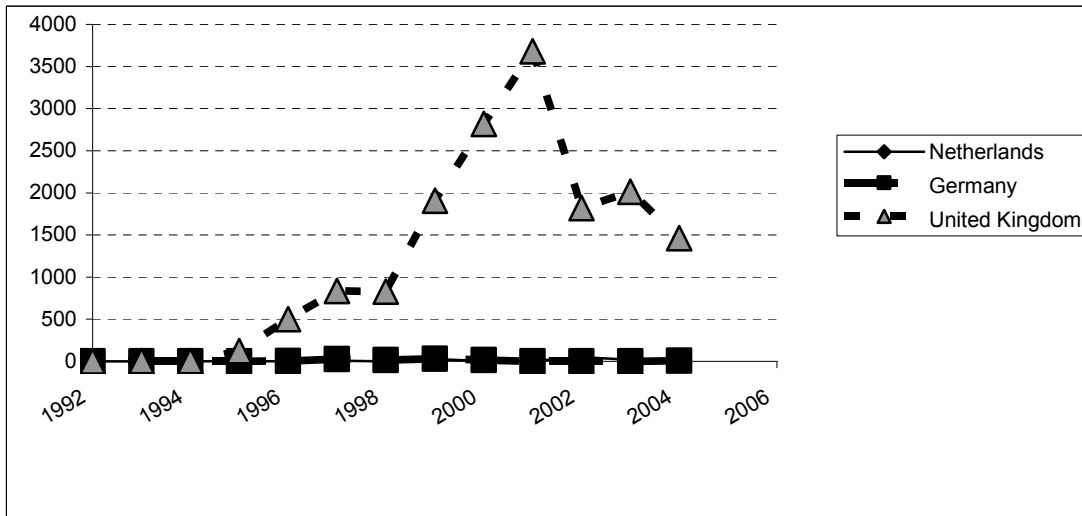
Ethiopian beans is the Netherlands, Ethiopia has maintained a strong trading relationship with Italy, and the majority of Ethiopian beans land in Italy before being trucked to their final destinations.

**Figure 1. Major markets for Kenyan green beans (tons) 1992-2004**



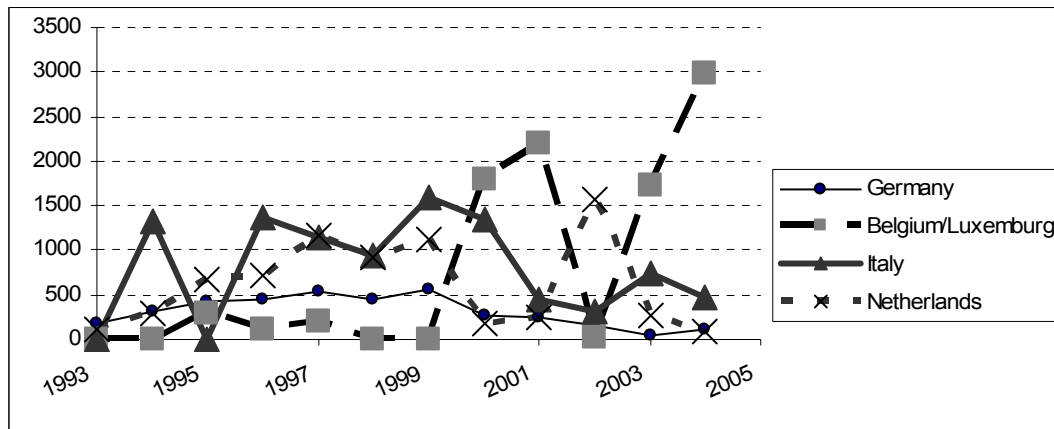
Data source: UN Harmonized Trade Statistics

**Figure 2. Major markets for Zambian green beans (tons), 1992-2004**



Data source: UN Harmonized Trade Statistics

**Figure 3. Major markets for Ethiopian green beans (tons) 1992-2004**



Data source: UN Harmonized Trade Statistics

In all three countries, logistics (in particular the availability of airfreight space) play a significant role in the green bean trade, due to the perishability of the product. Kenya (and until recently, Zambia) has regular direct British Airways flights to the UK, facilitating shipping of green beans to the UK (Jensen, n.d.; Harris, et al., 2000). In contrast, Zambia Airlines, the only national carrier in this country, no longer flies to Europe. Thus, Zambia now depends on British Airways flights from South Africa for green bean shipping, meaning that Zambian exporters must truck their beans to South Africa for onward shipment. The national carrier of Ethiopia has direct flights to Italy, meaning that exporters must ship to Italy and truck the green beans to their final destinations.

Figures A.1 and A.2<sup>5</sup> (in the Appendix) show the green bean-producing areas in Kenya and Ethiopia. The common significant feature in the two countries is the close proximity (within a 2-hour drive) of the producing areas to the airports. Airport proximity benefits green bean exporting due to the perishability of the product, the low value-volume ratio of the product, which is due to high processing requirements and makes long-distance transport costly, and the requirement of flexibility in orders.

<sup>5</sup> The areas presented in the Ethiopian map include those of other field beans. Green beans are located exclusively in the Rift Valley, particularly in the Upper Awash river basin and Ziway.

### 3. CONCEPTUAL FRAMEWORK

We herein use value chain analysis and the new institutional economics theory to examine the emergence of, effects of and response to food safety standards in African green bean-exporting countries. The value chain analysis addresses the issue of who controls the global commodity trade, how they do so and what consequences might be experienced in developing countries (for a comprehensive discussion please see Gereffi, 1994, 1999, and Daviron and Gibbon, 2002). The institutional economics theory differentiates between spot- and contract-based market transactions and non-market based transactions (e.g. hierarchies and vertical integration) that are used by exchange parties to minimize the costs of exchange.

Gereffi (1994; 1999) distinguishes between buyer-driven and producer-driven supply chains. In a producer-driven supply chain, the producer makes decisions on what to produce, how much to produce, and how to produce it. In contrast, the buyer-driven chain is governed by the needs of importers, retailers and branded companies. The retailers not only wield considerable influence on the chain, but also develop their own brands with the aim of: 1) competing with others (Reardon and Farina, 2002); 2) meeting consumer demands expressed through increased demand for food safety; and 3) complying with due diligence requirements (Fulponi, 1994; 2005). At the same time, retailers have developed sophisticated logistical systems. The influence of retailers on commodity chains is most evident in Africa, where they have increased their control on fresh fruit and vegetable trade (Dolan et al., 1999; Humphrey, 2003). Dolan et al. (1999) indicate that while wholesale chains initially controlled the majority share of the fruit and vegetable trade, the largest supermarket retailers have gradually increased their share over time. These retailers accounted for over 70-90% of the fresh fruit and vegetable trade in 2000.

Dolan and Humphrey (2002) identify a number of ways that retailers can influence the value chain, including: 1) requiring that the products be customized to meet their specified parameters; 2) requiring various grades of a given product; 3) requiring product labels that provide information about nutritional content and safety; and 4) requiring certifications that provide information about the processes followed during production, such as ISO 9000 (quality system) and SA 8000 (environmental system), HACCP (GMP) and EurepGAP (GAP), and ETI (social responsibility).

Three factors help entrench buyer control of the chain, especially when produce is sourced from developing countries (Dolan and Humphrey, 2005). First, producers may be forced to control the production process such that the production parameters fit buyer demands (which reflect consumer requirements). Second, a buyer may have a better understanding of the market than the producer. The buyer then interprets the needs of the market and informs the producer what is required. In both cases, the buyer will often develop parameters (protocols) to be followed by the producer. Third, it may be



necessary for the producer to enact logistical parameters or modify existing logistical arrangements to facilitate delivery of products with the specified parameters.

Such alterations may be occasioned by time pressure in cases of perishable products, or when there is some degree of task complexity or a demand for flexibility in produce delivery. Where produce is sourced from developing countries, a buyer's specification of production parameters is driven by three factors: 1) the buyer may not find any existing suitable standard for governing/regulating particular process parameters (Reardon and Farina, 2002); 2) the buyer may not regard existing standard as sufficiently credible; or 3) the buyer may deliberately design a standard that differentiates the in-house brand from that of competitors.

Specification of production and logistical parameters (e.g. food safety standards) may reduce the buyer's transaction costs, but requires additional coordination of such activities (Fulponi, 2005). The value chain literature identifies two types of integration used for coordinating, namely vertical integration and vertical disintegration (Sturgeon, 2001). Vertical integration entails bringing activities at various levels of the marketing system under the control of a single body, and may require (for example) the merging of production and processing. Vertical disintegration is the formation of relationships that are geared at meeting market requirements through the activity of independent firms.

Dolan and Humphrey (2002) discuss two types of global commodity chain networks: 1) those that bring together firms with different competencies (traditionally called "networks"), and 2) those that bring together firms showing a marked asymmetry in competence and power, wherein a lead firm specifies what is produced, how it is produced and provides the necessary monitoring (called a "quasi-hierarchy"). The nature of the product and its market determines the type of coordination necessary for delivering produce meeting the buyer's specifications. The nature of the network coordination, on the other hand, affects the type of supply chain chosen by the producer, which in turn affects the nature and extent of adjustments (investments) the producer must make to meet buyer requirements.

The development of close relationships can result in transaction dependency and opportunism, especially when the transaction requires specific assets for completion or is characterized by uncertainty. Asset specificity in a transaction can take several forms. When a transaction must be completed within a specified time (e.g. in the case of perishable produce), the transaction is said to be characterized by temporal asset specificity. A transaction that requires some specialized physical facility or machinery to complete is said to entail physical asset specificity. When the transaction requires the use of specialized skills and/or knowledge acquired through training, it is characterized by human asset specificity. Lastly, a transaction requiring that an asset (e.g. a processing facility) be situated in a certain location results in locational asset specificity.

Asset specificity can present serious challenges for some producers, especially when acquisition of the necessary assets (e.g. skills and physical facilities) entails a costly investment. In the extreme case, where assets are lumpy and costly and entail economies of scale, the poor smallholders are likely to be excluded from production or from selling to specific markets (Poulton et al., 2005; Okello, 2005a). Farmers in developing countries are especially likely to be disadvantaged due to poor infrastructure (roads, water, and communication) in these countries. Poor infrastructure can also significantly increase the transaction costs of enforcing compliance with buyer requirements, thus undermining the gains arising from product standardization. In addition, geographical dispersion of the farmers in such countries can also drive up costs of enforcing buyer requirements, causing exporters to exclude some farmers from the chain.

