



Government of the Netherlands

Climate Smart Agriculture - Opportunities in the Kenyan horticulture sector



Advance Consulting BV

Report prepared for RVO Netherlands
Enterprise Agency and the Embassy of the
Kingdom of the Netherlands in Nairobi,
Kenya

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RVO Netherlands Enterprise Agency and the Dutch Embassy in Nairobi, Kenya commissioned an explorative study regarding opportunities in the Kenyan horticulture sector in the context of climate change. The study has been executed by Advance Consulting BV from Ede, the Netherlands in 2018-2019.

The outcomes of this study are reflected in this document. The findings and conclusions in this report are those of the authors and do not necessarily reflect those of the RVO or the Dutch Embassy in Nairobi.

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List of abbreviations

AECF	Agriculture Enterprise Challenge Fund
CCAFS	Climate Change, Agriculture and Food Security program
CFC	Common Fund for Commodities
CSA	Climate Smart Agriculture
DEG	Deutsche Investitions- und Entwicklungsgesellschaft
DGGF	Dutch Good Growth Fund
FFV	Fresh Fruit and Vegetables
FPEAK	Fresh Produce Exporters Association of Kenya
GHG	Green House Gas
HCD	Horticultural Crops Directorate
EKN	Embassy of the Kingdom of the Netherlands
KALRO	Kenya Agricultural & Livestock Research Organization
KCDMSD	Kenya Crops and Dairy Market Systems Development
KPHIS	Kenya Plant Health Inspectorate Service
RVO	Netherlands Enterprise Agency
SDG	Sustainable Development Goal
SDGP	Sustainable Development Goals Partnership
SME	Small & Medium-sized Enterprises
USAID	United States Agency for International Development

Executive summary

The horticulture sector in Kenya is a major engine for economic growth and development. **Kenya has a large export-oriented horticulture sector and at the same time a growing domestic demand for fresh horticultural produce.** In 2016 the area under horticulture production was well over 600,000 hectares, with a total production value of EUR 1.8 billion. Major drivers for sector growth are the sustained demand for high quality fresh produce in several European export markets (Great Britain and the Netherlands in particular) as well as in the rapid urbanisation in Kenya.



Figure 1: Young pepper transplants in sandy field with flood irrigation in a SME farm

To maintain competitiveness the Kenyan horticulture growers, traders and other businesses have to continuously innovate and improve their performance. In addition to domestic and international market forces, **the effects of climate change pose a growing challenge to the Kenyan horticultural sector. This particularly applies to the Kenyan small and medium sized enterprises.**

Rainfall in East Africa has become unpredictable, with periods of drought increasingly being interspersed with periods of excessive rainfall. These climatic changes affect production directly as well as indirectly. Changes in precipitation have direct consequences for plant growth and facilitate the increased presence and outbreaks of pests and diseases, both existing and new. Yields and income levels in the (rainfed) agricultural sector are seriously affected by climate change.

Dealing with these climate related risks and challenges requires the adoption of improved

products, approaches and technologies. **The Dutch horticultural supply industry is well positioned to assist horticultural businesses in Kenya.** The key question is how to better match the growing demand for climate smart agriculture (CSA) solutions in Kenya with the existing Dutch supply of innovative CSA products, techniques, technologies and services.

The Embassy of the Kingdom of the Netherlands (EKN) in Nairobi and the Netherlands Enterprise Agency (RVO) work together with public and private partners to strengthen the Kenyan horticulture sector. They commissioned this study with the overall goal to facilitate the uptake of Dutch and other technologies, products and services which lead to more productive and (climate) resilient horticulture SMEs in Kenya.

The study has **four main objectives:**

- Investigate the (technical) gaps in the use of effective climate-smart technologies by Kenyan medium and small-scale commercial horticulture farms and their supply chain partners;
- Identify promising CSA products and services from Dutch and other companies and organizations;
- Identify and review business opportunities for Dutch initiatives in Kenya;
- Identify what strategies and conditions contribute positively to the innovations leading to more productive and climate resilient horticulture SMEs in Kenya.



Fig. 2: Healthy potato crop grown from disease-free planting material

The study carried out by Advance Consulting from the Netherlands focused on the Kenyan horticulture sector in general and the sub-sectors dominated by the Small and Medium Sized Enterprises (SME's) in particular. The consultants conducted many interviews and discussions with horticulture farmers, input supply companies, sector organizations, research institutes and other stakeholders in the horticulture sector, both from the Netherlands and Kenya. This provided much of the findings and conclusions presented in this report. In addition existing data and reports on climate smart agriculture in Kenya were used.

Based on a large number of interviews it can be concluded that **SME farmers in Kenya are aware of the risks of climate change** to their horticultural businesses. They report erratic rainfall patterns, the increased prevalence of pests and diseases, temperature variability, the lack of infrastructure (storage and transportation) and lack of access to technical information (on meteorological data and on CSA solutions) as key challenges to their level of climate resilience. Other common challenges are the scarcity and increasing costs of labour, limited access to farm mechanization and post-harvest equipment, lack of financing opportunities for agricultural production and capital investments and price volatility.

The above-mentioned challenges offer opportunities for Dutch companies to become active in the Kenyan horticulture sector. From the interviews with farmers and an assessment of the horticulture sector, the most **promising market segments** were identified:

- ✓ Products and technologies aimed at farm productivity improvements; there is considerable potential to increase yields, improve quality and optimise input utilisation
- ✓ Forecasting, agricultural advice and market-data services; SME growers mentioned a clear demand for improved meteorological data, but also market data and cultivation advisory services are required.
- ✓ Post-harvest handling and management (including storage); post-harvest losses are very high in Kenya and the demand for improved fresh produce handling and storage practices and equipment is high.

- ✓ Financial services for agri-food businesses; SME growers in Kenya are part of the classic 'missing middle' when it comes to financing and there is a need for small to medium sized funding solutions and products (ranging often between USD 50,000 and 500,000)

Getting access to the Kenyan horticulture market is not always straightforward and easy. It requires additional efforts and **three different market entry models and strategies for CSA solutions, products, technologies or services** are identified for the Kenyan horticulture sector. These are:

- A. *Market access through local presence and direct sales*; it requires considerable initial investments to have a local subsidiary or dedicated agency, but it pays off in terms of customer loyalty and sustained sales.
- B. *Market access through collaboration with upstream supply chain partners*; collaboration with a supply chain partner (e.g. an existing input supplier) with an established network and good reputation is an alternative option with less upfront investments. The success of this approach hinges on finding a partner who has a complementary product or service and has a clear interest in also promoting your products and services.



Figure 3: Kenyan wholesale company sourcing eggplants from SME growers in Mukueni

C. *Market access through collaboration with downstream supply chain partners;* The third market-entry model is based on accessing the market through a cooperation with the main clients of the SME growers including for example local aggregators, wholesalers, supermarkets, processors and exporters. The key to successful cooperation with these downstream supply chain partners is finding a win-win between their commercial interests and your products and services. This could for example include a better quality or more reliable supply of fresh produce.

For each model inspiring examples already exist. A range of Dutch, Kenyan and international companies operate successfully in the four high-potential market segments identified. From these inspiring cases, important lessons can be drawn for Dutch new market entrants willing to supply Kenyan SME horticulture farmers with CSA solutions. These examples are described in this report.

Common challenges that entrepreneurs starting in Kenya will need to overcome are

- a) a lack of knowledge and expertise on CSA solutions in the Kenyan context;
- b) a lack of available financing for both farmers and entrepreneurs;
- c) high transaction costs;
- d) a slower pace of business and
- e) difficulties attracting and keeping good staff.



Figure 4: Smallholder tunnel and drip irrigation tank in Machakos District, Kenya

New entrants can also learn from a range of **common characteristics of successful companies** in Kenya’s SME horticulture sector – success factors

which new companies can strive towards. These include having a strong local presence (either by the company itself or through strategic partnerships with a strong, reliable partner that has this local presence; a willingness and ability to continuously learn and adapt; deep understanding of the local target market; having a clear long-term commitment and the financial capacity to invest for the long-run; and lastly, following a clear business model and doing so in a business-driven manner.

To help Dutch companies develop their businesses in the Kenyan SME horticulture sector, several **support programs and financial instruments** exist. Aspiring market-entrants can co-finance their initial market research, start-up activities or further expansion into the Kenyan market with a range of options from the Dutch government and other international funds and donors. Realism about farmer willingness and ability to pay for new products or services is crucial for the development of a strong and winning business case.

Chapter 1. Setting the scene

1.1 Kenyan horticulture faces the threat of climate change

Agriculture is crucial to Kenya's economy and development path. The sector directly contributes 26% of the country's Gross Domestic Product (GDP). Another 27% of GDP is contributed indirectly by agriculture through linkages with other sectors. It is estimated that 65 per cent of Kenya's export earnings derive from agriculture. In terms of employment, the sector employs more than 40% and more than 70% of Kenya's rural population. Agriculture offers livelihood opportunities to millions of Kenyans.¹ Given these impressive numbers, the Government of Kenya recognizes that agriculture is absolutely critical to growing the nation's economy, reducing the cost of food, alleviating poverty and assuring food and nutrition security across the country.²

Within the agriculture sector, horticulture has the greatest commercial significance. The development and steady growth of Kenya's horticulture sector in the past three decades is widely acknowledged as a success story. Kenya has become a major exporter of fresh produce to Europe and continues to tap into new markets in Russia and the Middle East. At the same time, driven by rapid population growth, urbanization and a growing middle class, domestic demand for Kenya's fresh produce is at an all-time high. In 2016 the total value of fresh fruit and vegetables (FFV) marketed in Kenya amounted to USD 1.46 billion. Around 21% (USD\$ 310 million) came from the export of fresh fruits and vegetables and another 79% (US\$ 1.15 billion) from the domestic sector.³

Kenya's horticulture production is largely concentrated in a small number of Kenyan counties with excellent suitability in terms of geography and climate. The top 15 of the 42 counties supply 74% of the total horticultural output (see Figure 5).⁴ In 2016 the area under horticulture production was well over 600,000 hectares, with a total production value of EUR 1.8 billion. The most productive sub-sector is (the exports of) cut flowers, which make up 32.7% of total horticulture value, with vegetables and fruits making up 33.9% and 26.6% of total horticulture value respectively.

In 2016 Kenya exported a total of Ksh 102 billion (EUR 887 million) worth of flowers, fruits and vegetables. In 2017 this grew to Ksh 115 billion (EUR 1 billion) while Kenya's export in the first eight months of 2018 already totalled Ksh 104 billion (EUR 904 million) (versus Ksh 75 billion (EUR 653

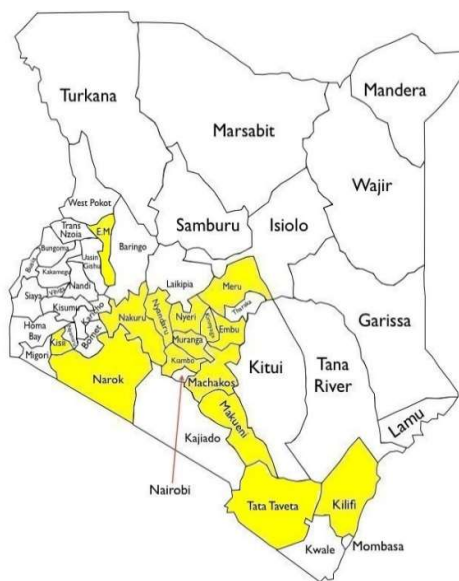


Figure 5: Main horticulture production counties

1 FAO (2019) Kenya at a Glance. <http://www.fao.org/kenya/fao-in-kenya/kenya-at-a-glance/en/>

2 Government of Kenya (2019) Agricultural Sector Transformation and Growth Strategy 2019-2029. <http://www.kilimo.go.ke/wp-content/uploads/2019/01/ASTGS-Full-Version.pdf>

3 Horticultural Crops Directorate (2016) Horticulture Validated Report 2015-2016. Agriculture and Food Authority, Kenya.

4 A more detailed overview of the horticulture sector in Kenya can be found in annex E.

million) in the same period a year earlier). Kenya's largest share of export earnings is made from cut-flowers, but the high growth rates are shared among all flowers, fruit and vegetable products.

Kenya's thriving horticulture sector faces major challenges due to the negative effects of climate change.

Rainfall has become unpredictable, with periods of drought increasingly being interspersed with periods of excessive rainfall. These climatic changes affect production directly as well as indirectly. Changes in precipitation have direct consequences for plant growth and facilitate the increased presence and outbreaks of pests and diseases, both existing and new. Yields and income levels in the (rainfed) agricultural sector are seriously affected by climate change.

