Republic of Rwanda

Ministry of Public Service and Labour

Analysis of Employment and Skills in the Floriculture Value Chain in Rwanda

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SKILLS RWANDA

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Acronyms

CIP	—	Crop Intensification Program
CSO	—	Chief Skills Office
EMBs	—	Electronic Billing Machines
EPC	—	Export Promotion Council
FPEAK	—	Fresh Produce Exporters Association of Kenya
GDP	—	Gross Domestic Product
HCD	—	Horticultural Crops Directorate
ISO	—	International Organisation for Standardisation
KEBS	—	Kenya Bureau of Standards
KEPHIS	—	Kenya Plant Health Inspectorate Service
KFC	—	Kenya Flower Council
KIRDI	—	Kenya Industrial Research and Development Institute
LNV	—	Ministry of Agriculture, Nature, and Food Quality
MARD	—	Ministry of Agriculture
MINAGRI	—	Ministry of Agriculture and Animal Resources
MINICOM	—	Ministry of Trade and Industry
MoALF	—	Ministry of Agriculture, Livestock and Fisheries
NAEB	—	National Agricultural Export Development Board
NGO	—	Non–Governmental Organisation
NISR	—	National Institute of Statistics of Rwanda
NST	—	National Strategy for Transformation
NVWA	—	Netherlands Food and Consumer Product Safety Authority
PSTA	—	Plan for Agricultural Transformation
RCA	—	Rwanda Cooperative Agency
RDB	—	Rwanda Development Board
RVO	—	Netherlands Enterprise Agency
RWF	—	Rwandan Franc
SNS	—	Smart Nkunganire System
SSCs	—	Sector Skills Councils
TFA	—	Tele Flower Auction
UAE	—	United Arab Emirates
WUR	—	Wageningen University & Research

Executive Summary

Introduction

Agriculture is central to Rwanda's economy, generating substantial GDP and employing a significant portion of the workforce. Recognizing this importance, national development strategies (NST1, Vision 2050, and PSTA4) prioritize agricultural modernization, productivity, and resilience. Initiatives like the Crop Intensification Program have driven the expansion of priority crops such as floriculture, with regulations ensuring quality standards.

This study aims to develop a value chain analysis methodology for use in agricultural sector planning through focusing upon the floriculture sector. It employs a three–component model examining core value chain functions, supportive infrastructure, and relevant rules. The methodology utilizes desk research, a small–scale quantitative survey, and qualitative case studies to gather and analyse perceptions of those working in the value chain, as well as a review of how other countries manage their value chain for skills development and employment in the floriculture sector.

The floriculture sector in Rwanda demonstrates significant potential for economic growth, as evidenced by the promising export trends observed between 2017 and 2023. Over this period there has been a substantial increase in both the volume and value of flower exports, particularly between 2018 and 2020. Notably, the sector's resilience during the COVID–19 pandemic defied economic contraction, with exports continuing to rise.

Despite experiencing a recent decline in both volume and value, the overall trajectory underscores the floriculture sector's capacity for substantial contributions to the national economy through exports. To fully realize this potential, targeted policy interventions are necessary to promote production, productivity, skills development, and technological advancements among value chain actors. This study delves into the complexities of the floriculture value chain, identifying opportunities and challenges for sustainable growth and development.

Structure and Trends in the Floriculture Sector

The Rwandan floriculture sector is structured into the following four distinct stages:

1. Input dealing, production, marketing and distribution, and support services. Input dealers supply essential resources like seeds and fertilisers.
2. Producers range from individual farmers to large–scale companies. These are responsible for the actual growing and cultivation of the flowers and related products.
3. Marketing and distribution stage. This involves aggregators, local traders, and exporters who connect producers with domestic and international markets.
4. Support services, such as packaging, cold storage, and transportation, ensure the quality and timely delivery of flowers.

These stages operate under regulatory frameworks that govern quality control and interactions among value chain actors.

Export trends between 2018 and 2023 reveal a promising trajectory for Rwandan floriculture. Both export volume and value increased significantly from 2018 to 2020, demonstrating resilience even during the COVID–19 pandemic. Despite recent fluctuations, the overall growth indicates the sector's potential to contribute substantially to the national economy.

However, challenges persist. The average farm size remains small, hindering economies of scale and technological adoption. This necessitates policy interventions that promote land consolidation and modernization. Additionally, strengthening infrastructure and enhancing skills development throughout the value chain are crucial for sustaining growth and maximising export potential.

The floriculture sector's resilience and growth potential position it as a key driver of economic development in Rwanda. To fully capitalize on this potential, a comprehensive approach is needed. This includes targeted policies that address structural challenges, investments in infrastructure and technology, and capacity–building initiatives to enhance skills and productivity across the value chain.

Key Survey Findings

- **Sector Structure**: The Rwandan floriculture sector is characterized by four distinct stages: input dealing, production, marketing and distribution, and support services. Actors range from individual farmers to large companies, each playing a specific role in the value chain.
- **Export Trends**: Flower exports have shown promising growth between 2018 and 2023, with substantial increases in both volume and value. The sector demonstrated resilience during the COVID–19 pandemic, highlighting its potential for economic contribution.
- **Production Diversity**: The sector exhibits diversity in production scales, with some actors focusing on small-scale production for the local market and others engaging in large–scale production for export. Roses dominate the flower types produced, followed by Gentian flowers and other varieties.
- **Actor Heterogeneity**: Individual farmers typically operate on smaller plots of land and have lower annual turnover compared to cooperatives and companies. This highlights the importance of collective action and resource pooling for increased productivity and market access.
- **Land and Inputs**: Land size and input usage vary significantly among actors. Individual farmers cultivate smaller plots but tend to use more fertiliser per hectare, possibly due to estimation errors or specific cultivation practices.
- **Seed Sourcing**: Most actors propagate planting materials on their farms, while a few purchases seeds from local or international markets.
- **Expenditure on Inputs**: Cooperatives and companies spend more on seeds and fertilisers per hectare than individual farmers, reflecting their greater financial capacity and focus on large–scale production.
- **Challenges with Suppliers**: Rising input costs and unexpected delivery delays are significant challenges faced by floriculture actors when dealing with suppliers.
- **Market Destination**: Most actors, both individuals and cooperatives/companies, primarily sell flowers to the local market. However, some have successfully penetrated foreign markets, indicating the potential for export expansion.

- **Employment Patterns**: Employment varies by actor type and value chain stage. Individual farmers primarily employ elementary workers, while cooperatives and companies employ more technicians and skilled agricultural workers.
- **Skills Gaps**: Skills gaps are prevalent among both producing and non–producing actors, particularly in areas such as skilled agricultural work, service, sales, and soft skills like customer care.
- **Technology Adoption**: Technology adoption is relatively low in the sector, with limited mechanization and use of soil testing kits. However, digital payments are widely used.
- **Compliance with Standards**: Most actors comply with labour regulations regarding wages, worker protection, and non-discrimination.
- **Success Factors and Challenges**: Accurate demand forecasting, quality service provision, skilled workforce, reliable suppliers, and cooperative membership are identified as success factors. Challenges include input availability and cost, post-harvest losses, limited market access, and other logistical constraints.

Qualitative Case Study Findings

Understanding the complexities of the floriculture value chain in Rwanda requires in–depth insights into the experiences and perspectives of diverse actors. This study combines qualitative data collected from various actors (seed multipliers, farmers, cooperatives, processors, and others) with quantitative survey results. This combined approach sheds light on critical themes such as employment and skills issues, value chain blockages, the role of technology, and the impact of government policies.

Employment and Skills

- **Concentration of Employment**: Most workers are concentrated at the production stage, primarily as casual labourers for basic tasks.
- **Limited access to expertise**: Small–scale farmers lack access to specialized agronomists.
- **Training Gaps**: Training is limited and focuses on basic skills, with significant gaps in areas like specialized floriculture knowledge, pest control, fertiliser application, irrigation, and marketing.
- **Systemic Issues**: Current education and extension systems are not tailored to floriculture, hindering knowledge transfer and skill development.

Blockages to the Value Chain

- **Transportation and Refrigeration**: Lack of affordable refrigerated trucks and poor infrastructure lead to post–harvest losses and reduced marketability.
- **Limited Policy Attention**: Floriculture receives less policy support than other crops, limiting access to specialized inputs and financial assistance.
- **Underdeveloped Supply System**: Lack of locally available, high–quality seeds and packaging materials hinders growth.

Role of Technology

- **Low Technology Adoption**: Most farmers lack access to modern technologies like tractors, greenhouses, irrigation, and fertigation systems due to financial and bureaucratic barriers.

- **Limited Access to Tools**: Lack of access to essential tools like soil testing kits and specialized equipment hinders productivity and quality improvement.
- **Unequal Technology Distribution**: Larger companies utilise sophisticated technologies, while small–scale farmers struggle to adopt even basic tools.

Influence of Government Policies

- **Mixed Impact**: Government policies have both helped and hindered the sector. Export promotion and capacity–building programs are beneficial, but floriculture receives less attention compared to other crops.
- **Lack of specialised suppor**t: Flower farmers lack access to specialized fertilisers and subsidies available for other crops.
- **Land and Skills Constraints**: Shortage of land, unclear land rights, and inadequate practical skills training limit the sector's development.
- **Tax Regulations**: Requirements like EBM receipts and issues with delayed payments pose challenges for floriculture actors.
- **Need for Targeted Policies**: A more comprehensive and tailored policy approach is needed to address the unique needs of the floriculture sector and unlock its full potential

Lessons from International Best Practice

The Netherlands: The Netherlands, traditionally the global centre of the flower trade, has seen its industry shift towards larger companies and overseas production. However, the Dutch auction system, handling 65% of global flower trade, remains a key player, emphasizing the power of collective bargaining and government support. Stakeholders include large and small growers, the Royal Flora Holland Cooperative, and various government ministries and agencies. The sector is supported by a comprehensive regulatory framework, advanced logistics, and strong research and development collaborations. Despite facing challenges like global competition and rising costs, the Dutch flower industry remains a model of innovation and efficiency.

The Netherlands offers valuable lessons for Rwanda, including the potential benefits of a similar auction system, leveraging comparative advantages, and adopting sustainable practices. However, Rwanda must also address challenges like labour availability and regulatory costs to ensure the long-term viability and competitiveness of its floriculture sector.

Colombia: Colombia has emerged as a leading flower producer due to its favourable climate, abundant land, and low–cost labour. The sector's growth has been facilitated by government policy changes and the transition to a more liberalized economy. Key stakeholders include Asocolflores, the Colombian Association of Flower Exporters, logistics companies like Maersk, and various government agencies promoting exports and R&D. Despite facing challenges like market concentration and labour concerns, Colombia aims to significantly expand its flower exports by 2030.

Rwanda can learn from Colombia's experience by focusing on sustainable practices, developing a strong value chain, and expanding into new markets. However, it's important to address labour concerns and ensure fair wages and working conditions to maintain a positive image in the global market.

Kenya: Kenya is Africa's leading exporter of cut flowers, benefiting from its favourable climate, market access, and government support. The sector's growth has been driven by attracting foreign investment and developing sophisticated farming techniques. Key stakeholders include the Kenya Flower Council (KFC), the Fresh Produce Exporters Association of Kenya (FPEAK), and various government agencies. The government has implemented financial incentives, special economic zones, and capacity–building programs to support the sector.

Rwanda can learn from Kenya's experience by leveraging its own favourable climate, building infrastructure and logistics networks, and investing in skills development. However, it must also address challenges like high production costs and environmental concerns to ensure the sector's sustainability and competitiveness.

Recommendations and Conclusions

The agricultural sector presents complex and diverse skills needs across varying value chains in different countries. Understanding these requirements is key to crafting effective skills development and training programs aligned with the realities of the sector. This analysis offers insights into the multifaceted nature of skills and employment issues within selected agricultural value chains, highlighting the need for targeted interventions that address specific value chain dynamics and local contexts. Key recommendations for supporting change in the value chain include the following:

Employment and Skills

- **Target Skills Development**: Implement targeted training programs to address specific skill gaps in areas like specialized floriculture knowledge, pest control, fertiliser application, irrigation, and marketing.
- **Revise education and extension systems**: Tailor agricultural education and extension services to include floriculture–specific modules, ensuring graduates possess relevant practical skills.
- **Promote Formal Training**: Encourage formal training sessions within organisations or through partnerships with specialized trainers to enhance the knowledge and skills of both farmers and workers.

Blockages to the Value Chain

- **Invest in Infrastructure**: Improve transportation and cold storage infrastructure to reduce post–harvest losses and improve the marketability of flowers.
- **Prioritize Policy Attention**: Increase policy support for floriculture, including access to specialised inputs and financial assistance, to level the playing field with other crops.
- **Develop Input Supply Chains**: Foster the development of local industries to produce high–quality seeds and packaging materials, reducing reliance on expensive imports.

Role of Technology

- **Incentivise Technology Adoption**: Provide subsidies and support for farmers to adopt modern technologies like irrigation systems, greenhouses, and digital tools for supply chain management.
- **Facilitate Access to Technology**: Make essential tools like soil testing kits and specialised equipment more readily available and affordable for small–scale farmers.

- **Provide Technical Support**: Offer training and extension services to help farmers effectively utilise new technologies.