Theoretically, there are a number of institutional mechanisms that might help integrate smallholders into the high-value chain. First, smallholder farmers can orient their products toward markets that are less demanding in terms of adjustment needs. This might entail shifting from the demanding supermarket chain to the less stringent wholesale chain or domestic market. Second, smallholders can collectively invest in lumpy/costly assets, thus reducing the per-farmer costs. Collective action arises wherever there are economies of scale in production or marketing. This includes the objective of ensuring traceability, as the cost for the establishment of establishing traceability is lower for firms and farms that band together (e.g. into farmer groups or cooperatives). Collective action also has a rationale if agents in the supply chain have different comparative advantages. Thus, a producer group (which has a comparative advantage in production) can benefit from collective action with agents having marketing expertise. Such action has also the advantage of enabling small farmers to take advantage of economies of scale by jointly producing greater volume, thereby lowering the buyer's transaction costs. Third, the public and private sectors can partner to help smallholders overcome the challenges of market requirements by investing in infrastructural requirements that are lumpy or have public good characteristics (training and extension, road, supply of safe water).

Traditionally, public sector activities such as extension, research and development, and price and marketing policies have been largely commodity-based, and thus may not provide the support smallholders require for entry into a high value supply chain. The private sector has traditionally been directly involved in the production, marketing and distribution of agricultural commodities, and the rise in high value commodities has given the private actors an ever-larger and more specific function. By working together, the public and private sectors can play a complementary role in helping small farmers overcome the challenges of developed country standards.

#### **4. EMERGENCE OF FOOD SAFETY STANDARDS IN THE GREEN BEAN INDUSTRY**

Consumer pressure, protection of brand image, stricter food regulation in the EU during the 1990s, and the need for access to a due diligence defense drove retailers to develop strict commercial standards. This push culminated in the introduction of EurepGAP (European retailers' protocol for Good Agricultural Practice) in 1999 (Jaffee, 2004). Currently, 30 of the retailer members of the Euro-Retailer Produce Working Group (EUREP) control 85% of fresh produce sales in the EU, and their standards go much further than the legal minimum specified under public EU regulations. The EurepGAP code for production of fresh fruits and vegetables was first introduced in 1996 by a group of 11 British and Dutch retailers, with the objective of creating a single private sector standard. EurepGAP certification can be given either to individual grower or to a marketing organization attached to an exporter. In the cases studied herein, most small farmers who have achieved EurepGAP certification for production of green beans (and other commodities) have done so through a marketing organization.

One of the key drivers for scaling up the IFSS in high-value chains has been consumer concerns about food safety, resulting largely from food safety failures in the 1980s and 1990s (Dolan and Humphrey, 2002; Freidberg, 2003 and 2004). These two decades were marked by a series of food-borne disease outbreaks in Europe linked to produce originating from developing countries; these include a Salmonella outbreak in the UK in 1989, an E. coli outbreak in fast food hamburgers in the United States in 1993, and Dioxin contamination of animal feed in Belgium in 1999 (World Bank, 2005; Freidberg, 2004). Importing countries have also become concerned about the introduction of pests through imports from developing countries. The EU, for instance, formulated and implemented Council Directive 2000/29/EC to control the introduction of pests and diseases harmful to plants and plant products. This directive requires that imported produce be accompanied by phytosanitary certificates declaring them free of pests and disease. Likewise, supermarkets in developed countries have responded to changing regulatory and demand conditions by seeking to meet consumer demands for all products (Dolan and Humphrey, 2002). In the case of green beans, they have developed food safety protocols that seek to assure consumers that due diligence is being exercised when sourcing fresh beans.

In response to the above challenges, some countries have moved to harmonize food safety regulations. A case in point is the attempt to harmonize pesticide residue limits under the auspices of the Liaison Committee for Caribbean, Africa, and Pacific (COLEACP). However, such efforts have been constrained by the use of private standards by developed country supermarkets. Many major retailers still

demand that products comply with their in-house food safety protocols in addition to meeting industry standards such as EurepGAP.<sup>6</sup>

Some private industry standards deal with a more involved set of issues. The Ethical Trading Initiative (ETI), for example, deals with the freedom of association, child labor, flexible working conditions, adequate remuneration of labor, and provision of health care and retirement benefits to farm workers. At present, compliance with the ETI is not mandatory. However, major exporters in Kenya, Zambia, and increasingly Ethiopia, are becoming more involved in the issue of child labor.

Within green bean-producing countries, there are also homemade<sup>7</sup> food safety standards for horticultural crops, especially for export markets (Freidberg, 2003). Zambia and Ethiopia, for instance, have the Zambia Exporters and Growers Association (ZEGA) and the Ethiopia Horticultural Producers and Exporters Association (EHPEA) codes of conduct, respectively. Kenya has the Fresh Produce Exporters Association (FPEAK) code of conduct, which was recently renamed the KenyaGAP. Kenyan exporters and growers are also subject to the Horticultural Ethical Business Initiative (HEBI), which, similar to the ETI, deals with labor issues. Compliance with these codes is mandatory for all growers and exporters in Zambia and Ethiopia, but less so in Kenya. At least three leading Kenyan exporters (Vegpro Ltd., Homegrown (Kenya) Ltd., and Kenya Horticultural Exporters Ltd.) and one Zambian exporter (York Farms) have developed their own code of practices that encompass hygiene, pesticide usage and traceability.

The decision by exporters to develop their own code of practices is usually strategic. Exporters with their own codes use them to signal their serious desire to meet high standards, and may also use them to steal market shares away from competitors. Table 2 summarizes the various foreign and domestic food safety standards that affect green bean growers in the study countries. These high standards determine the structure of the supply chains described in the next section.

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<sup>6</sup> The retail-level private food safety standards differ among stores. The two most well known retailer private standards are Tesco's Natures Choice and Mark & Spencer's Farm to Folk. Compliance with these private standards is demonstrated through certification by an accredited third party recommended by the importers representing these retailers. The Kenyan smallholders producing for these retailers are often certified as producer marketing organizations under the exporter. The overwhelming perception among green bean industry participants in both Kenya and Zambia is that retailers' own food safety standards are more stringent than the foreign public food safety standards and even EurepGAP requirements.

<sup>7</sup> These are food safety standards developed by developing country exporters and growers, and are intended to show developed country importers that the exporters and growers are addressing food safety concerns.

**Table 2. Array of food safety standards operating in the study countries in 2004**

<b>Food safety standard</b>	<b>Countries complying</b>
<b><i>Foreign standards</i></b>	
British Retail Consortium	Kenya, Zambia
EurepGAP	Kenya, Zambia, Ethiopia
Ethical Trading Initiative	Kenya, Zambia
HACCP	Kenya, Zambia
Nature's Choice	Kenya, Zambia
Farm to Fork	Kenya, Zambia
Sanitary and Phytosanitary Standards	Kenya, Zambia, Ethiopia
<b><i>Domestic standards</i></b>	
<b><i>Industry</i></b>	
ZEGA code of practices	Zambia
KenyaGAP	Kenya
EHPEA code of practices	Ethiopia
Horticultural Ethical trading initiative	Kenya
<i>Company/exporter code of practices</i>	Kenya, Zambia
<b><i>Public</i></b>	
Kenya Bureau of Standards	Kenya
HCDA code of practices	Kenya
Zambia Standards Bureau	Zambia

## 5. GREEN BEAN SUPPLY CHAINS IN THE THREE COUNTRIES

Figures A.3, A.4 and A.5 in the Appendix present the green bean supply chains found in the three studied countries. Green beans destined for export are marketed either through the supermarket supply chain or through the traditional wholesale supply chain. In addition, some green beans enter the domestic markets in all three countries. There is also an active processing industry for green beans (though usually of a different variety from the exports) in Kenya and, to a smaller extent, in Ethiopia. In the figures, traceability requirements are represented by a broken line to distinguish the supermarket chain from the wholesale and domestic channels.

### Food Safety and Organization of the Export Supermarket Chain

The UK supermarket chain has the most stringent FSS (Singh, 2002; Jaffee, 2004; Henson et al., 2005); these include strictures on the type and quality of inputs used in production, as well as the absence of pests and diseases prohibited by the importing countries. Green beans marketed through this chain must be third-party certified as meeting standards such as EurepGAP, BRC, and in most cases the retailers' private food safety protocols. In addition, the beans must be accompanied by a phytosanitary certificate issued by a competent authority guaranteeing absence of prohibited pests, and (more importantly) they must 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 who supply the supermarket chain. In particular, the exporters closely supervise the type, dose and timing of pesticide use (through their field staff), and allow growers to use only pesticides authorized for use by the destination market.

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 Zambia<sup>8</sup>, exporters have adopted the HACCP and GAPs, and have extended these practices to the farm level. In both countries, growers are required to have toilets, pesticide storage units and hand-washing facilities available on the farm or in the grading shed. Leading exporters also closely monitor the quality of water and soils used for irrigating the green beans, often testing the utilized water and soil twice a year for pathogens (especially Coli forms and Salmonella).

The exporters require that farmers keep records of the type and quality of inputs used. Duplicate copies of these records accompany the beans to the exporter's processing facility (packhouse). In Kenya

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<sup>8</sup> Although Ethiopian exporters also have a system for monitoring hygiene, it is far less rigorous than those found in Kenya and Zambia.

and Zambia, the farmers keep their own records individually or collectively (in case of a farmer group), while records are kept by the exporter in Ethiopia. The Ethiopian records are limited to records of pesticide usage; pesticide is applied by the exporter in this country, but is the responsibility of farmers in Kenya and Zambia.

The EU importers do not directly monitor the green bean growers, but rather monitor the exporters and expect that the exporters will in turn monitor their growers. In general, the relationship between the importers and the retailers is informal. There are typically no formal contracts because of the need for up-to-the-last-minute flexibility that allows orders to be changed depending on market circumstances. Flexibility in supply is essential, as major supermarket stores tend to avoid direct competition on price. Instead, a store might opt to reduce its bean order when a competitor has beans on sale. Such a decision could be communicated to the exporter just hours before a shipment is scheduled to leave, yet the exporter is expected to change the order accordingly. Conversely, an exporter could also experience a sudden, last-minute increase in the size of the order. If a given exporter is repeatedly unable to adjust to a last-minute order change, that exporter might be removed from the list of preferred suppliers, or could have less chance for future contract renewal. To allow for the necessary flexibility, exporters often have their outgrowers plant more beans than needed for their regular buyers, and then sell the surplus to other markets.

The relationship between a UK importer and an overseas exporter usually involves formal contracts that are renewed as long as the exporter does not grossly violate the IFSS. The exporters, especially those supplying to EU supermarkets, closely monitor their growers through a team of well-trained field assistants. However, some EU importers are extending their monitoring to the farm level through regular visits for inspection of the use, storage, and disposal of pesticides, as well as the hygiene level on the farm and in the farm-level packing and holding facilities.

The most careful control of pathogen contamination occurs in the exporters' packhouses. Leading exporters in both Zambia and Kenya have invested in state-of-the-art equipment that washes the beans with chlorinated water and chills them before packing. The workers wear special clothes and rubber boots in the packhouse and are required to wash their hands at regular intervals or during shift change, in order to avoid cross-contaminating beans with pathogens.

