



#### Mapping the Technological Capabilities and Competitiveness of Kenyan-Owned **Floriculture Firms**

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Mapping the Technological Capabilities and Competitiveness of Kenyan-Owned Floriculture Firms

Francis Mulangu

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#### CAE Working Paper 2017:5

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#### ABSTRACT

The Kenvan floriculture, together with the horticulture sector, is considered to be a success story of non-traditional exports in African countries. Kenya is the largest exporter of cut roses to the European Union, and accounts for about 8.4% of the global supply of cut flowers. The floriculture sector is the third highest export earner in Kenya, after tea and tourism, and has experienced steady growth over the years both in volume and value. This paper is part of the AfriCap research project, which aims to advance our understanding of how and why locally owned firms build the technological capabilities required to enter, and remain competitive within, new export sectors such as floriculture. As a first step, we must know what kind of capabilities local firms actually have. In the case of Kenya, local firms include firms owned by Black Kenyans, Asian Kenyans, and White Kenyans. This paper measures the technological capabilities of locally owned floricultural Kenyan firms using data collected through a structured survey carried out with a sample of firms. The survey contains questions based on the technological capabilities required for entering and upgrading within the floriculture global value chain, including investment; product; production, harvest and post-harvest processes; logistics, finance and services linkages; input supply chain linkages; and end market capabilities. Firms were also categorized according to their export market trajectories: indirect exporting through other firms, direct export through auction, and direct export through direct sales. The firm survey analysis shows that there is significant variation of technological capabilities across firms depending on their export market trajectories as well as the type of local ownership: Asian-Kenyan, Black-Kenyan, and White-Kenyan. The survey also included competitiveness measures, and a quantitative analysis of competitiveness and capabilities measures shows a generally positive relationship between the different measures of competitiveness and a firm's aggregate technological capabilities.

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Francis Mulangu was a post-doctoral research on the AfriCap research project from January 2016 through Feburary 2017. He is now an economist at the Millennium Challenge Corporation in the US. He would like to thank the research assistance provided by George Boateng, Bethuel Kinuthia, and Andrew Wekessa, as well as the firm owners, general managers, and production managers who volunteered to discuss the particularities of their firms.

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#### Mapping the Technological Capabilities and Competitiveness of Kenyan-Owned Floriculture Firms

#### Introduction

Kenya is the largest exporter of cut rose flowers to the European Union. It roughly controls 8.4% of the global supply of cut flowers and nearly 38% of all flowers exported to Europe. The sector is thus a major earner of foreign exchange for Kenya and has experienced steady growth over the years both in volume and value. The floriculture sector is the third highest export earner in Kenya, after tea and tourism, and Kenyan flowers are sold in more than 60 countries (KFC 2015). The main European Union markets for Kenyan flowers are Holland, United Kingdom, Germany, France, and Switzerland. Sixty-five percent of Kenya's floriculture exports go to the Dutch auction, an auction located in Aalsmeer, Netherlands, where the majority of flowers sold in Europe are traded, with the rest going through direct sales marketing channels to countries such as Japan, Russia, and the USA.

The Kenyan floriculture sector, together with the horticulture sector, is considered a success story of non-traditional exports in African countries. It has remained competitive mainly due to the sector's ability to quickly adapt to new global demands. The European supermarket revolution of the late 1980s provided an opportunity for the sector to add fresh fruits and vegetables, and later cut flowers, to its long-established canned-fruits base. On the other hand, this success has led to the consolidation of the sector around foreign-owned firms, which gradually discontinued sourcing from smallholder farmers and became producers themselves in an effort to control quality. However, the recent supermarket rise in Kenya, and the East African sub-region as a whole, has led to the emergence of middle-class black Kenyan farmers who, in addition to producing themselves, increasingly use contractual agreements with smaller farmers to help meet the growing local supermarket and export demands (Neven et al. 2009).

In 2015, horticulture contributed 1.45% to the national GDP, while cut flower exports contributed 1.01%, with a total of 597.72 million US dollars in export value (Mwase 2015). Cut flower exports continued to grow, while exports of fruit and vegetables remained constant. The floriculture sector in Kenya produces numerous varieties of roses, carnations, summer flowers, and cuttings, enough to satisfy global buyers' demands across seasons. The high altitude, relatively cheap labor, flexible labor laws, and well established local and international airport logistics provide the competitive advantage foundation on which local firms learn to compete in the floriculture global value chain.

This paper is part of the AfriCap research project, which aims to advance our understanding of how and why local firms build the technological capabilities required to enter and remain competitive within new export sectors such as floriculture. In particular, the project is interested in the factors that facilitate learning among local firms, especially in the risky contexts of African countries in which there are many constraints to productivity that have to be addressed not only at the firm level but also at the industry and national levels. We look to why local investors take this risk, and what factors explain whether they succeed in becoming competitive. Also, we look at variation among firms in terms of their overall capabilities and competitiveness. As the first step in this research, we must know what kind of capabilities local firms actually have. In the case of Kenya, local firms refer to firms owned by Kenyan nationals, including firms owned by Black Kenyans, Asian Kenyans, and White Kenyans.

The AfriCap project combines Global Value Chains, and related frameworks such as Global Production Networks, and Technological Capabilities theoretical approaches in order to better explain industrialization in African countries in the context of increasingly globalized production networks coordinated through transnational inter-firm linkages. We argue that the Global Value Chain approach is not sufficient to explain the varied processes, trajectories, and pace of industrialization across African countries. Technological Capabilities are defined as a mix of organizational and operational capabilities and skills that firms need in addition to formal education and scientific knowledge, but which can only be developed through actual experience. Acquiring this experience is not automatic, but rather a slow process of learning-by-doing and discovering what works in the local context through experimentation and failures. Acquiring technological capabilities also requires a conscious effort on the part of firms to monitor what is being done, to try new things, to keep track of developments throughout the world, to accumulate added skills and to increase the ability to respond to new pressures and opportunities.<sup>1</sup>

This working paper measures the technological capabilities of locally owned floriculture firms in Kenya using data collected through a structured survey carried out with a sample of local firms. The survey contains questions based on what technological capabilities we know are required for entering and upgrading within the floriculture global value chain. The capabilities required were discussed and presented in the first AfriCap working paper by Staritz and Whitfield (2017), but the matrix is presented again in this paper and adapted to the Kenyan floriculture context. The main categories of capabilities are product and production process, input integration, linkages, and investment, and these are considered at different levels of complexity. The scoring and analysis of the survey responses were

<sup>&</sup>lt;sup>1</sup> For a more detailed discussion of the objectives and motivations of the AfriCap project, see Staritz and Whitfield (2017).

done in a way that captures both the performance of Kenyan firms against a global standard as well as variation among the firms.

The preliminary research identified 103 firms operating in the floriculture sector, of which 84 firms were identified as owned by Kenyans. The breakdown of these Kenyanowned firms by ethnicity shows that 42.86% are owned by Asian Kenyans, 29.76% owned by Black Kenyans, and 27.48% owned by White Kenyans. In the past, most locally owned flower firms had White Kenyan owners, but the research found that White Kenyan owners were selling their farms to Asian Kenyans, or outsourcing the management to Asian Kenyans because their children are less and less interested in continuing the family business. As a result, Asian Kenyan owned firms constituted the majority of locally owned flower firms in 2016. The research also pointed into different waves of investment by Black Kenyans. The first wave of Black Kenyan investors were mostly politicians who worked for previous governments, while the more recent wave of investors included black Kenyans who previously worked on Dutch-owned flower farms and had moved into their own business. Some of these new Black Kenyan owners started first by buying export rejects and selling them to the local or regional market, and others started in production only and sold their flowers to large exporting farms or a pure exporter.

The technological capabilities survey was carried out among a sample of the Kenyanowned firms. Based on the survey results, Kenyan floriculture firms were divided into three types based on their export market trajectory: type 1, basic production farms that export through other firms; type 2, firms that export through Dutch auction; and type 3, firms that export through direct sales. The analysis shows that type 2 and type 3 firms have high-end market capabilities, while type 1 firms have no or very low-end market capabilities because they do not directly export. All type 1 firms in the sample were owned by Black Kenyans, while the ethnicity of the owners of type 2 and 3 firms was varied (including Black, Asian and White). Overall, the firms (all types) scored a medium on product and production process capabilities, medium on input integration capabilities, medium on investment capabilities, and low on linkage capabilities. Since most flowers are exported to countries where Kenya has traditionally exported fruits and vegetables, accessing buyers and adhering to export quality and quantity requirements did not involve a steep learning curve. The overall low linkage capabilities among locally owned firms is a reflection of the intensive competition among firms that seldom share information and would like to internalize any value chain activities to minimize leakage of their production process to competitors.

In addition to measuring and mapping the technological capabilities of Kenyan floricultural firms, the second objective of the paper is to understand the competitiveness gains associated with building capabilities, because after all, building capabilities must contribute to improving firms' competitiveness position. Firm level information on competitiveness was also collected through the survey. The competitiveness measures include the value of exports per farm size, number of employees per hectare planted, and value of exports per number of employees. After giving each firm an aggregate score on technological capabilities, we estimated the correlation between their aggregate capabilities and these measures of competitiveness.

We found a positive correlation between aggregate capabilities and quantity exported per harvested area and quantity exported per number of workers, respectively. However, the relationship between aggregate capabilities and number of workers per harvested area is rather neutral. The paper discusses in detail the relationship between the individual capabilities and competitiveness measures across trajectories and finds that firms managers are willing to increase the wage bill by hiring more workers in an effort to increase export quantity per area harvested and/or export quantity per worker. In other words, the marginal output per worker seems to be higher than wage rate, leaving sufficient rooms for firms to earn more from each worker they hire. While the crosssectional nature of the data does not give us sufficient parameters to deduce causality, for now our focus is on the correlations between capabilities and competitiveness. We will rely on the next phase of the research, through firm histories, to collect information on past activities to identify causal relationships.

Part one of the working paper discusses the floriculture global value chain, the emergence and evolution of the Kenyan floriculture industry, including the national institutional environment, and the position of locally owned firms. Part two explains how the survey to measure local firms' capabilities was designed and carried out, as well as how indicators of capabilities were constructed and scored. Part three presents the scores of the local firms and discusses trends emerging from the analysis, and then compares firms' capability scores with the measures of competitiveness. The paper concludes with a summary of main findings and a short outline of the next phase of research that will focus on using a firm history method to examine how firms' capabilities have been created over time: their motivations, strategies, and success or failures.

#### Part 1: Overview of the Kenyan Floriculture Export Industry

Kenya is a major player in the global flower value chain. The quality of labor and infrastructure in Kenya, along with the climate, resulted in the growth of the floriculture industry, mainly in rose exports to the Dutch auction. However, the future of floriculture is mixed. As the exporting requirements are becoming stricter, Kenyan firms will be forced to either consolidate or seek other markets for direct sales, which introduces a new set of challenges.