Influence of Government Policies

- **Streamline Regulations**: Simplify and clarify regulations to reduce administrative burdens on floriculture businesses.
- **Review Tax Policies**: Address tax–related challenges, such as the requirement for EBM receipts and issues with delayed payments, to ensure a fair and supportive tax environment.
- **Enhance Market Information**: Develop a reliable market information system to provide farmers with real-time data on demand and prices.
- **Promote Inclusivity**: Design gender–sensitive interventions to ensure equal access to resources and opportunities for women in the sector.
- **Engage Youth**: Develop targeted programs to attract and retain young people in floriculture through training, mentorship, and financial incentives.

Introduction

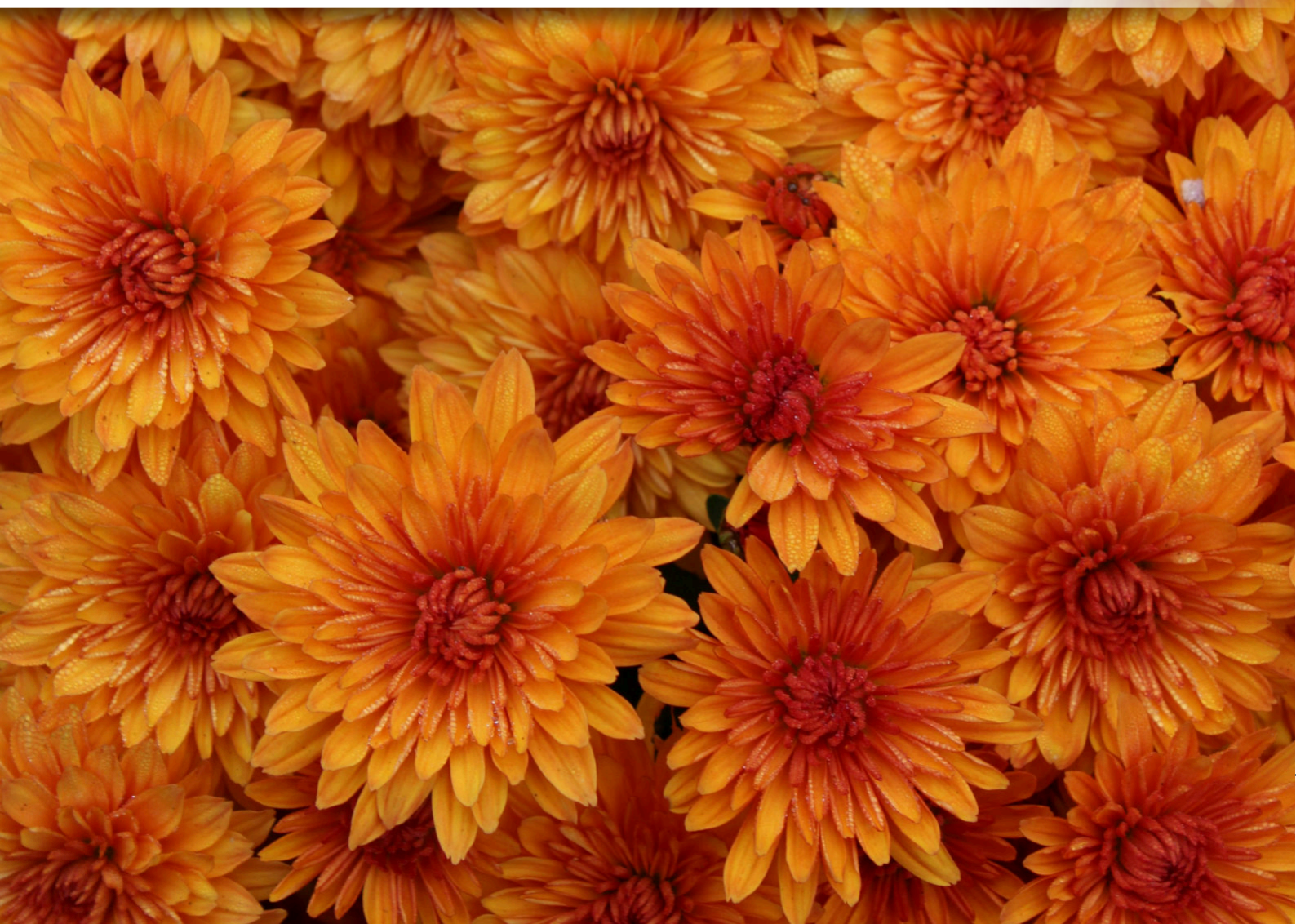
Agriculture is a primary contributing sector to Rwanda's economy, contributing 25% to the country's Gross Domestic Product (GDP) in 2022 (NISR, 2022). The Labour Force Survey 2022 estimated that over 3.4 million adults were employed in market–oriented agriculture, accounting for 46.8% of the working population in 2022 (NISR, 2023). It is important to note that, according to NISR, under the new international standards, employment in the agriculture sector includes only those who produce agricultural goods intended mainly for sale or barter and those who are paid to work in agriculture. Hence, 46.8 per cent of those employed in agriculture are accounted for by this new definition. Otherwise, when those involved in substance farming are included, a significant 70% of the population derives their livelihoods from agriculture.

The proportion of people employed in market–oriented agriculture is notably higher among women (55.6%) than men (39.8%), presenting an enormous opportunity for women's economic empowerment by promoting female–dominated activities or supporting women to engage in higher–value activities along the value chain. The relative importance of the agriculture sector is further reflected in the composition of exports, with traditional export crops like tea being among the single most important contributors to export revenues in Rwanda (NAEB, 2023). However, the size of farming units remains relatively low, averaging 0.4 hectares in 2023 and 76% of farmers operated on less than half a hectare in 2022 (MINAGRI, 2023). In response to this issue, land consolidation remains a policy priority meant to boost mechanisation and modernization for enhanced productivity, especially for priority crops like maize and beans.

Given the relative importance of the agriculture sector, it is not surprising that it has been prioritised in national development in an attempt to leverage its potential contribution towards sustainable and inclusive growth. Priority Area 6 of the National Strategy for Transformation (2017–2024) focuses on the modernisation and increasing production of agriculture and livestock (Republic of Rwanda, 2018), while agriculture and wealth creation is one of the five pillars of the country's Vision 2050 (Republic of Rwanda, 2020). The fourth phase of the Strategic Plan for Agriculture Transformation (PSTA4, 2018–2024) also has strategic interventions meant to boost productivity and modernize agriculture and livestock, as well as build the resilience of agricultural systems and livelihoods to the adverse effects of climate change and extreme weather events (MINAGRI, 2018).

These policy developments complement earlier initiatives like the Crop Intensification Program (CIP), established in 2007 and were instrumental in promoting certain priority crops, including maize. The National Strategy for Transformation also emphasizes expanding the area planted to priority crops, from 635,603 hectares in 2017 to 980,000 hectares in 2024. This stimulated the large–scale growing of crops like maize and beans, including in marshlands later authorised for crop cultivation.

The floriculture industry is very dynamic in its varieties and trade volumes. It is getting more and more diverse in terms of global actors. Now there are about 120 countries actively involved in the floriculture industry, with the Netherlands as an epicentre of world flower production and distribution.



Objectives of the Study

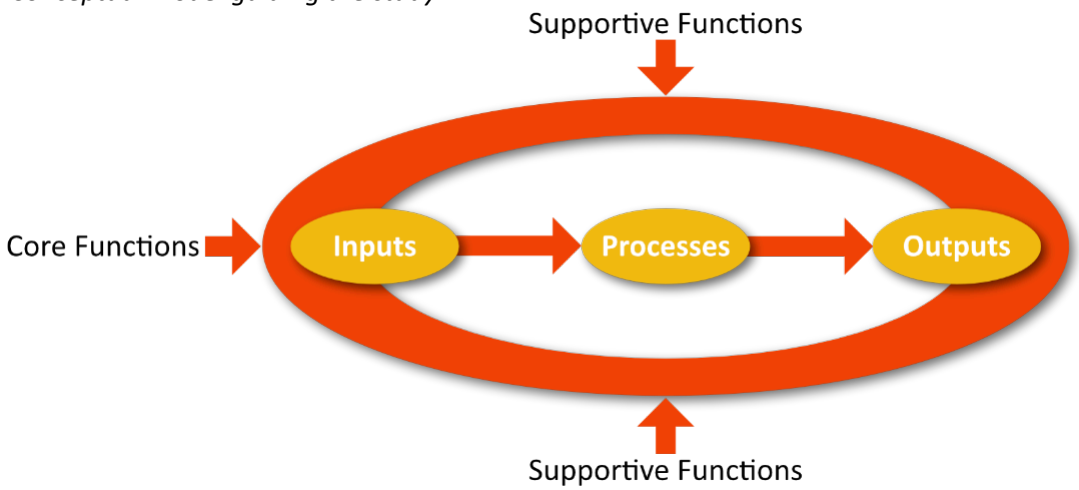
The objectives of the study are as follows:

- Develop a practical methodology for undertaking value chain analysis that can be used by planners and mangers at the Sector Skills Councils and the Chief Skills Office (CSO).
- Pilot the methodology in the agricultural sector and to refine the approach for use in other identified sectors.

Theoretical Model and Conceptual Assumptions Underpinning the Study

Our model focuses on three components of selected agricultural value chains (see Figure 1 below). The first part of our conceptual model focuses on the operation of the core functions associated with a value chain and consists of the inputs, the producer, and the buyer. This may be more complex since the relationship between the three stages may combine and not be stand–alone. Using this approach, we can understand the operations of different stakeholders involved in the value chains (selected input suppliers, operators of storage and transport facilities, providers of packaging materials, and buyers), their corresponding relationships, and, more importantly, how they influence production and management practices occurring between farmers and more formalised enterprises, and correspondingly how these impacts on employment and skills.

Figure 1: Conceptual model guiding the study



The second component of our approach focuses on what Porter calls the supportive infrastructure and what economists refer to as the enabling environment.[1] This is primarily concerned with the ease of doing business in the agricultural sector and what factors have facilitated or impeded this process. The former may relate to skills or human resource issues, organisational factors, and the availability of information about certain issues, including access to markets. Increasingly, one of the most important issues affecting infrastructure is the role played by digitalisation and how it may bring stakeholders together, as well as the delivery of

[1] Porter's, V. C. M. (1985). What Is Value Chain. E–Commer., 1–13.

services. The final component of our approach focuses on rules, covering issues associated with legislation, regulations, and commitment to standards. The former is particularly important to the agricultural sector since they also cover trade agreements, which are important for determining what type of markets Rwanda can access and what standards they need to achieve.

Methodology Used in the Study

The following methods were used to gather and analyse the data.

Desk Research

The desk research exercise entailed reviewing relevant documents to create a thorough understanding of the context within which the value chain analysis was conducted. Additionally, quantitative information collected from some reports was used to present patterns and dynamics of flower production and/or export, which were presented tabularly and graphically. International case studies were also documented based on a comprehensive review of documents on value chains in other countries, with a view of picking lessons for and benchmarking with Rwanda. The documents reviewed during desk research include but are not limited to:

- Policy documents to shed light on the existing policy developments to promote modern and sustainable agriculture in Rwanda, as well as skills and employment issues. Such documents include the National Strategy for Transformation (NST1, 2017–2024), the fourth phase of the Strategic Plan for Agricultural Transformation (PSTA4), and Vision 2050.
- Annual reports from MINAGRI and seasonal agriculture survey reports from the National Institute of Statistics of Rwanda (NISR) were meant to provide trends and dynamics of relevant agriculture indicators, such as the geographical distribution of production of certain crops.
- Annual reports from the National Agricultural Export Development Board (NAEB) show trends in volumes and values of flowers exported, serving as a proxy for foreign demand.
- Labour Force Surveys conducted by NISR indicate the proportion of people employed in agriculture compared to other sectors.
- Reports on floriculture value chains from other countries from which lessons would be drawn for benchmarking with Rwanda's context.