A leading export company in Kenya randomly takes swabs from workers' hands and tests them for pathogens. If a swab tests positive for pathogens, the worker is penalized. All containers used at various stages of processing are color-coded to avoid mixing and subsequent pathogen cross-contamination. In addition to requiring strict adherence to hygiene during processing (sorting and chopping the beans, and arranging them into trays and pallets), packing and bar coding (in the case of high-care prepacked beans) is performed under temperature-controlled conditions. Similar conditions

exist in the EU importers' warehouses, except that little processing is performed there, with the main activities comprising repackaging and bar coding.

### **Food Safety and Organization of the Wholesale Chain**

Green beans from most small- and medium-scale farmers feed into the wholesale chain. In general, exporters selling exclusively to the wholesale markets do not require farmers to comply with foreign private food safety standards and traceability. They do demand compliance with some physical attribute standards (e.g. size and spotlessness of the beans), consistency in volume, and the EU's public standards. However, monitoring and coordination in this supply chain is less pronounced overall.

A substantial portion of beans in Kenya that pass through this chain originate from the spot market and are usually grown with no supervision by the exporter. This channel has a number of intermediaries between the farmer and final retailers, and is therefore less coordinated. Exporters who sell in this chain do not have the quality management systems needed to meet the stringent supermarket requirements (Humphrey, 2003). All Ethiopian green beans exclusively pass through this channel. However, unlike the other two countries, Ethiopia does not have a spot market for green beans.

In Zambia, exporters source beans from their own farms or contracted outgrowers mostly to the supermarket channel. However, some Zambian and Kenyan green beans that are normally marketed through the supermarket chain may be unloaded to the wholesale chain in cases of overstocking due to order cancellation, rejection based on quality, or unavailability of cargo space.

### **Food Safety and Organization of the Domestic Chain**

Beans sold through domestic channels are either intended for domestic processing or are sold fresh. This chain is the least coordinated of the three, though this status is changing in some countries. In Ethiopia, the domestic chain comprises of traders who buy rejects that fail to enter the export market, usually making the purchase through some kind of auction. The trader then transfers the beans to the wholesale or retail markets (including domestic supermarkets). Zambia and Kenya have a more organized channel, whereby some exporters sell rejects and/or leftovers of the export channel to a central warehouse (Freshmark in Zambia and Fresh N Juicy in Kenya), which packages the beans and distributes them to interlinked supermarket chains (Shoprite and Nakumatt, respectively). While these domestic retail outlets buy other domestically traded vegetables directly from farmers, we do not find evidence of direct purchase of green beans from farmers by them.

There is also an additional outlet for small producers selling green beans, namely the domestic canning industry. Only Ethiopia and Kenya currently can green beans for export, with Kenya leading in



terms of volume.<sup>9</sup> Both countries export canned beans to France, with Ethiopia also selling some of the canned beans in domestic supermarkets. Green bean canners in both countries source most of their supplies from smallholders. The market for canned beans does not demand compliance with private IFSS. The only IFSS the processors need to meet is the pesticide residue limits. Consequently, the firms undertake the sourcing, storage and application of pesticides to guard against violation of residue limits.

There is a growing domestic market for fresh green beans in all three countries. In Kenya, the sale of green beans in domestic supermarkets has evolved since 2002 as an overflow from sales to UK supermarkets. The leading supermarkets in Kenya (Nakumatt, Uchumi, Tusker Mattresses and Ukwala) sell green beans in prepacked and loose forms. Nakumatt has the most developed system of green bean sourcing and sale. Uchumi, the second largest supermarket chain in Kenya also sells green beans in most of its retail outlets in Nairobi. However, unlike Nakumatt, Uchumi does not sell beans under its own brand name.

Apart from the domestic supermarket channel in the three countries, some beans are sold in wholesale and open retail markets. In Kenya, these channels obtain their beans from export companies in Nairobi. Such beans have either been rejected or have missed export due to order cancellation or failure to obtain cargo space on the European airlines.<sup>10</sup> Some exporters also sell or donate non-exported beans to children's homes, hospitals and major hotels. In addition, there is an active market for rejected green beans as animal feed, especially in the suburbs of Nairobi.<sup>11</sup> The hygiene conditions under which beans sold in the domestic market are held and repacked is unknown. However, beans packed by Fresh N Juicy and distributed to Nakumatt are processed under substantially less hygienic conditions than those of the export firms, as Fresh N Juicy has no advanced system of preventing pathogen contamination in the warehouse.

In Zambia, supermarkets and to a limited extent open market farmers sell fresh green beans as prepacks or loose or both. The 17 Shoprite supermarket outlets sell beans in plastic bags under their own brand name. Other, smaller private supermarkets also sell green beans, although mainly in plastic bags and loose forms. The beans sold in Zambian supermarkets are predominantly rejects, although some are exportable overstocks made available due to order cancellation. In addition, none of the Zambian supermarkets sell pre-washed, chopped and prepacked beans in small trays, such as those found in Kenya's Nakumatt and Uchumi supermarkets. The domestic marketing channels have no system of preventing contamination of beans with pathogens.

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<sup>9</sup> Kenya's green bean canning industry is over two decades old. Ethiopia's green bean processing industry is in its infancy, as the only firm operating there started processing green beans in 2005.

<sup>10</sup> The beans are rejected for failing to meet physical quality attributes, especially ideals in size, shape and spotlessness.

<sup>11</sup> However, there was conflicting information regarding whether the green beans that end up as animal feed are sold, or whether dairy farmers are given these beans for free.

The domestic market for fresh green beans is the least developed in Ethiopia. Ethiopian supermarkets sell fresh green beans in loose form only. Even the leading supermarket chain does not sell prepacked beans. Since the vegetables are loose, beans get mixed with other vegetables, increasing the chance of pathogen cross-contamination. Unlike Zambia and Kenya, only rejects are sold in the domestic markets of Ethiopia. The wholesalers source their beans from the exporter via auctions and sell to traders, who then sell in the open markets or small supermarkets. The larger supermarkets obtain their green beans from agents, who buy from wholesalers.

Clearly, the supermarkets in all three countries lack a well-designed system of verifying green bean quality. At one time, Uchumi in Kenya had proposed the establishment of a quality testing laboratory facility, but this idea was shelved due to financial difficulties. Nakumatt, Shoprite, and Shri Solomon, the leading domestic supermarket chains in Kenya, Zambia, and Ethiopia, respectively, have no quality testing facilities at present. Indeed, quality in these leading supermarkets is based on physical attributes (e.g., size, shape, and spotlessness). This is contrary to South American supermarkets which have well-defined quality assurance system with standards that threaten the continued participation of smallholders in such markets (Berdegue, et al., 2005). Compared to the Latin American domestic market FSS (Farina and Reardon, 2000; Farina et al., 2005), the leading supermarkets in the study countries did not have such standards. However, some have already started asking questions relating to the hygienic conditions in the farm and the safety of water used in case of irrigation.

## 6. EFFECTS OF STANDARDS ON SMALL ACTORS IN THE GREEN BEAN SUPPLY CHAIN

A tightly-coordinated supply chain works against the smallholder<sup>12</sup> in three ways: 1) information asymmetry and transaction costs; 2) organizational constraints; and 3) regulatory failure (Rich and Narrod, 2005). Information asymmetry makes it harder for smallholders to guarantee food safety without costly third-party certification or close monitoring. It is more expensive for exporters to monitor numerous smallholders, making it more costly to work with small farmers. In addition, it is typically not economical for smallholders to establish the quality management systems essential for assuring food safety. Finally, smallholders tend to be geographically dispersed, thus increasing the cost of coordination.

The various chains have become more coordinated with the imposition of IFSS, creating an entry barrier for smallholders and/or discouraging them from these chains. The exact number of smallholders that have been marginalized by the IFSS is unknown, but in Kenya, evidence from a few leading exporters suggests that more than half of the small outgrowers were dropped immediately following imposition of IFSS. Consequently, while over 60% of green beans were produced by smallholders in Kenya in 1980s, this share had dropped to about 30% by 2003 (Jaffee, 2004, Kimenye, 1993).

In Zambia, the first exporter of green beans (York Farms) sourced from its estate farms or from larger outgrowers. The York Farms outgrowers were typically the spouses of white settlers and wealthy former copper mine workers (Freidberg, 2005). Thus, they tended to be more skilled, educated, and endowed with financial (cash) and physical (land) capital. Small farmers began participating in the Zambian green bean business when Agriflora Ltd entered the green bean export business. Agriflora's founders lived in Kenya before moving to Zambia, and the firm set up one of the largest and most successful smallholder green bean outgrower schemes in Zambia. The shift towards smallholders was mainly driven by declining number<sup>13</sup> of large white outgrowers. At the peak of its green bean business, the Agriflora Smallscale Scheme (ASS) had an estimated 500 smallholder outgrowers producing beans and baby corn on a year-round basis, just like their Kenyan counterparts. The company provided training, information on produce handling, technical/extension assistance and input loans (fertilizer and certified seed), and controlled pesticide use by buying, stocking and spraying the beans under an interlinked credit arrangement. The outgrowers had packhouses with the cold stores, cement floors, washable tables and toilets needed to meet hygiene standards. ASS also kept records for its farmers, thus helping them meet traceability standards.

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<sup>12</sup> The definition of smallholders differs by country. In Ethiopia and Kenya, smallholders are defined as having up to 2 acres of beans, while in Zambia, smallholders may have up to 5 acres of beans.

<sup>13</sup> For instance the number of Agriflora's large-scale outgrowers declined from a peak of 25-30 in 1997 to just 6-7 in 2000 (Freidberg, 2004).

When Agriflora collapsed in 2004, the smallholders sought to contract with other exporters, especially York Farms.<sup>14</sup> However, York Farms would not accept beans produced by smallholders for fear that they might violate its clients' pesticide residue and hygiene standards. York Farms bought baby corn from the remnants of the former system because baby corn requires no pesticides at later growth stages and is harvested and delivered to the exporter with its sheath. It therefore has a lower risk of pesticide and pathogen contamination. The problems in Agriflora and the ensuing difficulties in securing an alternative market outlet in York Farms (largely due to IFSS) led to a drop in the number of smallholders. Haantuba (2004) indicates that the number of smallholders in the ASS dropped from 500 to 180 following the collapse of Agriflora Ltd.

The role of smallholders in the Ethiopian green bean industry has been limited to private exporters only. The state farms do not have outgrowers. Verschoor et al. (2006) estimate that more than 80% of beans produced in Ethiopia are from large-scale state-owned farms. Smallholders are affiliated to just two private export companies, which together account for the remaining 20% of the fresh green beans produced in Ethiopia. Both private exporters in Ethiopia grow some of the beans needed to meet their orders on their estate farms. Hence, compared to Kenya and Zambia, the share of smallholder outgrowers in green bean production is quite small in Ethiopia. Figure A.6 (in the Appendix) presents the number of smallholders growing beans for Ethioflora, one of the two private companies. The zero entries for 2001/02 and 2002/03 indicate years when the company suspended sourcing from smallholders due to problems relating to their compliance with pesticide residue limits and observance of planting and harvesting schedules.