The first section in Part 1 gives an overview of the floriculture global value chain to situate the Kenyan floriculture sector and developments in the global context. The growth

of Kenya's floriculture industry is an outcome of a number of developments of the fruits and vegetable sector. The second section in Part 1 discusses the critical junctures in the growth path of the horticultural sector that provided opportunities for Kenya to grow its floriculture sub-sector. The growth of the floricultural sector was facilitated by adequate infrastructure, national capacities, and good relationships with buyers created by existing fruits and vegetable exports. Exogenous events such as the supermarket revolution of the 1980s served as a catalyst for the growth of the sector, and it helped the sector to adopt phytosanitary practices, which were key for the floriculture sector. The final section presents an overview of the Kenyan floricultural sector including general statistics about production and export activities by destination and type of end products as well as an overview of the firms producing cut-flowers.

#### The floriculture global value chain

The floriculture global value chain can be divided into two segments based on their different governance structures. The first segment is cuttings: partially grown stems of flowers (dominated by chrysanthemums or mums) or pot plants. Cuttings are intermediate products that are more light-weight and delicate and lower in bulk, and hence have higher unit prices than cut flowers. A handful of transnational propagation companies control the global market in cuttings. As Figure 1 shows, five transnational companies together hold 57% of the market. Governance of the cuttings segment of the global value chain is exercised through ownership of outsourcing production sites. The leading cuttings firms have a number of propagation farms around the world that function as joint ventures or wholly owned subsidiaries and receive export directives from the headquarters and export to customer locations. Entering this segment of the global value chain requires competencies greater than that required for cut flowers (Evers et al. 2014). The high production cost of cuttings has consolidated the global production of cuttings to only a few companies. Today rose production has taken over chrysanthemums production mainly because consolidation within the cuttings segment increased the barriers to entry; the oligopolistic market structure keeps the number of firms to a minimum in order to increase returns, and the existing companies seek to buy out any firms entering the cuttings sub-sector as a means to retain the oligopolistic structure.



Figure 1: Top five cutting propagators and their global market shares

The second segment of the global value chain is cut flowers, consisting primarily of roses, carnations, and summer flowers, which are exported as final consumer products. They are grown, harvested and then processed (clipped, bundled into bouquets, boxed) at the farm and made ready for shipment (Evers et al. 2014). Governance of the cut flowers segment is driven by buyers' demand for particular flower varieties and their adoption of standards. Large and long stem roses grown with minimum amounts of chemical are the most prized product.

Global floriculture is traded in two main ways: through an auction system and direct sale channels. Although there are several auctions across the world, the Dutch auction plays the most influential role in global floriculture. It is also a favored market channel by the specialized outlets, which are dominant in Europe. However, the direct sale channel is rapidly growing in European and other markets.

Current trends suggest that global buyers, including retailers and auction houses, are putting increasing pressure on supplier firms to increase quality, develop new varieties and cut costs (Evers et al. 2014). Growth in European demand for flowers has slowed, yet at the same time, consumer demand for production quality and social and environmental standards has increased. Thus, margins across the floriculture global value chain are under pressure, and direct trade channels (bypassing the auction system) are growing. Additionally, technology and knowledge are developing rapidly in cultivation and in how flowers are traded, and transactions are increasingly computerized (Dutch Ministry of Economic Affairs Agriculture & Innovation 2012).

The main standards governing the floriculture global value chain are Milieu Project Sierteelt (MPS), a widely accepted private certification/labeling protocol that aims to reduce the environmental impact of floriculture through reduced use of pesticides, fertilizers, and energy, and to improve working conditions. MPS has been benchmarked to the Euro-Retailer Produce Working Group for Good Agricultural Practices (UNEP 2009). The MPS environmental and social certification program consists of four certificates: MPS-A (for environmental registration that certifies the use of crop protection agents, fertilizers, energy and waste); MPS-GAP (safe, good quality, traceable products that have been cultivated in a sustainable manner); MPS Quality (a quality assurance system that includes sector-specific requirements for floriculture); and MPS-SQ (certificate for products cultivated under good working conditions) (UNEP 2009). Standards required by global buyers can promote economic upgrading of supplier firms when buyers place orders for significant volumes and provide upgrading support in terms of guidance on product quality and processes.

In light of these changes, the future of locally owned flower firms in developing countries, such as Kenya, that rely on the Dutch auction as their main market outlet is mixed. Tougher export quality requirements against pesticides have pushed farms increasingly to adopt integrated pest management practices. However, integrated pest management (IPM) reduces the productivity of farms and thus would reduce the profit margins of small farms that rely on volume to make a profit. Therefore, the only way to survive is to diversify end-markets by including direct sales buyers, in order to potentially obtain higher prices and to overcome the reduced productivity associated with IPM. Kenyan firms are also seeking local buyers for rejects that cannot be exported, which as we will see later is a key training ground for young Black Kenyan entrepreneurs interested in entering the floricultural sector but lacking the necessary capital to start production. However, the direct sales marketing channel requires new capabilities in marketing and plant breeding (or good relationships with breeding companies) to quickly respond to changing consumer demands for types and quality. This then requires a large investment that can be difficult for local firms without direct access to cheaper credit. Local firms that can overcome this high sunk cost are those firms that use profit from non-flower growing activities to finance flower growing activities.

#### Emergence of the Kenyan floriculture export industry

Horticulture production in Kenya began during the early colonial period. Minot and Ngingi (2004) report that horticulture production in Kenya started in the early 20th century when private entrepreneurs ventured into large-scale commercial production, exporting passion fruit juice, temperate horticultural crops, and Asian vegetables. The beginning of the Second World War inspired the development of horticulture processing and marked the establishment of the first pineapple processing factories in the late 1940s

(English et al. 2004). The early attempts to set up large-scale horticultural enterprises initially involved exclusively white settler farmers, but entrepreneurs at that time also began setting up smallholder production schemes and sourced much of their horticulture produce from native Kenyan farmers. The main motivation for expansion and commercialization of horticulture came from the private sector. Unlike other export sectors, there was little direct interference by the government in horticulture, but the government never entirely ignored the sector's development. It established several regional research stations in support of horticulture experimentation as early as the first half of the 20th Century (Minot and Ngingi 2004). By 1957 the National Horticultural Research Centre was established, which later evolved into the Kenya Agricultural Research Institute's horticultural research center.

Until the 1960s, horticulture experienced limited growth, and at independence in 1963, exports still represented less than 3% of agricultural exports. Independence brought land reform, which culminated in redistribution to smallholders. The reform specifically embraced social considerations to support smallholders through public investments, including free primary education and the establishment of extension services and a regulatory environment. The Horticultural Crops Development Authority (HCDA) was established in 1967 with a mandate to develop, coordinate, and facilitate the horticultural industry. This reflected the government's recognition of the potential of export horticulture to boost Kenya's economy. However, unlike marketing boards for other commodities, the HCDA was never strongly involved in the setting of prices and never functioned as a legal monopoly in marketing. Rather, it confined itself to a facilitative role, attempting merely to coordinate the various actors in the sector. Many experts regard the restricted interventions of the HCDA combined with the relatively strong private sector drive as decisive factors for the rapid growth of the horticulture industry in Kenya (Minot and Ngingi 2004).

During the 1970s, export growth was mainly due to investments in pineapple processing led by Del Monte. In addition, fresh and canned French beans became key export commodities in the late 1970s and 1980s. French beans, Asian vegetables, and chrysanthemums subsequently became the most important of Kenya's horticultural export commodities. The demand for export vegetables grew markedly in the 1970s, indirectly caused by the expulsion of the Asian community from Uganda (Minot and Ngingi 2004). For the large Asian community in the UK, Kenya constituted a convenient alternative supplier (to Uganda) for Asian vegetables. Kenya ensured a year-round supply. Furthermore, smallholders had accumulated experience with producing Asian vegetables and with the presence of the Asian community in Kenya, and family and social ties between traders in London and Nairobi existed, reducing risk and transaction costs in the vegetable trade.

The European supermarket revolution of the late 1980s was vital to the horticultural industry and eventually the floriculture sub-sector. It provided an opportunity for the sector to add fresh fruits and vegetables, which later made cut flowers and cuttings the next opportunity in Kenya's product space (Evers et al. 2004). It is during this period that both foreign and local investors started to invest in floriculture. Among the local investors, numerous politicians and politically connected individuals invested in floriculture firms and passed the management of their firms to Asian Kenyan who had prior experience managing horticultural farms.

The growth in tourism created airfreight space, which was convenient when export produce was too small in quantity to be carried by charter flights. Likewise, tourism provided alternate outlets for vegetables and other horticulture produce in the form of hotels and restaurants. These factors allowed the industry to accumulate experience in overseas marketing, transport, and distribution at a time of growing international demand and facilitated the consolidation of linkages to international markets, both vital for the subsequent rapid take-off in horticulture exports (Steglich et al. 2009).

The Kenyan floriculture sector started with foreign direct investment from the Danish farm Dansk Chrysanthemum and Kultur, which made a multi-million dollar investment in chrysanthemum production for export in 1970 (Minot and Ngingi 2004). Over time, as the well-established horticulture sector, largely led by pineapples produced by Del Monte, experienced slower growth, cut flowers attracted more investments from local horticultural firms and investors as well as foreign direct investment from Holland. The adequate weather conditions, available skills created by the more mature horticulture sector, high European demand, and the export logistical infrastructure made it possible for investors to venture into floriculture, mainly rose production (Minot and Ngingi 2004).

#### Overview of the Kenyan floriculture sector

Flowers are grown mainly in the areas of Lake Naivasha, Mt. Kenya, Nairobi, Thika, Kiambu, Athi River, Kitale, Nakuru, Kericho, Nyandarua, Timau, Trans-Nzoia, Uasin Gishu, and Eastern Kenya. The main flower varieties cultivated in Kenya are roses, carnations, and alstroemeria. Additional flowers cultivated include *Gypsophila*, lilies, *Eryngium, arabicum, Hypericum*, statice, and summer flowers, amongst many others. Cuttings are also grown in Kenya, but only by foreign-owned firms associated with some of the top five transnational propagation companies identified in Figure 1. Unlike cut flowers, cuttings are generally grown on the outskirt of Nairobi within a two-hour drive to the airport. For example, Syngenta Flowers has a propagation farm in Thika, while Selecta Klemm has a number of farms scattered between Thika, Juja, and Limuru, because of the relatively higher frequency of exports per week.

The value of flowers exported from Kenya has passed the symbolic bar of \$500 million in 2013, with more than 100,000 metric tons exported, as illustrated in Figure 2. The ratio between cut flowers and cuttings exports in Kenya is six to one, as cut flowers make up about 86% of all floriculture product exports. As illustrated in Figure 3, the top export destination of Kenyan cut flowers is the Netherlands, where the main auctions are located, followed by the United Kingdom and Germany. Destinations such as Russia and Austria are slowly becoming important export markets over the past four years, due to the higher premium buyers are willing to pay on direct sales. Although not stated in Figure 3, due to the lack of recent data, the EU embargo against Russia after the annexation of Crimea may have pushed Russian buyers to identify direct buyers from Kenya instead of relying on the Dutch auction.