The World Bank recently reported that the start of Kenya's 2019 production season was delayed due to an exceptionally long rainy season (March – May 2019), risking a negative effect on harvests. Below average short rains (October – December 2018) are expected to put the sector under further pressure.⁵ These World Bank reports are in line with observations and concerns voiced by a range of scientists who predict that climate is increasing average temperatures, will increase precipitation variability, cause more erratic rainfall patterns, and will negatively affect the harvests of a range of key crops in Kenya.⁶

Climate change has great impact on agricultural systems around the world, including Kenya. It increases existing production risks and brings new challenges to smallholder farmers, commercial farmers and agribusinesses. It makes agriculture-based livelihoods more vulnerable and poses a threat to food security across the globe. SME farms in Kenya-responsible for 80% of the country's domestic food production) have limited access to physical, economic and financial resources that help them adapt to and mitigate the risks of climate change. So far, the SME farmers in Kenya have achieved production growth primarily through expansion of the cultivated areas rather than through yield increases, pointing to limited adoption of new technologies and agricultural innovations.

1.2 Climate Smart Agriculture: a broad array of solutions to key climate threats

In response to the climate challenges in agriculture worldwide, the **climate-smart agriculture approach (CSA)** was born. CSA is an approach that helps to guide actions needed to transform and reorient agricultural production and supply systems to effectively support development and ensure food security in a changing climate. CSA aims to tackle three main objectives: (a) sustainably increasing agricultural productivity and incomes; (b) adapting and building resilience to climate change; and (c) reducing and/or removing greenhouse gas emissions, where possible.⁷ The three pillars of the approach are productivity, adaptation and mitigation:

- I. **Productivity:** CSA aims to sustainably increase agricultural productivity and incomes from crops, livestock and fish, without negatively impacting the environment. Sustainable intensification of agricultural production systems should lead to more efficient use of water, soils and other natural resources, while providing the farmers with the necessary incomes to sustain investment levels in more resilient and productive food systems;
- II. **Adaptation:** CSA aims to reduce the exposure of farmers to short-term production and business risks, while also building their capacity to adapt farming operations to the longer-term effects of climate change;

⁵ WorldBank (2019) Kenya's Economic Outlook Remains Stable Amid Threats of Drought in 2019. www.worldbank.org/en/news/press-release/2019/04/08/kenyas-economic-outlook-remains-stable-amid-threats-of-drought-in-2019

⁶ See for example: Adhikari, U. et al (2015), Climate change and eastern Africa: a review of impact on major crops; in Food and Energy Security published by John Wiley & Sons Ltd. and the Association of Applied Biologists (p. 110 -132)

⁷ Lipper et al (2014) Climate-smart agriculture for food security: www.nature.com/nclimate/journal/v4/n12/full/nclimate2437.html

- III. **Mitigation:** Wherever and whenever possible, CSA also contributes to the reduction and/or removal of greenhouse gas (GHG) emissions, e.g. by using less fossil fuel during the production processes, introducing new soil management practices and reducing deforestation.

A wide array of possible and potential solutions and opportunities to make agricultural systems more climate-smart has been identified by CCAFS⁸. They are listed below in two main categories: (1) Techniques and technologies that facilitate climate-smart production practices at the farm level, and (2) Products and services that improve value chains, systems and the enabling environment around farmers and agribusinesses. The solutions and opportunities related to both categories are further explained in the two sub-sections below.

1.2.1 CSA techniques and technologies that facilitate climate-smart farming

- ✓ **Improved crop production:** Examples include use of new varieties including higher-yielding and shorter-duration varieties, or those with resistance or tolerance to particular climate shocks such as drought, flood or salinity; improved crop nutrient management; farm diversification and intercropping, crop rotation, increased cultivation of perennial crops.



Figure 6: Use of a shade net in Makeni County (source: AC)

- ✓ **Improved soil management:** Examples include minimum tillage or conservation farming; promoting soil coverage such as mulching; avoiding nutrient losses, carbon losses, rainfall run-off, soil erosion and accumulation of contaminants in the soil; maximising use of organic fertilisers and optimising use of inorganic fertilisers.

- ✓ **Improved water management:** examples include improved water harvesting, capturing and retention of rainfall, increased water use efficiency measures; efficient irrigation systems and practices, including drip irrigation.



Figure 7: Drip irrigation in Machakos (source: AC)

- ✓ **Improved energy management:** techniques and technologies to reduce energy losses and increase energy efficiency; use of renewable energy applications; reducing reliance on fossil energy.

1.2.2 CSA products and services that improve value chains and the enabling environment

- ✓ **Value chain approach:** examples include increasing supply chain efficiencies through waste reduction, improved storage to reduce post-harvest losses, opportunities to increase access to markets, improved input production, improvements in logistics and transport.
- ✓ **Access to finance:** increasing access to finance for climate-smart investments at the level of farmers and SME agri-businesses part of the value chain; de-risking bankable agri-food businesses in climate smart value chains; Results Based Financing for Green energy and other climate smart technologies.

⁸ CCAFS (2017) Climate Smart Agriculture 101 – CSA Guide. <https://csa.guide/>

- ✓ Index-based insurances: Index insurance (often coupled with access to credit) to allow farmers to better manage production and market risks and to invest in improved practices.
- ✓ Climate information services: Providing farmers and farming businesses with weather information that is timely, adequate, accessible.

1.2.3 CSA: a clear priority for the public and private sectors of Kenya and the Netherlands

The Government of Kenya has long recognized its vulnerability to climate change and gives clear priority to it in its recent policies. With the technical support of the CGIAR's CCAFS program (introduced in section 1.2), the Government of Kenya has drafted its national policy on climate change. In its National Adaptation Plan 2015-2030⁹ the Government lays out its ambition to make Kenya's agricultural value chains resilient to climate change. The promotion of sustainable and climate smart agriculture methods are considered key to creating climate resilience.

Understanding the great challenges posed by climate change, the Government of the Netherlands gives clear priority in its policy for international development cooperation to food security, sustainable agriculture and water management. In its Multiannual Country Strategy for the country¹⁰, the Embassy of the Netherlands in Kenya gives further shape to this policy. The Embassy is committed to help Kenya better prepare for the effects of climate change and underlines that climate action is a crucial part of the Netherlands' efforts to help Kenya become more sustainable and productive.

Against this background of policy support for CSA, it is clear that also the private sector can play a unique role in the development and distribution of innovative technologies and services for Climate Smart Agriculture. The longlist of CSA products, services, techniques and technologies presented in the previous section all have great potential relevance for the Kenyan horticulture sector. While several agronomy-related techniques and technologies mentioned in 1.2 may appear to be 'basic' good agricultural practices, they still need to be applied in location-bound contexts of specific production areas and value chains. Other products, techniques and services listed may or may not exist yet and still need to be developed, piloted or rolled-out at scale in the Kenyan horticulture sector. As such, they point to concrete business opportunities relevant to Dutch businesses, in particular the Dutch horticultural supply industry which is strongly developed in the Netherlands.

In the remainder of this report, light will be shed on farmer perspectives regarding their demand for CSA solutions, and entrepreneur perspectives regarding the highest-potential opportunities for Dutch companies. Why and how we arrived at these insights is explained in the next section.

1.3 The study: Dutch CSA businesses opportunities in the Kenyan SME horticulture sector

Several Dutch companies have anticipated current and future climate challenges in the Kenyan horticulture sector. Frontrunning companies have already developed innovative CSA products, techniques, technologies and services, piloted them and have entered the Kenyan market with their solutions.

The further roll-out and market penetration of Dutch CSA products, services and innovations is welcomed by the Embassy of the Kingdom of the Netherlands (EKN) in Nairobi and the Netherlands Enterprise Agency

⁹ See https://www4.unfccc.int/sites/NAPC/Documents%20NAP/Kenya_NAP_Final.pdf

¹⁰ See <https://www.government.nl/binaries/government/documents/publications/2019/08/13/the-netherlands-and-kenya/The+Netherlands+and+Kenya.pdf>

(RVO). For this reason, the EKN and RVO commissioned a study with the overall goal to contribute to the facilitation of the uptake of Dutch technologies, products and services which lead to more productive and (climate) resilient horticulture SME's in Kenya. The study has the following objectives:

1. Investigate the (technical) gaps in the use of effective climate-smart technologies by Kenyan medium and small-scale commercial horticulture farms and their supply chain partners;
2. Identify promising CSA products and services from Dutch companies and organizations;
3. Identify and review business opportunities for Dutch initiatives in Kenya;
4. Identify what strategies and conditions contribute positively to the innovations leading to more productive and climate resilient horticulture SMEs in Kenya.



Figure 8: A removed irrigation system in Machakos County (source: AC)

The study carried out by Advance Consulting from the Netherlands focused on the Kenyan horticulture sector in general and the sub-sectors dominated by the Small and Medium Sized Enterprises (SME's) in particular. The focus on the SME horticulture sector is based on the assumption that this sector has a largely untapped commercial potential and that the Dutch horticultural supply industry can add value and create impact.

The study therefore excluded the segment of large companies involved in high value exports of cut flowers and (fresh, semi-processed and processed) horticultural produce. These large companies often operate with foreign direct investment and frequently have access to the latest technologies and information. Smallholder farmers who only or mainly produce for their own subsistence were also not included, given the fact that their (financial and operational) capacity for the uptake of new technologies and services is very limited.

The study is based on a combination of desk research into climate change and CSA in Kenya and an extensive series of interviews and discussions with horticulture SME farmers, input supply companies, sector organizations, knowledge institutes and other stakeholders in the horticulture sector, both from the Netherlands and Kenya (see text box 1). In total 48 interviews were held.

Text box 1: Overview of key stakeholder groups represented in the interview series.

1. **SME farmers:** These are all small and medium commercial growers. They produce fruits and vegetables commercially for the domestic and/or export market, have employees and invest in irrigation systems. The goal of the farmer interviews was to assess the gaps in the use of effective climate-smart agriculture technologies in the Kenyan horticulture sector and determine effective and latent demand for CSA techniques and solutions.
2. **Kenyan key organizations in the horticulture sector**, including the Kenya Agricultural & Livestock Research Organization (KALRO), Fresh Produce Exporters Association of Kenya (FPEAK), Kenya Plant Health Inspectorate Service (KEPHIS).
3. **Kenyan processors and exporters**, companies that procure the horticulture produce from the SME farmers and after aggregation, sorting grading and/or processing supply the (export) markets.
4. **Dutch companies and organizations**, with whom potential CSA solutions were discussed and, more importantly, discussions were held about what determines a successful market approach in the Kenyan horticulture sector.

All interviews were guided by a semi-structured interview template which contained questions on general farmer or company details, trends and development in Kenyan horticulture, weather and climate, markets, farming and productivity, the role of the government and access to finance. The interviews sketched a rich picture of farmer perceptions on climate change and were instrumental to categorize the main market segments where opportunities lie for Dutch companies.

1.4 Outline of this report

This introductory chapter described the climate change challenge that the Kenyan horticulture sector faces and provided a general overview of the CSA approaches and solutions available. This was followed by a brief presentation of the broad array of potential techniques, technologies, products and services to facilitate climate-smart farming and enabling systems around farmers and agribusinesses. From these starting points, the goal, approach and methodology for the overall study was described. In the remaining chapters, the results of the interview rounds, further desk research and analysis are presented.

Chapter 2 provides a summary overview of the experiences from Kenyan commercial SME farmers regarding climate change and other key challenges they face to make their businesses more successful and climate resilient. The chapter touches upon CSA solutions that are frequently adopted by interviewed farmers and sheds light on their effective and latent demand for CSA products and services.

Chapter 3 describes and illustrates different models and strategies for entering the Kenyan market with CSA solutions, products, technologies or services. Three main models are presented: (a) Market access through local presence and direct sales; (b) Market access through collaboration with upstream supply chain partners; and (c) Market access through collaboration with downstream supply chain partners. For each model, inspiring examples are showcased from pioneer companies and established businesses in the Kenyan context, operating specifically in the high-potential market segments identified in chapter 2.

Chapter 4 builds on from the successful models and cases presented in chapter 3, summarizing some of the main challenges these companies have had to overcome to successfully bring their CSA products and services to the Kenyan market. These are challenges which new entrants can expect to encounter as well. This is followed by an outline of the common characteristics of companies successful in Kenya's SME horticulture sector – success factors which new companies can strive towards. The final section outlines various support programs and financial instruments that aspiring market-entrants can make use of to co-finance their start-up or further expansion into the Kenyan market.

Lastly, the annexes provide overviews of the companies and other stakeholders interviewed as well as a brief background overview of the current Kenyan horticulture sector.