Thus, IFSS have produced a strong screening effect on smallholders. In response to IFSS, smallholders and governments have adopted different coping strategies, such as switching target markets or products, or instituting institutional solutions for preserving smallholder participation within the fresh beans export sector (see next section).

The loss of smallholder participation arises from the prohibitive costs of adjusting production to align with IFSS requirements, as well as the costs associated with actually demonstrating compliance. The main costs of compliance include investments in required facilities, the cost of switching from toxic to less toxic pesticides, changes in productivity arising from the adjustments, and the costs of establishing traceability. The costs of demonstrating compliance with IFSS further include: 1) investment in training and quality assessment (QA) manuals; 2) pre-audit costs; and 3) certification costs. These investments vary widely among growers, as some of the costs depend on farm size.

Table 3 compares the typical costs of IFSS compliance among a farmer group in Kenya, an individual smallholder farmer, and a large-scale farmer producing beans under contract for UK export.

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<sup>14</sup> Agriflora Ltd collapsed due to management issues, not because of issues with meeting the food safety standards.

The cases were carefully selected to represent each category, and the data were obtained from records and supplemented by discussions with farmers, group leaders and one of the certification companies in Kenya. In all cases, only one pre-audit is undertaken prior to certification. The smallholder farmer group has 15 members. The computation also assumes that the small farmer's plot is close to the homestead, meaning that there is no need for a separate toilet and pesticide disposal pit/incinerator. Many exporters allow the family toilet to be used by farm workers and for the disposal of leftover pesticides.

**Table 3. Costs and incomes (in Kenya shillings) associated with IFSS compliance and certification by grower type, 2006<sup>15</sup>**

<b>Cost item</b>	<b>Farmer group</b>	<b>Small farmer</b>	<b>Large farmer</b>
Grading shed	59,800	20,000	34,000
Charcoal cooler	41,000	5,400	32,000
Toilet	5,000	-	7,000
Pesticide storage unit	24,450	8,000	37,000
Disposal pit	1,000	-	1,000
Needs assessment & QA manuals	24,750	21,500	31,000
Analyses (soil, water, MRL)	45,064	40,000	41,800
Pre-audit (1)	132,000	56,750	32,000
Certification	105,890	94,540	94,540
<b>Total IFSS investment costs</b>	<b>438,954</b>	<b>228,190</b>	<b>311,340</b>
<b>Cost per farmer</b>	<b>29,264</b>	<b>228,190</b>	<b>311,340</b>
Year 1 income	3,600,000	96,000	384,000
Year 2 income	7,520,000	240,000	864,000
<b>Total income over investment period</b>	<b>11,120,000</b>	<b>336,000</b>	<b>1,248,000</b>
<b>Cost of compliance as % of total income</b>	<b>4</b>	<b>68</b>	<b>24</b>

Source: Authors' compilation.

The exchange rate during time of survey was 1US\$ = 74 Kenya shillings

Table 3 clearly shows that when the smallholders work together as a group of 15 farmers, the cost per unit of income is significantly lower. This reduction in costs has to be compared to the risks of lower monitoring by expanding the group size. Hence, smallholders who do not belong to a farmer group face a far greater threat of being marginalized by IFSS. Notably, the incomes earned in the second year are substantially higher than those of the first year in all cases. This is potentially because the farmers: 1) increased their production and sales volumes once they obtained EurepGAP certification (allowing more reliable access to the export market); 2) achieved better prices through access to the premium markets; and 3) learned how to cope with the standards.<sup>16</sup>

Similar to the shifting preference towards larger farmers, importers tend to favor larger exporters. The quality management systems (e.g. HACCP) that the exporters must use to demonstrate compliance

<sup>15</sup> These costs are by no means exhaustive. They do not account for productivity losses due to changing from toxic to less toxic pesticides. They also omit the costs of establishing a traceability system, training, and investment in human capital (e.g. a trained agronomist/entomologist), etc. The incomes are the net of conventional variable production costs (and hence can be viewed as gross margins). Since some investments are spread over two years, we present the income from green beans for both years.

<sup>16</sup> See Spencer et al. (2005) for a discussion of learning curves in compliance with the IFSS.

with IFSS entail high investment costs that can be more easily handled by large exporters. In addition, importers tend to prefer sourcing beans from larger exporters due to their need for guaranteed supply continuity. Increasingly, importers also expect the exporters to become involved in product innovation and development (Dolan and Humphrey, 2000). Consequently, the share of large exporters has increased over time. This is particularly evident in Kenya, where the top 7 exporters control over 75% of all exports (Humphrey, 2003), and Zambia, where all green bean exporters are large.

In the three countries, the general trend in the green bean industry (and other fresh vegetable exports) has been towards consolidation. This has been driven largely by the need for greater monitoring, due to increased demand for compliance with stringent food safety standards. Implementation of quality management systems entails high investment costs, thus creating barriers for small firms to enter the green bean export industry. Thus, the export of green beans in Zambia is dominated by 3 large exporters and involves no small exporters, while Ethiopian green bean export is dominated by 2 public exporters.

The fresh green bean high-care processing industry is perhaps the most concentrated. In Zambia only 2 (i.e., 33% of the total) firms currently have high-care packhouses. Approximately 10% of the green bean exporters in Kenya have high-care packhouses, while there are no high-care packhouses in Ethiopia at this time (although the two private exporters are in the process of constructing them through financial support from donors and buyers<sup>17</sup>).

Consolidation among exporters subsequently feeds back into consolidation in production, as observed in Kenya and Ethiopia. In Kenya, large farms bought land and integrated backwards, while simultaneously contracting with medium and large-scale outgrowers. In Ethiopia, a similar trend towards concentration is beginning to emerge, with exporters indicating intentions to develop more medium- and large-scale outgrower sources. The trend towards concentration in production is extended to other stages of the supply chain as well. In the three studied countries, the intermediaries (brokers or middlemen) are disappearing. As standards enhance the need for coordination, exporters are increasingly hiring their own field staff to not only supervise compliance with food safety standards, but also to ensure that side-selling is minimized.

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<sup>17</sup> An emerging issue is that exchange rate fluctuations threaten exports; this has been especially significant in Zambia, where the domestic currency has gained strongly against the dollar.

## **7. INSTITUTIONAL MECHANISMS AND THE PARTICIPATION OF SMALLHOLDERS IN CHAINS WITH FOOD SAFETY STANDARDS**

The previous section describes how IFSS tend to exclude smallholders from the supply chains. However some smallholders in these countries have been able to continue participating in the chains. In this section, we discuss the institutional mechanisms that have helped those smallholders meet IFSS. These include market re-orientation by switching target market or product, having exporters contract with groups of small farmers, and formation of alliances among NGOs, donors, and the public sector. The first mechanism essentially entails avoiding the standards, while the latter two reduce the transaction costs (for example those relating to contract enforcement) and help farmers attain economies of scale or access the human and physical capital needed for IFSS compliance.

### **Switching the Target Market or Product**

One of the strategies related to switching of markets has been the reorientation of production towards the domestic canning industry.<sup>18</sup> In 2000, only a few hundred farmers grew beans for the canning industry. However, the Kenya Horticultural Development Project (an NGO) estimated that by 2004, some 20,000 smallholder farmers were growing beans for one of Kenya's leading green bean canners, with 3,000 having attained EurepGAP certification.

In canning, the processing companies undertake the key production practices that must comply with IFSS, thereby eliminating the information asymmetry problems faced by the fresh produce exporters. These companies employ pesticide spray operators for their outgrowers, and do not allow farmers to handle the produce beyond harvesting and drop off at company-designated collection points (i.e. the farmers are not involved in sorting/grading or storage in charcoal/Hessian coolers). Thus, the farmers are not required to invest in the long-term facilities required by the fresh export market, such as pesticide storage units, shower rooms and toilets. However, these companies pay up to 25% less than what farmers get for fresh export beans, enabling them to recover the costs of inputs and services (seeds, pesticides, labor for pesticide spraying, transportation and sorting).

There are five canning companies currently operating in Kenya. The companies produce some beans on their own farms, but the bulk of the canned beans are sourced from small- and medium-scale outgrowers. Some of these canners have a long history of working with smallholders. One such company dominated green bean processing in the mid 1990s, with an outgrower scheme involving some 30,000 smallholders in Western Kenya and parts of the Rift Valley (Jaffee and Bintein, 1996). Another company,

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<sup>18</sup> This strategy has been used by Kenyan smallholders who were excluded from the fresh export market following the introduction of IFSS.

which is the current canned bean industry leader, has established an outgrower base including 20,000 smallholders spread over the traditional and emerging green bean growing areas of Kenya.

The second market re-orientation strategy adopted in the study countries, especially Ethiopia, has been to switch products. A recent expansion in flower production has benefited Ethiopian smallholders exiting the green bean sector. Investment in flower production has recently attracted substantial donor and government support (Greenhalgh et al., 2005), and many of the smallholders who could not cope with the increasingly demanding requirements of the fresh green bean export market are being absorbed as laborers on flower farms, which offer higher wages compared to other activities in the areas. Indeed, the manager of Ethioflora, the largest private exporter of green beans, indicated that the recent establishment of the Sher Flower Farm close to its green bean plantation has created competition for labor during the peak season<sup>19</sup>.

### **Contract Production of Green Beans**

Contract farming helps poor smallholders by facilitating their access to inputs (e.g. information and credit) and reliable output markets. In particular, contract farming allows smallholders access to technical information regarding the pesticide usage, hygiene requirements and agronomic practices (including IPM) that facilitate compliance with IFSS. Contracted smallholders receive technical information in the form of handouts, training and field extension services. They also receive quality seeds (and in some cases protective clothing) under interlinked credit arrangements. In addition, contract production of green beans enables buyers to monitor and enforce IFSS compliance (at lower transaction costs) under a longer-term relationship.

Typically, small farmers have been linked with exporters through smallholder outgrower schemes. Kenya and Ethiopia in particular have very active smallholder schemes. In Kenya, green bean farmer groups existed even prior to the IFSS, mainly for the purpose of marketing (i.e. to find a buyer and negotiate better prices for members). Some exporters advanced seeds on loan and provided limited technical advice to these schemes, mainly to ensure that physical quality attributes were met.

Beginning in late 1990s with the imposition of the IFSS, exporters began transforming the way these smallholder groups operated (Jaffee, 2004). First, the groups were reorganized and their sizes were reduced from as high as 350 farmers in a single group to less than 30 farmers per group. The farmers were then trained on the new quality parameters, the IFSS and the necessary production practices. Thereafter, the farmers were subjected to close monitoring under more formal contracts than the previous procurement arrangements. Some exporters supervised group members individually and penalized the individual for violation of practices. However, most supervised the group as a whole and penalized all

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<sup>19</sup> Ethioflora contracts smallholders mainly for land and labor.



members for violations (Okello, 2005a). Typically, the exporters provided group members with technical information essential for meeting the pesticide usage and hygiene requirements of IFSS, as well as seeds in the form of a loan.