Cuttings grown in Kenya are mostly exported to the Netherlands since the two leading companies, Fides B.V and Beekenkamp, which control 58% of the global market, are based in the Netherlands (see Figure 4). Germany controls 17% of the global market share through Selecta Klemm and Dümmen. A large quantity of cuttings are exported to other destinations, unlike cut flowers, because cuttings are exported to the final consumer destinations where they will grow to maturity and will not be re-exported, as is the case for cut flowers going to the Dutch auction.



Figure 2: Value and quantity of Kenya cut flower exports

Source: COMTRADE Online



Figure 3: Kenya Cut-flowers exports by destinations (in \$1,000)

Source: International Trade Center (ITC) Online



Figure 4: Kenya cuttings exports by destinations (in \$1,000)

Source: International Trade Center (ITC) Online

The exact number of flower firms in Kenya is not known. I estimate that there are 197 firms based on data from a combination of sources: a list of registered firms at the Kenya Flower Council (KFC), indications from interviews with the Kenya Plant Health Inspectorate Service, and information from a list put together by a Dutch researcher studying Dutch-owned floriculture firms in Kenya. All 197 firms were contacted by both email and telephone to verify if they were still in operation and to ascertain whether they could be categorized as locally owned firms or foreign firms. Only 103 firms responded. Some firms did not respond because of the secretive nature of the industry, while other firms could not be reached during the period when we tried to contact them because they operate only seasonally in order to help large firms meet their seasonal higher demand.

Out of the 103 firms, 84 firms (or 81.55%) are Kenyan-owned. The breakdown of Kenyan firms by ethnicity is presented in Figure 5, which shows that 42.86% are owned by Asian Kenyan, 29.76% owned by Black Kenyan, and 27.48% owned by White Kenyan. In the past, most locally owned flower firms had White Kenyans owners. However, increasingly White Kenyan owners are selling their farms to Asian Kenyans or outsourcing the management to Asian Kenyans, because their children are less and less interested in continuing the family business. As a result, Asian Kenyan owned firms constitute the majority of locally owned flower firms today.



Figure 5. Floriculture Firms in Kenya by Ownership

Most of the early Black Kenyan-owned firms were owned by political elites. In contrast, the firms established more recently have young Black Kenyan owners who previously worked for foreign-owned flower firms. A number of these newer Black Kenyan owned firms started off by buying export rejects from larger farms to sell in the domestic market or to export in the East African sub-region, and later established small farms growing summer flowers to sell to larger exporting firms during the high season, when those firms could not produce enough to meet their buyers' demand. Summer flowers were preferred among these start-up Black Kenyan firms because they do not require the very high investments in irrigation, planting materials, and greenhouses that rose production requires.

Based on this initial research into flower firms to identify ownership and operational status, we found that local flower firms could be categorized into three groups based on how they export and their end-markets. Type 1 firms export indirectly by selling to other exporting firms or local exporting agents with whom they have established contractual agreements, which we refer as sub-contracting. These firms do not have an exporting license or direct access to foreign markets.

Type 2 firms are those that mainly export to the Dutch auction. They may also export through direct sales occasionally, but their main marketing channel is the auction. Type 3 firms mostly export through direct sales. They are relatively more sensitive to buyers' demands and concerns, and often operate in the niche markets of high-quality large roses. Selling through the Dutch auction does not mean that a firm has overall lower capabilities than firms that sell through direct sales. Rather, they have different specialization within the categories of technological capabilities, as shown below when discussing the local firm survey results.

#### Part 2: Mapping the Technological Capabilities of Kenyan-Owned Firms

The technological capabilities required for entering and remaining in the floriculture global value chain are summarized in the matrix in Table 2. The horizontal axis of the matrix describes the categories of capabilities required in the industry: investment; product; production, harvest and post-harvest processes; logistics, finance, and services linkages; input supply chain linkages; and end market linkages. Entering production of cut flowers for export requires a large investment capacity to set up production facilities and source inputs as well as to hire and train quality workers. Along with finance, farms need access to cool-chain logistics from farm to airport, and cargo booking and handling services.

The complexity of each category of capabilities increases depending on the targeted end-market, end product, and market channels, as indicated on the vertical axis of Table 2. The matrix contains three rows: basic production capacity, Dutch auction, and direct sales to European Union markets. We focus on direct sales to the EU because direct sales to other destinations such as Dubai do not require as stringent requirements. They are listed in this order because the literature on the floriculture global value chain generally considers the direct sales marketing channel to the European Union to require greater capabilities than the Dutch auction marketing channel. However, firms selling mainly via the Dutch auction may build their capabilities by diversifying or adjusting their product, process, and marketing strategies, which require new capabilities, rather than moving into direct sales to the European Union. The matrix has also been adapted to the Kenyan context, and thus differs slightly from the matrix used in the Ethiopian floriculture case study (see Melese 2017). Thus, the rows reflect the three types of Kenyan owned firms: firms with basic production capabilities are considered as type 1, and firms that export to auction and direct sales are considered as type 2 and type 3 respectively.

Basic production capabilities mainly consist of producing floricultural products with the goal of selling them through a local exporter or an exporting farm that cannot meet the demands during peak seasons. They produce products that meet the minimum quality required by local buyers and use basic farm management systems. They rely extensively on advice from experienced farm managers from exporting farms for meeting quality requirements and learning to export.

To sell via the Dutch auction, firms need to meet stringent minimum requirements related to plant health, quality sorting, grading, and packing that necessitate extending their capabilities beyond the basic production capabilities described in the first row. However, to strengthen their competitiveness and prices received in the auction channel, firms need to deepen their basic production capabilities: expanding varieties, upgrade greenhouse technologies, regularly train workers, and improve product quality (stem length, head size, colour), as well as improve production, harvest and post-harvest processes while also improving data recording and management information systems. At the same time, firms should improve and control the cool chain and logistics to prevent/minimize quality deterioration until the products reach the end-market. They can also increase their market knowledge and ability to exploit services provided by the auction by collecting information on buyers as well as working on feedback from buyers or unpacking agents at the auction regarding their quality and reliability. In turn, the firms can engage in direct marketing or 'auction-direct', which is a kind of direct sales but facilitated by the auction itself. Although certification is not required by the auction, it is important to take on sustainability standards (business-to-business and/or consumer labels) that are most commonly adopted by competitors, such as MPS-ABC, GLOBALGAP and Fair Flower and Fair Plants. Furthermore, firms need to build relations with breeders in order to get exclusive varieties, which are important for meeting the requirements of the dominant auction buyers (such as florists) that have a higher demand for exclusive varieties and high value/quality products. Farms selling to Europe primarily via the direct sales channel, especially to supermarkets, need to have higher capabilities to ensure consistency, reliability, and flexibility in terms of meeting buyers' specifications.

#### **Survey Design**

Deepening capabilities in direct sales involves vertically integrated chain operations, especially in logistics and marketing, as well as adding more value on products such as delivering ready-to-use bouquets. In order to build such capabilities, firms need to link up with various private and public institutions that render general as well as sector specific supports.

The matrix in Table 2 guided the design of the local firm survey questionnaire, which is provided in the Annex at the end of the working paper. The survey questions capture a firm's performance across the categories of capabilities, and their depth within each category in relation to the marketing channel.<sup>2</sup> The questionnaire includes both quantitative indicators and qualitative measures, including open-ended questions. Although the questions were largely aimed to examine the current conditions of the firms at the moment of the survey, firms were asked about their past situations related to initial experience and investment capabilities. The questionnaire is relatively long, but not all questions were relevant for all firms. If the interviewee was pressed for time, the questionnaire indicated the 'must ask' questions in bold, which were asked in all instances in order to have a minimum base of comparable data.

All of the 84 Kenyan-owned firms initially contacted were asked to participate in the face-to-face survey, but only 18 of them agreed to participate. The competitive nature of the industry in Kenya made firm managers less receptive to allow researchers to interview them because they perceived that the information could be used to increase competition. The survey with these 18 firms was carried out between 25 July and 5 August 2016 and again during 2 to 12 December, 2016. Interviews to fill in the survey were conducted with the owner, general manager, or production manager of each firm. In addition to survey responses, we also noted the various observations made during the farm visits that could undermine or support the responses received from the interviews. Table 3 presents the profile of the 18 local firms that participated in the survey, including the ethnicity of the owner and the export trajectory of the firms. The survey collected information from all three types of Kenyan-owned floriculture firms and covering all ethnicities. The sample includes three type 1 firms, which were all black Kenyan owned; eight type 2 firms, of which four were Black Kenyan-owned, two were Asian Kenyan

<sup>&</sup>lt;sup>2</sup> The order of the questions in the questionnaire in Annex 2 do not directly correspond to the matrix, as they had to be ordered in a way that made sense for an interview.

owned, and two were White Kenyan owned; and seven type 3 farms, of which four were White Kenyan owned, two Black Kenyan, and one Asian Kenyan.

	Ethnicity		
Farm ID	of firm	Export trajectory*	Geographic
	owners		location
1	Black	Type 2	Kitale
2	Black	Type 1	Thika
3	Black	Type 3	Ravine/Nakuru
4	Black	Type 2	Nanyuki
5	Black	Type 1	Thika
6	Black	Type 2	Nakuru
7	White	Type 2	Timau
8	White	Type 3	Timau
9	White	Type 2	Limuru
10	Asian	Type 3	Limuru
11	Asian	Type 2	Nakuru
12	Asian	Type 2	Nanyuki
13	White	Type 3	Athi River
14	Black	Type 3	Limuru
15	Black	Type 1	Kitale
16	White	Type 3	Kitale
17	Black	Type 2	Athi River
18	White	Type 3	Nanyuki

Table 3: Profile of Locally Owned Farms included in the TC Survey

Note\*:

Type 1= sub-contractor, Type 2 = export mostly to Dutch auction, Type 3 = export mostly to direct sales