Chapter 2. Kenyan SME farmer perspectives and demand for CSA solutions

This chapter gives a deeper insight into the climate-related challenges faced by Kenyan SME farmers in the horticulture sector. From a range of interviews with local farmers and other entrepreneurs, the prevailing perspectives and experiences related to climate change are laid out. The local knowledge and experiences are corroborated by research findings. The chapter further dives into farmer demand for CSA solutions and sheds light on the degree of adoption (or lack thereof) of technologies and services already available in the Kenyan market.

2.1 Profile of interviewed SME horticulture farmers

The findings in this chapter are the result of 26 interviews with stakeholders in the Kenyan horticulture sector: 16 on-site interviews with Kenyan horticulture farmers and 10 interviews with processors, exporters and agricultural organizations.¹¹ The 16 farmers engaged for this study are located in seven counties: Embu County (3), Kiambu County (1), Kilifi County (1), Machakos County (4), Makueni County (3), Nakuru County (2) and Nyandarua County (2) (see Figure 9).

A visual overview profiling the interviewed farmers is provided in Figure 10. The interviewed farmers all run a commercial operation and have various employees to support them in management of the farm. These are farmers who tend to be fairly experienced in growing fruits and vegetables, some of them also producing for export markets. The average interviewed farmer is in his or her 40s and 50% of them have a high education level.

The average plot size of the interviewed farmers is 145 acres with a median of 50 acres. The largest farm in the sample grows produce on 620 acres with the smallest farm being just 2 acres. Protected cultivation is an exception; only two SME farms have a small greenhouse for sensitive crops or for the purpose of seedling production. All farmers have access to irrigation, which is considered a precondition for being successful as a commercial horticultural farmer.

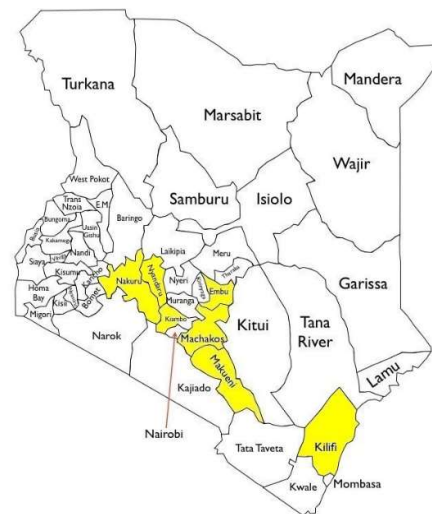


Figure 9: Counties visited for interviews

Kenyan farmers are generally optimistic about the potential of the Kenyan horticulture sector. The interviewed SME farmers confirm this positive outlook, especially confirming the high demand for the fruits and vegetables they produce. They generally do not need to travel to a market to sell their produce, as buyers come directly to their farm to carry out the harvest and close the purchase. Interviewed farmers supplying to export markets (either directly or through specialized exporters) even mentioned that they experience a steady increase in demand for their quality produce. Their perceived increase of foreign demand for Kenyan fresh produce is backed-up up by industry data.¹²

¹¹ A full list of interviews and farmer details can be found in the annexes

¹² See for example www.businessdailyafrica.com/markets/marketnews/Horticulture-nets-Kenya-Sh305-billion/ and www.hortidaily.com/article/9043163/kenya-horticulture-export-earnings-growing/.

Climate Smart Agriculture – Opportunities in the Kenyan Horticulture Sector

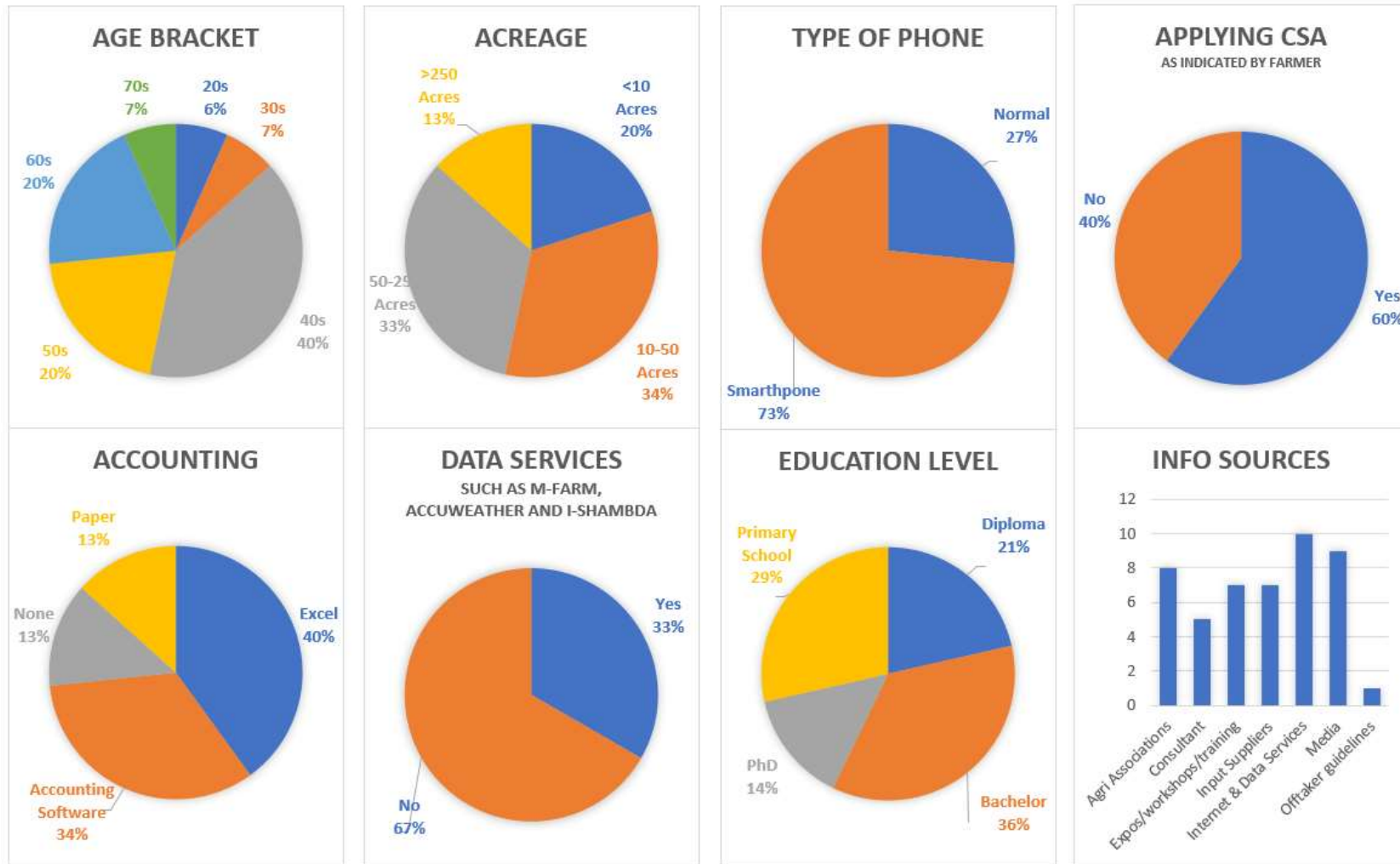


Figure 10: Profile of interviewed farmers

2.2 Climate-related challenges of Kenyan SME horticulture farmers

Erratic rainfall patterns (leading to both droughts and floods) and temperature changes are reported as the most pressing climate change issues identified by Kenyan SME horticulture farmers. These issues directly affect farmers’ production capacity and for this reason are the most noticeable to them. Figure 11 summarizes the main challenges identified by Kenyan SME horticulture farmers. The main challenges will be discussed in more detail in this section, illustrated by short reports of interviewees.

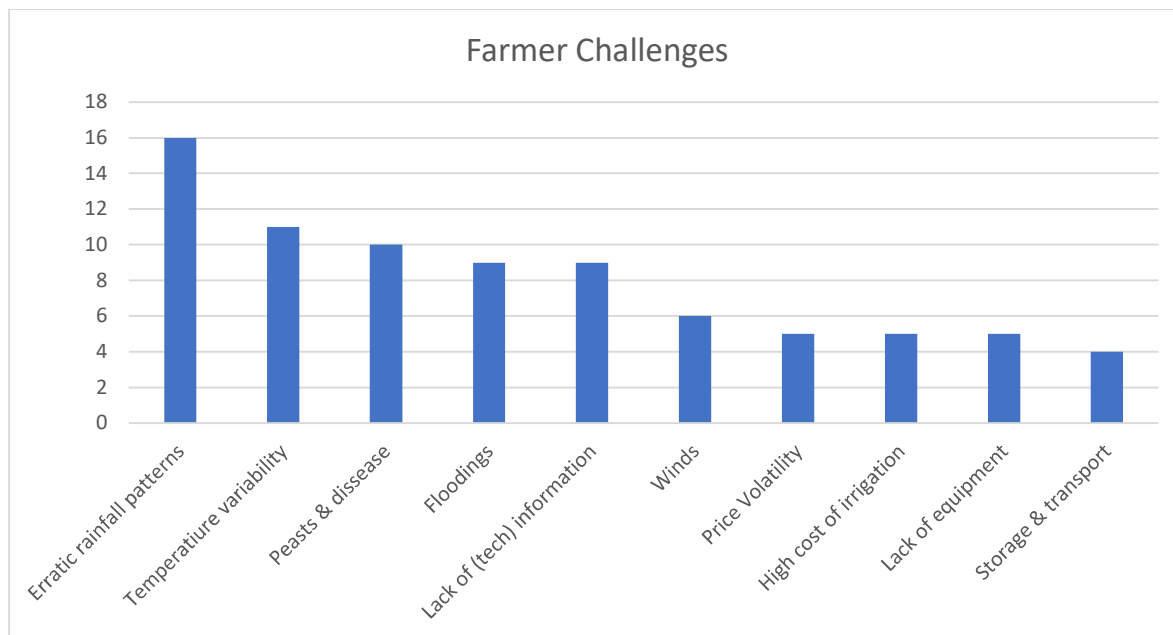


Figure 11: Main CSA-related challenges mentioned by SME horticulture growers

2.2.1 Erratic rainfall patterns

Dealing with the erratic rainfall patterns is by far the most important challenge for the Kenyan horticulture farming sector. The issue of erratic rainfall came up in every interview and is perceived as the largest threat for the development of the horticulture sector.

The main observation of farmers is that Kenyan weather patterns have changed significantly over the last decades. In the past, Kenya knew two clearly defined rainy seasons, the long rains and short rains, which followed a predictable pattern. Farmers knew what to expect and at what time to plant. Nowadays, the rains may come too early or too late, sometimes they do not come at all, or they come with increased intensity.

Vert Limited works with 1,800 smallholder horticulture farmers from whom they source products that are exported to Europe. They indicated that the 2018 long rains (April) were the worst rains in recent times. The excessively heavy rains damaged a significant amount of their outgrowers’ crops.

Throughout their normal productions cycles and in times of drought, many commercial SME farmers rely on (drip) irrigation. While droughts do occur, farmers mention that their biggest headache is not so much the lack of rainfall, but the unpredictability of the rains and especially the excessive rains and flooding that now occur more often. Most horticultural SME farms cultivate in the open field rather than under protected tunnels. Excessive

rainfall and flooding significantly damage farmers' crops. The associated soil erosion following from this leads to losses of fertile topsoil, putting also the long-term fertility of agricultural lands at risk.

2.2.2 Increased prevalence of pests and diseases

The increased prevalence of pests and diseases is another frequently mentioned challenge. The increased disease pressure is directly related to changes in weather patterns, such as the erratic rainfalls, different levels of humidity and an increase in temperature variability.

While hot weather causes an increase in bacterial infections, colder weather leads to increasing fungal infections on fruits and vegetables. Changing weather patterns also influence insect populations, which can cause direct damage to crops or indirect damage as vector of plant diseases. A frequently mentioned example is fruit flies, for example the *Bactrocera dorsalis*, a species of fruit fly originating in Asia but which now thrives in Kenyan mango orchards as an effect of overall increasing temperatures.

2.2.3 Temperature variability

Farmers are also struggling with increased changes in temperatures and greater temperature variability. In addition to the frequent changes, farmers notice that the cold days have become colder and the hot days have become significantly hotter. In open field crops which most interviewed farmers cultivate, the higher temperatures lead to higher evapotranspiration. This in turn forces the farmer to irrigate more, leading to higher costs of production.

Farmers who rely on surface water for their irrigation systems are also facing a reduction of available water, since the hot weather and lack of rain deplete the water level in rivers and ponds. The hot weather therefore exacerbates the droughts from delayed and/or reduced rainfall. In addition to its effect on water and water management, the hot temperatures also lead to increased crop diseases.