In Zambia, a similar outgrower scheme was also used by Agriflora Ltd., with the major difference that the exporter sprayed the beans on behalf of its members. In Ethiopia, the intensity of supervision is still much lower than that in the other two studied countries. Though the level of supervision is commensurate with the lower level of requirements for food safety in this country, the exporters undertake some production practices that affect quality, and eventually recover their costs from group sales. In particular, exporters spray the beans for the farmers and also maintain records in case the markets demand traceability.

Leading exporters prefer working with farmer organizations because it is cheaper to train farmers as a group. The group leaders undergo training, and are then able to act as trainers themselves as well as functioning to monitor and enforce IFSS compliance. Monitoring of farmer organizations differs depending on the exporter, but typically functions either at the individual member level, or through monitoring of the group leader.

Some exporters require the farmer organizations to hire their own technical assistants (TAs) who can quickly respond to members' hygiene, pest and disease problems.<sup>20</sup> The organization must have a grading shed with a toilet (in the vicinity), a cement floor and washable tables, a charcoal cooler, and a facility for hand washing. The producer organization normally hires a TA and a clerk. The TA enforces compliance with pesticide residue requirements by members, occasionally conducts field visits with the exporter's agronomist as part of the training, and also keeps records for all members regarding the type, amount and date of pesticides used. The clerk, on the other hand, enforces compliance with hygiene requirements within the grading shed. This strategy is used by a few leading exporters in Kenya and by the 2 private exporters in Ethiopia.

Producer organizations in Ethiopia have made significant alterations to this strategy. They have no permanent grading sheds with cement floors and washable tables. The grading facilities in Ethiopia are used solely for holding beans prior to collection, and are typically makeshift tents with earth/grass floors. In addition, the buyers do not require Ethiopian smallholder organizations to hire their own TAs.

The strategy of monitoring only the leaders while punishing the whole organization for violations is used by some exporters in Kenya and by York Farms in Zambia. Here, the leaders are offered IFSS training and then required to monitor and enforce IFSS compliance among all members of the group. IFSS violations result in the punishment of the entire group, and the punishment continues until demonstrable remedial action has been taken.

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<sup>20</sup> In many producer organizations, especially in Kenya, the group hires a clerk to act as the hygiene inspector.

Some producer organizations use two other strategies to ensure that members do not violate the pesticide residue requirements. They may hire a team of pesticide applicators that spray the green bean fields for farmers, under an interlinked credit arrangement made by the group. Alternatively, there may be a small pesticide store run by the TA, from which members can borrow pesticides on interlinked credit arrangement. The TA dispenses only the right kind and quantity of pesticide based on the stage of the crop and outcome of pest scouting. The advantage of this system is that it facilitates accurate record keeping by the TA and control of the types and quantity of pesticides used by farmers.

In both Kenya and Zambia, where traceability is demanded by leading exporters, growers must keep records of the plots planted, pesticides used (the active ingredient, dosage, quantity used, and date of application), and crop handling protocols. A good traceability system includes crop and produce movement records as well as pesticide stock movement records. Producer organizations have met the high human capital needs of establishing traceability by jointly hiring field TAs and depot/grading shed clerks to compile the records required under IFSS. Each producer organization is allocated a unique number by its buyer (exporter). Within each organization, every individual farmer is allocated a number that must accompany all of her/his produce. If a farmer has more than one plot of beans, the plots are given different numbers with labels denoting the date of planting, as well as the name and variety of crop.

Major exporters have formal contracts with producer organizations; these contracts specify the price, volume and production practices for the farmers. In Kenya, the contracts further specify that the group should employ a TA to perform pest scouting and advise members on safe pesticide use. Contracts are either seasonal (in Ethiopia) or annual (in Kenya and Zambia), with groups typically working with the same exporter over many years. In Kenya and Zambia, contract renewal is automatic in the absence of a serious food safety violation. In Ethiopia, some smallholder groups switch exporters every year.

### **Collective Action among Producers and its Role in Meeting IFSS**

In linking smallholders with green bean export markets, some of the producer group contracts have involved collective action (CA) among the farmers. Smallholders have developed horizontal alliances in the form of producer organizations (e.g. the self-help groups in Kenya and Ethiopia, and cooperative societies in Ethiopia and Zambia). There are four main reasons for CA among farmers: 1) the ability to jointly undertake lumpy investments helps farmers overcome the diseconomies of scale suffered by individual farmers; 2) collective access to inputs lowers input costs (also a source of economy of scale); 3) the costs of implementing traceability are lowered for the buyers; and 4) it is beneficial to create a system of group (versus individual) monitoring.

Through producer organizations, smallholders jointly make the investments needed to comply with the IFSS, such as cold storage and grading facilities, toilet and pesticide storage units, as well as TAs

and grading shed clerks. These organizations also conduct training for members and facilitate farmer-to-farmer monitoring in the absence of the exporter's field TA and/or to reinforce the exporter's training. In Kenya and Zambia, the organizations invite experts to train farmers on GAPs, especially the observance of pre-harvest intervals following pesticide application, integrated pest management, packer hygiene and maintenance of a functional traceability system.

The constitution of members is a critical factor for the success of a farmer organization, since the outcome for an individual in the group tends to depend on the activity of all other group members. Thus, organization membership is controlled, and new members must undergo screening before becoming eligible to join. Typically, anybody wishing to join the organization must be recommended by at least one member. A meeting is then convened where members discuss the conduct of the applicant in other organizations (social or economic). This is followed by a vote. If the member is accepted, he/she must pay an entry fee. In well-established organizations, the entry fee is substantial and acts as an entry barrier. Additionally, society leaders in Zambia normally meet and interview the applicant before his/her application is discussed by the general membership. Most of the established organizations in Kenya, especially those closely monitored for compliance with food safety standards, are not currently recruiting new members because they have reached the sizes required by their buyers.

There are two types of producer organizations. The farmer self-help groups, which are found mainly in Kenya (and to a limited extent in Ethiopia), are registered by the Ministry of Culture and Social Services and are run by an elected committee of 7 people, at least 2 of whom serve as ordinary members. The committee enforces the group laws, negotiates contracts with exporters, and is responsible for enforcing compliance with IFSS. The second type of producer organization, the cooperative society, is found in Zambia and Ethiopia. These organizations are registered under the Ministry of Cooperatives. The leadership structure is similar to that of self-help groups in Kenya. The Zambian cooperatives have come together to form a cooperative union that is responsible for managing all of the societies,<sup>21</sup> negotiating contracts for all member societies, and resolving problems the society leaders are unable to tackle. In contrast, the Ethiopian societies operate individually with each having an elected committee that oversees its affairs.

All producer organizations are financed by donations from members. In Kenya, the organization deducts an average of 5 Kenya Shillings per kilogram of beans marketed. Of this, Ksh 3 goes towards running the group, while the remainder is put into a farmers' savings account held by the group. In Zambia, the society and the union deduct 2 and 5% of each member's earnings, respectively, for running the organizations (Haantuba, 2004; Mwila and Wamulume, 2005). In addition, members are expected to

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<sup>21</sup> LACCU did not exist during the operation of Agriflora Ltd, and thus was not involved in production of green beans during this time. The union was formed after Agriflora Ltd collapsed, in an effort to coordinate the activities of individual societies.

donate (based on capacity) money for continued development of the societies. A similar arrangement exists among Ethiopian farmer organizations, wherein each member contributes 3 Ethiopian Birr per kilogram of beans for running the group. In addition, each farmer in Ethiopia is expected to maintain the irrigation channels bordering his/her plot.

### **Public-Private Partnerships (PPP)**

The first type of public sector partnership is found in the formation of a producer organization itself. In the three countries studied herein, groups are formed when farmers (with common interests, needs and/or goals) mobilize themselves, elect temporary officials and register with the relevant authority. Formation of a producer organization, however, entails ex ante transaction costs related to the identification and screening of members, as well as negotiations over the size, membership fee, leadership, mode of punishment and sharing of benefits. To offset such costs, governments, exporters, non-governmental organizations (NGOs) and donors have facilitated the formation of some smallholder organizations.

In Kenya, most farmer organizations are formed through the farmers' own initiative, with only very limited input from the Ministry of Agriculture's regional extension officers. In Ethiopia, the Ministry of Cooperatives has facilitated the formation of producer organizations, but the main drivers behind their formation have been the exporters and, to some extent, an NGO. In Zambia, the formation of the producer organizations comprising the ASS was driven by the exporter (Agriflora Ltd.), with some financial support from donors. In recent years, the number of producer organizations mobilized and supported by NGOs and donor agencies has increased markedly (FPEAK, 2005; Murimi, 2004).

Notably, PPPs have recently mushroomed to support the compliance of smallholders with IFSS. Such partnerships focus on providing information, financial support, and capacity building (e.g. training for smallholder group leaders), including audits and certification for EurepGAP compliance. Donors and NGOs have also jointly established Africa's only indigenous certification company, which is aimed at decreasing the cost of EurepGAP and making it more accessible to smallholders. PPPs have also been instrumental in lobbying for EU supermarkets to recognize the ability of smallholders to meet EurepGAP standards.

NGOs and donors in Kenya have helped 93 Kenyan green bean farmer groups (with a total membership of 2000 smallholders) obtain EurepGAP certification. Most of the smallholder farmer groups are certified as producer marketing organizations. This implies that the group's certification is sponsored by a buyer and ceases to be valid upon dissolution of the relationship between the group and the buyer. In Zambia, the audits and eventual certification of the single EurepGAP-compliant society were funded by donors. At present, none of the producer organizations in Ethiopia are certified or preparing for EurepGAP certification, but the exporters are EurepGAP certified.

Assistance in complying with IFSS has largely come from donor and NGO funding and has focused on three main areas: EurepGAP compliance and certification, access to information and capital, and market access by compliant farmers. The bulk of the technical support has been directed toward projects that benefit smallholders by sponsoring their EurepGAP training, audits and certification. In some cases, smallholders have also been provided with infrastructure to meet IFSS requirements.

The government's role in the provision of supporting infrastructure in all three countries has been minimal. The road networks to the producing areas are poor and largely inaccessible during the wet season. The landline phone networks in the producing areas are either poor or non-existent, leaving exporters to rely on expensive cell phones. Enforcing compliance with IFSS requires frequent trips to the farms/groups or contact with field staff and outgrower groups, also requiring cell phone use. Many farmers have no access to potable (treated) water for use in their packing facilities (grading sheds and depots), and the use of untreated water introduces the risk of contaminating beans with water-borne pathogens. Thus, poor road and phone networks and the lack of potable water drive up compliance costs. Since government extension services have been largely inadequate for the green bean growers, exporters have been forced to rely on PPPs, some of which are discussed below, to train farmers on IFSS.