		Ta	ble 2: Kenyan floricultu	re technological capal	bilities matrix		
Trajectories	Investment	Product	Production process	Harvest & Post- harvest process	Logistic, finance & services	Input supply chain	End market
Basic production capacity/ sub- contracting	Selection of varieties, Choosing location & type of greenhouse, irrigation, and other equipment; construction of pack house and stores	Meet minimum quality req. of targeted market	Basic farm management system and data recording; hire and train managers & workers	Cutting at the right stage, at right length, at right position; transport to pack house; Defoliating, grading, bunching, trimming; packing; quality control Cool chain on farm	Access to cool chain from farm to airport; access to cargo booking and handling services; access to finance;	Source varieties from breeders Source quality packing materials; chemicals and fertilizers	Find local buyer; negotiate; build relation
Dutch Auction	Expand land holding (req'd to expand varieties); upgrade greenhouse technology; cool chain on farm; inventory and storage system; Conducive and safe working environment	Increase number of high-value varieties, Increased certifications/labels & use for product differentiation, Improve vase life, packaging	MPS-ABC; CoP-Silver (Globalgap); Monitoring production process to improve efficiency & increase yields of products that meet specifications (stem length, head size), as well as re- evaluate/change production strategy; Increase training of staff; communicate HR policy; Basic agric R&D.	Monitoring and improving all processes	Improve cool chain management; Increase reliability and consistency in delivery; Create own logistics company, or in collaboration with other farms Access to sector specific and other services	Relations with international consultants, breeders, foreign farms to discuss farm activities and gain knowledge; Collaborating in collective schemes to buy inputs, arrange transport logistics and handling; Vertical integration of upstream or downstream functions: packaging materials, propagating planting materials	Provide product information at acceptable level of accuracy; appear regularly on the auction clock; Appear on all auction days; consistently score high in grading and reliability index Relation with auction service to improve grading score and reliability index Negotiate directly with buyers. Increase market intelligence gathering. Participating in trade fairs
Direct Sales	Expansion— higher volumes req'd	Varieties dictated by buyer; packaging presentation, Ready-to-use bouquets	B2B and consumer Labels/certifications req'd;		Integrated cool chain management; just-in-time delivery		Own marketing & distribution centers

#### Scoring technological capabilities

Based on the survey results, the categories in the Kenyan floriculture technological capabilities matrix were condensed from seven to five categories. Key indicators for each category were selected based on questions in the survey for the purposes of quantitative and qualitative assessment. The categories and indicators are illustrated in Figure 6.

#### Figure 6: Capabilities categories and indicators of Kenyan-owned floricultural firms



The categories of technological capabilities used here are not that different from those used in the Ethiopia floriculture case study (see Melese 2017). However, two features of the Kenyan floriculture value chain required adjusting the capability categories to reflect the particularities of the Kenyan case. Unlike Ethiopia, a large number of local firms produce summer flowers; whereas in Ethiopia, farms only produce roses. As a result, the types of greenhouses (or lack thereof), irrigation systems, and production technologies used will be different from those used to produce roses. This is taken into account by including the investment capabilities category, which captures types of key farm equipment in which firms invested.

The second key difference with the Ethiopian case is that in Kenya not all firms directly export their flowers, but rather export indirectly by selling to exporting firms or to local agents. This is likely to be the case because there have been no industrial policies targeting the floriculture sector in Kenya, unlike in Ethiopia. Therefore, new entrants to the industry, especially Black Kenyan owned firms, started only with production activities of summer flowers, which did not require greenhouses or drip irrigation. We accounted for these firms

by giving them no scores for end market capabilities since they do not export directly. Other low fixed cost entry points in the Kenyan value chain include traders who bought export rejects from large firms to sell in the local market or in the East African region. These traders have not been included in the survey because they do not have their own farm and thus fall out of the scope of this research.

The first category of technological capabilities is end-market, which refers to the overall capabilities of firms to meet the specifications of buyers in different markets, their ability to establish stable relations with those buyers and their market knowledge and promotion skills. It is measured using four indicators: (1) number of end-market regions, (2) number of direct buyers (in direct sales or auction-direct), (3) stability of relation with buyers, and (4) *marketing*. For the first two indicators, it is assumed that the higher the number of the endmarket regions or the number of direct buyers that the farm has, the higher the capabilities of the firm. In the case of relations with buyers, firms were asked to rate their relations with their direct buyers as stable, somewhat stable or ad-hoc. If they rated their relations as 'stable', then they were asked with how many of the buyers they worked for more than one year. A subjective assessment was applied in reaching a final score. For instance, if a firm has relations with half of its buyers for at least one year, 'stable' is granted; otherwise, the score is lowered to 'somehow stable'. Marketing reflects the effort produced by the firm to catch and maintain the attention of buyers. Indicators of marketing effort include having a website, participating in trade shows, and the size of the firm's marketing personnel. These indicators were used to arrive at a subjective assessment of a firm's marketing effort as low, medium or high. Firms that indirectly export through other firms received a total end market score of zero since they do not have a direct relationship with global end markets and buyers.

Four indicators were selected to measure product and production process capabilities of firms: (1) *number of varieties*, (2) *number of export days per week*, (3) *internal reject rate*, (4) *average labor turnover rate*, and (5) *type of end product*. The *number of varieties* is assumed to indicate a firm's ability in dealing with more varieties, where each variety requires specific knowledge and skills, a firm's potential to reach different market channels. In relation to the *number of export days per week*, exporting for more days indicates a higher capacity of firms in shipment planning and forwarding to end-markets. Additionally, it shows greater market presence, which is important in finding new buyers and establishing a position in a market. The third indicator is *average internal reject rate*. The lower the internal reject rate is the better the firm's ability in maximizing efficiency or profit. Moreover, it also implies a stronger production process that can generate export standard products with fewer rejects. Regarding the *rate of labor turnover*, a lower turnover rate indicates a firm's ability in increasing efficiency and productivity, as labor would be stable enough to master and adapt the work. The final indicator is the *type of final product*. Unlike Ethiopia, firms produce

summer flowers in addition to roses. We account here for the fact that some firms exclusively produce summer flowers or roses, or a mixture of both.

Input integration refers to a firm's ability to source inputs measured using one indicator: *inhouse propagation*. If a firm is capable of operating in-house propagation of plants instead of buying from external suppliers, it indicates a firm's stronger financial, logistical as well as technical capabilities in supply chain management. Kenyan firms would like to as much as possible internalize propagation. The competitive nature of the industry encourages firms to internalize as many activities as economically possible in order to control leakage and spying from competitors. Unlike the case of Ethiopia, we did not include importing inputs internally as an indicator of input integration because flower firms generally acquire their inputs from an Israeli company that has a monopoly in the supply of production inputs in Kenya. There is no variation across firms and therefore less useful for our case here.

Two indicators were selected to measure the linkage capabilities of local firms. The first indicator is a *firm's linkage with other firms in the industry*. Firms were asked to rate their participation in any kinds of collaborative schemes (formal or informal) with other farms as limited, medium, or high. The second indicator is a *firm's linkage with sector specific and research institutions*. Based on a number of questions regarding this kind of linkage in the survey, we made a subjective assessment for each firm as high, medium, and low.

Regarding the investment capabilities, there are three indicators: *irrigation type, greenhouse type, and type of fertigation infrastructure*. We used the responses provided by firms related to these indicators to qualify their investment technological capabilities as low, medium, or high. For irrigation, drip irrigation received the highest score followed by overhead and hoses. For the greenhouse type, we assigned scores as follow: 0=none, 1= shedding nets; 2= plastic cover with light diffusing properties; 3= mechanical ventilation system, 4= flexible window opening; 5= fixed window opening; and 6= climate registration and sensors. For fertigation, the assignment of scores was done as follow; 0= none, 1= fertigation at a fixed time interval and no automatic adjustment; 2= computerized fertigation automatically adjusted based on climate data.

After scoring each firm's indicators, I normalized the individual indicator scores by dividing them by the largest number of each indicator, in order to justify the sum scores at the category level. At the end, each indicator had a score of between 0 and 1, where 0 is the lowest and 1 is the highest. One important caveat here is the internal rate of rejection indicator under product and production process category, where closer to 0 is higher and closer to 1 is lower in terms of capability scoring. I added an extra step there to adjust it in a way that reflects the interpretation of the other indicators. The scores presented in Table 4 below are normalized values. Then I took the sum at the category level and subjectively score them as Low, Medium, or High.

Table 4.	Kenyan-owned	Floriculture	<b>Firms</b> 1	<b>Fechnological</b>	Capabilities	Scores
	•					

	(0) Firm category	(1) end-ma	arket				(2) produ	ict and pro	duction pro	ocess			(3) Inputs integration (4) Linkages				(5) Investment						
Farm ID	Types	# of end market by regions	# of buyers in direct sale/aucti on	relation with buyer	marketing	sum score	# of varieties	# of export days per week	Internal reject rate %.	Type of end product	labor TO rate	sum score	in-house propagati on: 1=Yes; 0=No	Sum Input Integratio n Score	with other farms	with support and research institutio ns	Sum Linkag Score	es type	n Greenhou se type	Fertigatio n system	sum Inves ent score	tm s	Total TC
2	Sub-contracting					0	. 0	0.3	0.9	1	0	2.2 N	0	L	0.33	0.33	0.66	L 0.67	0.2	1	M 1	87 LN	4LLM 4.73
5	Sub-contracting					0 1	. 0.1	0.6	0.7	0.8	0.2	2.4 N	1	М	0.33	0.33	0.66	L 0.67	0.2	0.5	L 1	37 LN	1MLL 5.43
15	Sub-contracting					0 1	. 0.1	0.4	0.1	. 1	0	1.6 L	1	М	0.67	0.33	1	M 0.67	0.2	0	L (	1.87 LL	MML 4.47
1	Dutch auction	0.3	0.3	0.7	0.3	1.6 I	. 0.1	1	0.1	. 1	0.3	2.5 N	1	М	1	0.33	1.33	Н 1	0.4	1	М	2.4 LM	MHM 8.83
4	Dutch auction	0.3	0.3	1	0.3	1.9 I	. 0.1	0.3	1	. 1	0	2.4 N	1	М	0.33	0.33	0.66	L 1	0.8	0.5	М	2.3 LM	MLM 8.26
6	Dutch auction	0.3	1	1	0.7	3 H	<b>i</b> 0	0.6	0.4	0.3	1	2.3 N	1	М	0.67	0.33	1	M 1	0	0.5	М	1.5 HM	MMM 8.8
7	Dutch auction	0.3	0.3	1	0.7	2.3 N	<b>1</b> 0.2	1	0.9	0.8	0	2.9 N	0	L	0.33	0.67	1	M 1	1	1	н	3 MN	/ILMH 9.2
9	Dutch auction	0.3	0.7	1	0.7	2.7 N	<b>/</b> 0	0.7	1	. 0.3	0	2 N	1	М	0.33	0.33	0.66	L 0.67	0	0	L	).67 Mľ	VIMLL 7.03
11	Dutch auction	0.7	1	1	1	3.7 H	<b>i</b> 0.4	1	0.8	1	0	3.2 H	0	L	0.33	0.33	0.66	L 1	0.4	1	М	2.4 Hł	HLLM 9.96
12	Dutch auction	0.3	0.3	1	0.3	1.9 N	<b>N</b> 0.3	1	0.9	1	0.3	3.5 H	1	М	0.33	0.33	0.66	L 1	1	1	н	3 Mł	HMLH 10.06
17	Dutch auction	0.3	0.3	0.3	1	1.9 N	<b>N</b> 0.3	0.7	0.7	1	0.5	3.2 H	0	L	0.33	0.33	0.66	L 1	1	1	Н	3 M	HLLH 8.76
3	Direct Sales	1	1	1	0.7	3.7 H	<b>i</b> 0.4	1	0	1	0.3	2.7 N	1	М	0.67	0.33	1	M 1	1	1	н	3 HM	MMH 11.4
8	Direct Sales	0.3	1	1	1	3.3 H	<b>i</b> 0.7	1	0.4	1	0.1	3.2 H	0	L	0.33	0.33	0.66	L 1	1	1	н	3 HI	HLLH 10.16
10	Direct Sales	1	0.7	1	0.7	3.4 H	<b>i</b> 0.2	1	0.7	0.5	0.1	2.5 N	1	М	0.33	0.67	1	M 0.67	0.8	0	M 1	47 HM	MMM 9.37
13	Direct Sales	0.7	0.7	1	1	3.4 H	<b>i</b> 0.5	1	0.8	0.5	0.1	2.9 N	1	М	0.67	0.33	1	M 1	1	1	н	3 HM	MMH 11.3
14	Direct Sales	0.7	0.7	1	0.3	2.7 N	<b>1</b> 0.2	0.6	0.9	0.5	0.3	2.5 N	1	М	1	0.33	1.33	Н 0.67	0.2	0	L	).87 MN	AMHL 8.4
16	Direct Sales	0.3	1	0.7	1	3 H	<b>I</b> 0.3	0.4	0.5	1	0.1	2.3 N	0	L	1	0.33	1.33	Н 1	0.8	1	М	2.8 HN	1LHM 9.43
18	Direct Sales	1	1	1	1	4 H	<b>I</b> 1	1	0.5	1	0.1	3.6 H	0	L	1	0.33	1.33	Н 1	0.8	0.5	М	2.3 HF	ILHM 11.23