'Temperatures in Nyandarua area have been extreme over the last few years. Notably, temperatures during the day are very high, with nights being excessively cold. Both extremes have had negative effects on the vegetables on the farm. Frost is a major challenge and has been noted to occur in the months of January, June, and in September.'

– Joseph Theuri, owner Edenville Farm in Nyandarua.

2.2.4 Lack of infrastructure: storage and transportation

Farmers as well as traders/exporters interviewed all pointed out that Kenya's infrastructure is insufficient to get produce from farm to market in an efficient way, especially in the SME farmer segment. Large growers and exporters can invest in their own infrastructure such as trucks, warehousing, storage and cold rooms. SME farmers depend on third parties for these kinds of services.

None of the farmers interviewed had access to proper storage facilities - they all depend on off-takers to come to their farms, to harvest and purchase their produce at the right time. Buyers only harvest the produce that they want to buy, limiting the harvest period to the moments that a buyer is present on the farm. Fruits and vegetables that are



Figure 12: Traditional charcoal-padded cold room in Embu

not yet ready for harvest, are not purchased and can be lost if buyers do not return, especially when SME farmers have no alternative to get their produce to the market. As a result, the losses in volume and quality are high in these supply chains. These losses are discounted from the farm-gate prices that the SME growers receive.

While the lack of infrastructure for storage and transportation is not a result of direct changes in climate, improvements in this area directly contribute to reducing food losses and increased income generating opportunities (for both farmers and their buyers).

2.2.5 Access to technical information

Extension services oriented towards improved horticultural production and especially towards short- and long-term climate change adaptation and commercially viable productivity enhancing strategies are largely unavailable to SME farmers. While farmers always aim to optimize their production systems within the circumstances they operate in, there is a clear need and demand for quality extension services.

In the past, public extension officers advised farmers (free of charge) on crop and soil management and the general trends and development in the markets. However, the services were discontinued about two decades ago due to the high public costs. Local government bodies that are involved in agricultural production, specifically KEPHIS (Kenya Plant Health Inspectorate Services) and HCD (Horticultural Crops Directorate), play an important role in quality control of especially export crops. In the eyes of farmers these organizations could be of greater support if they would provide more practical guidelines and information on successful climate smart practices.

While some SME growers can afford to hire their own agronomists or horticultural consultants to advise them, others are largely left on their own without the ability to pay for private extension services. Most interviewed SME growers therefore rely on their agro-input dealers for advice on crop protection. Farmers require, however, unbiased advice as opposed to the current scenario where agro-companies give advice with the intention of selling their own products and services.

Various farmers also mentioned the lack of weather and climate forecasting data and services. Improved meteorological reporting systems with more accurate forecasts of rains and other forthcoming climatic conditions could be of tremendous benefit to the horticulture sector.

2.3 Other important challenges reported by farmers

Throughout the interviews, farmers also mentioned a range of issues not directly related to CSA. These are worthwhile to mention here, since they directly influence SME farmers' demand, willingness and capacity to pay for CSA solutions and innovations.

- Scarcity and increasing costs of labour:

All horticulture farmers rely on outside labour for their production process. One of the challenges in this regard is that the costs of labour has increased, especially in areas with a lot of agricultural activities. During harvest seasons it can be very difficult to get casual labour for the farm, since people are tending to the harvest of their own (small) farms.

- Lack of access to mechanization and equipment

Many SME growers face a lack of access to mechanization and equipment. Farmers cite the high investment and maintenance costs of farm equipment as the major reason.



Figure 13: Farm tractor in the larger-scale Kibwezi farm in Makeni (source: AC)

- Lack of financing opportunities for agricultural production and capital investments:

Many farmers and organizations mention the government-imposed interest rate cap as a big deterrent to agricultural loans. In September 2016 the Kenyan government imposed a rate cap of 4 percent-points above the central bank rate. Due to the cap, private sector lending in Kenya decreased from 9.3 percent in 2016 to 2.4 percent in 2017¹³. Furthermore, farmers complain that banks do not understand agricultural business models and are therefore hesitant to lend money for agricultural investments. Whereas *smallholder* farmers are increasingly receiving improved access to agricultural loans¹⁴, either through inputs on credit of micro-credit schemes, small and medium-sized commercial farmers must rely on the informal financial markets. This is a clear example of the ‘missing middle’ in financing opportunities in East-Africa. In addition, many agricultural supply companies do not sell on credit. The lack of investments in the agricultural sector hamper the development necessary to develop Kenya’s agricultural sector and feed Kenya’s fast-growing population.

- Price volatility:

SME farmers who mostly grow their crops for the domestic market cite challenges with price volatility. There is still a frequent mismatch between supply and demand. This is further aggravated by the fact that there is a general lack of (cool) storage infrastructure.

2.4 Effective and latent demand in the face of increasing farmer risk

In the face of climate change, farmers’ production risks, financial risks and market risks continue to increase. Farmers continuously try to find solutions for the production challenges they face. During the farmer interviews, an inventory was made of CSA solutions currently in use by SME farmers, as a means to identify effective demand. The most important ones are the use of (drip) irrigation and quality seeds. Farmers also apply several good agricultural practices that are relevant for climate adaptation. SME farmers portray limited knowledge and awareness of other CSA solutions apart from solar applications.

2.4.1 Farmers’ increased production risks, financial risks, and market risks

From the range of issues and challenges identified by the interviewed SME farmers, a key conclusion to be drawn is that the risk of farmers continues to grow in the face of climate change. Farmers’ increased production risks are most directly linked to climate change, with crop failure or sub-optimal production driven among others by changing weather patterns, an increase in pests and diseases and a lack of technical support for SME growers on CSA practices. Farmers’ increased financial risks and high market

¹³ <https://uk.reuters.com/article/uk-kenya-economy/kenyas-parliament-approves-retaining-interest-rate-cap-against-imf-wishes-idUKKCN1LF1L4>

¹⁴ For example from companies/organizations like One Acre Fund, FarmDrive, Apollo Agriculture, Sunculture, Agrics, etc.

risks are caused by among others erratic weather patterns and high costs of inputs. Growers do not reach optimal yields and quality levels, lack of storage facilities and no back-up for off-takers, which aggravates the risk of financial insolvency.

A lack of private and governmental investments in the Kenyan agricultural sector leads to a lack of financing opportunities for SME horticulture growers. Investors, such as local banks, perceive the market risks in the agricultural sector as too high when compared to other sectors such as real estate and retail, while the government allocates only a limited part of the national budget to the sector.

West Rift Feeds is a 185-acre farm near Naivasha in Nakuru County. The farm uses a centre pivot irrigation system to enable year-round production of cabbages, French-beans, chillies and pumpkins for the local market and broccoli for export markets. The company pays over \$5,000 in monthly electricity and fuel bills to operate their irrigation system. High operational expenses pose a risk to companies such as West Rift Feeds in the light of increasing climate related production failures.

2.4.2 Effective demand: mostly limited to irrigation solutions and quality seeds

The use of **(drip) irrigation** is the most important CSA adaptation to drought by Kenyan SME growers. Although irrigation is considered a high cost, all interviewed farmers use an irrigation system on their farms. The majority of farmers have a drip irrigation system, with a small number of farmers using sprinkler irrigation. For farmers relying on rivers for their irrigation systems, the erratic rainfalls have more implications than for farmers who use water from boreholes. In periods of drought the water volume in rivers is reduced and access to enough water for irrigation may become difficult.

All interviewed farmers report that they invest in **quality seeds**. The companies and brands from which seeds are bought are highly diverse, ranging from large international seed companies to lesser known local brands or input suppliers. Without entering into debate about the *actual* quality of the seeds purchased by SME farmers, their keen interest to obtain quality seeds is translated into actual spending and thus clearly indicates effective demand.

Text box 3: Effective and latent demand

*A simple definition of **effective demand** is the quantity of a good or service that consumers are actually buying at a current market price.*

*In turn, **latent demand** is demand for a product or service which a consumer cannot (yet) satisfy for different reasons: the product or service is not affordable, it is unavailable or the consumer simply doesn't know yet that it is available.*

Farmers apply **climate-smart agricultural practices and techniques** as well. One hundred percent of interviewed farmers applies crop rotation. At least five of the interviewed farmers adopt climate-smart techniques by planting their crops on terraces with the aim of avoiding soil erosion as a result of excessive rains. A small number of farmers reported they practice rainwater harvesting and storage. Frequently, farmers do not perceive or denominate such practices as specifically *climate-smart*, considering them instead as common good agriculture practices that help them enhance crop growth and increase their yields.

A noteworthy finding from the farmer interviews is that a rather small number of CSA methods are currently adopted by Kenyan SME farmers. Main underlying reasons for this are:

- a frequent lack of awareness of CSA opportunities
- the lack of finance
- limited affordability of CSA solutions.

Many farmers have very limited know-how of other CSA techniques, technologies, products and services beyond irrigation and quality seeds. In other cases, CSA solutions that are known to them are considered 'expensive', pointing to a lack of finance with which farmers can invest in additional or new solutions. A clear example of this as reported by interviewed farmers, is the case for renewable energy solutions which can help farmers to lower the cost of irrigation systems. While farmers are aware of this opportunity, they consider it unaffordable.

The lack of awareness, know-how, finance and affordability of CSA solutions undermine the uptake of CSA solutions among Kenyan SME horticulture farmers. It also points to a high potential latent demand for CSA solutions which can help farmers to reduce financial, market and production risks. This latent demand for CSA solutions is outlined in the next section.

2.4.3 Latent demand: CSA solutions that reduce financial, market and production risks

The CSA-related challenges offer opportunities for (international) companies to become active in the Kenyan horticulture sector. From the interviews with farmers and assessment of the horticulture sector, several key technologies and market segments are identified that can support farmers with improved growing conditions and risk mitigation.

Considering Kenya's (changing) climate there is high potential for **irrigation optimisation**, which can benefit non-irrigated farms to increase production and improve growing conditions on farms that already have some basic form of irrigation. Without irrigation, commercial horticulture is not feasible in Kenya, which makes it a precondition for farmer success. Secondly, there is great potential for increasing **farm productivity** in a sustainable way. The farmer interviews and desk study show an increase in pests and diseases in the Kenyan horticulture sector. In addition to crop health management, farmers in Kenya could benefit from **protected cultivation**, which is currently only used on larger and more professional farms. Protected cultivation can reduce crop failure and support increased yields.



Figure 14: Greenhouse in the large-scale farm Edenville in Nyandarwa County (source: AC)

Because of the increased volatility of the Kenyan climate and lack of protected cultivation, farmers can tremendously benefit from **forecasting, advice and market-data services**. Access to weather and climate data and information on market demand can support farmers in planning their agricultural activities and growing the right crops based on market demand.

The Kenyan horticulture sector faces high levels of post-harvest losses. Not only are large amounts of fruits and vegetables lost on the farm during harvesting, the inefficient value-chain arrangements and the lack of post-harvest facilities also lead to high losses. There is a need for improved **post-harvest technologies and services**, including sorting, grading and packing, (cold) storage solutions, and logistics services.



Figure 15: Modern cold room in Kinondu Farm, Embu (source: AC)

Finally, the agricultural sector in Kenya faces a significant lack of financing opportunities. While the agricultural sector accounts for a quarter of Kenya's GDP, the sector only receives 4% of total credit extension in the country¹⁵. This creates great opportunities for **innovative financial products and services** to support Kenya's agricultural sector.

For many farmers the cost of irrigation is a serious challenge. Some farms are connected to the grid and use electricity to power their systems while other farms use expensive diesel generators. Many farmers are looking at renewable energy as an alternative to grid power and diesel fuel, but none of the interviewees has yet invested in this technology. This is a clear indication of high latent demand for affordable renewable energy solutions.

In practice, it will be important for farmers to gain access to a range of CSA solutions, know-how and practices which are tailored to their specific circumstances. Introducing a single technology or service alone will not directly make an SME farmer climate resilient. Awareness and capacity to implement more favourable production practices related to crop, soil, water and energy management are as important as the use of tangible CSA technologies or specific CSA services.

2.5 Summary of promising market segments for Dutch CSA solutions

Drawing from the previous sections, four market segments in the Kenya SME horticulture sector can be identified which offer considerable opportunities for Dutch companies. Products, services and technologies developed and marketed in these four segments can significantly help farmers to reduce their production risks, financial risks and market risks. While difficult to quantify at this stage, latent demand has been observed in all four segments based on the range of interviews with farmers and entrepreneurs. The four high-potential market segments are:

- a) Products and technologies aimed at farm productivity improvements
- b) Forecasting, agricultural advice and market-data services
- c) Post-harvest handling and management (including storage)
- d) Financial services for agri-food businesses.