### *Ethiopia*

Ethiopian exporters and their growers comply with the pesticide residue limits and the phytosanitary requirements set by the European Commission (EC) by working closely with the Ethiopian Plant Quarantine Department (EPQD), a public body serving the export industry. Although currently understaffed, the department trains inspectors, conducts routine pest inspection of beans both in the field and at the point of exit, and issues phytosanitary certificates. Besides inspecting export consignments, the EPQD monitors green bean crops at various growth stages for the presence of eggs, larvae, or insect pests.

The EPQD has a training division that offers general training to smallholder groups on integrated pest management (IPM; including importance of field sanitation) and the safe use of pesticides. Ethioflora, a private farm allied with the state farms, benefits directly from this IPM and pesticide safe use training. All smallholder groups supplying Ethioflora get IPM and safe pesticide use training at no cost under the EPQD-Ethioflora partnership. Also, the Ethiopian Export Promotion Agency through partnership with the Dutch Center for Promotion of Trade from Developing Countries (CBI) facilitates compliance with EU food safety requirements by disseminating up-to-date technical and market information. Even though the Ethiopian green bean industry is not yet subject to strict IFSS, the industry has recently taken steps to upgrade the level of hygiene. The two private exporters are upgrading their packing facilities for production of high-care prepacked green beans in an effort to target major European

supermarkets. The state-of-the art packhouses are being financed through PPPs involving donors and the government. A list of important initiatives is provided below:

- 1) The Common Fund for Commodities (CFC) aims to develop an integrated cold chain and marketing tools for complying with the hygiene and traceability requirements of the EU supermarkets. It also funds projects to increase the exportability of fresh vegetables, especially from smallholders.
- 2) The Dutch Integrated Institutional Export Development Program, in partnership with Ethiopian Horticultural Produce and Exporters Association trains and builds the institutional capacity of the export managers and sets up information networks for compliance with IFSS.
- 3) The Dutch Program for Cooperation with Emerging Markets (PSOM) has funded business-to-business partnerships in Ethiopian horticulture. At least 15 Dutch-Ethiopian joint ventures existed in 2005 (Greenhalgh et al., 2005), with some involved in the export of fresh vegetables.
- 4) The British Department for International Development (DFID) has funded various activities including helping green bean exporters obtain EurepGAP certification. DFID funding was instrumental in establishing the Ethiopian Horticultural Produce Exporters Association and supporting its operations.
- 5) United States Agency for International Development (USAID) promotes the development of small horticultural growers, including those producing green beans, through an NGO called Volunteers in Overseas Cooperative Assistance (VOCA). The initiative aims to build smallholders' business skills and improve their ability to efficiently manage cooperative societies.
- 6) The World Bank is involved in capacity building to support the private green bean exporters and promote producer organizations.

The government of Ethiopia has played a role in a number of these interventions. Through the Ethiopian Development Bank, the government has set up an investment fund that can be accessed by the horticultural industry. The government has also allocated land with developed irrigation systems for horticultural investments, and has improved access to key inputs, for example by streamlining procedures for proper usage, storage and disposal of pesticides. Through donor support, the government has also invested in smallholder irrigation systems.

### *Kenya*

Among the three studied countries, Kenya has the most extensive public-private and private-private partnerships in the green bean industry. These support compliance with IFSS (particularly EurepGAP) and provision of technical and financial support. Some of the key initiatives are:

- 1) The Government of Kenya (GOK), in partnership with the Japanese International Cooperation Agency (JICA), established the HCDA's Fresh Produce Handling Company. The company owns cold storage facilities in areas that grow fresh vegetables. In the green bean sector, the partnership: 1) mobilizes and recruits smallholders to form farmer groups; 2) trains smallholders on GAPs and other export market requirements; and 3) trains technical officers and smallholder group leaders to act as EurepGAP internal auditors and service providers, respectively, to smallholder groups. Through this partnership, more than 100 smallholder farmer group leaders have been trained as IFSS service providers and several hundred smallholders belonging to farmer groups have been trained on good agricultural practices (HCDA, 2005).
- 2) The GOK, Kenya Plant Health Inspectorate Service (KEPHIS) and USAID have partnered to develop regulatory and pest control mechanisms. Through this funding, KEPHIS conducts pest surveillance inspections in smallholder green bean farms as part of a routine pest control program. This helps smallholders reduce losses resulting from rejection of their beans at ports of exit due to pest infestation. USAID has also funded capacity building in KEPHIS, including staff training and establishment of a pathogen and pesticide residue testing facility on the KEPHIS campus. The KEPHIS laboratory facility was certified as compliant with Good Laboratory Practices in mid-2006. Also through USAID funding, a PPP between green bean exporters and the International Insect Physiology and Ecology (ICIPE) offers IPM training to smallholders, in order to reduce their reliance on pesticides. Furthermore, USAID funding has facilitated a partnership between the Kenya Horticultural Development Project (KHDP) and green bean exporters, providing management and business skill training, market advisory services, and support for EurepGAP training and certification.
- 3) A partnership between the Business Management Service Development Project (BMSDP) of DFID and the HCDA has trained a pool of horticulture service providers to serve smallholders. The BMSDP is supporting the formation and registration of the Association for Development of Horticultural Exporters of Kenya (ADHEK) and the Association of Horticultural Service Providers of Kenya (AHSPK). The ADHEK aims at helping small exporters meet and communicate compliance with EurepGAP, establish workable systems of traceability, and get reliable access to high-end European markets. Since ADHEK members source beans from smallholders, it is to their benefit to support smaller farmers in meeting and demonstrating compliance with IFSS. The BMSDP also works with other partners, particularly the Kenya Horticultural Development Project, to promote the formation of producer marketing organizations and their subsequent EurepGAP training and certification.
- 4) Three NGOs, namely Care International (Kenya), Reach the Children Inc., and ICIPE, have partnered with private firms to train, audit and/or provide financial aid for small-scale green bean farmers seeking to obtain EurepGAP certification. Most of these NGOs are supported by donor agencies.

ICIPE was heavily involved in the establishment of AfriCert, the only Kenyan EurepGAP certification body. AfriCert was established to provide a cheaper way for to smallholders to obtain EurepGAP certification by eliminating the cost of sponsoring auditors from outside Kenya. Since its establishment, AfriCert has performed several EurepGAP audits and certifications of smallholder groups in Kenya and a few in Zambia. In addition, ICIPE is currently partnering with green bean exporters (e.g. Kenya Horticultural Exporters and Woni) to train EurepGAP trainers and other horticultural industry service providers. Reach the Children Inc. is currently involved with 10 smallholder farmer groups in Machakos; the group provides EurepGAP certification, training on GAPs, microcredit services and market linkage programs.

- 5) Another NGO, Pride Africa, works to create linkages between various actors in the horticultural industry in an effort to improve: 1) training on GAPs and access to technical information; 2) access to credit; and 3) access to export markets. Pride Africa has facilitated linkages between farmer groups and EurepGAP trainers, input sellers, banks, and exporters (Ashraf et al., 2005). The Pride Africa-Donor partnership facilitates smallholder access to the credit needed to finance IFSS investments and transition to better (but often costly) pesticides. Pride Africa is sponsored by international donors, including International Development Research Center (IDRC), International Fund for Agricultural Development (IFAD) and the FORD Foundation.

### ***Zambia***

Zambia's green bean industry has benefited from public-private and private-private partnerships from the outset. York Farms and Agriflora Ltd were set up using venture capital obtained from donors, the government of Zambia and private entrepreneurs (Freiberg, 2004). The Agriflora Smallscale Scheme (ASS), comprising hundreds of small green bean farmers, was largely run through partnerships with the government, donors and input suppliers. These initiatives included the following:

- 1) The partnership between Agriflora Ltd and the government provided extension services to small farmers. The government provided extension personnel and Agriflora Ltd supported their training through a partnership with ZEGA Training Trust and funding from international donors, notably the Cooperative League of the United States of America (CLUSA) and Norwegian Agency for Development (NORAD). ZEGA Training Trust runs the most comprehensive and practical training on compliance with IFSS requirements offered to smallholder producer organizations; these include training on pesticide residue limits, hygiene, and the establishment of traceability systems. Through the ASS-ZEGA Trust partnership, hundreds of smallholders have been trained on IFSS requirements and incorporated into the green bean export business.



- 2) The Agribusiness Forum (a private business firm funded by donors and to a limited extent by the government of Zambia) partnered with Agriflora Ltd to provide training to the ASS outgrowers. Smallholders were trained on business and group management skills and assisted in overcoming the challenges of meeting IFSS.
- 3) The government of Zambia and the Japanese International Cooperation Agency (JICA) partnered to build collection depots with cold facilities that ASS members could use as holding and grading facilities. Agriflora Ltd also obtained inputs from suppliers through loans involving a major Zambian bank, the government, and the input distributors. This arrangement aided smallholders during their transition to the use of recommended pesticides.

## 8. CONCLUSIONS AND RECOMMENDATIONS

The rising demand for green beans and the resulting price increases have lured developing countries to enter green bean production (Singh, 2002; Humphrey, 2003; Rich and Narrod, 2005). Products such as green beans offer opportunities for smallholders to participate in high-return export markets. However, these high-income markets are characterized by stringent food safety standards that have become increasingly tight over time. The IFSS have impacted small farmers in specific ways, resulting in substantial reorganization of the supply chains. The new food system is dominated by food safety considerations, and scale and close coordination have become essential attributes.

Imposition of the IFSS has acted to filter smallholders out of the supply chains in the three countries studied herein. However, through shifts in target market and collective action (CA) in the form of farmer organizations, some smallholders have been able to resolve the new constraints and gain access to technical advice, insurance and credit. They have also been able to jointly invest in the facilities needed to meet the IFSS. It is not yet clear to what extent these initiatives are sustainable or available for up-scale. Given the scale economies and the requirements of traceability, CA among small farmers has been necessary. However, it truly has not been sufficient. A number of PPPs have supported CA by fostering an enabling environment for smallholders, mainly by supporting the costly facilities necessary for IFSS compliance.

Though we herein examine the case of green beans, our analysis can be generalized to a number of smallholder-produced export commodities. The long list of initiatives designed to increase smallholder market access raises important policy questions. The government initiatives and PPPs that have increased IFSS compliance by smallholders have often involved subsidies. These subsidies, apart from the fiscal cost, may also distort private incentives for investing in IFSS compliance, especially if the subsidies do not target the provision of services with public good attributes or a proven market failure. Assessing the full costs and benefits of such interventions is an important area for further research. One generalizable feature of the interventions here is that at least in the short run, the government and PPPs are crucial for helping the small farmers graduate to the stringent requirements of the high-value export markets.