#### Part 3: Analyzing the Technological Capabilities of Kenyan-owned Firms

The technological capabilities scores of the 18 firms presented in Table 4 show that the firms' capabilities are mixed across firm type and categories of capabilities. However, when we consider the numerical interpretation of the scores, we can identify firms with aggregate capabilities of high, medium, and low. Assuming that firms with scores above 10 have high capabilities and those between 10 and eight have medium capabilities, and those below eight have low capabilities, we conclude that most firms have medium capabilities. Among the Asian owned firms, one has high capabilities and two have medium capabilities. Concerning the Black-Kenyan owned firms, three have low capabilities, five have medium capabilities, and one has high capabilities. Among the White Kenyan owned firms, four have high capabilities, one has medium capabilities, and one has low capabilities. We now break this down at the capabilities level.

First, the end market capability of firms is mostly high with eight firms registering high capabilities and five firms with medium and another set of five firms with low capabilities. Among type 1 firms, end market capabilities are low as these firms do not directly export. Type 2 firms have mostly medium end market capabilities. These firms invest in maintaining relationships with buyers by organizing visits to their farms in order to demonstrate strict adherence to quality. They also seek to invest in obtaining certifications such as Fairtrade in an effort to stand out among their competitors. Among type 3 firms we note that their end market capability is mostly high. This is because the number of end markets by region is fairly high, as these firms constantly search for more customers across the global market. Some of them engage in marketing intelligence by hiring consultancy firms to help locate potential markets and, in some instances, visit buyers to establish relationships.

Type 1 firms are the only ones that sell their products locally as they are mostly start-ups and lack export licenses to operate on their own. They generally have one stable buyer and a stable relationship with their buyer. These buyers could be independent exporters or middlemen or nearby exporting farms. The bargaining power between these firms and their buyers vary depending on global market demands. During the high season when the buyer needs flowers to help meet its contract obligations, type 1 firms have more bargaining power. It is also important to mention that buyers take a substantial risk by exporting flowers they did not produce. Production decisions made by type 1 firms are not fully known by their buyers and this may undermine the quality effort made by buyers on their own farms. This is why most of the buyers export flowers they buy from type 1 firms under a different label than the flowers they produced themselves.

Type 2 firms sell their products to the Dutch auction with relatively stable buyers, which is a key advantage. Once they meet the minimum requirements for selling at the auction, their flowers will be bought, although not necessarily at prices as high as those fetched by type 3 firms through direct sales in the EU. Meeting strict quality requirements remains a key determinant of firms' survival. This is why a number of firms have strict in-house quality control procedures when entering both the greenhouse and the farm. Vehicles have to drive through a small water ditch to remove impurities from tires and workers must sanitize their hands before entering the greenhouses and when moving from one planting row to another. The government of Kenya also seeks to maintain Kenya's good reputation as a source of quality cut flowers. For this reason, the Kenya Plant Health Inspectorate Service, which plays the role of regulator for ensuring that exported flowers meet the key qualities required in the destination countries, provides advisory services to firms that experience successive higher rates of rejections at the port. These advisory services include both general advisory and handholding at the production site. This is the only support that the Kenyan government provides to the industry.

Local firms in Kenya recognize that the direct sales marketing channel to European countries attracts higher prices than the Dutch auction. This is why most firms see direct sales to Europe as a potential future market outlet. However, shifting to direct sales requires building capabilities, especially in marketing and market intelligence in order to identify and maintain buyers. Production systems also need to change to allow the firm be more flexible and responsive to changing customer preferences. Tighter attention to details, especially when managing higher prevalence of pest and disease resulting from firms' growth to meet changing customer demands. Firms also need to establish close relationships with breeders in order to ensure uninterrupted supply of new and rare varieties. This is easier for medium-size firms, especially those owned by White Kenyans. Most large firms find their niche market in the auction given their ability to supply large quantities and make their profit based on volume. Small firms, however, are not able to afford the investments required to make the switch to direct sales. The size of their operations may not justify the typically high royalties necessary to produce certain varieties.

Type 2 and 3 firms scored high on marketing effort, with a sensible advantage in favor of type 3 firms. This is expected since they rely on heavy marketing to ensure customer satisfaction and loyalty. Type 2 firms heavily invest when first entering the auction, as it is important to make a big entrance and firms managers make sure to advertise their farm and its unique qualities prior to their entrance. Later, customer loyalty is maintained through organized site visits and efforts at the firms' level to maintain quality.

The product and production process capabilities of firms are mostly medium. There is a slight edge of type 3 firms over type 2 firms, both of which score overwhelmingly higher than type 1 firms. Type 2 firms score high because they have a high number of export days per week given their large operations. Since the auction is their primary outlet, they rely on quantity to meet their profit maximization objectives. If type 3 firms score high it is because they are more likely to have a high number of varieties and mostly produce not just roses, but large roses that attract a premium in the international market. 40% of firms produce large flowers. This is mostly the case with firms located in Timau near Mt Kenya, as higher altitudes are adequate for the production of large rose flowers. Intermediate and T-hybrid roses are produced by 30% of the firms, and 15% of the firms produce either sweetheart small roses or summer flowers. However, Kenyan owned firms produce a large variety of cut flowers. Regardless of the types of flowers produced, the average number of varieties is about 17, with some type 3 firms producing 54 varieties. Firms have in most cases acquired capabilities for producing multiple varieties, which is key for surviving in a very dynamic industry.

Quality is at the core of the floriculture sector, as mentioned when discussing end market capabilities. One of the most important decision farm managers and owners must make is the choice of production manager. Very often production managers are poached from other firms because of their reputation in minimizing pest infestation, and they are paid a premium based on the rejection rate percentage and successful initiatives taken to reduce production costs. On average, internal rate of rejection stand at about 7% and does not vary substantially across firm types: 7.3%, 6%, and 7.7% for type 1, type 2, and type 3 firms respectively.

Firms must be able to attract and retain quality workers. The labor turnover rate stands at 4.4% among our sample firms. However, the rate varies across firm type, with type 1 and type 2 firms registering a 3% and 2.7% labor turnover rate, respectively, while type 2 firms register 7.4%. In the past, 55% of all firms have poached managers from other firms. Experienced managers bring with them tactic knowledge and contacts to buyers. Firms in the sample did have labor retention strategies. In addition to paying workers every two weeks, some firms provided bonuses: 70% of the firms give bonuses based on performance, and the rest tend to be more discretionary. Quality of work life also influences the labor turnover rate. Benefits such as lunch, transportation, day-care (since most production workers are mothers), and salary advances increasingly are becoming the norm in the floriculture industry. However, not every firm provides all of these benefits. White Kenyan firms tend to provide more benefits such as transportation, day-care for children, and lunch.

Training is regularly offered to workers to help improve quality. Training includes quality control, production and harvesting protocols, and in some instances, product suppliers will deliver their products with application trainings. Very often these trainings are offered in

collaboration with the human resource managers, who in some instance keep track of the different trainings in which individual workers have participated. However, it is not known if this is used to determine salary increases or promotions.

We initially considered in-house propagation and breeding as indicators of input integration, but then found out that no local firms integrated breeding in their activities. Breeding is a long-term capital-intensive activity in which no firm in Kenya is willing to invest because returns to this type of investment are realized years after the initial investment is made. Therefore, we only considered in-house propagation and found that 11 firms (61%) do inhouse propagation. The benefit of propagation is that it reduces the probability of contamination due to off-farm agents: agents that were introduced during transplantation. Inhouse propagation may also reduce the production costs of a farm since production workers may conduct propagation activities. We did not see a clear trend in terms of input integration across firm types.

Most firms scored low on linkage capabilities. Out of 18 firms, eight had low linkages, six had medium linkages, and four had high linkages. Three out of the four firms with high linkages are type 3 firms, and the remaining one is a type 1 firm. Among the six firms with medium linkages, three are types 3 firms, two are type 2, and one is a type 1 firm. Most firms have some type of collaborative relationship with other firms. We were not able to determine whether these relationships were from one type of firm to another during the time of the survey, but this is a question that will be addressed later. Some firms, especially those in close proximity to Ergaton University in Nakuru (a local university known for its good agricultural program), allow students to come and run trials at their farms. These relationships with local R&D can be key to help firms overcome the exorbitant cost associated with accessing inputs, but it is hard to assess whether this is an opportunity fully captured by firms since universities may not be up to speed with the demands of farms. As for the government, there is no evidence of government support to the industry.

Firms have mostly medium investment capabilities. Investment capabilities are highest among type 3 and type 2 firms, and understandably lower among type 1 firms. We note that 67% of farms use drip irrigation and the rest use overhead irrigation. Regarding the types of greenhouses, 30% of farms use the high-end greenhouses with climate registration and sensors. About 22% of them use greenhouses with flexible window openings, 11% use greenhouse with mechanical ventilation, 22% use shedding nets, and the rest do not use any type of greenhouses.