Collection of Primary Quantitative Data

Primary quantitative data was collected through a small–scale survey of 26 actors along the different stages of the floriculture value chain. This covered six districts and three provinces (Table 1 & Figure 2), which dominate floriculture production. Within the districts, value chain actors were selected through snowball sampling, where local leaders and interviewed actors would recommend other actors to be interviewed depending on their role and level along the value chain. However,

Table 1: Number of actors interviewed

Province/District	No. of Actors
Eastern Province	2
Rwamagana	2
Kigali City	12
Gasabo	4
Kicukiro	5
Nyarugenge	3
Northern Province	11
Musanze	3
Rulindo	9
Grand Total	**26**

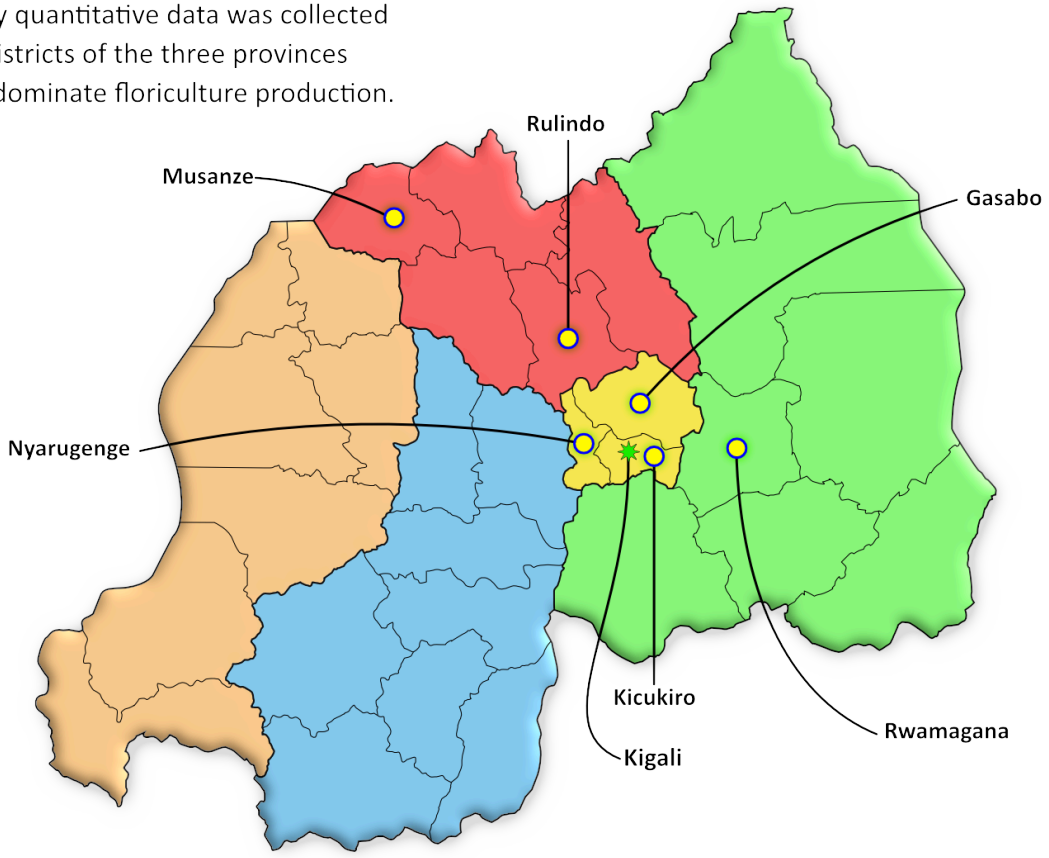
caution was taken to ensure that the selected actors constitute reasonable representativeness of the different stages of the value chain, size of actors — large versus small scale producers — and geographical location.

A structured questionnaire (available from CSO upon request) was used to elicit detailed information on identifying the actors, activities undertaken, output and turnover, employment, skills and skills gaps, success factors and challenges related to business growth, among others. Analysis was done descriptively, highlighting patterns cross–tabulating key characteristics of the actors and their processes along the different stages of the value chain.

Overall, the small–scale survey involved 26 actors, including 16 in flower production and 10 in other value chain–related activities, covering input supply, transportation, production of packaging materials, and marketing and distribution. The floriculture value chain is relatively simple compared to other agricultural products and does not have some stages, such as processing. By ownership, 15 out of 26 actors interviewed operated as individuals, and 10 worked in groups, either as cooperatives or companies.

Figure 2: Study/survey locations

Primary quantitative data was collected in six districts of the three provinces which dominate floriculture production.



Collection of Primary Qualitative Data for Case Studies

As part of the study, selected actors were profiled to gain deeper insights into the functioning of the floriculture value chain. A total of five actors were profiled, and the collected information included how the actors operate, how they managed to circumvent challenges to expand operations and/or move up the value chain, technologies used and how these have shaped production and performance, and skills gaps and how

the government could support addressing them. The ultimate goal of the case studies was to provide in–depth evidence on how to lead actors in the floriculture sub–sector are responding to change, the innovation they have introduced and the type of support they would like to be provided by the government. The case studies built upon the small–scale survey by identifying details of the specific blockages to the effective functioning of the value chain and providing an understanding of why they are occurring and how they could be addressed.

Data Analysis Strategy

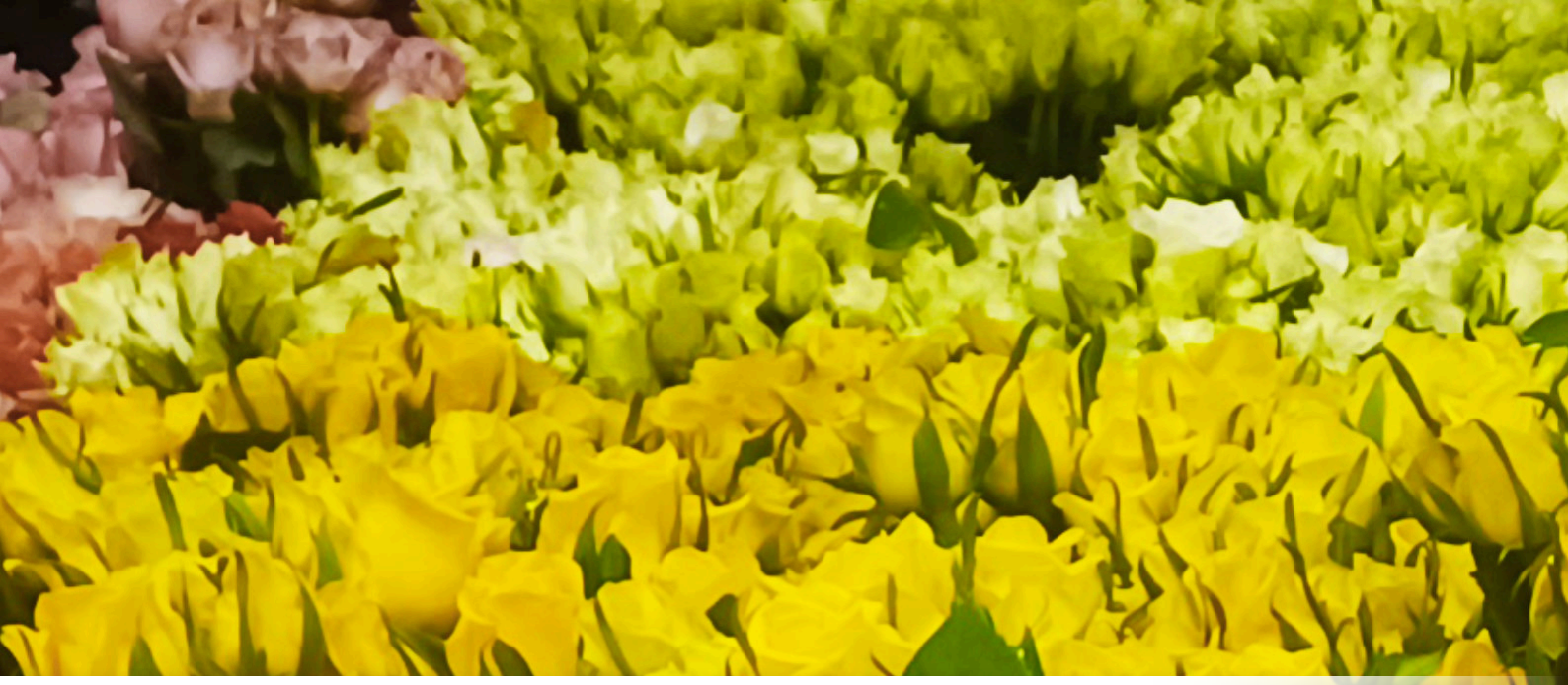
A mixed–methods approach was used to analyse the collected data. The quantitative survey data was analysed using statistical techniques to identify trends, correlations, and the relative importance of factors influencing the floriculture value chain, especially around the drivers of change, skills formation, and employment–related issues. The qualitative interview data was coded and analysed thematically, especially around skills and employment and blockages to the value chain, revealing in–depth insights into stakeholders' experiences, challenges, and opportunities within the value chain. This thematic analysis helps contextualize and add explanatory power to the quantitative results.

The combined analysis was used to critically reflect on the study's original objectives, approach, and key findings. In addition, this was informed by a review of international practices for the sector, drawing on the experience of a few other flower producers in Africa. Based on this reflection and evidence, several recommendations were developed for policy improvements, particularly around strengthening the value chain, how they could positively impact decent work, and the implications for skill development.

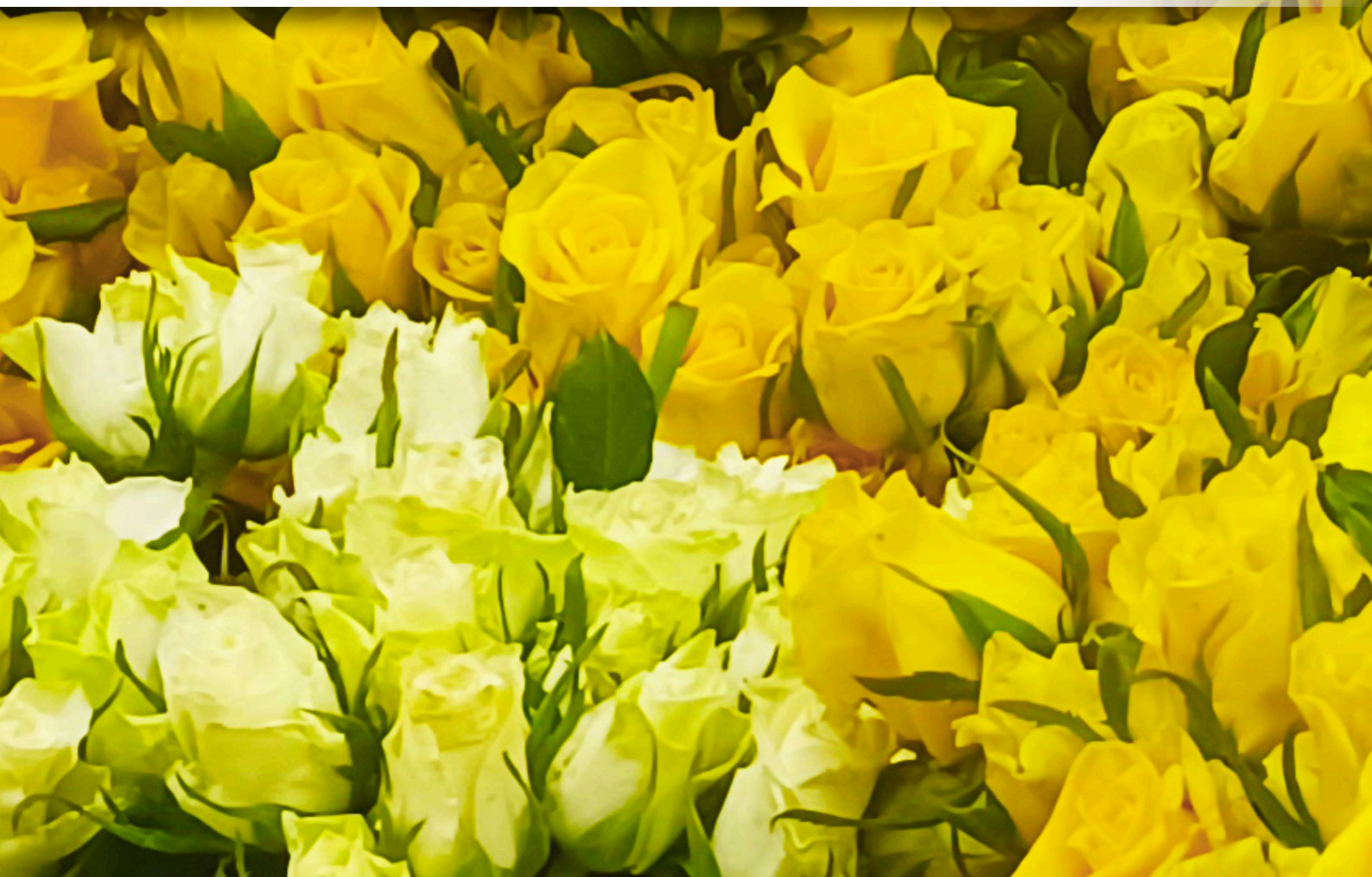
On a final note, the analysis also considered the methodological implications of the approach, particularly in terms of how value chain assessment and analysis could be incorporated into sector skills planning, especially for the country's Sector Skills Councils (SSCs). This is an important dimension since it will allow the SSCs to take on board economic drivers of change and to consider how they could influence the employment agenda, especially around anticipating future skills in priority value chains.

Limitations of the Enclosed Study

With only 26 actors interviewed in the survey, the representativeness of the data for the entire floriculture value chain might be limited in statistical terms. However, it should be noted that the study was more concerned with exploring relationships between different drivers of change, their impact on employment, and their implications for skills development. Therefore, while the study might not be totally representative in statistical terms, it was representative in terms of explaining relationships around skills and employment and the factors that influence them. Additionally, some degree of representativeness is gained by covering actors of different sizes, operating along the main stages of the value chain and in diverse geographical locations.



The floriculture sector is a classic demonstration of how unemployed, underutilised local entrepreneurial potential and natural endowments can be mobilised for economic development, but do not just bloom automatically under the warm sun of comparative advantage; policymaking helps enure the success of the sector.