Products, services and technologies aimed at productivity improvements are of the most direct interest to SME farmers. Across the Kenyan horticulture regions, there is considerable potential to increase yields, improve quality and optimise input utilisation. With its expertise on growing the best quality produce with minimum resource on small land surfaces, there is ample potential for the Dutch horticulture supply sector to expand into Kenya, provided that Dutch solutions are adapted to fit the Kenyan context.

Forecasting, advice and market-data services can help farmers to gain more understanding of their environment, market and surroundings, allowing farmers to make better choices in the management of their lands as well as better marketing decisions. SME growers mentioned a clear demand for improved meteorological data, but a range of other data and advisory services are welcomed. Dutch companies have

¹⁵ Source: FAO ; <http://www.fao.org/economic/ess/investment/credit/en/>

a lot of expertise in forecasting, advice and market-data services. The Netherlands Space Office has supported the development of forecasting- and farmer advice services. Although various of these services struggle with developing a genuine business case, almost all projects have clearly demonstrated that Dutch technology can be used to support (Kenyan) farmers with forecasting services, agricultural advice and market-data services.

Improved post-harvest technologies can help farmers and entrepreneurs to reduce post-harvest losses and increase product shelf-life, thus facilitating greater margins and/or higher prices. Presently the Kenyan agricultural sector is characterized by very high post-harvest losses and although losses are prevalent in all agricultural sectors, they are by far the highest in the horticulture (fruit and vegetable) sector. Due to the perishable nature of many crops and a lack of storage and market linkages, post-harvest losses can exceed 50% of production. In the Kenyan mango value chain, an average 46% of produce is lost on farmer level with another 14% lost further in the value chain: only 40% of all Kenyan mangos is actually sold. Post-harvest losses lead to low sales volumes while the losses generated further in the value chain are discounted on the farm-gate price.

Financial services can address a key gap in SME financing, which is one of the major challenges in the Kenyan horticulture sector. SME growers in Kenya are part of the classic 'missing middle' when it comes to financing. They are often too big for the micro-finance institutions but are not big enough to attract significant bank loans. These companies often require amounts between \$50,000 and \$500,000. This offers opportunities for Dutch companies and organizations to expand their business and offer innovative, simple and affordable solutions in the sector.

Chapter 3. Market entry models for private-sector CSA solutions in promising market segments

A range of CSA solutions is available or currently being developed to help Kenyan SME farmers adapt and become more resilient to climate change. Uptake of these CSA solutions, however, is not always obvious. Dutch agricultural entrepreneurs supplying CSA solutions can find it challenging to access the Kenyan market and to achieve commercial success. Fortunately, in recent years a range of Kenyan, Dutch and other international entrepreneurs have developed successful models and strategies for entering the Kenyan market with CSA solutions, products, technologies or services. Based on an extensive series of interviews with Kenyan, Dutch and other international entrepreneurs, these models are presented in this chapter.

Three main models are described:

- I. Market access through local presence and direct sales;
- II. Market access through collaboration with upstream supply chain partners; and
- III. Market access through collaboration with downstream supply chain partners.

For each model, inspiring examples are showcased from pioneer companies and established businesses in the Kenyan horticulture sector. All examples are directly connected to the high-potential market segments that were identified in the previous chapter (productivity improvements; forecasting, advice and market-data services; post-harvest technologies and financial services). For ease of understanding, the mentioned companies have been categorized under a specific model, even though in practice several companies opt to operate under two or even multiple models.

3.1 Model 1: Market access through local presence & direct sales

This promising and challenging model is based on having strong local presence and entering in direct sales transactions with smallholder farmers and/or SME customers in the Kenyan horticultural sector. This approach requires having a talented and professional team on the ground. Depending on the product or service offered, it may require significant staff numbers to cover large geographic extensions.

Through this approach, the company works directly with or very closely to the end-customers. This allows a company to pick up on new trends in demand quickly and gain almost direct feedback from clients. The establishment of strong local presence and a local, regional or even national network implies long-term commitment. Once trust is gained towards the clients, companies will often have a head-start compared to competitors with no local presence.

For most Dutch suppliers the upfront investment required to build up this local presence before a large enough share of the market has been captured is a disadvantage. Direct sales to farmers that are relatively small and less organized (as compared to large professional horticultural enterprises) may also imply higher transaction costs. Individual SME farmers may have a low absorption capacity for new technologies or have little cash to invest. For these reasons, direct sales is not the right channel for every company and every product or service. A number of well-recognized companies (both Dutch, Kenyan and international) that have opted for this model are described below.

Company: Holland Greentech

Market segment: Farm productivity improvements

A strong example of this model is the Dutch company Holland

Greentech. Holland Greentech sells a range of horticultural inputs and provides technical support to



farmers. The company markets their products, technologies and services as well-adapted to the East-African context. It deploys its trainings as a service to help farmers increase productivity through the correct use of new technologies, while trainings double as an opportunity to expand into particular customer channels. The company selects the most promising customers from their farmer training cohorts, deepening collaboration with them to expand their presence and sales opportunities. The company supports promising customers with quality products and aims to follow the customer as the scale and technology level of farming business develops, ‘growing together’ towards more professional horticulture farming. Holland Greentech’s strong local presence also attracts attention from larger farmers to whom the company can sell its quality products on behalf of a group of Dutch supply companies, including irrigation systems, greenhouse and climate control equipment, fertilizer, seeds and integrated pest control solutions. It continuously improves its portfolio to offer products and services that help farmers become more resilient to climate change.

Company: Quipbank

Segment: Farm productivity improvements

Quipbank is a Kenyan company, and as its name suggests, it is an equipment bank which offers rental and sales options for agricultural vehicles and equipment. Quipbank is supplied with ex-lease equipment by VAELL and purchases new agricultural machinery directly from John Deere and other reputable equipment manufacturers. Three years ago, the company developed the TingA proposition: agricultural mechanization as a service. TingA gives smallholder farmers access to high-performance mechanization services as and when they need it, avoiding the high expense of buying or long-term leasing equipment that is only needed for a short period. TingA services can be used for cultivation areas from one acre in size and up. The company has a strong focus on climate-smart agriculture and actively promotes conservation agriculture and crop rotation among its clients. Quipbank is dedicated to providing affordable services and markets these as a ‘community mechanization concept’. Farmers willing to use these services are asked to register themselves on the Quipbank platform through their most direct local organizations such as a local church, SACCO or cooperative. Farmers can then access TingA services through an sms and mobile based application.



Figure 16: Potato harvester



Figure 17: SunCulture drip irrigation system

Company: SunCulture

Segment: Farm productivity improvements

SunCulture is a Kenyan company that designs, manufactures and distributes solar-powered irrigation systems and services with ‘Pay As You Grow’ technology. The company address the market of 4.5 million hectares of arable land in Kenya which is not suited for rainfed agriculture and requires irrigation for commercial farming. The company’s solutions make it not only simpler, but also less expensive for farmers to grow higher value crops and increase yields. The company recently launched the RainMaker2 which is an affordable, practical and smart solar powered irrigation solution. The RainMaker2 is an easy to install submersible pump connected to a smart control unit that includes remote monitoring and predictive maintenance. The product is completely tailored to the Kenyan market and based on SunCulture’s many years of working directly with Kenyan (smallholder) farmers.

Company: Amiran

Segment: Farm productivity improvements

A central player in the Kenyan horticulture sector is Amiran. This originally Israeli firm has been active in Kenya since 1963 and has therefore been able to develop a client and gather in-depth local experience over multiple decades. It has focused on large and small-scale growers from the start, and has grown into a “one-stop shop” for all product categories a farmer may need. The company is big in floriculture but also serves a vast amount of horticulture and cereal growers. Amiran has a very strong local presence and supports farmers with a broad range of products and services. They supply agro-chemicals, fertilizers and seeds, but also irrigation and climate control systems. Based on their experience with Kenyan farmers they have recently developed the Family Drip System which is a simple irrigation system tailor-made for the small farmer. This system can be purchased as part of a complete Farmer Kit, which includes a simple greenhouse and inputs such as seeds, crop protection products and fertilizers. The greenhouses cannot be compared to the technological advanced greenhouses that are used in the Netherlands but are developed with the needs and financial means of Kenyan farmers in mind. With a highly renowned brand name, Amiran not only operates through direct sales, but also through collaborations with other supply chain partners (models 2 and 3).



Figure 18: Amiran horticulture tunnel for SME growers



Company: Agrico East-Africa

Segment: Farm productivity improvements

Another example of the local presence model is Agrico East-Africa, a subsidiary of the Dutch Agrico. The company works directly with farmers to develop the market for certified seed potatoes in Kenya. Agrico realizes that the development of the Kenyan potato sector requires more than access to certified seeds. It requires farmers to be properly trained on good and climate-smart agricultural practices, and for them to have access to mechanization and crop protection services and the development of market linkages. Because of their actual presence on the ground, the company can partner with a broad range of local and international partners to further develop the Kenyan certified seed potato market and ware potato sector. Although the model as such appears successful and attractive to farmers and is therefore noteworthy, the company is facing major obstacles in the roll-out of its potato varieties due to the lack phytosanitary clearance from Kenyan regulatory organizations.

3.2 Model 2: Market access through collaboration with upstream supply chain partners

Kenyan SME horticulture growers require a steady supply of quality seeds, crop protection products and services, mechanization services, fertilizer, agricultural expertise, (irrigation) equipment and so on. But for many companies, it is not desirable or commercially feasible to establish local presence to a scale and degree as the examples mentioned in the previous section. Therefore, this second market-entry model is based on a commercial collaboration with supply chain partners that are well-established and have local presence or clientele, who will bring your product or services to the market for you.

Well-established companies operating through model 1 have already obtained a strong reputation and have established trust with a large number of farmers. By offering your product or service under their umbrella can propel sales into an untouched network. This can be done while simultaneously promoting your own brand name (as is frequent with well-established, internationally renowned seed companies

selling through local agents or representatives) or without doing so (which can be a logical choice if your product or service is not connected (yet) to any known brand name).

Choosing a reliable and committed local sales partner or service provider requires careful research. A challenge can be transferring the necessary product-related know-how and aftersales care to the Kenyan sales partner. The mutual and often significant advantage for both partners is that the transaction costs related to dealing with many SME clients can be shared. Large and small Dutch companies have opted for this market-entry model. Noteworthy examples and illustrations are provided below.

Company: Rijk Zwaan

Segment: Farm productivity improvements

One of the best examples of this model is the Dutch company Rijk Zwaan. Rijk Zwaan is an international vegetable breeding company, a privately-owned family business, it is active in over 30 countries worldwide. In East Africa, the company has set up a breeding station in Arusha, Tanzania, where it breeds new varieties for the African market. Rijk Zwaan continuously improves the varieties it sells, helping farmers to adapt to climate change through crops with higher resistance to pests and diseases, drought resistant varieties and salinity resistant crops, among others. Rijk Zwaan holds demonstration plots in several of the countries where it operates, but normally sells its seeds through local distribution partners. Given its own strong brand name, Rijk Zwaan is careful about selecting reputable distribution and sales partners. In Kenya, Holland Greentech (which was elaborated upon in the previous section) is an official supplier of Rijk Zwaan seeds. To further enable Rijk Zwaan’s market penetration in Kenya, the company has established partnerships with several other strong partners as well, including Dodore.



Company: Dodore

Segment: Financial services

Dodore is a Dutch/Kenyan fintech company with offices in Nairobi and in Amsterdam. The company developed the Agri-Wallet, which is an innovative blockchain-based supply chain finance solution to help (smallholder) farmers increase their yields. The mobile Agri-wallet provides farmers with access to affordable farm loans and helps farmers to save for farm inputs. Funds in the Agri-wallet are restricted and conditional to purchase farm inputs only. Furthermore, the farm inputs can only be bought from participating and well-renowned reliable input suppliers. As such, the Agri-wallet ensures that farmers have easy access to sustainable input supply financing. Agri-wallet works on all types of mobile phones in every country because it combines blockchain and easy to use universal SMS text messages. Farmers use simple short commands to check the balance in their Agri-wallet and to pay participating input suppliers (merchants). Agri-wallet helps farmers to save automatically at the time of the harvest and ensures that farmers have sufficient funds to invest in their farms. Agri-wallet users can leverage their savings by accessing flexible and affordable farm loans. Agri-wallet reduces the risk of lending to smallholders because farm loans cannot be diverted. Bundled with tech-driven crop insurance offered by Dodore’s partners, Agri-wallet helps to de-risk farmers’ operations. See also text box 2 for further insights into financial services for smallholder and SME farmers.