In general, owners performed feasibility studies prior to the establishment of their farms. The feasibility study sought to identify the ideal production area and varieties. Availability of

water sources and electricity are some of the reasons why most farms are located within a three to four hour drive time from Nairobi where electricity is regularly supplied. Varieties were tried and tested for a few seasons before the full roll out on the farm. This was necessary to test the competence of their production manager in managing pest and diseases, even though most owners had experience in the industry before establishing their own farm. In addition, conducting feasibility studies and test production was key to raising capital from local banks, as most banks required them as part of the loan appraisal process. The prior experience of the firm owner was also key in securing their first buyers. Many owners relied on the prior industry network they had, and others used the experience in dealing with the Dutch auction to ensure that their firms fetched the highest grade in their first sales as it sends a strong signal to buyers about the new company. For firms owned by Black Kenyans, the political influence of the owners was key for learning how to export. They used their influence to receive advisory services and for the inspections services to help for their production managers in order to reduce the probability of rejection at the airport.

For those in direct sales, the ongoing Russia embargo with the EU provided a unique opportunity to sell directly to Russian buyers as Russia was blocked from importing flowers from the EU. Other lucrative markets - Australia, UAE, and Saudi Arabia - have gained serious attention. While direct sales to Europe are often associated with a higher premium, the dynamic nature of these markets requires firms to be very flexible and adapt to the often-capricious nature of customer demands.

All rose producers use greenhouses. Summer flowers are often produced in the open, and some farms rely on contractual arrangements with nearby smallholder farmers to meet the demand of summer flowers during peak season. Most firms use the same greenhouses they have been using since the farm was established, and they are often equipped with flexible window opening to better regulate the temperature. Drip irrigation is also commonly used, except for summer flowers production where conventional broadcasting irrigation is used. Fertigation schemes are mostly computerized and automatically adjusted based on climate data. However, some farms do not have sophisticated fertigation equipment; they rely on the judgments from the production manager to decide when to feed the plants. This is why the firm owner or general manager's choice of production manager is key. Owners who worked in the industry before establishing their farms or those with production experience tend to have the upper hand in terms of selecting a production manager.

		Type 1	Type 2	Type 3
Capabilities	Average	firms	firms	firms
End Market	Medium*	N/A	Medium	High
Product and production process	Medium	Low	High	High
Input integration	Medium	Medium	Medium	Medium
Linkages	Low	Low	Medium	Medium
Investment	Medium	Low	High	High

Table 5: Distribution of technological capabilities across types of firms

\*Note: The average of end market capabilities is high when we ignore the zero scores of type 1 (sub-contracting) firms. However, if we consider the score registered by type 1 firms, the average goes down to medium.

Overall, type 1 firms have no end market capabilities, medium input integration capabilities, and low product and production process, linkages, and investment capabilities. Type 2 firms have medium capabilities for end market, input integration, and linkages; and high capabilities for product and production process and investment. Type 3 firms have medium capabilities for input integration and linkage capabilities; and high capabilities for end market, product and production process, and investment.

#### Comparing firm technological capabilities with competitiveness measures

The data collected on the three indicators of competitiveness are presented in Table 6. The missing values in the tables are due to some respondents' refusal to provide that information during the survey interviews. On average, the number of workers per hectare is 16, the number of stems exported per employee is 49,054, and the number of stems exported per land size is 537,077.

Farm ID number	Quantity	Quantity	Number of
	exported per	exported per	worker per
	worker	area harvested	hectare
1	9,667	263,636	27
2	12,000	428,571	36
3	68,182	1,442,308	21
4			38
5	4,522	109,474	24
6	153,846	500,000	3
7	33,241	545,455	16
8			18
9			3
10	36,000	327,273	9
11	100,000	631,579	6
12	33,962	84,507	2
13	3,40	119,172	31
14	51,613	363,636	7
15	1,800	9,000	5
16	142,857	1,714,286	12
17	55,714	1,218,750	22
18	28,571	298,507	10

**Table 6: Measures of Competitiveness** 

Analyzing the competitiveness data in terms of firm types shows that the number of stems exported per worker is 6,107; 64,405; and 55,177 for type 1, type 2, and type 3, respectively. In other words, the competitiveness (in terms of labor productivity) for type 1 firms is far below those of type 2 and 3. Some difference in labor productivity is expected, given the lower technological capabilities and often unstable end market faced by type 1 firms. However, we do not yet know much about the sources of this extremely large difference in stems per worker between type 1 firms and the directly exporting type 2 and 3 firms. It is possible that part of the difference might arise because type 1 firms are selling some products in the domestic market, and the measure is based on total workers and stems exported. For the case of quantity exported per area harvested, the average is 182,348 for type 1, 540,654 for type 2, and 710,864 for type 3. We again see type 1 firms to be far below type 2 and 3 firms in terms of land productivity. For the number of workers per area, the average is 22,

15, and 16 for firm type 1, type 2, and type 3, respectively. Type 1 firms have less technology and thus lower efficiency than the other types of firms, but this may not be the whole story. Further research is required to understand the causes of labor and land productivity.

We now compare firms' capabilities and the different measures of competitiveness to evaluate if there are patterns. We plot the capabilities scores across competitiveness indicators and draw a regression line across it to show the trend. The series of graphs presented below tell us two stories. First, the nature of the relationship between capabilities and competitiveness is not straightforward. The second message delivered by the graphs is the relative efficiency of firms' capabilities against the average. If a firm is on the regression line, it means that its competitiveness is rightly associated with its capabilities, or the firm is efficient. If it is above the regression line, it means that its capabilities are under delivering the required competitiveness, inefficient. If it is below the line, it means that its capabilities are over-delivering the required competitiveness.

The relationship between exports per worker and aggregate capabilities, which is the sum of all categories of capabilities, is positive trending. In other words, firms with more aggregate capabilities are correlated with higher levels of exports per worker. In terms of efficiency, we note that out of the 15 firms considered in this analysis about four are close to the regression line, and they are mostly type 2 firms. Seven firms are below the regression line, of which all are type 1 firms, and the remaining four are above the regression line. For the case of exports per harvested area, we have also noted a positive relationship, although the graph is associated with high level of variations. Three firms are on the regression line, seven are below the regression line, and the regression line, and the regression line, and the regression line, and the regression line, are below the regression line.

Overall, we can conclude at the aggregate level that firms' capabilities over-deliver on the expected competitiveness, except for the case of workers per harvested area where most firms' capabilities are found to be under-delivering. We have also noted that among the firms located in the graph, type 2 firms are most prominent, and all type 1 firms are consistently over-delivering across all competitiveness indicators. The efficiency of type 2 firms may be explained by the relatively predictable nature of selling through the Dutch auction where rules are clear and stable, allowing firms to work with a specific quality target. The over-delivering nature of type 1 firms may be explained by the fact that most of these firms work hand in hand with rules imposed by large exporting firms without bearing the burden associated with exporting. This gives type 1 firms an edge that is reflected in their over-delivering nature.

At the individual capability measures, the picture is slightly different from the results presented for the case of firms' aggregate capabilities. We first note for the case of end-market capabilities in Figure 8 a positive relationship between end market capabilities and exports per worker and exports per harvested area. However, we note a negative correlation between the end-market capabilities and the number of workers per harvested areas.

Regarding product and production process capabilities in Figure 9, we note a positive correlation across all three competitiveness measures. Better product and production process capabilities correlate with higher production per land and labor but comes at a cost of lower labor efficiency. The input integration graphs in Figure 10 should be seen as a probabilistic relationship given the binary nature of the capability measure. The probabilities are decreasing with the competitiveness measure, implying that firms that do their own propagation tend to have lower exports per worker, exports per harvested area, and workers per harvested area.

Linkage capabilities do not have a substantial correlation with any of the measures of competitiveness as illustrated in Figure 11. This result confirms the secretive nature of the Kenyan floricultural industry where firms operate in silos with limited interactions. Finally, the relationship between investment capabilities and all three competitiveness measures are strongly positive. Investment allows firms to export more per worker and harvested area, but it is associated with more workers per harvested area. A firm may need additional labor to maintain the greenhouse or fertigation units that help the firm to increase its land and labor productivity. Farm managers are always seeking to increase production even if it comes at a cost of a higher wage bill. This may imply that firms' labor management strategies and incentive schemes may be made better to attract and retain more workers to increase production in a cost-effective way.



Figure 7: Aggregate capabilities and competitiveness



Figure 8: End Market capabilities and competitiveness



Figure 9: Product and Production process capabilities and competitiveness



Figure 10: Input integration capabilities and competitiveness



Figure 11: Linkage capabilities and competitiveness



Figure 12: Investment capabilities and competitiveness

#### Conclusions

The main objective of this working paper was to map the technological capabilities of Kenyan-owned floricultural firms based on a survey carried out among a sample of locally owned firms. The survey was designed based on the capabilities required to enter the floriculture global value chain, to enter new export markets and market channels, and to sustain and stabilize exports by deepening capabilities in particular market channels. Based on the survey data and a methodology developed in the AfriCap project, each firm was scored on specific categories of capabilities using strategic indicators and then given an aggregate technological capabilities score. We assessed Kenyan-owned firms in terms of scores on each category of capability (end-markets, product and production process, input integration, linkages, investment), as well as in terms of scores across the type of firms: their export trajectory/market channel (type 1 firms export indirectly and thus have no direct relations with global buyers; type 2 firms export mainly through the Dutch auction; type 3 firms export through direct sales channels to buyers in Europe).

As Table 5 summarizes, Kenyan-owned firms on average have medium technological capabilities in all of the categories except for linkage capabilities. The experience the industry as a whole had in fruits and vegetable exports gave the floriculture sub-sector an advantage. Low linkage capabilities seem to stem from the secretive nature of the industry that leads firms to be less cooperative among themselves and other third parties for fear of market loss through copying by competitors.

Disaggregating in terms of the export trajectories of firms, the survey results show that type 1 firms have low capabilities except for input integration, where some firms have in-house propagation units. The results are mixed for the type 2 firms, which have low end-market capabilities, medium input integration and linkage capabilities, and high product and production process and investment capabilities. Type 3 firms have medium input integration and linkage capabilities, and high end-market, product and production process, and investment capabilities.

A secondary objective of the paper was to compare firms' technological capabilities scores to measures of competitiveness for which we could collect data. The analysis showed that the relationship between exports per worker and aggregate capabilities is positive trending. For the case of exports per harvested area, we have also noted a positive relationship, although the graph is associated with a high level of variations. Unlike the case of these two measures of competitiveness, the relationship between workers per harvested area and aggregate capabilities is neutral, although very slightly upward trending. We can conclude at the aggregate level that firms' capabilities over-deliver on the expected competitiveness, except for the case of workers per harvested area, where most firms' capabilities are found to be under-delivering. Firms are more interested in increasing exports per area and per labor and less interested in improving efficiency in terms of workers per harvested area. It seems that farm managers are seeking to increase production even if it comes at a cost of a higher wage bill because incentive systems are designed to reward production and punish production rejections and not labor size.