Characterisation of the Floriculture Value Chain in Rwanda

Structure of the Floriculture Value Chain

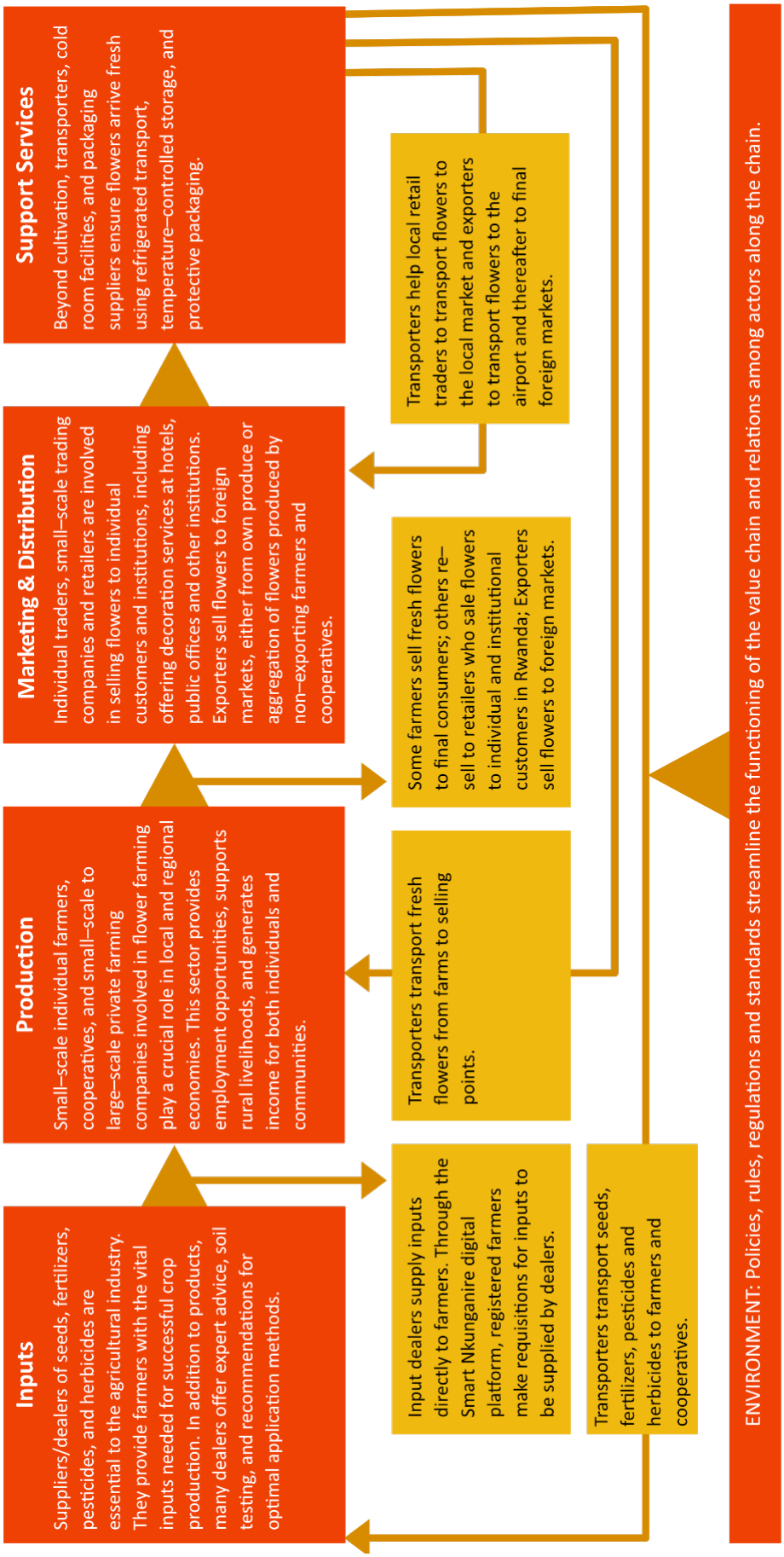
The structure of the floriculture value chain is characterized by four major stages: inputs dealing production, trade, marketing and distribution, processing, and support services (Figure 3). This can be summarised as follows:

- **Input dealing**: This stage involves a system of agro–dealers who supply seeds, inorganic fertiliser, herbicides and pesticides as either individuals or small–scale to large–scale companies. At the community or village levels, the system of agro–dealers works with national input supply systems, including the Smart Nkunganire System (SNS), which requires farmers to register and be part of a database from which orders are placed and delivered by agro–dealers.
- **Production stage**: For the production stage (second stage), three types of actors are involved: individual farmers who don't belong to any cooperative or farmers' groups, cooperatives and groups of farmers, and small–scale to large–scale private farming companies.
- **Marketing and distribution**: The third stage involves trade, marketing, and distribution, including aggregators who buy fresh flowers from farmers and cooperatives and sell them to individual and institutional customers within the local market in Rwanda and exporters. Exporters, in turn, have two categories: those who aggregate flowers from farmers, cooperatives and small–scale companies that cannot export, and those involved in both farming and export. The two categories of exporters export fresh flowers to foreign markets, the common ones being in Europe — especially the Netherlands — Japan and Kenya.[2] Some actors during this stage are also involved in auxiliary services related to flower marketing, such as decoration and serving relatively high–end individual and institutional customers.
- **Support systems**: The final stage involves providers of support services like packaging, operators of cold room storage facilities, and transporters. Producers and suppliers of packaging materials provide boxes and other materials used to contain flowers during transportation and marketing. Transporters transport flowers from individual farmers, cooperatives and companies to customers, local traders and exporters.

At the apex of the value chain are rules, regulations and policies that guide the activities of the value chain — including quality control — and streamline interactions among the value chain.

[2] For a considerable share of flowers that are exported to Kenya, this is a transit country from where they are re–exported to final markets mainly in Europe.

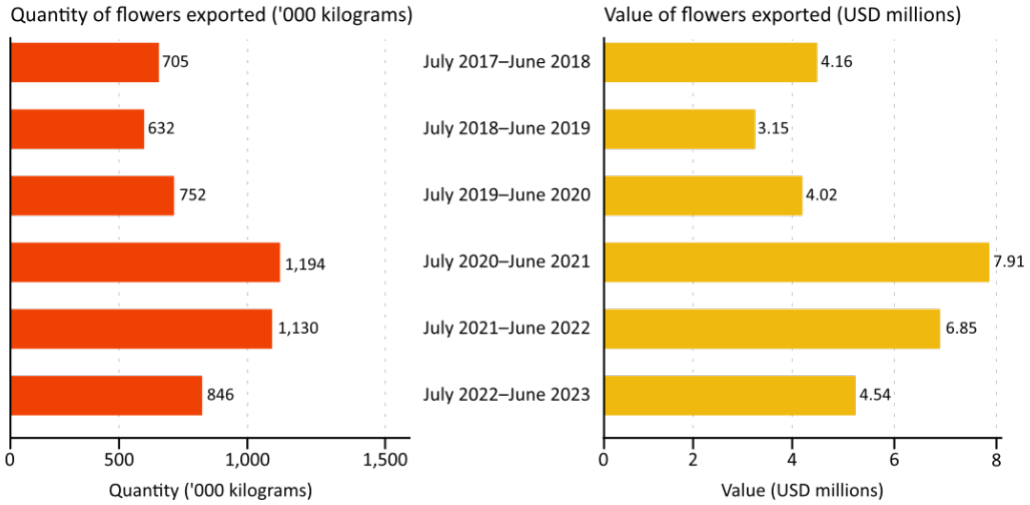
Figure 3: Structure of the floriculture value chain in Rwanda



Trend of Flower Exports from Rwanda: 2018–2023

Local demand would indicate the sector's overall performance dynamics and potential, but the lack of suitable data prevents such analysis. To overcome this challenge, the dynamics of exports were used as a proxy for measuring demand tracking trends in export volumes and values over 2017–2023 (NAEB, 2023; 2022; 2021; 2020; 2019; 2018). Export trends are presented in Figure 4, indicating the volume and value of flower produce exported between 2017 and 2023.[3] The trajectory of flower exports is promising, with volumes and values exported rising substantially between 2018 and 2020. Surprisingly, the floriculture sub–sector defied the COVID–19 shock, as exports rose in volume and value when the economy contracted by 3.4%. Despite the recent reduction from 1.1 million tons to below a million tons in volume and from 6.5 million to 4.5 million USD, the overall trajectory reflects the potential for the floriculture sub–sector to contribute substantially to the national economy through exports. This calls for policy focus to promote production, productivity, skills, and technology among value chain actors.

Figure 4: Volume and value of flowers exported: July 2017–June 2023



Source: NAEB export statistics

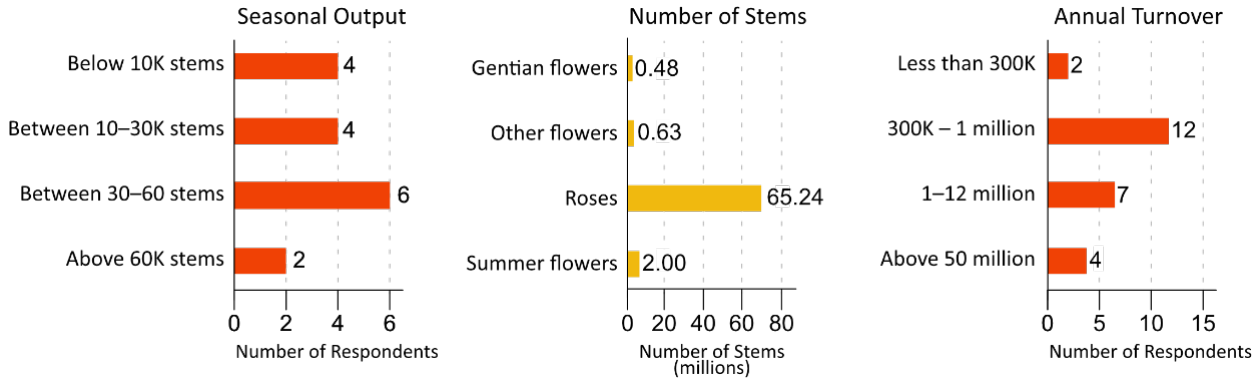
As far as demand is concerned, domestic market for flowers is increasing steadily over the years, with farmers realising the potential to grow flowers as a profitable business. With the growing urban population, demand for roses, summer flowers and other types of flowers is on a positive trend, both within Kigali and secondary cities. This is triggering farmers to gradually increase the size of land allocated to flower farming as a viable and profitable alternative to several other cash and food crops. As far as international demand is concerned, the market for Rwandan flowers is growing, most of which are exported to the European Union — particularly the Kingdom of Netherlands via Brussels Airlines and RwandAir — while Japan, Australia, Germany and the United Kingdom are emerging potential destinations.

Seasonal Output and Annual Turnover

There is considerable diversity in terms of seasonal output measured by the number of stems of flowers harvested in the season that preceded the survey (Figure 5). Out of 16 actors involved in growing flowers (ac-

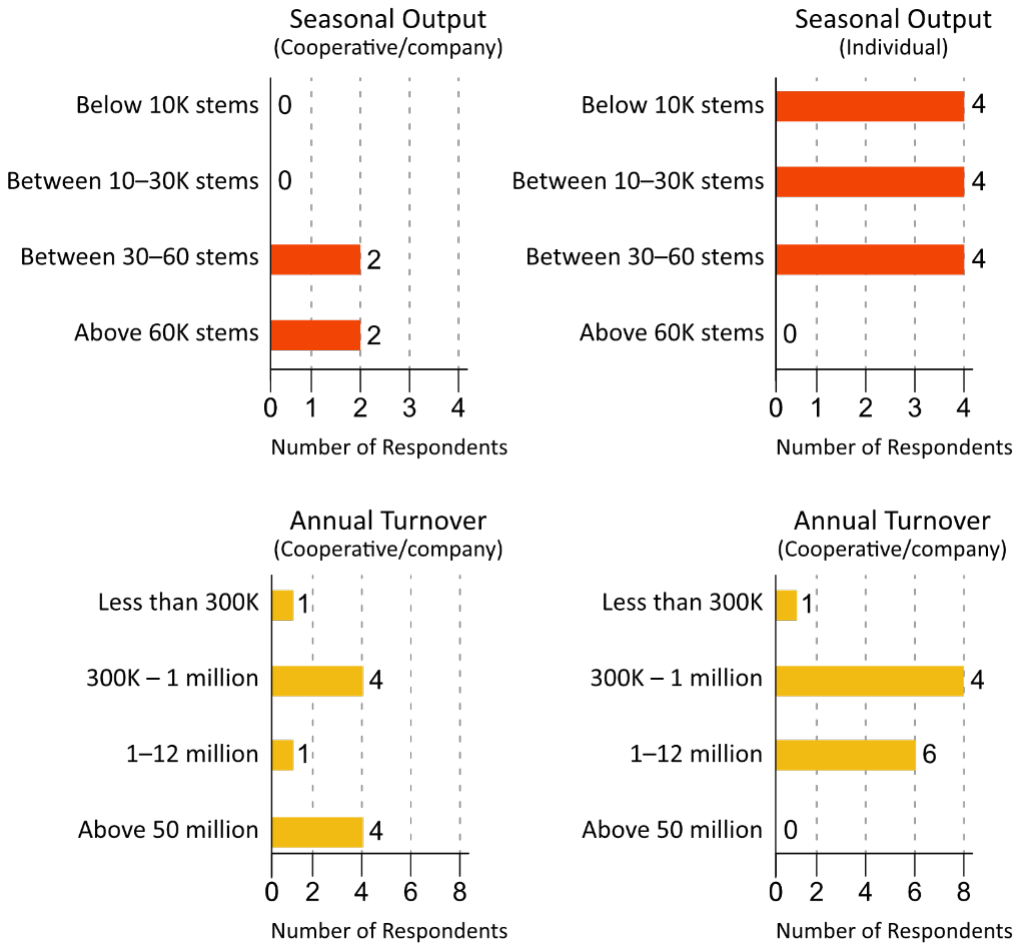
[3] Volume is used in the NAEB reports to mean the total quantity of the product exported, measured in kilograms. On the other hand, value relates to the monetary value in United States Dollars, of the products exported.