# APPENDIX

Figure A.1. Growing areas in Kenya

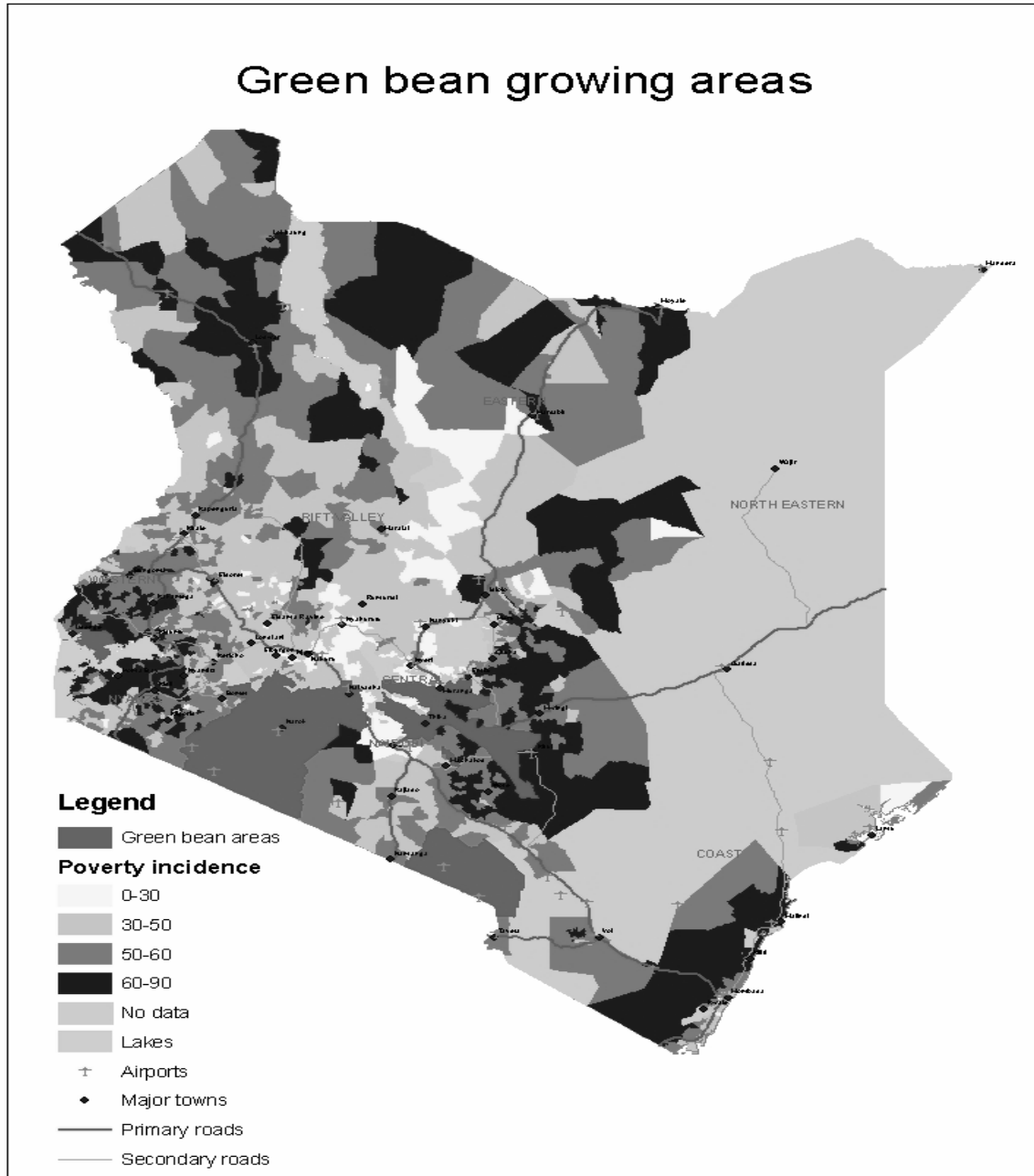
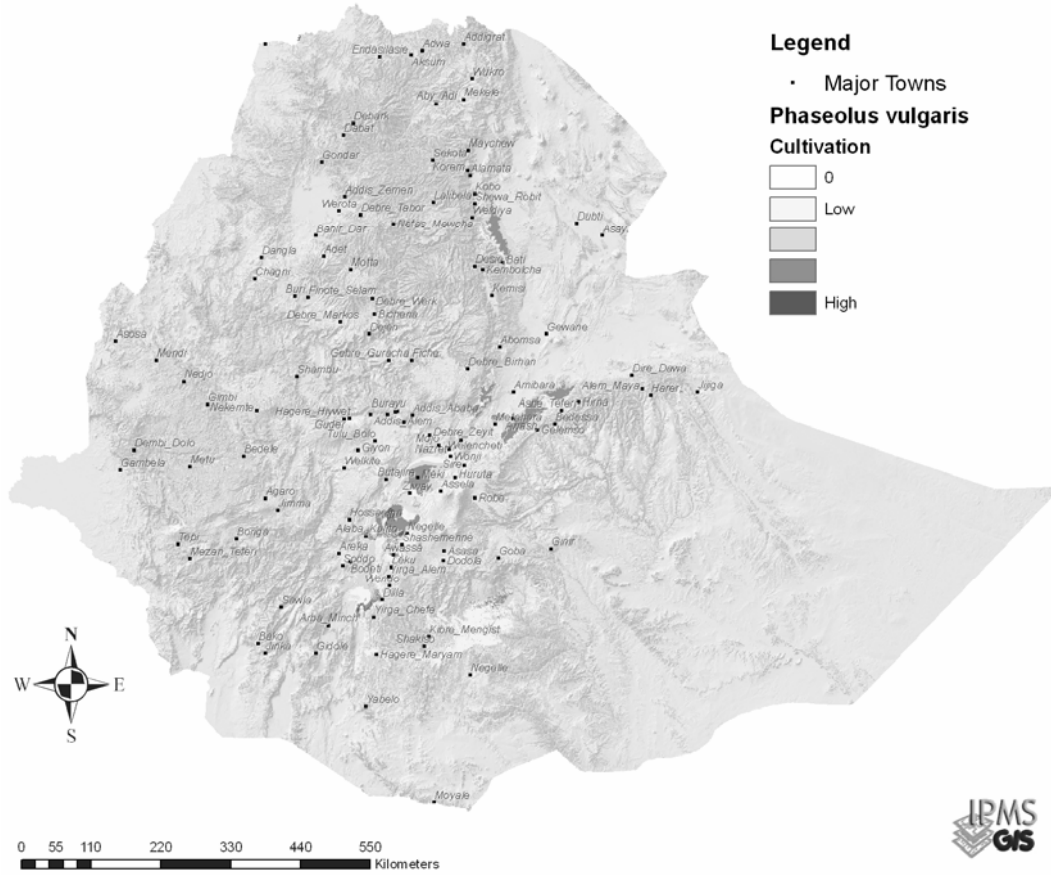
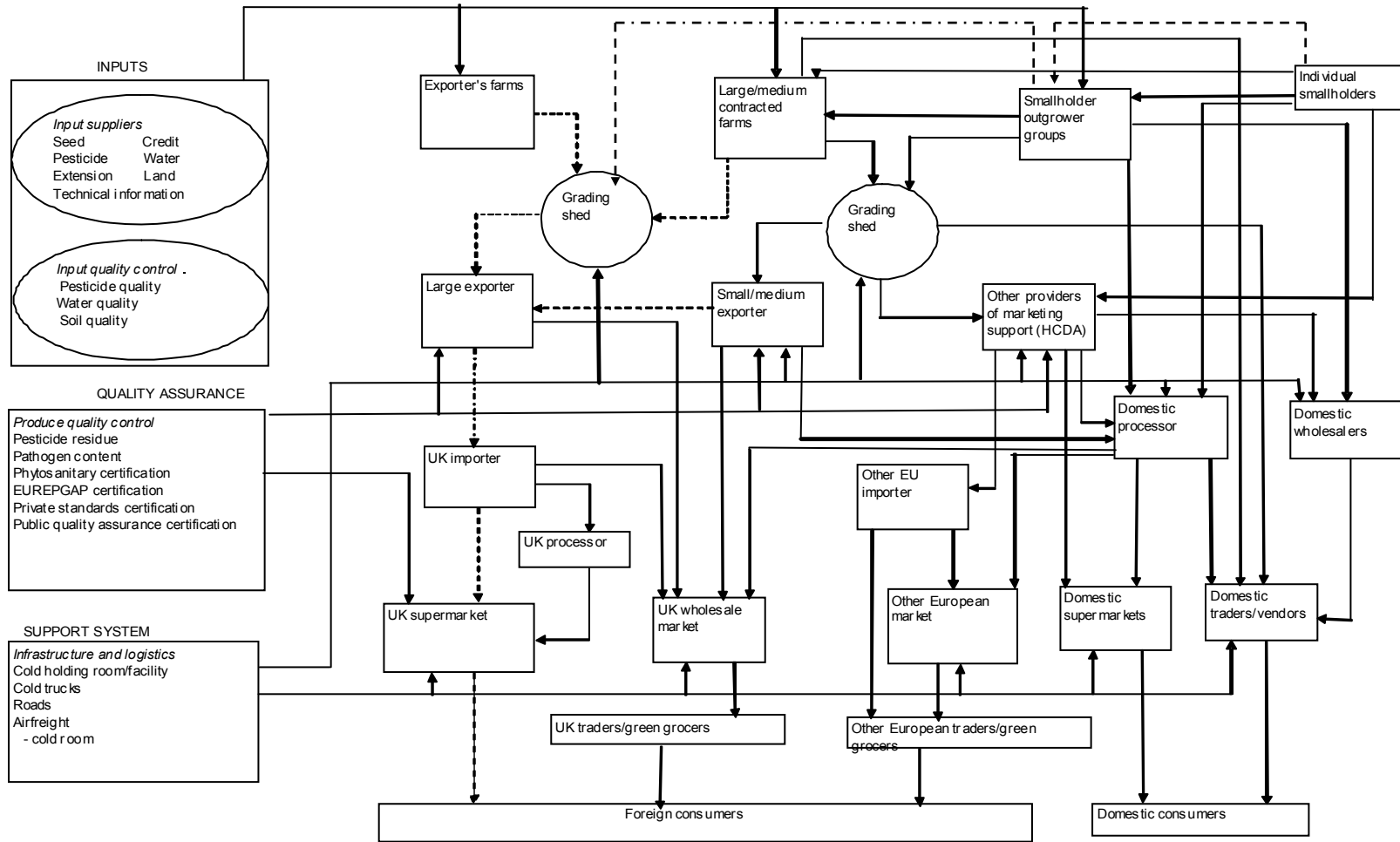