In the next phase of the research, we have strategically selected some of the surveyed firms for further research in order to understand the factors that shape firms' investments, effort and outcomes in terms of building capabilities. In particular, it will focus on channels for learning, such as linkages with foreign firms, linkages with buyers within the global value chain, linkages through sub-contracting as well as the role of industrial policies. This research will be carried out through 'firm histories' based on in-depth and repeat interviewing with owners and other staff.

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## Annex Floriculture Sector Local Firm Survey Questionnaire

Name of firm	
Address (cluster name) Website	
Name of interviewee	
Job title	
Duration of employment	
Ownership	a) Black Kenya
structure/nationality	b) White Kenyan
	c) Asian Kenyan
	d) Foreign
	e) Other
Date of establishment	
Date of production/export	
Total size of land	
holding(ha)	
Cultivated land size (ha)	
Number of employees	Starting, 2010, now
Development (10 years)	
Product type today (%)	a) Rose
	b) Summer flower
	c) Bouquet flowers
<b>X 1</b>	d) horticulture
Name main product:	
# of varieties of main	
product(s)	
Export destinations (%)	a) Europe
	-auction
	-direct
	b) Middle east
	c) Japan d) Other
# of ownext days non weak	a) Europa
<i>#</i> of export days per week	a) Europe
tu/ via	-ducuon
	h) Middle Fast
	c) Japan
	Other
	c) Japan Other

#### **PART I: FIRM PROFILE**

Total annual export (volume) In USD Starting, 2010, Now	
Certificates	a) Bronze:
Year of certification	b) MPS:
	c) GlobalGAP
	d) KenyanGAP
	e) other (specify)

#### PART II: INVESTMENT

Was a feasibility study	a) No
carried out before the initial	b) Yes
investment?	By whom?
Had the owner/GM	a) No
experience in the sector or	b) Yes
in business?	Explain:
How did the firm get	a) Buy it from abroad (foreigners). From where?
managerial expertise and	b) Employ nationals with previous work experience
skilled labor in the	in flower farms. From which firms?
beginning?	a) Trained workers and/or managers
How was location selected?	b) Allocated by govt
	c) Based on feasibility study/market research
	d) Other
How were varieties	a) Just following g what other firms do (neighbors)
selected?	b) Amount of royalty fee
	c) Based on product life cycle analysis
	d) Experimenting what is best on the location
	e) Producing what buyers demand/ based on market
	research
	f) Other
With how many varieties	
of roses the firm started	
exporting?	
In 2010 (starting, 2010,	
now?)	
How was the investment	a) Local government bank
finance raised?	b) Locally owned private bank
	c) Sister company

How was working capital	d) Joint venture-PSOM or other subsidies
raised?	e) other
How did the firm get its	auction:
first buyer?	How did the firm access auction?
	Direct sale:
	How did the firm access/establish contact to buyers in :
	- Europe? middle east? Japan? Other?
How much info did you	a) Little
have & analysis did you	b) Medium
conduct before initial	c) High
investment?	
	·
	Equipment
What are the main features	a) shedding nets;
of your greenhouse?	b) plastic cover with light diffusing properties;
	c) mechanical ventilation system
	d) flexible window opening
	e) fixed window opening
	f) Climate registration and sensors
Why you select the specific	
type of greenhouse?	
Have you changed your	
greenhouse since first time?	
If yes, when and why?	
What kind of irrigation	a) Drip
system do you have?	b) other
How does the fertigation	a) Fertigation at fixed time interval and no automatic
system work in the	adjustment
greenhouse?	b) Computerized fertigation automatically adjusted
	based on climate data (radiation)
	c) Computerized and automatically regulate
	fertigation (amount and proportion) with additional
	sensors
Do you do regular	a) Yes
maintenance of	b) No
fertigation/irrigation	
system/ greenhouse?	

### PART III: END MARKET

Do you know your buyers in	
austion?	
If Vos How many are they?	
Now 2010 2005	
Do you have direct contact	
bo you have direct contact with the sustion buyers?	
with the auction buyers:	
If YES,	a) Via FloraHolland direct
How did you establish that?	b) Other
If NO, why?	
If YES,	a) Yes
Do you negotiate and determine	b) No
price outside auctioning process?	
How stable are your	a) Stable
relationships with your auction	b) Somewhat stable
main buyers?	c) Ad hoc
In direct sale, who are main	How many in:
buyers?	-Europe? Middle East? Japan? others?
buyers? Now, 2010, 2005	-Europe? Middle East? Japan? others?
buyers? Now, 2010, 2005 Development in 10yrs?	-Europe? Middle East? Japan? others?
buyers? Now, 2010, 2005 Development in 10yrs? How stable are your	-Europe? Middle East? Japan? others? c) Stable
buyers? Now, 2010, 2005 Development in 10yrs? How stable are your relationships with your main	<ul> <li>-Europe? Middle East? Japan? others?</li> <li>c) Stable</li> <li>d) Somewhat stable</li> </ul>
buyers? Now, 2010, 2005 Development in 10yrs? How stable are your relationships with your main buyers?	<ul> <li>-Europe? Middle East? Japan? others?</li> <li>c) Stable</li> <li>d) Somewhat stable</li> <li>e) Ad hoc</li> </ul>
buyers? Now, 2010, 2005 Development in 10yrs? How stable are your relationships with your main buyers?	<ul> <li>-Europe? Middle East? Japan? others?</li> <li>c) Stable</li> <li>d) Somewhat stable</li> <li>e) Ad hoc</li> </ul>
buyers? Now, 2010, 2005 Development in 10yrs? How stable are your relationships with your main buyers? What are the minimum	<ul> <li>-Europe? Middle East? Japan? others?</li> <li>c) Stable</li> <li>d) Somewhat stable</li> <li>e) Ad hoc</li> <li>a) quality</li> </ul>
buyers?Now, 2010, 2005Development in 10yrs?How stable are yourrelationships with your mainbuyers?What are the minimumrequirements of non-auction	<ul> <li>-Europe? Middle East? Japan? others?</li> <li>c) Stable</li> <li>d) Somewhat stable</li> <li>e) Ad hoc</li> </ul> a) quality <ul> <li>b) quantity</li> </ul>
buyers? Now, 2010, 2005 Development in 10yrs? How stable are your relationships with your main buyers? What are the minimum requirements of non-auction channels?	<ul> <li>-Europe? Middle East? Japan? others?</li> <li>c) Stable</li> <li>d) Somewhat stable</li> <li>e) Ad hoc</li> </ul> a) quality <ul> <li>b) quantity</li> <li>c) # varieties</li> </ul>
buyers?Now, 2010, 2005Development in 10yrs?How stable are yourrelationships with your mainbuyers?What are the minimumrequirements of non-auctionchannels?	<ul> <li>-Europe? Middle East? Japan? others?</li> <li>c) Stable</li> <li>d) Somewhat stable</li> <li>e) Ad hoc</li> </ul> a) quality <ul> <li>b) quantity</li> <li>c) # varieties</li> <li>d) Certificate</li> </ul>
buyers?Now, 2010, 2005Development in 10yrs?How stable are yourrelationships with your mainbuyers?What are the minimumrequirements of non-auctionchannels?Who sets the requirement?	<ul> <li>-Europe? Middle East? Japan? others?</li> <li>c) Stable</li> <li>d) Somewhat stable</li> <li>e) Ad hoc</li> </ul> a) quality <ul> <li>b) quantity</li> <li>c) # varieties</li> <li>d) Certificate</li> <li>a) Individual buyers</li> </ul>
buyers?Now, 2010, 2005Development in 10yrs?How stable are yourrelationships with your mainbuyers?What are the minimumrequirements of non-auctionchannels?Who sets the requirement?	<ul> <li>-Europe? Middle East? Japan? others?</li> <li>c) Stable</li> <li>d) Somewhat stable</li> <li>e) Ad hoc</li> </ul> a) quality <ul> <li>b) quantity</li> <li>c) # varieties</li> <li>d) Certificate</li> <li>a) Individual buyers</li> <li>b) Dubai flower center</li> </ul>
buyers?Now, 2010, 2005Development in 10yrs?How stable are yourrelationships with your mainbuyers?What are the minimumrequirements of non-auctionchannels?Who sets the requirement?	<ul> <li>-Europe? Middle East? Japan? others?</li> <li>c) Stable</li> <li>d) Somewhat stable</li> <li>e) Ad hoc</li> <li>a) quality</li> <li>b) quantity</li> <li>c) # varieties</li> <li>d) Certificate</li> <li>a) Individual buyers</li> <li>b) Dubai flower center</li> <li>c) other</li> </ul>
buyers?Now, 2010, 2005Development in 10yrs?How stable are yourrelationships with your mainbuyers?What are the minimumrequirements of non-auctionchannels?Who sets the requirement?What are main challenges to	<ul> <li>-Europe? Middle East? Japan? others?</li> <li>c) Stable</li> <li>d) Somewhat stable</li> <li>e) Ad hoc</li> <li>a) quality</li> <li>b) quantity</li> <li>c) # varieties</li> <li>d) Certificate</li> <li>a) Individual buyers</li> <li>b) Dubai flower center</li> <li>c) other</li> </ul>
buyers?Now, 2010, 2005Development in 10yrs?How stable are your relationships with your main buyers?What are the minimum requirements of non-auction channels?Who sets the requirement?What are main challenges to meet different requirements?	<ul> <li>-Europe? Middle East? Japan? others?</li> <li>c) Stable</li> <li>d) Somewhat stable</li> <li>e) Ad hoc</li> <li>a) quality</li> <li>b) quantity</li> <li>c) # varieties</li> <li>d) Certificate</li> <li>a) Individual buyers</li> <li>b) Dubai flower center</li> <li>c) other</li> </ul>
buyers?Now, 2010, 2005Development in 10yrs?How stable are your relationships with your main buyers?What are the minimum requirements of non-auction channels?Who sets the requirement?What are main challenges to meet different requirements?And what do you do to meet	<ul> <li>-Europe? Middle East? Japan? others?</li> <li>c) Stable</li> <li>d) Somewhat stable</li> <li>e) Ad hoc</li> <li>a) quality</li> <li>b) quantity</li> <li>c) # varieties</li> <li>d) Certificate</li> <li>a) Individual buyers</li> <li>b) Dubai flower center</li> <li>c) other</li> </ul>