Figure 5: Seasonal output (number of stems) and annual turnover (RWF)



tors at the production stage of the value chain), six harvested between 30,000 and 60,000 stems, while eight harvested below 30,000 stems. Two actors harvested over 60,000 stems, including one that harvested two million and another 65 million. This characterises the floriculture value chain with the dual existence of a minimal number of actors that produce flowers at a small scale, mainly for the local market, and large–scale actors who produce massively and primarily target foreign markets. By flower type, roses dominate the value. Findings show that over 65.2 million stems were harvested in the preceding season, almost entirely produced by one particular company. Roses are followed by Gentian flowers with two million stems harvested, over 600,000 stems of other types of flowers and close to half a million stems of summer flowers.

Figure 6: Seasonal output (number of stems) and annual turnover (RWF) by type of actor



Disaggregation of seasonal output and annual turnover by type of actor shows that the majority of individual actors or farmers harvest 30,000 stems or below. In comparison, all cooperatives and companies harvest over 30,000 stems (Figure 6). Regarding annual turnover, the common range for individuals and groups (cooperatives and companies) is between 300,000 and one million Rwandan Francs (RWF). A difference is only noted regarding turnover exceeding 50 million RWF, a category that represents only cooperatives and/or companies without any individual actor. These differences among actors are not surprising given that individual actors have a smaller resource base than cooperatives and companies, underscoring the importance of operating in groups to boost production and turnover.

Land and Agricultural Inputs

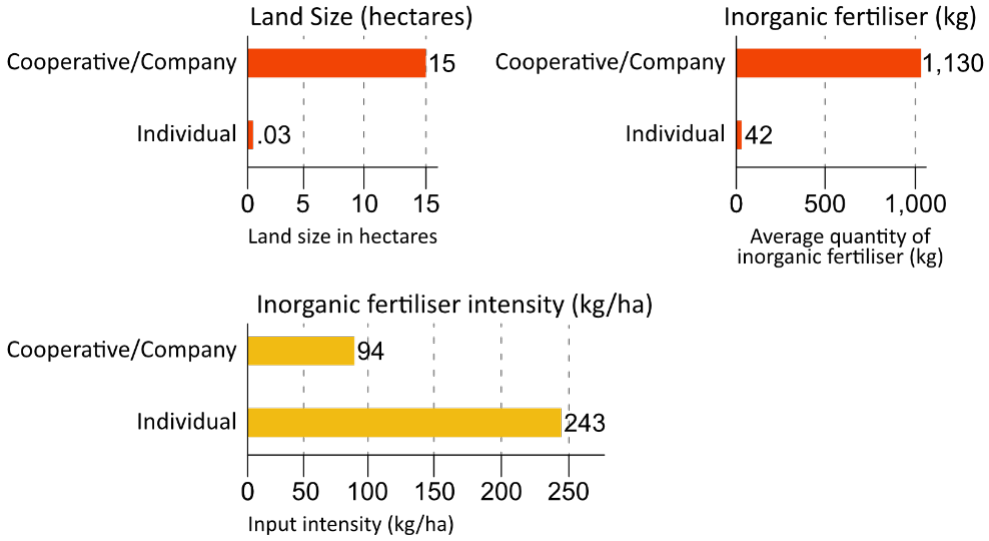
This subsection highlights patterns of land size and ownership and usage of agricultural inputs[4] – mainly fertilisers to boost yields and pesticides and herbicides to protect flowers from pests and diseases. In addition to land size and quantity of inorganic fertiliser used, input intensity is also presented, specifically for inorganic fertilisers.[5] Input intensity appropriately adjusts for differences in relative farm size between individual farmers and cooperatives/companies and gives a better measure of input usage than raw quantities. Input intensity is calculated as:

$$Input\_Intensity_i = \frac{Input\_Quantity_i}{Land\_Size_i} \quad for\ i = `1, ..., 21$$

Where is the quantity of input — seeds and inorganic fertiliser, entered separately in the equation — used by the farmer in the season that preceded the survey, measured in kilograms; is the size of land in hectares cultivated by the farmer in the previous season; and subscript is denoting farmer.

Figure 7 presents land size, quantity and intensity of inorganic fertiliser used, disaggregated by type of actor. The average land size cultivated in the season preceding the survey differed notably among producing ac-

Figure 7: Land size, quantity and intensity of inorganic fertiliser disaggregated by actor type



[4] Agricultural inputs are defined in this study as materials used to boost yields.

[5] Organic fertiliser is not presented because most actors had trouble estimating the quantity used. Seeds were not applicable to most individual farmers who majorly reply on planting of stems from their previous harvest instead of buying seeds.

tors, with individual farmers cultivating on smaller plots of 0.3 hectares on average compared to 15.5 hectares cultivated by cooperatives and other groups of farmers such as private farming companies. The quantity of inorganic fertiliser is also substantially higher among cooperatives and companies (1,130 kilograms) as compared to individual farmers (42 kilograms). However, when it comes to the intensity of inorganic fertiliser, individual farmers reported using more inorganic fertiliser per hectare compared to cooperatives and companies. This is surprising and could be attributed to two potential reasons. First, individual farmers have very small plots (denominator in the intensity equation) and tend to report relatively high quantities of fertilisers per season, leading to a high intensity. Secondly, there is a possibility of individual farmers making more errors in estimating either the quantity of fertilisers or land size, given the general lack of records compared to cooperatives and companies. The findings should, therefore, be considered as indicative of the relative differences among types of actors but interpreted with some degree of caution.

As far as the source of seeds is concerned, the majority of the actors propagated planting materials on their farms by cutting stems from existing flowers. In contrast, only four out of 16 actors bought seeds from local or international markets (Figure 8).

Figure 8: Main source of seeds/planting materials

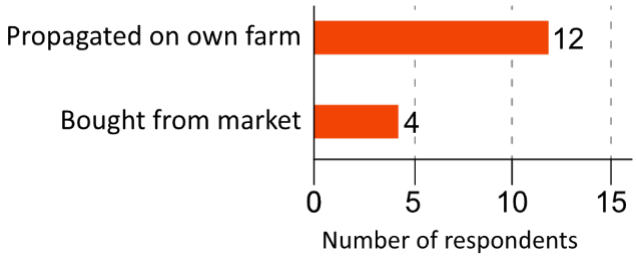
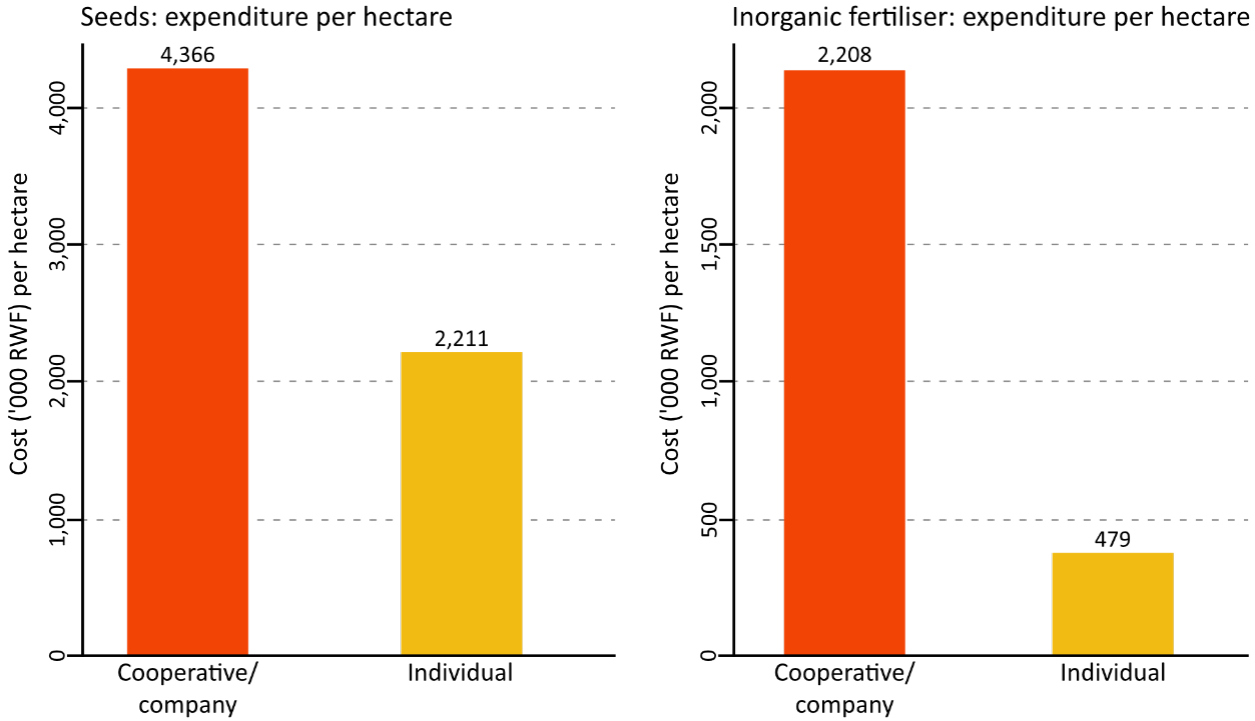


Figure 9: Average expenditure on fertiliser per hectare disaggregated by actor type



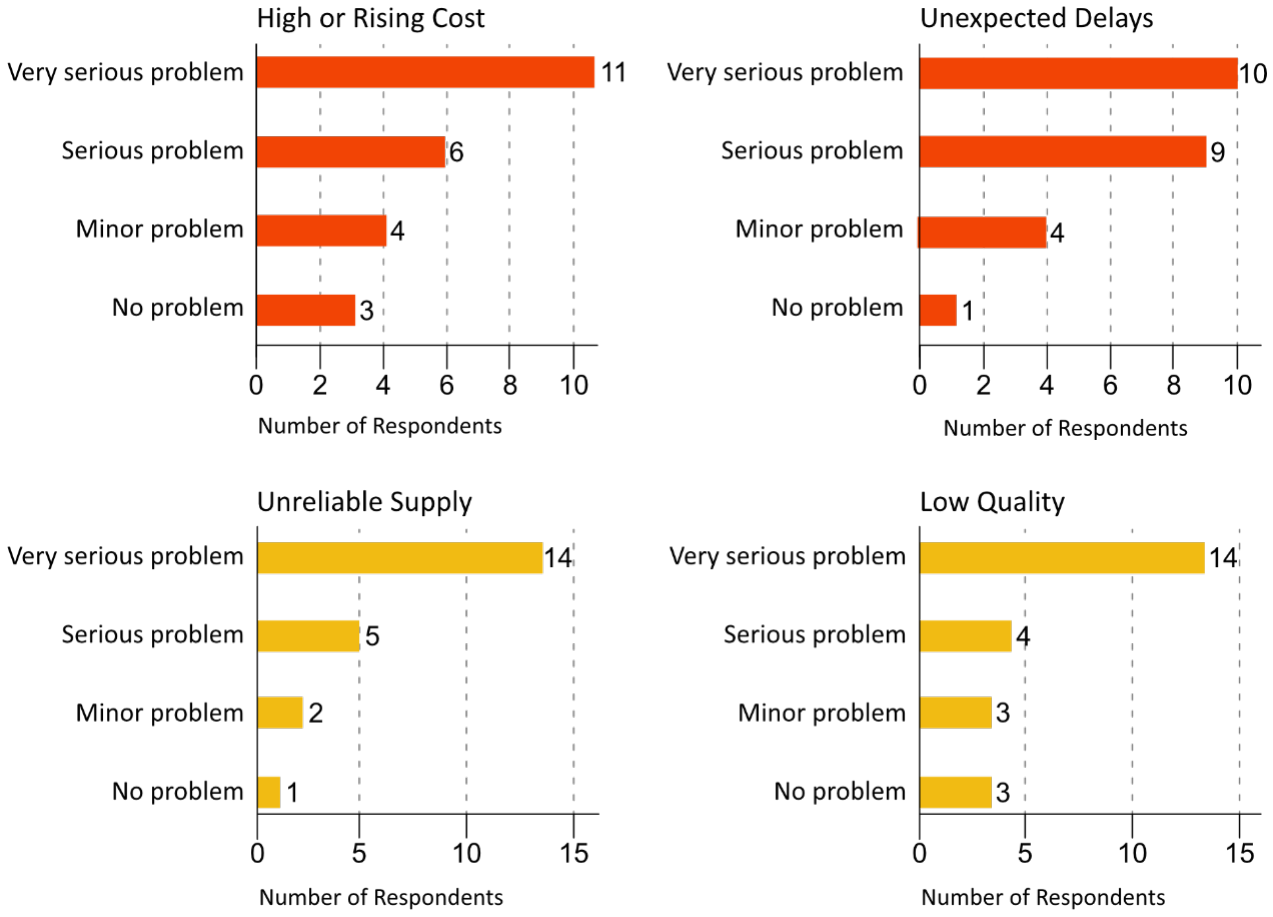
Average Expenditure on Seeds and Inorganic Fertiliser

Figure 9 presents individual farmers' and cooperatives' average expenditure on seeds and inorganic fertilisers per hectare. Average spending per hectare on seeds is more than twice as high among cooperatives/companies than among individual farmers, which is unsurprising given that individuals generally have lower financial capacity to purchase inputs. Similarly, expenditure on inorganic fertilisers per hectare is more than four times higher among cooperatives as compared to individual farmers, underscoring the importance of pooling resources to expand production scale and boost yields.