Figure 19: Agri-wallet financial services model

Company: AgroCares

Segment: Forecasting, advice and data services

AgroCares (formerly SoilCares) has developed the AgroCares Nutrient Scanner, which supports farmers with instant, on-the-spot monitoring of nutrients in soil, feed and leaf. The scanner checks for example NPK and Ph values in the ground which enables farmers to improve the health and fertility of their soil and make the right decisions with respect to inputs, crops and planning. The scanner is portable and easy to use, reducing complexity for the farmer or service provider. Scans are priced at approximately Ksh 10,000 (USD 10), making them relatively affordable to SME



Figure 20: Soil testing kit

farmers. The sales of the scanner are coupled with sales of a service package, where AgroCares provides additional (long-distance) monitoring and advisory services to help farmers interpret scanner data and determine desirable actions on the field. The use of the scanner and services together helps farmers to reduce (the cost of) inputs and increase their yields and produce quality. A common challenge faced by companies with similar proposition is the low willingness to pay for the services that are additional to the hardware item. One way that AgroCares is aiming to overcome this hurdle is to bundle the services with other products or to make the service part of a larger project or program. In the latter category, the company has teamed up with New Down Town Ltd, an agro-chemicals and farm inputs company that has on-the-ground presence and also provides farm advisory services to farmers. The inputs company had an interest in improving their fertilizer recommendations to farmers, now using AgroCares services to help their farmer clients to improve yields and quality.

Text box 4: The growing segment of financial services for smallholders and SMEs in Kenya

Kenya is seeing strong growth in the market for smallholder input finance. Companies entering this segment often base their propositions on a model as pioneered by One Acre Fund, an international NGO. Smallholder farmers are supported with inputs on credit (certified seeds and fertilizer) and a broad range of other services such as training, agronomical advice and the development market linkages. Two other interesting companies are Apollo Agriculture and Agrics East-Africa. Apollo and Agrics are mainly active in the Kenyan maize sector, which requires relatively small investments. Per acre, farmers need to invest around Ksh 10,000 (USD 100) in inputs. The low investment per farmer and abundance of smallholder farmers enables fast upscaling but require high transaction costs. Apollo Agriculture sees itself as a tech company, rather than an input supply company. Other companies active in this space are FarmDrive and Tulaa, both of which recently acquired significant funding to scale their operations in Kenya.

The majority of financial and credit initiatives in Kenya focus on smallholder farmers. But once these firms grow and become larger, they are well-positioned to also start servicing SME growers in the horticulture sector. The companies already have the know-how and capabilities to expand into the new market. The major challenge is that the investments in horticulture are significantly larger compared to farmers who grow maize. Inputs to grow one acre of maize are \$100, while for one acre of potatoes a farmer needs around \$700 in inputs. A quality irrigation system such as the Rainmaker2 from SunCulture costs around \$1,000 per acre, which excludes the drilling of a borehole. A potential business model would be to combine the technology, credit checks and market information from the above firms with larger investors to serve the SMS horticulture grower market.

3.3 Model 3: Market access through collaboration with downstream supply chain partners

The third market-entry model is based on accessing the market through close cooperation with the main clients of the SME growers including local aggregators, wholesalers, supermarkets, processors and exporters. Since only the largest wholesale companies and exporters have their own farms, many companies work directly with SME horticulture farmers as suppliers of quality produce. The direct relationships that these aggregators and buyers have with farmers can offer a valuable entry point in reaching new customers for Dutch entrepreneurs.

The farmers who are part of these networks often have a guaranteed market for their produce, provided they can supply produce at the quality preferred by the buyer. Having market security make SME farmers less vulnerable to market shocks and enables farmers to consider longer-term investments into their farm. Buyers and aggregators tailoring to higher-end domestic or international markets require consistent quality produce and have an incentive to invest in their outgrowers especially if alternative suppliers are not at hand or equipped to provide the right quality.



Figure 21: Wholesale vegetable company based in Nairobi sorting and grading vegetables

This interest and commitment paves the way for business opportunities that link pre-financing or the repayments to quality farm inputs and/or equipment through the aggregating or buying company. This can reduce both payment risks and transaction costs. It also creates opportunities in the post-harvest technology segment, which can provide solutions that reduce post-harvest losses and help guarantee a longer shelf-life of the produce. Real-life examples of business opportunities and collaborations under this model are provided below.

Company: Makindu Growers

Segment: Farm productivity improvements

This example illustrates the model from the aggregator’s point of view and underpins the interest and willingness of buying partners to collaborate in service provision to SME farmers, in order to drive up productivity and quality in line with buyer requirements. Makindu Growers is a medium sized exporter of fruit and vegetables based in Nairobi. It is a family owned company founded in 1974. The company closely works with 80 small commercial farmers who supply Makindu with quality eggplants for the export to the UK. The farmers grow produce on 1 to 5 acres, with some farmers owning up to 100 acres. Since all of Makindu’s supplying farmers require irrigation, Makindu has supported them with pre-financing the investment, enabling farmers to become less vulnerable to droughts. This was based on the long history that many farmers have with the company.

Company: Vandersat

Segment: Financial services (linked to forecasting, advice & data services)

The Dutch company VanderSat develops a patented downscaling technology which integrates various satellite data sets to create daily high-resolution data products. These products include Soil Moisture, Land Surface Temperature and Vegetation Optical Depth, providing data to clients from four different business sectors: (re)insurance, agri & food, water management and social & environmental impact.

In Kenya, VanderSat works with ACRE in Kenya ACRE on a crop index insurance model, based on strong partnerships with regional initiatives such as M-PESA mobile banking. ACRE Africa develops and offers a diverse portfolio of agricultural insurance products to farmers, working with a crop index insurance model.



VanderSat

As an example of how this works, think of a drought hitting a horticultural production region that damages a farmer's crops. While traditionally, the insurance company would make a company visit to verify a farmer's claim, the crop index insurance model bases its judgement on a satellite-informed drought index for the specific region of the farmer. The farmers are paid based on the weather conditions or other data sources that confirm the drought, eliminating the need for farm visits and thus significantly reducing transaction costs. Automatic payments through mobile money services can further lower transaction costs. As a result, insurance services can be offered to farmers at affordable prices and improve their resilience to climate change. ACRE offers insurances to farmers directly, but also to companies working with farmers which have a stake in the farmers' economic security and stability. These include aggregators, banks or loan providers, processing companies, cooperatives and input companies.

Company: Off-Grid Factory

Segment: Post-harvest technologies

The Dutch company Off-Grid factory is a turn-key partner for realizing autonomous power projects which work grid hybrid and off-grid. The company started off in Kenya in a different field of work (installing wind-solar-diesel hybrid systems for GSM towers for one of Kenya's major telecom providers) yet quickly recognized opportunities in the horticulture sector. The company developed an innovative solar cooling system for solar-powered storage technology, in collaboration with an aggregator of smallholder and SME horticultural produce. With their innovation, the Off-Grid factory is currently a finalist in the global Off-Grid Cold Chain Challenge. They are finetuning the development of their energy systems in collaboration with crop- and product-specific cooling experts, in order to deliver tailor-made off-grid or hybrid appliances that help Kenyan entrepreneurs improve the shelf life of their produce.



Text box 5: The potential for innovative Dutch solutions for horticultural storage and cooling

Several Dutch companies are innovating and piloting solutions in the Kenyan context. Other companies and innovators besides the Off-Grid Factory are Hanse AgroStore, Geerlofs, Celtic Cooling and SunCooler.

***Hanse AgroStore** is part of Hanse Steel Group, a Dutch family business, specialising in the construction of complete business premises in the agricultural, industrial and utility sectors. The company has recently spun-off Hanse AgroStore. In Kenya the company has realized a (ware) potato storage facility in Eldoret which does not require any electricity. The technology can store Shangi potatoes, known for their low dormancy, for up to three months. When farmers can delay the sale of their potatoes, they can potentially receive almost double the price for their potatoes. Hanse AgroStore has proven that the technology works in the Kenyan context. Their next step is to commercialize and scale their operations in Kenya.*

*The SunCooler is a mobile cooling device built by the company **FirmTec**. The SunCooler chills fruit, vegetables, meat, fish, dairy and medicines in an affordable and sustainable way. There is no need for fuel, a generator, a grid connection or batteries. The sun is the only source of energy. The SunCooler can be used in horticultural value chains to store perishable goods such as green beans, snow peas and mangos. The company currently has one active unit in Kenya.*

*Other successful Dutch cold storage companies in Kenya are firms such as **Geerlofs Refrigeration** and **Celtic Cooling**. Both companies have been active in Kenya for many years and support the Kenyan horticulture sector with professional (large scale) cooling solutions. These companies do focus mainly on larger-scale horticulture farms and storage, transport and processing companies further in the value chain.*

3.4 Other market-entry models

Two noteworthy examples of Kenyan companies following altogether different models for market-entry are Twiga Foods and AgVenture.

Company: Twiga Foods

Segment: Farm productivity improvements

Twiga Foods was founded in 2014 with the goal to bridge the gaps in food and market security through an organised platform for an efficient, fair, transparent and formal marketplace. The Twiga Foods platform uses mobile phone technology to match supply and demand, aggregating market participants and finding buyers for farmers' produce in Africa's large, but highly fragmented fruit and vegetable market. Twiga's e-commerce platform enables vendors to order fresh produce, as and when needed, from farmers across Kenya. The system is a win for both sides – farmers have guaranteed access to a fairly priced, transparent, mobile marketplace while vendors can consistently source high-quality produce, which is conveniently delivered for free to their doorstep by Twiga. By increasing efficiency in the supply chain, Twiga reduces waste, increases market security for farmers and may ultimately help reduce food prices for end consumers. The company is growing very fast and recently (November 2018) raised \$10 million dollars to connect even more smallholder farmers in rural areas to informal retail city vendors.



Figure 22: Twiga employee weighing bananas for domestic marketing

Company: AgVenture

Segment: Farm productivity improvements

AgVenture is a company built on the premise of Climate Smart Agriculture. Working with 3,500 farmers on non-irrigated farms, they support farmers by enabling them to apply sustainable conservation agriculture practices. Over time, it has become apparent that production of Kenyan cereals is increasingly uncompetitive, with declining yields and an inability to compete with international pricing. In addition, continued mono-cropping of cereals brought increasing soil borne disease and reduced productivity, making the industry vulnerable. A conversion to conservation agriculture is considered necessary to ensure long term farming sustainability and resilience of farmer livelihoods. AgVenture's business model starts with developing the markets for 'crop rotation' products, such as oil seeds and pulses. The company has developed three factories to process oil seeds and pulses and developed market-linkages with off-takers. Based on this newly developed market, the company supports farmers to implement crop rotation practices, giving them a guaranteed price for their produce. After farmers start with crop rotation, they experience a significant reduction of pests and diseases and increased soil moisture.



Figure 23: bottles with vegetable oils

Chapter 4. Looking ahead: bottlenecks to expect, success factors to work towards and market entry support programs

Drawing from the successful cases presented in chapter 3 and the numerous in-depth conversations with entrepreneurs operating in Kenya, this chapter summarizes some of the main challenges these companies have had to overcome to successfully bring their CSA products and services to the Kenyan market. These are challenges which new entrants can expect to encounter as well. This is followed by an outline of the common characteristics of companies successful in Kenya's SME horticulture sector – success factors which new companies can strive towards. The final section outlines various support programs and financial instruments that aspiring market-entrants can make use of to co-finance their start-up or further expansion into the Kenyan market.

4.1 Frequent challenges of entrepreneurs and how to tackle them

Companies struggle with a range of issues that make doing business in Kenya a challenge. Common challenges include those in the political and legislative fields, such as the tax treaty between the Netherlands and Kenya which has not yet been ratified and the difficulty of getting work permits in Kenya. Such challenges cannot be addressed by individual companies and may have to be treated as the cost of doing business in Kenya. Common challenges that *can* be solved by the entrepreneur were extensively discussed with interviewed companies. These are: 1) a lack of knowledge and expertise on CSA and horticulture in the Kenyan context; 2) lack of available financing; 3) high transaction costs; 4) a slow pace of business and 5) difficulties attracting and keeping good staff.

Local CSA and horticulture knowledge & expertise

A first important challenge encountered by many entrepreneurs is the **lack of farmers and clients' knowledge & expertise on CSA and professional horticulture in the Kenyan context**. While Kenyan small and medium commercial horticulture farmers are generally quite well-aware of the (negative) effects of climate change, they lack a detailed understanding of climate-smart agriculture techniques, products and services. This brings a clear marketing challenge for new entrants willing to bring CSA products and services to the Kenyan market. Companies can counter this challenge by working very closely with their customers. Farmer training and demonstration projects should be a part of the company's marketing efforts. Companies should never assume that farmers know how to exactly use the product and/or service they offer and should provide adequate support and after-sales care. Local presence and farmer trainings and demonstrations will help to develop trust. To convince farmers of a new product or service, 'seeing is believing'. If you are unable to establish local presence (see market entry model 1), make sure you find a strong, reliable partner to collaborate with (see market entry models 2 and 3).