Have demands & capabilities	a) No
expected from top buyers	b) Yes
increased in the last 10 years?	
How do you deal with this?	
What are main challenges in	
fulfilling huvers'	
demands/canabilities?	
Doos firm pogotisto with	
buyers?	a) No b) Ves
buyers.	How? On what issues?
How does price is determined in	a. Supply and demand (auction)
direct sale to: Europe, Middle	b. Cost-price plus
East, Japan, other	c. Negotiation based on cost price
	d. Negotiation based on auction
	e. Other (specify)
Which end market offer best	a) Europe
price margin?	b) Middle East
	d) other
Which market channel offer the	a) Auction
best price?	b) Direct sale
How often is payment settled in	a) Auction and auction-direct
the channels you use?	b) Middle East
	c) other
When and Why did you	
diversify end market?	
Why do you choose auction or	
alrect sale as your major solling channel? <i>Elaborata</i>	
What is your future plan in	a auction
using market channels/end	b. direct sales
market? <i>Explain</i> why.	c. other regions than Europe
- ·	d. new markets
	e. Other (specify)
Has the firm engaged in market	a) No
intelligence and market & buyer	b) Yes
research?	Info from where? How?
	1. other tirms (specify by nationality)
	II. From association
best price? How often is payment settled in the channels you use? When and Why did you diversify end market? Why do you choose auction or direct sale as your major selling channel? <i>Elaborate</i> . What is your future plan in using market channels/end market? <i>Explain</i> why. Has the firm engaged in market intelligence and market & buyer research?	<ul> <li>b) Direct sale</li> <li>a) Auction and auction-direct</li> <li>b) Middle East</li> <li>c) other</li> </ul> a. auction <ul> <li>b. direct sales</li> <li>c. other regions than Europe</li> <li>d. new markets</li> <li>e. Other (specify)</li> </ul> a) No <ul> <li>b) Yes</li> <li>Info from where? How?</li> <li>i. other firms (specify by nationality)</li> <li>ii. From association</li> <li>iii. From auction</li> </ul>

PART IV: PRODUCT

Indity: Inobeel	
Describe the main products	a) Sweethearts-small
& portfolio? (%):	b) Intermediate and T-hybrid
2005, 2010, now	c) Large flower
Development (10 years)?	d) other
Now, 2010, 2005	
Average annual production	
in stem/kg?	
Average annual internal	
reject rate?	
Market place reject rate	
Unit price of main	
products?	
Average unit price?	
How often buyer returns	a) Often
product?	b) Sometimes
	c) rarely
Have you introduced new	a) No
products/varieties in the	b) Yes
past year?	
Have any products been	a) No
dropped?	b) Yes
	Which ones? Why?
What is your most	a) A
frequent grading score at	b) A1
the Dutch Auction?	c) B
What was your first	a) A
grading score?	b) A1
How did you improve?	c) B
Development in 10 years	
What is your most	d) A
frequent CLASS score at	e) B
the Dutch Auction?	d) C
(reliability index)	
What was your first	e) A
CLASS score?	f) B
How did you improve?	f) C
Development in 10 years	
What did you do to improve	a) Reduce number of touches
quality?	b) Other
From where or from whom	a) Auction
do you get advice to	b) Local firms (in a formal/informal settings)
improve product quality?	
mprove product quanty?	

		c)	Foreign firms (in a formal/informal
			settings)
		d)	Hired consultants
		e)	breeders
		f)	EHPEA (growers' association)
		g)	EHDA (government agency)
		h)	Other (specify) NGO?
Do you promote your	a)	No	
products?	b)	Yes	
	How?		
		a.	Via website
		b.	Participating in trade fairs (local and
			international)
		c.	Printing logo on packages
		d.	Through Corporate Social Responsibility
			in community development
		e.	Other (specify)
Has the firm invested in	a)	No	
product development &	b)	Yes	
improvements/adaptation?		Explai	n:
PRODUCTION PROCESS			
What do you do to prevent		a)	Chemical spray,
and cure diseases?		b)	Integrated pest management (IPM)
		c)	Both (a and b)
		d)	Other (specify)
Have you reduced number		a)	Yes
of touches during harvesting		b)	No
and post-harvest?			
If yes, How?			
At what stages do you			
monitor quality? And			
How?			
How do you deal with		a)	Destroy
production during seasonal		b)	Fill the gap or share surplus from/with
market fluctuations			neighbour/friend farm
(low/high seasons)?		c)	Other

How do you doal with labor	a) Hira agual labor
now do you deal with labor	a) mile casual labol
during seasonal fluctuation?	b) Engaging them in other work internally
	c) Sending them temporarily to other firms
	d) Lay off
	e) other
Do you record data?	a) Yes
On what issues do you	b) No
record data?	
Why?	
Do you intend to upgrade to	i) Why?
Silver? Or to get other	ii) If yes, what preparations you started
(higher) labels?	

#### PART V: PRODUCTION

EFFICIENCY & PRODUCTIVITY		
Annual profit before tax		
(how many times have u		
incurred loss?)		
Development (10 years)		
Labour productivity GH	#of workers per area:	
and PH	# of worker per stem	
Development (10 years)		
Unit cost of production of	Unit costs:	
main product (raw material		
cost, labor cost, overhead	Market price:	
costs) & market price		
LABOUR MANAGEMENT		
Share of management to		
total labor strength%:		
Respective educational		
background?		
Share of expatriate		
workers?		
In which positions?		
<b>Development (10 years)?</b>		

TT 1 1 . 1.1 .	
Have locals increased their	a) No
share in management,	b) Yes
technical jobs, supervisors?	
Which group of workers do	a) General workers
you often hire from other	b) Supervisors and other staff
farms?	c) Managers,
	d) Other
How often do you pay wage	
for general workers?	
	a) Yes
a) Do you	b) No
provide	0) 10
colory clips?	
Salary stips?	A
Labour turnover?	Average per year:
Absenteeism?	Average per year:
Unrest downtime?	Average per year:
	Is there a seasonality component?
Does the firm have a labor	a) No
retention strategy?	b) Yes
	What is it?
How is supervision of	
workers organized?	
Are there any	a) Time and productivity based
bonuses/benefits for	b) Discretionary (with bonuses and fines)
workers?	c) Other:
Is training regularly offered	a) No
to workers?	h) Ves
	Which type? Provided internally or externally?
Expanditures on training as	which type? I forface meritary of externally?
Experiatures on training as	
Development in last 10	
years?	
Does the firm have an HR	a) No
department and policy?	b) Yes

Where does firm get information a) Local f	irms
from on markets buyers products b) Foreign	ı firms
technology production etc?	
d) Hired of	consultants
e) Industr	v association
f) Releva	nt ministry/public institution
a) Other:	in ministry/public institution
Is the firm a member of an a) No	
industry association?	
Which'	How often does it meet? Main
henefit	s for your firm?
<b>Does the firm participate in</b> a) Limited	d links with other firms
collaborative schemes or b) Mediu	n links
informally with other firms?	networks
Horizontal/competitors or	ictworks
vertical/competitors of Eoreign firm	
If so, what kind of schemes	
(training input sourcing etc.)?	
How often does the firm seek (a) Not ver	rv often
knowledge or advice from other (b) Someti	mes
firms on how to improve	ften
nroduction and marketing? Which firms?	
	T
COOL-CHAIN	
Do you have cold room at farm? If	a) Yes
ves	h) No
How many hours do flowers stay Min Ma	x
in cold room?	
Do the firm own cold truck?	a) Yes
If no, where do you get the	b) No
service? Name provider	- )
Do you have a cool-chain a) Yes	
management protocol? If yes, b) No	
describe the general objective and	
content?	
Do you have access to cargo a) Yes	5

#### PART VI: SUPPLY CHAIN LINKAGES

If yes, name	
Who handles the flowers until	
loaded on a plane? Specify the	
company.	
Are there challenges related to	a) Yes
cargo booking and handling	No
services?	
If yes, explain	
How does it manage challenges	
with transport and logistics	
providers?	
Who is receiving and handling	
flowers at end market until it	
reaches the buyer? Name the	
company.	
What is your relation with the	a) Buying the service
handling agent/distribution center	b) Joint venture
at end market?	c) Other (specify
Do buyers have responsibility in	a) Yes
relation to logistics and cool-chain	b) No
If yes, what?	
	INPUTS
From where does firm source	a) Local
varieties? Name provider	b) Imports
	c) both
How is your relationship with	a) Not good, unable to get certain
breeders? Explain	b) Discriminations in accessing
	certain varieties
	c) Good, able to access varieties as
	wanted
	d) other
What kinds of planting materials	a) cutting,
do you use?	b) rootstock
Why? Where do you get planting	a) Local firms
materials? Name provider	h) Foreign
indertuis. Tuine provider	c) both
Do you propagate (Seed	
multiplication) plants at your	

farm? If yes, do you sell for others? if no why?	
How do you source inputs (chemical, fertilizers and packaging)? Name provider	<ul><li>a) buy it from local importer/supplier %</li><li>b) Import it internally%</li><li>c) other</li></ul>
What are the main challenges in managing input sourcing?	
Have you faced production or	a) Yes
quality loss due to inputs?	b) No
If yes, how often?	
For how long do you have to	
keep stock?	

#### PART VII: FINANCE & SUPPORT

Does the firm have relationships	a)	Limited links with institutions
with external public & private	b)	Medium links
institutions?Which are most	<b>c</b> )	Close networks
important institutions?		
Does the government (Ministry of	a)	No
Industry, industry-specific	b)	Yes
agencies) provide support		What kind of support services?
services to the sector?		
Does your firm participate in	a)	No
those services?	b)	Yes
		Which? Are they useful?
Does the firm have access to	a)	Yes
sufficient investment and		How?
working capital?	b)	No
Does the firm access finance		Why not?
through state-owned banks at		
special rates?		
Does the firm have access to	a)	No
foreign exchange?	b)	Yes
		How?
How effective is export permit	a)	Very effective
service?	b)	Effective
	c)	Not very effective Why?
How is the quality of utility	a)	Very good
provision?	b)	good
How do you deal with poor utility?	c)	poor
Does the firm interact with any	a)	No
education or research institute?	b)	Yes

	Which ones? How?
Does the firm buy management,	a) No
technical or administrative/IT	b) Yes, Which areas?
consulting services?	From whom?
	a) Foreign firms
	b) Domestic firms
	How often?

# PART VIII: PRODUCT DIVERSIFICATION and SHIFTING

PRODUCT DIVERSIFICATION (HORTICULTURE)			
Where and how do you sell the			
new products?			
What changes did you make to	a) Investment		
deal with new products?	b) Production		
	c) Supply chains and linkages		
What are advantages &			
challenges of working in			
different products and market?			
FULLY SHIFTED	TO NON-FLOWER HORTICULTURE		
When did you shift fully?			
Why did you shift away from			
flower? Explain			
Which technologies and	a. Investment		
knowledge did you transfer	b. End market		
from flower to horticulture?	c. Production		
Explain	d. Others		
What new technologies and	a. Investment		
skills did you need to get for	b. End market		
the new business?	c. Production		
	d. Others		

The Center of African Economies is an interdisciplinary research center within the Department of Social Sciences and Business at Roskilde University. Scholars associated with the Center research and publish on contemporary economic dynamics in Africa with a particular focus on:

- the nature, pace and outcomes of capitalist transformation processes unfolding across the African continent;
- who benefits and how those benefits are shared as well as how the distribution of economic benefits is contested and the implications for political instability; and

• linkages between the regulation of economic transactions and state formation in African countries.



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