Challenges in Working With Suppliers of Inputs and Raw Materials

This subsection analyses the relationship between floriculture value chain actors and their suppliers, including agricultural inputs, packaging materials providers and other relevant materials used in production and post–production activities. The rising cost of inputs from suppliers is reported as either a profound or severe problem by 11 out of 24 actors who responded to this question (Figure 10), reflecting concerns among actors about the affordability of inputs they use in their actors. Four actors reported unexpected delivery delays and low quality of supplied inputs as a serious problem. At the same time, suppliers' unreliability is not considered a key concern among actors. These observations imply that suppliers are reliable in providing the required quantities to their clients. However, unexpected delays and rising costs of supplies pose risks to the effective collaboration of actors with suppliers.

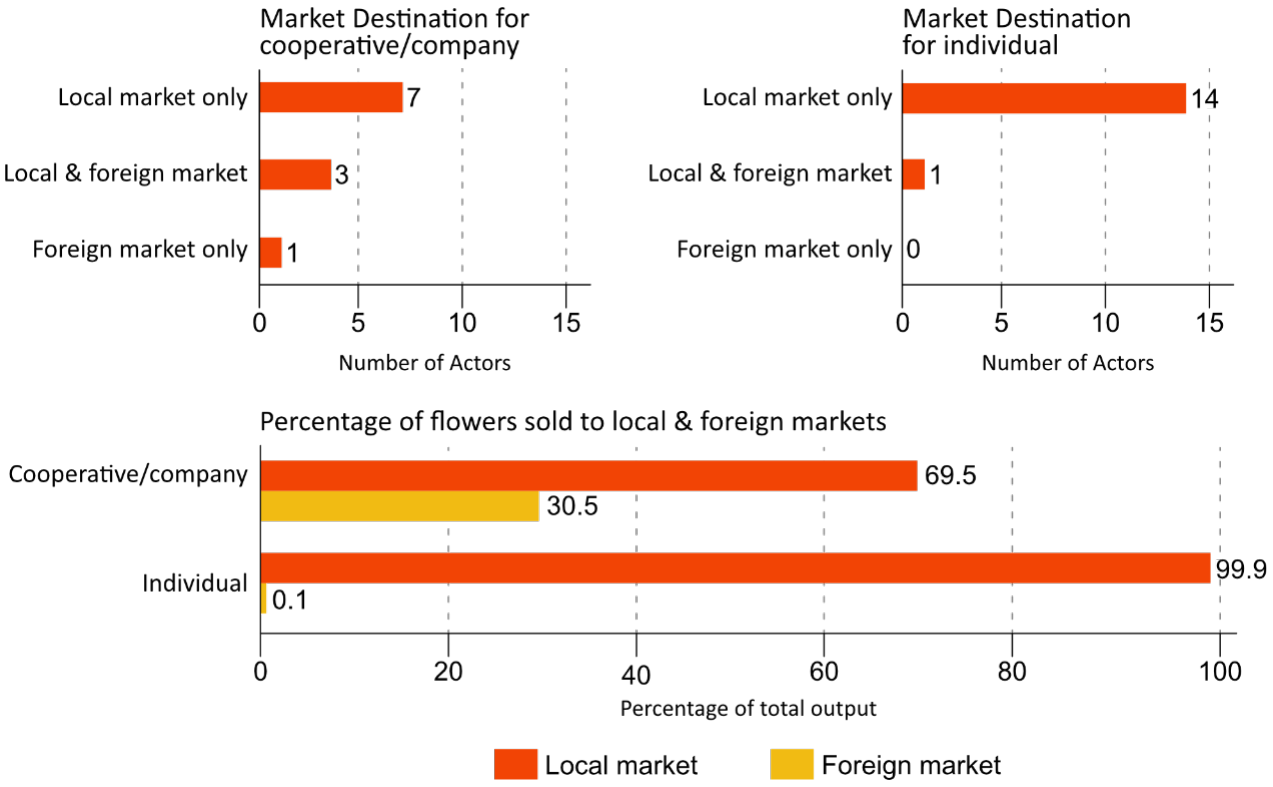
Figure 10: Main challenges faced by floriculture value chain actors in dealing with suppliers



Market Destination for Flowers

Marketing strategies and capacities differ substantially between individual farmers of flowers and those acting in groups as cooperatives or companies. Almost all 15 out of 15 individual actors sell flowers entirely to the local market (in Rwanda), with the exception of one actor who sells to both local and foreign markets (Figure 11). Similarly, the majority of cooperatives and companies sell flowers to the local market, with only four out of eleven actors penetrating foreign markets. Regarding the proportion of output, there are notable differences among actors; almost seven in every ten stems harvested by cooperatives/companies are sold to the local market, while the corresponding proportion for individual farmers is nearly 100%. These two observations point to the diversity among actors regarding marketing strategies and capabilities and the need to support actors — particularly individuals — to identify and satisfy requirements for foreign markets.

Figure 11: Main destination for fresh flowers disaggregated by type of actor

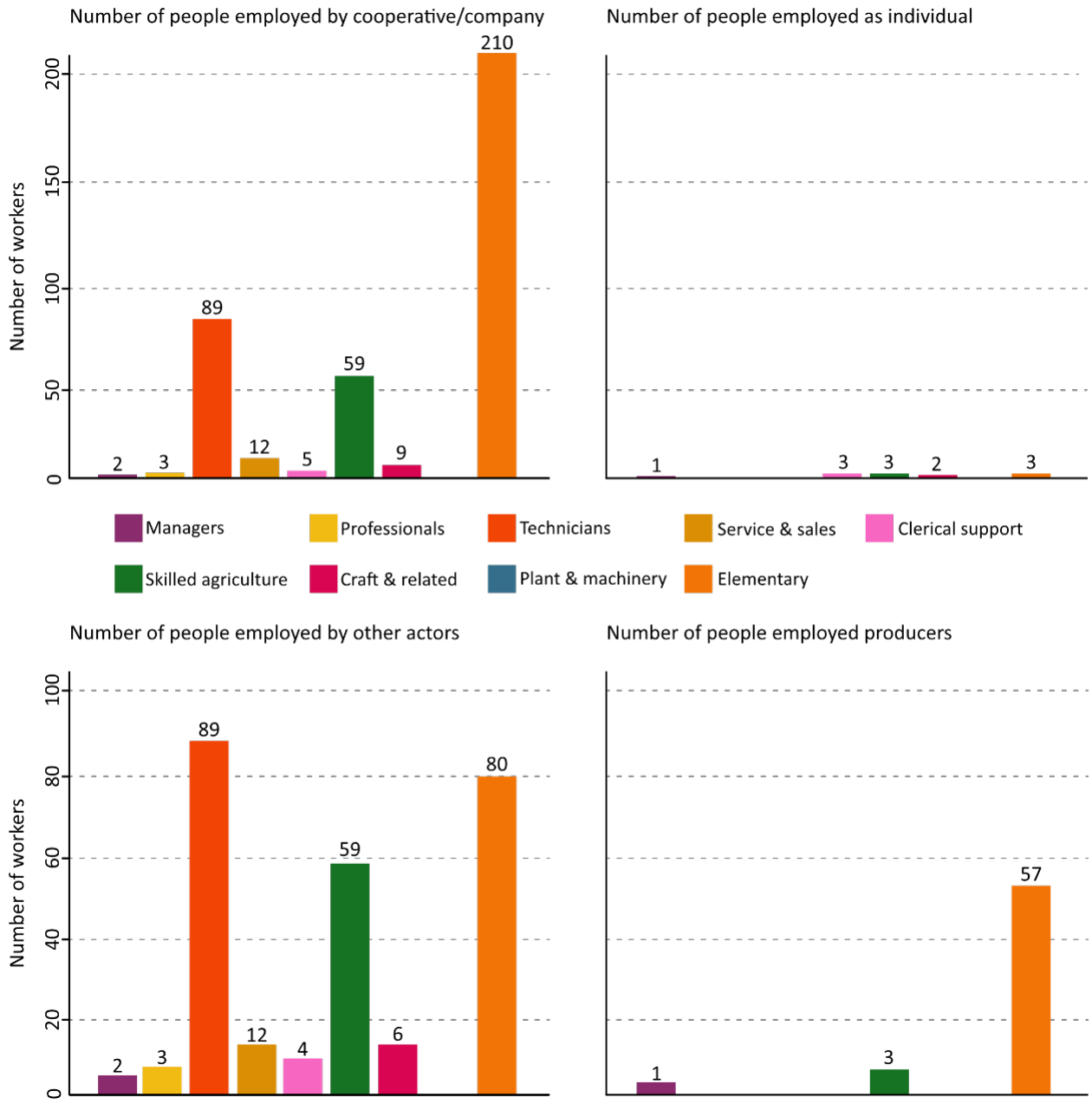


Employment Disaggregated by Occupation, Actor Type and Value Chain Stage

To understand where employment is concentrated within the floriculture value chain, Figure 12 presents the average number of workers in each occupational category, disaggregated by type of actor (individual versus company/cooperative) and stage of the value chain (producers versus non–producers). By type of actor, individual actors employ one manager — who is usually the owner — three clerical support workers, two workers in charge of craft and related activities, and three elementary workers. On the other hand, companies/cooperatives employ mostly technicians (89) and skilled agricultural workers (59). By activity or stage of the value chain, producers or farmers mostly employ elementary workers, averaging 59, who nor-

mally do casual work on a seasonal basis. For non–producing actors, the average number of workers is highest in the category of technicians (89), elementary workers (80) and skilled agricultural workers (59).

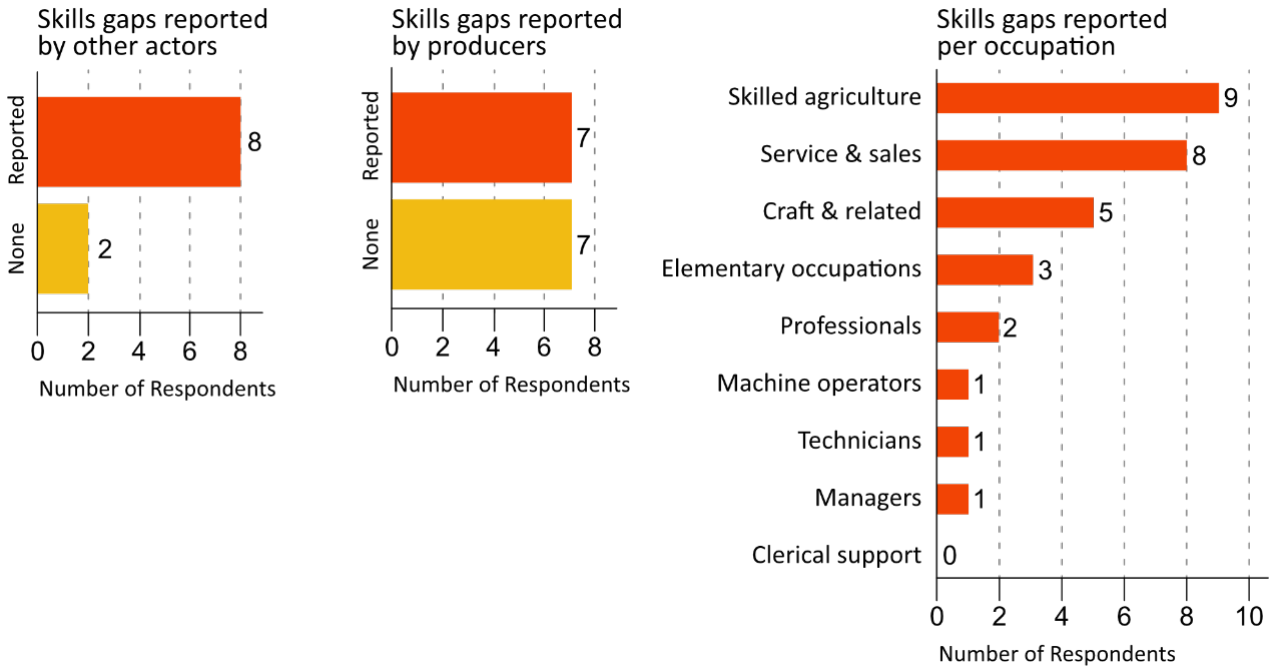
Figure 12: Employment disaggregated by occupation, actor type and value chain stage



Skills Gaps in the Floriculture Value Chain

Understanding the nature of skills gaps in the floriculture value chain is crucial to designing targeted policy measures and interventions to address them. In this regard, actors in the value chain were asked to mention whether or not they experience skills gaps and, if so, the occupations where the skills gaps are critical. Findings reveal that eight in every ten non–producing actors reported having skills gaps, a proportion much higher than that of producing actors — half of respondents (Figure 13). Regarding occupational categories, skills gaps are highest among skilled agricultural workers and service and sales workers, reported by nine and eight actors.