Lack of available financing

A second key challenge of doing business in Kenya commonly mentioned by both Dutch companies and SME growers, is the **lack of available financing**. A significant number of companies struggle with getting proper funding they need to deploy or scale their business in the Kenyan market. Companies furthermore notice that their customers are also affected by the current lack of financing as they do not always have the resources to invest in new products and services, even if they are interested to do so. The lack of financing is mainly driven by a lack of government investments, government policy (interest rate cap) and low private investments. To succeed in the Kenyan market, companies need to have access to long-term (patient) capital or grant funding. Almost all the companies interviewed that are now successful, have received (government)

grants while setting up their operations or were supported with capital and expertise by their (Dutch) shareholders or partners. The reality is that a company needs a significant amount of capital and patience to be successful in the Kenyan (horticulture) market. Smart partnering strategies with aggregators or other service providers can be an option, too, as it can help create a vehicle for the roll out of your products or services in an affordable way. Examples of this approach were provided in the previous chapter (in the sections on market entry models 2 and 3). Later in this chapter, an overview is provided of financial support programs for Dutch businesses in Kenya.

High transaction costs

A common complaint when working with SME growers is that **firms face high transaction costs**. This is caused by the fragmented market and the physical realities and logistical challenges of working with a large number of smallholder and/or SME growers, often dispersed over a large area while limited (technical) infrastructure is available. Transaction costs can be reduced in several ways. An option is to start out focused on smaller geographical areas. You can also connect with existing infrastructure and instant payments options which abound on the African continent, such as mobile payment solutions provided by M-Pesa. Other solutions are to use specialized call centres to connect with customers, as a (partial) replacement to field visits. A structural solution is also to create partnerships with other companies, NGO's or agencies. Noteworthy examples were provided in the previous chapter. Such partnerships enable you to combine products and service delivery to customers and help to create more efficient last-mile distribution networks.

Slow pace of business

Companies also struggle with the **slow pace of business**, since starting or scaling in the Kenyan market can take a lot of time. Getting the business registered and up and running was not a problem for many companies but getting a customer network and contracts can sometimes take a (very) long time. This is especially the case when working with county governments, NGO's and cooperatives. Entrepreneurs complain that the period between initial contact and the signing of contracts can be over two years. Entrepreneurs should accept the fact that building a new business in Kenya takes a lot of time and requires a lot of commitment and patience. One of the key mitigation strategies is to never trust on one single contract or agreement. Companies should focus on developing multiple routes to market with a broad range of partners and keep their options open.

Finding, hiring and keeping quality staff

Although there is a lot of talent in the Kenyan workforce, many entrepreneurs find it **difficult to find, hire and keep the right people**. Various interviewed companies indicated that given this situation, they have opted to hire motivated and eager personnel that still lacks the perfect skill set, but then train them in-house. This takes more time compared to hiring someone with the perfect CV, but it helps create staff loyalty and dedication. Since there is fierce competition for good personnel in Kenya, it is crucial to carefully carve out a strong HR strategy. It is very costly to continuously deal with a higher staff turnover at any level of your company. Therefore, make sure you can retain staff through proper salaries, continued training, secondary benefits (medical insurance) and appreciation.

4.2 Common characteristics of successful market entry approaches

So what is it that successful entrepreneurs in Kenya have done to get there, apart from tackling common challenges mentioned in the previous section? What factors should you create or work towards, and what pre-conditions must an entrepreneur meet to be able to gain success in the Kenyan market for horticulture CSA solutions? Five of the most important success factors are explained here: 1) strong local presence; 2) willingness and ability to learn and adapt; 3) understanding the local target market; 4) long-term commitment; 5) following a clear business model and doing so in a business-driven manner.

Strong local presence

Some of the most successful companies showcased in the previous chapter are often locally rooted and have a **strong local presence**. Local presence is required for various reasons. First and foremost, one needs to really understand the market and connect with (potential) customers since this cannot easily be done from a distance. Secondly, networking, relationships and becoming part of the local ecosystem are very important. Customers want to know with whom they are doing business and trust does not come easily. Successful companies have management teams with local managers or they have expats with extensive experience living and working in Kenya and the conditions that affect the adoption of CSA technologies and service. Since building a thriving business in Kenya takes a lot of time and hard work, it is important that the business is actually run in Kenya. The most ideal is for the actual owner of the company (the entrepreneur) to be working from Kenya but for larger companies this is often not possible. In this case the company should have a strong and dedicated team on the ground. If this is not possible or describable for you in any way, make sure you partner up with a strong local partner that does have this much-needed local presence.

Willingness and capacity to learn and adapt

The second element for success is to have the **willingness and capacity to learn and adapt**. There are many examples of Dutch firms and technologies who introduce a product or service to the market which they designed and developed in the Netherlands, and then expect Kenyan farmers to just purchase it. But the Kenyan horticulture market is very different from the Dutch market and farmer realities are as well. Your CSA product or service might need to be adjusted, fine-tuned and tweaked again and again to comply with local capacity and skill levels. Or perhaps your distribution model needs to be redeveloped to fit the Kenyan context. Making sure that a product or service fits the local context is a key requirement for success. Companies need to realize that their initial plans will often not work and that local context or a changing business environment will force them to change their course. The willingness and (financial) capacity to learn and adapt is therefore key.

Truly understand the target market

A third and related success factor is for companies to **truly understand their target market**. Market dynamics and market demand is different in every sector. The geographic variety across Kenya is tremendous and so are local preferences and needs. If companies want to service their customers to the best of their ability, they need to understand what drives their customers and what customers need. Companies need to work closely with their customers to receive feedback which can be applied towards improving the products, services and proposition to the client. Entrepreneurs cannot stay put in Nairobi – they need to get out into the field and work and engage directly with their farmer and agribusiness customers.

Invest for the long-run

Kenya is not an easy market and not a ‘quick win’ for the vast majority of entrepreneurs entering the country. To be successful, companies need to be willing to **invest in Kenya for the long-run**. Setting up a company, recruiting the right staff, getting the right permits and licenses and building a local network all take a lot of time, let alone reaching break-even or growing a profit over time. Be prepared and (financially) capable of doing so.

Have a clear business model & business-driven approach

The fifth and final condition for success might easily be underestimated or neglected. It seems too evident to mention, however the importance of having a **clear business model and to be highly business driven** cannot be underestimated. A marker for success is to have a clearly defined business model which is tailored to local market demand and can attract actual paying customers. Companies that launch their CSA products and services with the financial support of grants may lack a deep business-driven approach to operating in Kenya. The willingness to pay (in fact often the capacity to pay) of SME farmers is a real challenge that is frequently underestimated in the business planning phase. Willingness to pay can be estimated before starting the business, but can only be tested when a company actually becomes active in the market. Calculate your business perspective under different scenarios and develop your strategies carefully to reach a positive business case.

4.3 Financial support options for Dutch companies aiming to enter the Kenyan market

Access to finance is a big challenge for both Dutch companies that wish to enter the market. Starting a new business in or expanding to Kenya requires significant investments. On the customer side, Kenyan horticulture farmers often lack the financial means to invest in new services and products. This chapter gives an overview of the available funding instruments from the Dutch government and other investors and donors to fund the adoption and expansion of climate-smart agriculture businesses and business models in the Kenyan horticulture sector.

The **Netherlands Enterprise Agency** (*Rijksdienst voor Ondernemend Nederland, RVO*) manages several funding programs that are available to businesses wishing to invest or expand their operations in Kenya:



Netherlands Enterprise Agency

- The **DHI program**¹⁶ supports Dutch SMEs with doing successful international business. It targets SMEs that want to set up an international project, invest in a foreign company or market their product or service abroad. The budget for 2019 is EUR 5 million for DDGF countries and EUR 4 for non-DDGF countries. The minimal subsidy is €25,000. Demonstration projects can receive a maximum of €200,000 and feasibility studies and investment preparation project are capped on €100,000.¹⁷
- The **Dutch Good Growth Fund** (DGGF) was launched in 2014 to promote employment, production capacity and knowledge transfer in developing countries and emerging markets by supporting private sector investments.¹⁸
- The **Sustainable Development Goals Partnership** facility (SDGP) is a great opportunity for multi-stakeholder partnerships to solve challenges which cannot be tackled by one single company or

¹⁶ Subsidieregeling demonstratieprojecten, haalbaarheidsstudies en investeringsvoorbereidingsprojecten or facility for demonstration projects, feasibility studies and investment preparation.

¹⁷ <https://www.rvo.nl/subsidies-regelingen/dhi>

¹⁸ <https://www.dggf.nl>

organization. A public-private partnership (PPP) must consist of a maximum of 6 partners and include one Dutch organisation (the applicant), one local organisation, one NGO or knowledge institution, one company and one (local) government organisation. The facility is focused on three key Sustainable Development Goals: SDG 2 (zero hunger), SDG 8 (decent work and economic growth) and SDG 17 (Partnerships for the goals). The call is currently open. The minimum grant is of EUR 500,000, with a maximum of EUR 3 million per project.¹⁹

Other relevant funding sources include the following programmes:

Climate-Smart Agriculture Program (SNV) SNV is looking for private companies to co-invest in the implementation of climate change adaptation, productivity improvements and inclusive business models under its Climate-Smart Agriculture East Africa Project. The project uses an inclusive business development approach to climate-smart agriculture for arable crops in Kenya, Tanzania and Uganda. The goal of the program is to have 300,000 farmers adopt climate-smart practices and technologies among, develop inclusive business cases for 50 agri-business SMEs and 30 cooperatives and produce climate resilient sustainable food on 600,000 hectares. The project is hinged on the three key pillars of CSA: productivity, adaptation and mitigation. The Climate-Smart Agriculture project offers grants up to €200,000 with 50% co-funding required.



AgriFi Challenge Fund Kenya (Self Help Africa). This a European Union initiative to support productive and market-integrated smallholder agriculture through the provision of financial support worth EUR 18 million to agri-enterprises. The aim is to contribute to improvements in the capacity of smallholder farmers and pastoralists to practise environmentally sustainable and climate-smart agriculture as a business in inclusive value chains. The Challenge Fund is funded by the European Union and co-funded by SlovakAid and is implemented in parallel with a planned European Investment Bank (EIB) facility provided to local banks. Self Help Africa and Imani Development Limited are the Fund Managers for the programme. The AgriFi Challenge Fund offers grants up to €1,000,000 with 50% co-funding required.²⁰



Kenya Crops and Dairy Market System Development program (USAID, RTI)

The KCDMSD program is part of USAID's Feed the Future, the U.S. Government's global hunger and food security initiative that helps to increase agricultural production and reduce poverty and malnutrition in Kenya. The KCDMSD activity is being implemented in 12 Kenyan counties and is designed to spur competitive, resilient market systems in Kenya's horticulture and dairy sectors. The programme focuses on strengthening the following value chains: dairy, fodder/feeds, and horticulture (mango, passion fruit, avocado, banana, pineapple, and sweet potato). Grants range between KES 2.5 million and KES 25 million and 50% co-funding is required. Cost share can be done through cash contribution or through operational contributions. The program is currently closed but two new rounds will open in 2019.²¹



¹⁹ <https://www.rvo.nl/subsidies-regelingen/sdg-partnerschapfaciliteit-sdgp>

²⁰ www.advanceconsulting.nl/financing/grants/agrifi-kenya-challenge-fund/

²¹ <https://www.advanceconsulting.nl/financing/grants/usaids-feed-the-future-2/kcdmsd-kenya-feed-future-usaid/>

AECF

The Africa Enterprise Challenge Fund (AECF) is a development institution which supports businesses to innovate, create jobs, leverage investments and markets in an effort to create resilience and sustainable incomes in rural and marginalized communities in Africa. The organization has various competitions each year which focus mainly on renewable energy and agriculture. A current call by AECF is the Seeds for Impact Competition. The competition seeks to address the funding gap faced by seed companies in their quest to produce seed for food security crops particularly, publicly-bred varieties. AECF supports companies with grants and concessional loans between \$250,000 and \$1.5 million.²²



Common Fund for Commodities (CFC)

The Common Fund for Commodities works on with a market-oriented approach and concentrates on financing commodity development projects. Fund endeavours to achieve overall efficiency in and impact on commodity development. Through a range of financial instruments, the CFC seeks to support business activities in the field of commodity development, including agriculture, minerals and metals in Developing Countries. The intervention should, besides giving a sound financial return, also provide for a measurable social and environmental return. CFC works mainly with long-term loans (5 year) from \$300,000 to \$ 1.5 million, with a potential grace period of 2 years.²³



DeveloPPP (DEG)

The **Deutsche Investitions- und Entwicklungsgesellschaft** (DEG) is a Development Finance Institution (DFI) and a subsidiary of KfW Group. DEG employs the develoPPP.de CLASSIC programme to support measures by companies that wish to operate in developing and emerging countries on a long-term basis and thereby shape their business involvement in a sustainable manner. These may be companies looking to pilot an innovative technology, raise the standard of their supply chains or invest in a sustainable training programme. DEG provides project funding of up to EUR 2 million to German and European companies and companies in developing and emerging countries. Companies receive a maximum of 50% of project costs. DEG also provides support with project structuring.