Figure A.2. Green bean growing areas in Ethiopia

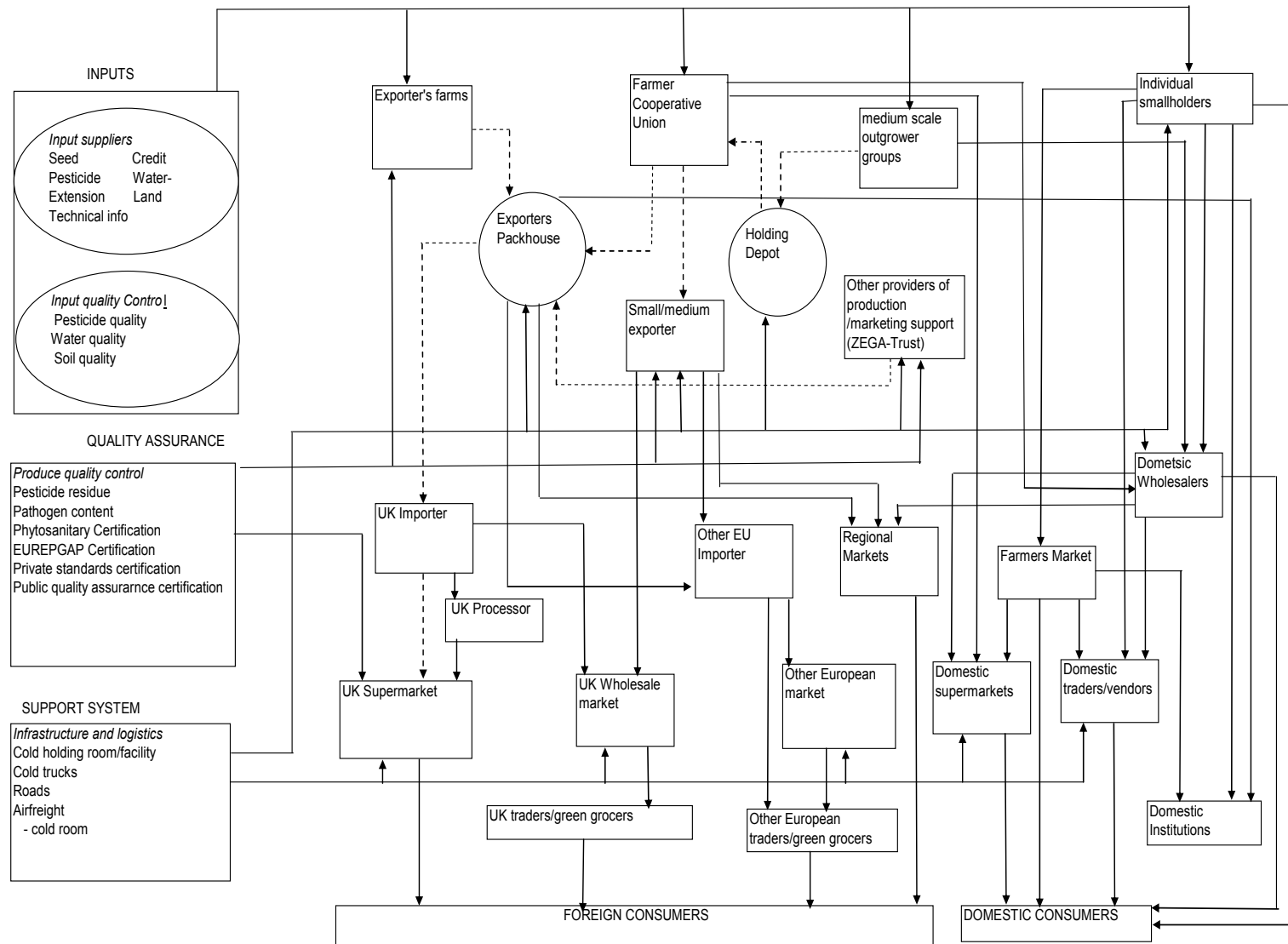
### Common bean cultivation in Ethiopia



**Figure A.3. Kenya's green bean supply chain**



**Figure A.4. Zambia's green bean supply chain**



**Figure A.5. Ethiopia's green bean supply chain**

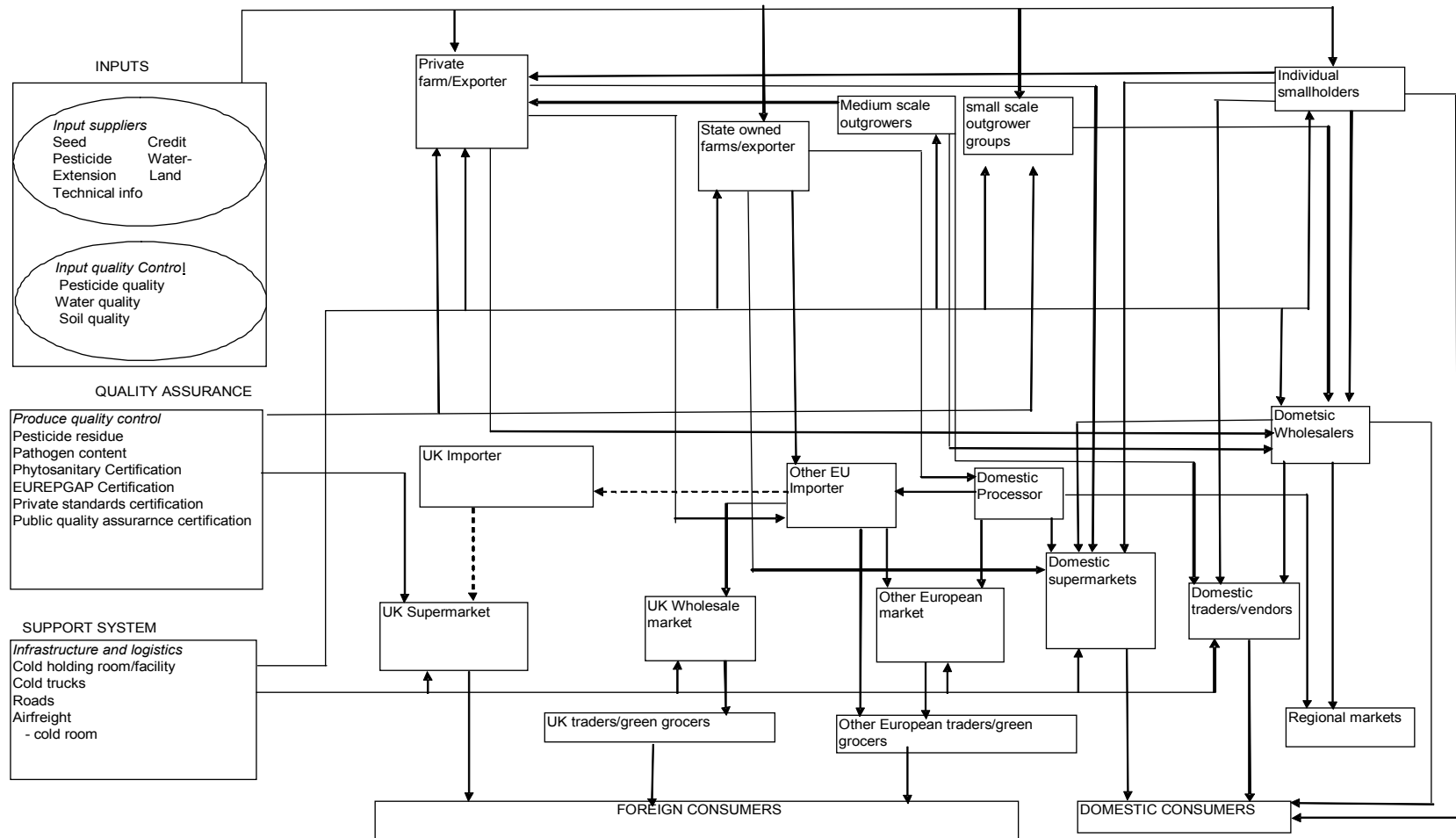
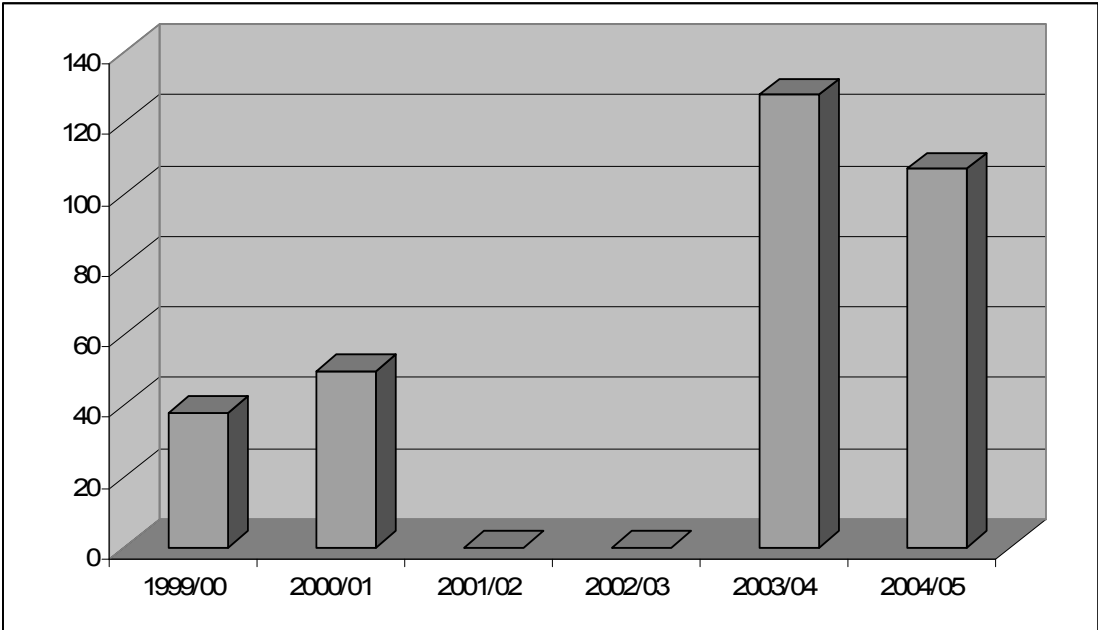


Figure A.6. Number of smallholder outgrowers supplying Ethioflora Ltd., 1999 – 2005







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Tel.: +1-202-862-5600  
Fax: +1-202-467-4439  
Email: [ifpri@cgiar.org](mailto:ifpri@cgiar.org)

**IFPRI ADDIS ABABA**

P. O. Box 5689  
Addis Ababa, Ethiopia  
Tel.: +251 11 6463215  
Fax: +251 11 6462927  
Email: [ifpri-addisababa@cgiar.org](mailto:ifpri-addisababa@cgiar.org)

**IFPRI NEW DELHI**

CG Block, NASC Complex, PUSA  
New Delhi 110-012 India  
Tel.: 91 11 2584-6565  
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