Figure 13: Number of value chain actors who reported experiencing critical skills gaps



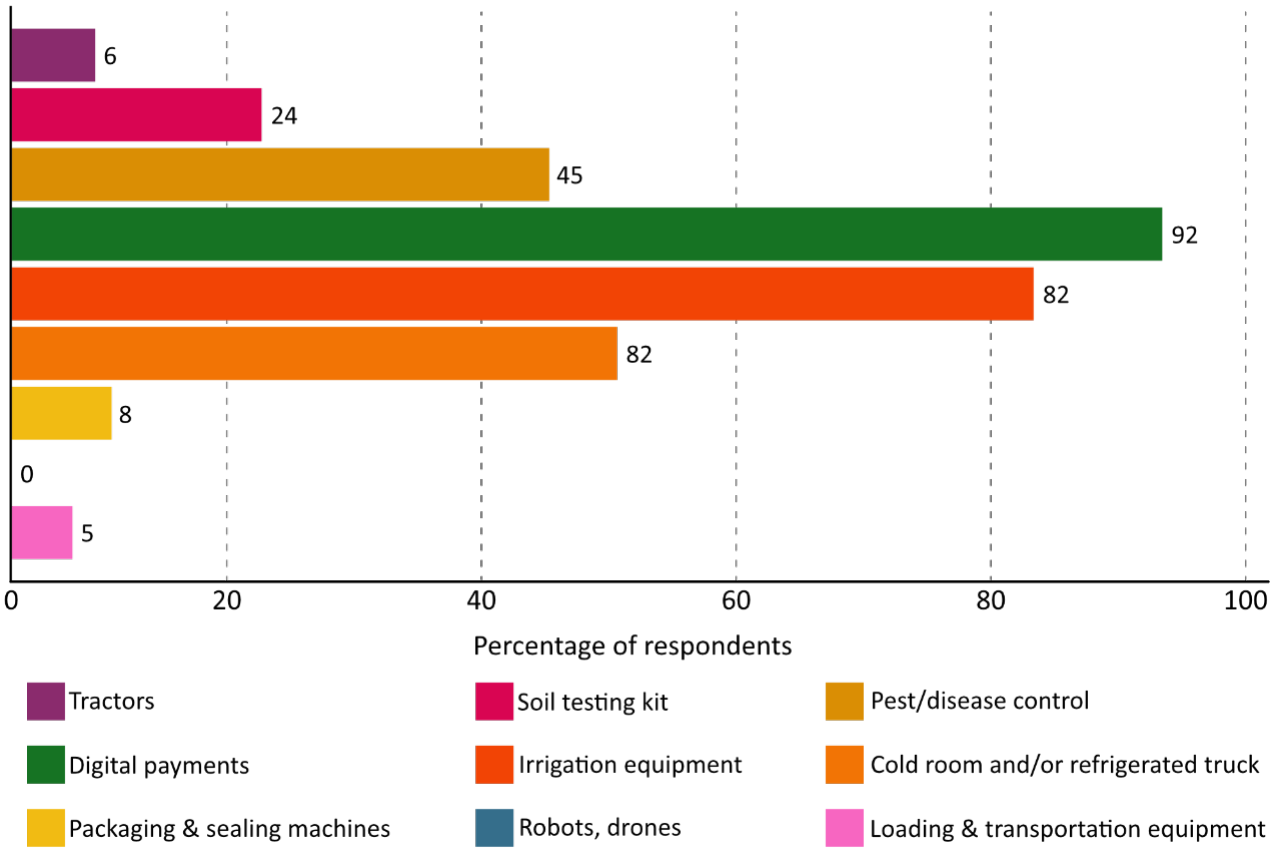
This finding, coupled with qualitative discussions with value chain actors, underscores the importance of targeted interventions to build the skills of agriculture workers, such as agronomists, and their capacity to transfer their knowledge to farmers to boost their production and productivity. Skills gaps related to service and sales workers are indicative of the critical need for professional marketers who can proactively find a market for flowers within local and foreign markets, which would, in turn, expand market opportunities and incentivise further production. Some actors also expressed concern over gaps in soft skills, such as poor customer care and the attitude of workers, calling for targeted initiatives to boost workers' professionalism, especially at the marketing stage.

Usage of Technologies

This sub–section assesses the usage level of various technologies among floriculture value chain actors. Generally, farming operations are primarily not mechanised, with almost no usage of tractors in any farming activity (Figure 14). The use of soil testing kits is also still shallow, implying limited scientific application in selecting soil types and plots suitable for different types of flowers, which could ultimately cut down yields. At the same time, disease and pest control equipment are relatively popular, mainly representing hand sprays used especially by individual small–scale farmers in the fight against crop diseases and pests. Although most actors reported using irrigation equipment, this mainly represents rudimentary tools such as watering cans, as relatively large companies only use sophisticated irrigation systems. Digital payments are quite popular, with nine in every ten respondents using any digital payment platform to either receive or make payments, most commonly using mobile money.

Half of the actors reported having access to a cold room or using a refrigerated truck to transport flowers to the market. The moderate access rate for cold rooms is explained not by ownership but rather by the presence of cold rooms established by the government and/or development partners in some districts, such as

Figure 14: Percentage of floriculture value actors using various technologies



Rulindo, where a few relatively large companies have their cold rooms. For refrigerated trucks, a few actors usually hire general–purpose ones meant for horticultural and dairy products. The majority either transport flowers to the market without any preservation measures or simply dip the flowers in water containers to prolong the withering period.

Compliance with Standards

This section examines the extent to which floriculture value chain actors comply with various standards. The most commonly applied standards are related to the regulation of workers, including timely payment of wages, payment of wages directly to workers who have done the work, equal payment of wages to male and female workers having done similar work, and protection of workers against violence and harassment (Figure 15).

Success Factors and Challenges to Business Growth for Floriculture Value Chain Actors

Promoting business growth in the floriculture value chain requires first understanding the factors influencing success and constraints to business survival and performance as reported by value chain actors (Figure 16). These success factors include the ability to forecast demand accurately, provision of good quality services to customers, recruitment of suitable occupations, having adequately skilled workers, reliability of suppliers and belonging to a cooperative or association. On the other hand, only one actor mentioned ac-

cess to unique technology as a factor that has had a high influence on its business success, partly reflecting the generally low levels of adoption of advanced technology in the value chain. Regarding challenges, the list is topped by input issues, such as unavailability, high cost, and/or low quality. This finding was corroborated by qualitative discussions where respondents expressed concern about the unavailability of seeds for certain types of flowers on the Rwandan market, which forces them to source them expensively from countries like Kenya, the Netherlands and Japan.

Figure 15: Number of respondents who reported complying with various standards

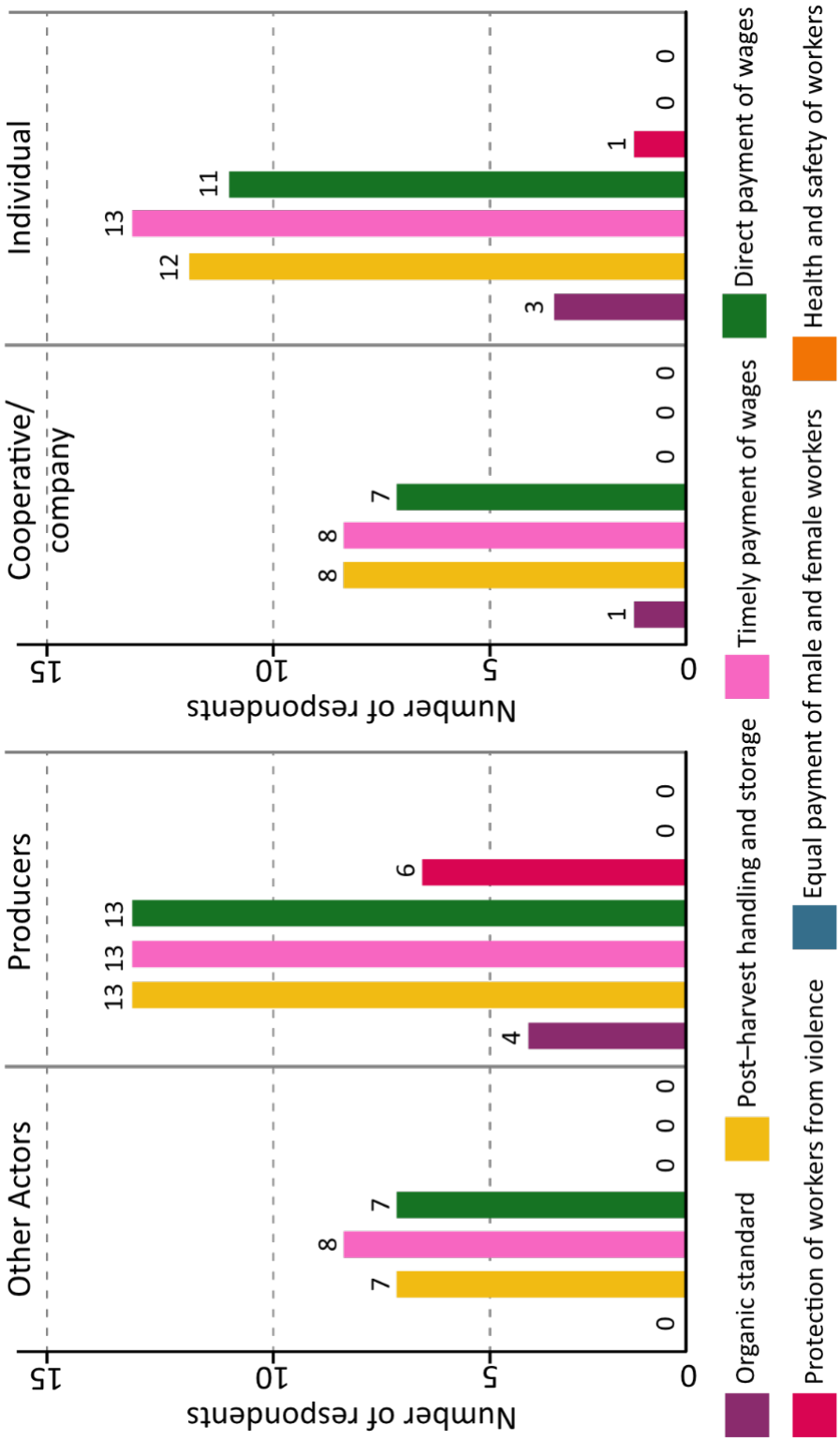
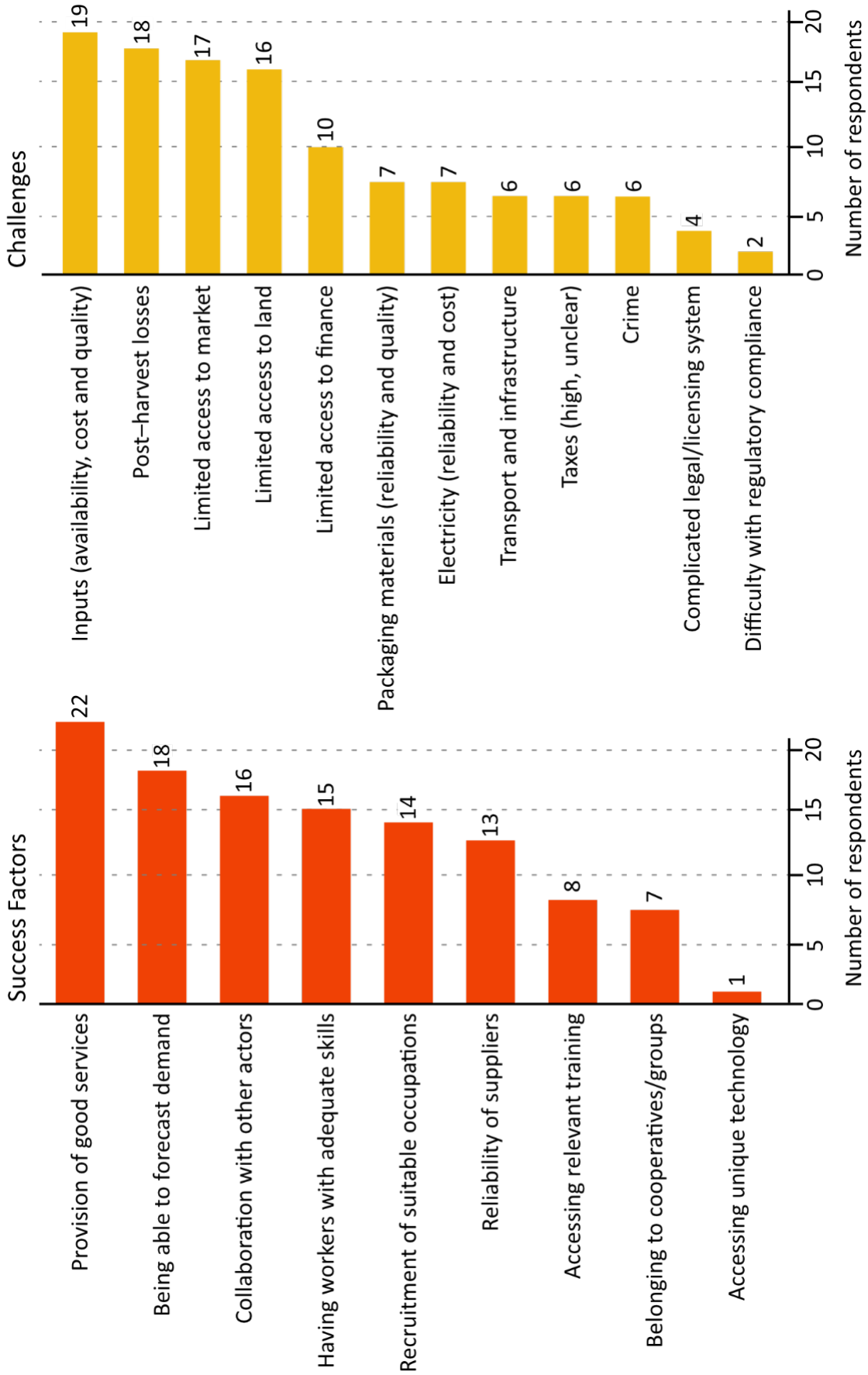


Figure 16: Number of actors reporting success factors and challenges to business growth



In the market chain, auctions and tele/Internet flower auctions as marketing strategies play an increasing important role in the floriculture industry.