4.4 Concluding remarks

To maintain competitiveness the Kenyan horticulture growers, traders and other businesses have to continuously innovate and improve their performance. In addition to international competition, the effects of climate change pose a growing challenge to the Kenyan horticultural producers and traders. This particularly applies to the Kenyan small and medium sized enterprises. Dealing with climate related risks and challenges requires them to adopt of improved inputs, production and supply technologies and different business approaches. There are products and technologies available for climate resilient productivity improvements and post-harvest handling and management practices. In addition there is an increasing range of ICT-based forecasting, advisory and other information services available that are aimed at Kenyan SME farmers.

New entrants in the Kenyan horticultural sector need to be aware of a number of sector characteristics. Given the large number of SMEs in the Kenyan horticulture sector and the small demand of the individual companies, the transaction costs are high for the supply industry. The level of know-how and exposure to

²² https://www.aecfafrica.org/agriculture/Seeds_for_Impact

²³ <https://www.advanceconsulting.nl/financing/concessional-loans/the-common-fund-for-commodities/>

new technologies and products among SMEs is also limited, so it requires convincing through careful explanation and demonstration, before these are adopted. Furthermore, access to capital among Kenyan SMEs is generally speaking lacking. New market entrants that wish to supply the Kenyan horticulture sector therefore require a good preparation and more than the usual marketing and promotion activities in order to have commercial success. The co-funding opportunities described in the previous section available are designed to overcome the initial phase and reduce the market entry costs.

Incorporating the main findings and conclusions from this study any new market entrant that wishes to supply the Kenyan horticultural sector with climate smart products and technologies is recommended to adopt the following phased preparations.

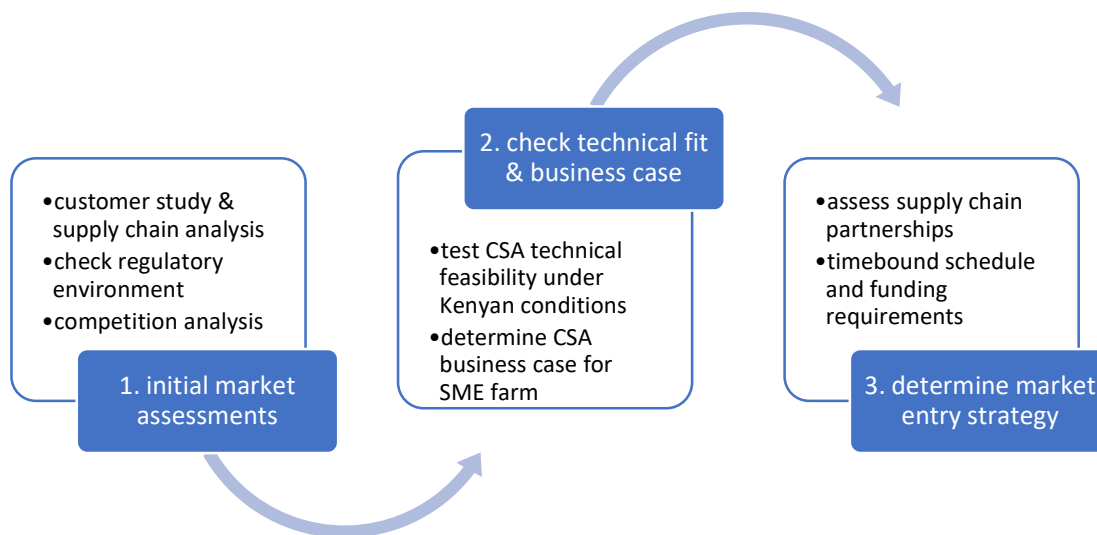


Figure 24: Market entry preparations

The first step will give the general overview of the market potential in qualitative and quantitative terms and whether and how it can be brought to market under the prevailing Kenyan laws and regulations. It should also become clear whether there is any serious competition from an existing domestic or international supplier.

During the second step the actual technical viability and economic feasibility should become clear under Kenyan SME conditions. A pilot or feasibility study may be required at this stage. In addition to demonstrating the benefits of the new CSA product or technology, also the preconditions and need for possible adjustments should become apparent at this stage. The outcome of this phase will be a major determining factor how the third and final preparation step should be approached.

The third phase will be concluded with a clear market entry strategy plan and funding proposal. It will also specify whether setting up a local sales and distribution organisation under own management or a partnership with an existing upstream or downstream chain partner is most feasible.

Annexes

A. List of farmers interviewed

Farm(er) name	County	Acres
Richard Mutisya	Machakos	2
Wanjiku Mbugua	Kiambu	10
West Rift Feeds	Nakuru	185
Nature's Choice	Nakuru	620
Kibwezi Agro Limited	Makueni	234
Kwa Maimbo farm	Makueni	32
Edenville Farm	Nyandarua	50
Kwa Mule farm	Makueni	100
Bereka Farm	Nyandarua	40
James-Gakii Farm	Machakos	42
Kwa Maingi Farm	Machakos	30
Kamuthanga Farm	Machakos	35
Joseph Nzioka Farm	Machakos	11
Fanaka Farm	Embu	70
Kinondu Farm	Embu	25

B. List of Kenyan companies and organizations interviewed

Company	Company type	Location
Equator Ltd	Exporter / Outgrower	Kilifi
FPEAK	Sector Organization	Nairobi
KALRO	Sector Organization	Nairobi
KEPHIS	Sector Organization	Nairobi
Makindu Growers	Exporter / Outgrower	Nairobi
Njoro Canning Factory	Processor	Nakuru
ProFresh Exports Ltd	Exporter / Outgrower	Nairobi
Quipbank Ltd	Mechanization provider	Nairobi
Royal Seeds	Seed Supplier	Machakos
Vert Ltd	Exporter/Processor	Machakos
Zucchini Greengrocers	Supermarket	Kiambu

C. List of Dutch companies interviewed

Company	Product or service
Agrico	Seeds (potato)
Agrics	Farm inputs on credit
Agventure	Conservation agriculture and market development
Apollo Agriculture	Credit scoring, extension and input supply
Dodore	Agri-Wallet, credit extension
e-prod	ERP for agricultural companies
Geerlofs Refrigeration	Cold Storage
Hanse Staalbouw	Storage construction
Holland Greentech	Wide range of agricultural products and services
Off-grid factory	Off-grid and hybrid electricity and cooling solutions
Omnivent	Cooled storage of bulk goods (potatoes, onions, carrots)
Rijk Zwaan	Vegetable seeds
Soil & More	Soil Advice
SunCooler	Mobile cold storage
Susteq	Technology supplier for prepaid water distribution
Vandersat	Geo/Satellite
Water Forever	Water

D. List of other interviews and discussions

Company or organization	Product or service
Advance Consulting	Consultancy for SME companies (focus on Kenya)
Rabobank Foundation	Investor in Kenyan agricultural sector
AECF	Investor in Kenyan agricultural sector
Self Help Africa	Investor in Kenyan agricultural sector
Enviu	Business Development in Kenyan agricultural sector
AgriProFocus	Network NGO promoting farmer entrepreneurship
SNV	Development NGO running a large CSA program in EA

E. Brief overview of the horticulture sector in Kenya

Agriculture is the backbone of Kenya’s economy, accounting for more than a quarter of GDP, 40% of total employment, 70% of rural jobs, 65% of exports and 60% of foreign exchange earnings. Agriculture is vital to national economic growth, food security, and poverty reduction, and almost the only means of livelihood for 74% of its population. In 2016 the area under horticulture production was well over 600,000 hectares with a total production value of EUR 1.8 billion. The most productive sub-sector is (the exports of) cut flowers, which make up 32.7% of total horticulture value, with vegetables and fruits making up 33.9% and 26.6% of total horticulture value respectively.

Category	Area (Ha)	Volume (MT)	Value (KES)	Value (EUR)	%
Cut Flowers	13,265	133,658	70,829,466,905	615,908,408	32.7%
Vegetables	322,534	4,126,457	73,325,938,841	637,616,860	33.9%
Fruits	172,527	3,191,175	57,299,316,546	498,254,926	26.5%
Other	111,110	532,518	14,912,291,493	129,672,100	6.9%
Total	619,436	7,983,808	216,367,013,785	1,881,452,294	100%

Source: Agriculture and Food Authority 2015/2016 validated report, EUR/KES 115

The majority of value in the Kenyan horticulture sector is generated by a small set of crops. The 20 top products (excluding flowers) are responsible for 93% of total value generated in the sector (KES 132 billion).

Product	Value (KES, 2016)	Value (EUR, 2016)	% of total ²⁴
Potatoes	27,978,366,910	243,290,147	19.7%
Bananas	18,109,189,023	157,471,209	12.7%
Tomatoes	13,687,162,311	119,018,803	9.6%
Mango	11,892,258,419	103,410,943	8.4%
Cabbage	9,667,526,306	84,065,446	6.8%
Pineapples	9,666,349,880	84,055,216	6.8%
Kales	7,014,782,771	60,998,111	4.9%
Avocado	6,924,034,856	60,208,999	4.9%
Water Melon	4,000,498,015	34,786,939	2.8%
Macadamia	3,750,447,258	32,612,585	2.6%
Cow peas	2,434,852,370	21,172,629	1.7%
Garden Peas	2,261,173,777	19,662,381	1.6%
Pawpaw	2,205,138,840	19,175,120	1.6%
Oranges	2,166,297,972	18,837,374	1.5%

²⁴ Excluding flowers

Coconuts	1,965,502,566	17,091,327	1.4%
Bulb onion	1,941,598,792	16,883,468.76	1.4%
Carrots	1,930,229,193	16,784,602	1.4%
French Beans	1,813,148,952	15,766,513	1.3%
African nightshade	1,524,092,340	13,252,977	1.1%
Passion	1,399,002,305	12,165,237	1.0%
Total	132,331,652,856	1,150,710,025	93%

74% of Kenya's horticulture is furthermore produced in just 15 of Kenya's 47 counties, showing that horticulture in Kenya is very much localized.

Counties	Value (KES, 2016)	Value (EUR, 2016)	% of value
Meru	11,700,579,770	101,744,172	8.2%
Murang'a	11,185,857,391	97,268,325	7.9%
Nyandarua	10,198,633,311	88,683,768	7.2%
Kiambu	9,350,529,235	81,308,950	6.6%
Nyeri	8,544,669,383	74,301,473	6.0%
Nakuru	7,939,395,312	69,038,220	5.6%
Machakos	6,910,030,728	60,087,224	4.9%
Kirinyaga	5,842,328,140	50,802,853	4.1%
Makueni	5,826,916,683	50,668,841	4.1%
Elgeyo Marakwet	5,688,277,880	49,463,286	4.0%
Kilifi	4,958,137,141	43,114,236	3.5%
Narok	4,672,677,891	40,631,982	3.3%
Kisii	4,305,377,490	37,438,065	3.0%
Embu	4,089,219,000	35,558,426	2.9%
Taita Taveta	3,814,191,855	33,166,886	2.7%
Total	105,026,821,210	913,276,706	74%

Source: Agriculture and Food Authority 2015/2016 validated report.

Kenya's total exports in 2016 amounted to \$4.7 billion (KES 470 billion) of which \$2.56 billion (KES 256 billion) is generated through agricultural products (excluding foodstuffs, animal products, wood and rubber). With 55% of exports the agricultural sector is by far the country's biggest earner of foreign currency. From the total agricultural export KES 100 billion (43%) and KES 22 billion (9%) is earned from tea and coffee exports respectively. The cut flowers sector is responsible for 26% of Kenya's total export. Fruit, vegetables and other horticulture products account for 22% Kenya's agricultural exports and 12.2% of the country's total exports.

Category	Value (KES)	Value (EUR)	%
Tea	110,080,000,000	957,217,391	43%
Coffee	22,016,000,000	191,443,478	9%
Cut Flowers	66,560,000,000	578,782,609	26%
Fruit, vegetable and other	57,344,000,000	498,643,478	22%
Total	256,000,000,000	2,226,086,957	100%

Source: MIT, <https://atlas.media.mit.edu/en/profile/country/ken/> USD/KES 100, EUR/KES 11