Qualitative Case Studies on Perceptions and Experiences of Floriculture Value Chain Actors

Introduction

Understanding how the floriculture value chain works requires gathering comprehensive information from actors, including but not limited to their perceptions and experiences regarding the organization of the value chain, as well as opportunities and challenges therein. In this regard, qualitative information was collected to supplement the mini–quantitative survey, where the former covered five actors operating at different stages of the value chain (Table 2). The actors were drawn from three districts across two provinces: Rwamagana District in the Eastern Province and Gasabo and Nyarugenge Districts in Kigali City Province.

The qualitative information collected from value chain actors was organized and presented around four common themes: employment and skills, blockages to the value chain, the role of technology, and the influence of government policies, regulations and infrastructure.

Table 2: General characteristics of floriculture value chain actors profiled

Actor name	Province	District	Years in Operation	Main Activity/ Activities	No. of Employees
Bella Flowers	Eastern	Rwamagana	8	Flower farming; export	812
Laurent Hagenimana	Eastern	Rwamagana	25	Flower farming	8 (0 permanent; 0 casual)
Bright Harvest	Kigali	Gasabo	9	Flower farming; export	84 (4 permanent; 80 casual)
V–Plus Industries Limited	Kigali	Gasabo	7	Manufacture of packaging materials	360
Jotete Investment Limited	Kigali	Nyarugenge	12	Flower farming; decoration.	149 (33 permanent; 116 casual)
Average/typical actor	N/A	N/A	12.2	N/A	283

Note: The total number of employees was arrived at together with the respondents, including both permanent workers with contracts and casual workers. For some actors, disaggregated information of employment by type (permanent versus casual) was not provided and as such, only the total number of workers is reported.

Employment and Skills

In terms of numbers, employment in the floriculture value chain is concentrated around the production stage, where the most significant number of workers employed are casual, involved in land preparation,

planting, weeding and picking/harvesting of flowers. Generally, most actors recruit their workers from the local communities in which they operate. This is mainly driven by the fact that operations for which workers are sought — particularly for the production stage — don't require sophisticated skills, considering the small–scale nature of operations. Only a handful of relatively larger–scale value chain actors manage to employ or hire services of professional agriculture workers such as agronomists.

Workers are trained, albeit at a low level, especially among small–scale flower farmers. For empowers who manage to train their workers, the main types of training include pest and disease control, fertiliser application and proper picking of fruits. Training for those involved in packaging, marketing, and distribution of flowers usually covers cutting, preservation, packaging, and marketing skills. Formal training sessions are organised for a handful of large–scale flower companies, either offered within the organization or outsourced from specialized trainers.

Actors at different stages of the value chain reported varying gaps in skills. For one actor involved in growing flowers (production stage), *"Many casual labourers lack the specialized skills to take care of flower plants, some of which required skills are different from the generic skills required of workers in other crops. Even agronomists who generally support farmers of food crops lack adequate knowledge about flowers because it is not their area of specialisation. We need agronomists who are specialized in floriculture to spread good practices among flower farmers and to guide workers on how to care for the flower plants and determine the right time for harvesting the flowers, among other activities*".

Skills gaps in the floriculture value chain are also partly attributable to the current education and agriculture extension systems unsuited to flowers. One company representative stressed this challenge, *"We grow summer flowers, which are grown outside and not in a greenhouse and hence require specialized personnel to control the external environment. However, we generally lack related technicians and skills in floriculture in Rwanda, and we always import the skills from Kenya and other countries. These concerns have been widely discussed, but we have not seen any change. I think the agriculture education where agronomists graduate needs to change to include floriculture studies so that we can have agronomists who know about floriculture*".

Another critical skills gap relates to pest control and fertiliser application, driven by farmers rarely receiving specialized training relevant to flowers. One farmer mentioned, *"Sometimes you find the flowers have withered, and when you investigate, you realize it was caused by a casual labourer applying pesticides wrongly*". For large–scale farmers, skills are critically needed in operating irrigation and fertigation systems, for which external consultants are often hired.

Skills gaps for those involved in the marketing and distribution of flowers are mainly related to marketing of flowers, as one actor engaged in both farming and decoration reiterated, *"Workers lack adequate skills in marketing, which limits our ability to access a wide range of markets within and outside Rwanda. Currently, we are mainly selling flowers to the local market. Still, if we could hire experienced marketers, they would perhaps help us identify international markets and related information such as how to fulfil quality and other requirements associated with flowers*"

Soft skills are also critically lacking in the floriculture value chain, especially at the marketing and distribution stage. One actor mentioned that *"Workers in Rwanda generally lack the positive attitude towards work. Their inability to offer good customer service often results in losing clients. We have a serious skills problem because even in administration, where we would expect someone to produce a report of what they did easily, they are simply unable to do so despite the numerous trainings we give them. This leaves me wondering whether it is because they do not know how to use a computer or are challenged by language barrier"*. These sentiments point to the need for dedicated capacity building focusing on soft skills, which are important for supplementing technical skills related to flower farming.

Blockages to the Value Chain

Several constraints stand in the way of the effective functioning of the floriculture value chain.

Transportation and refrigeration. Transportation of flowers to the market is a big challenge: one actor mentioned that *"We lack refrigerated trucks because they are expensive and those who own them either charge high fees or combine flowers with other horticultural and dairy products, which compromises the quality of flowers"*. The same actor added that, *"Transporting flowers to the market without refrigeration implies that they reach the market when they are not fresh and this reduces their marketability"*. For some actors, poor infrastructure in some remote areas adds to the woes of flower farmers by raising the cost of transporting flowers to the market and increasing the overall cost of production. One farmer was specifically challenged by the fact that *"The cost of transporting flowers to the market is sometimes almost equivalent to the value of the flowers themselves, which reduces profitability"*. Besides transportation, storage of flowers before sale is also hectic, especially for small–scale farmers, as one of them emphasized *"The challenge of keeping flowers fresh during good harvest due to lack of access to cold rooms, leading to post–harvest losses"*.

Limited policy attention. For some actors in the floriculture value chain, *"Policy support to floriculture remains lower than for some priority food crops. For example, there are no specialized and subsidized fertilisers for flowers, as with priority crops such as maize"*.

Limited access to finance. Limited access to finance significantly inhibits investments in the floriculture sub–sector. As one actor mentioned, *"Floriculture investments can be quite costly, especially setting up greenhouses and acquiring other relevant technologies and yet financial institutions consider farming high–risk, which limits us from accessing formal credit"*.

Underdeveloped supply system for planting and packaging materials. Unlike other crops with readily available seeds, planting materials for flowers are relatively harder to obtain in Rwanda. One farmer was concerned about both unavailability and cost, mentioning that *"It is hard to get planting materials from the local market as these are not propagated in the country while seeds are imported expensively from countries like Kenya and the Netherlands. This forces many farmers to rely on cuttings from on their farmers, but these often produce low yields"*. This reiterates the need for research and development and capacity–building interventions to facilitate the propagation of certain varieties of flowers in Rwanda.

According to the value chain actors, this would increase availability and reduce the cost of planting materials. Some actors expressed the need for input suppliers who specialized in floriculture seeds. This could re-

duce the burden of actors getting involved in the tedious work of making international orders for seeds alongside many other responsibilities. One company representative mentioned, *"We also need flower input sellers who can import the flower seeds and agro–chemicals on our behalf. Flower farmers indulge in all farming–related activities, including seed importation, worker training, packaging materials procurement, and negotiating prices for cold chain services. There are so many activities to be handled by one farmer, and instead, having specialized floriculture input dealers would not only take away this burden from farmers but also create a lot of jobs in the floriculture value chain".* The same view was shared by another company involved in both farming and export, whose representative mentioned that, *"We need input importers so that we can get the right seeds and fertilisers on time. We always have to buy seeds and fertilisers from Kenya, which takes time. But if someone else invested in importing the right type and quality of flower seeds and specialized fertilisers, or even produce them locally, it would spare some time for us and allow us to focus on other things to promote our flower businesses".*

Packaging materials are also a point of contestation among floriculture value chain actors. While some actors believe that high–quality packaging materials are unavailable or expensive in the local market, others believe the situation is gradually improving. One company illustrated the challenge it faces with packaging materials, mentioning that *"Packaging materials are still tricky. We cannot get the materials that we want from the local market. The appropriate packaging materials are not adequately available, and those available are even more expensive than those imported from countries like Kenya. I could order packaging material from Kenya and pay 150 RWF, yet the same material procured from Rwanda would cost me 1,000 RWF."*

Another company held a similar view: *"Although packaging materials are locally available, clients in the Netherlands prefer certain types which cannot be sourced in Rwanda, and we often resort to importing expensive boxes from Kenya to satisfy customer preferences."* On the other hand, one actor expressed a more optimistic view: *"Packaging materials used to be a critical challenge until one company was established in the Kigali Special Economic Zone to produce boxes which we use to package our flowers specifically".*

The Role of Technology

Technology adoption remains relatively low among floriculture value chain actors. None of the profiled actors used tractors for cultivation, and the reasons vary from the limited scale of farming operations to inadequate funds and bureaucratic decision–making processes in some companies. While greenhouses are important for producing high–quality flowers, only a handful of relatively large–scale farmers possess them. In contrast, others operate on open fields prone to environmental risks and pests. One farmer stressed this challenge, *"We would wish to grow flowers in greenhouses as this helps us to control the environment and produce high–quality flowers for the international market. However, installing a greenhouse involves a huge cost for which we have no funds".*

The usage of some technologies is limited by the inability of actors to fulfill associated regulatory requirements, as one company highlighted, *"We would like to use soil testing kits. However, these require having an ISO–certified laboratory, which we currently don't have".* One company highlighted that *"Unavailable technologies that the company would wish to have include a conveyor belt to reduce labour cost by 70%, increase efficiency, and minimize damages and time taken in preparation/packaging of flowers. However, these are not readily available in the local market".*

Overall, irrigation and greenhouse technologies are not widely adopted given the huge investment required and considering the small scale of farming activities undertaken by the actors. Some flower farmers who cannot irrigate and grow flowers throughout the year miss international market opportunities due to failure to schedule their harvest to match the timing of significant markets. One company that often supplies flowers to countries in Asia and Europe specifically faces this critical challenge as its representative mentioned, *"We also need irrigation technology because we miss the international market season when we still depend on the rainy season. The problem with depending on the rainy season is that we miss an opportunity to sell flowers in Europe and Asia when the two continents are in their winter season and unable to produce their summer flowers. Waiting for the rainy season in Rwanda allows us to harvest flowers when these continents return to the summer season and have enough flowers. Still, if we could use irrigation systems, we could grow flowers throughout the year and take advantage of European and Asian winter seasons to sell our produce".*

There are, however, some good practices of digital technologies from large–scale companies with sophisticated irrigation and fertigation[6] systems that are optimized for the effective application of water, fertilisers, and pesticides to flowers in different sections of the field. Enhancing access to similar systems by small–scale farmers would require multi–dimensional interventions, including pooling resources like land and enhancing actors to access low–interest credit and capacity building to utilize the technologies effectively.

Influence of Government Policies

According to stakeholders, policy influence in the floriculture value chain has been relatively minimal compared to other crops like maize. The government has supported export promotion and capacity–building interventions for farmers, especially those channelled through the National Agricultural Export Development Board (NAEB). A company representative who has benefited from such programs mentioned, *"Many government policies and interventions have helped us to promote our floriculture farming and export, including boosting the skills of farmers and offering incentives to encourage them to export. One of the most useful incentives is related to export promotion, where we are eligible for discounts on our flower cargo for export. This has greatly reduced the overall cost of exporting our flowers via RwandAir".*

Another actor appreciated the trainings by NAEB, saying, *"NAEB has provided multiple trainings to farmers, especially regarding flower handling skills. Normally, people start flower farming as a business without adequate floriculture knowledge and experience. I used to order flowers from different out–growers, and they would arrive in bad shape because many people did not know how to pack them, which caused losses. With support from NAEB through trainings, we are slowly acquiring the necessary flower–handling skills".*

Another company representative who benefited from capacity–building initiatives offered by NAEB reported solving some of the issues that had prevented the company from satisfying foreign markets. The actor mentioned, *"I faced many challenges serving the Netherlands market because our packaging could not meet their market requirement. We used to pack by leaving a 20–millimetre distance between flowers, while the Netherlands market required 23 millimeters. However, NAEB trained us and other farmers about the right flower packaging and handling to help us meet the international market requirements".*

[6] Fertigation is the practice of applying fertiliser solutions with irrigation water, typically through a microsprinkler or a drip system.

In terms of policy prioritization, however, floriculture actors feel that floriculture has not yet received the attention it deserves, as highlighted by one farmer, *"The government has many incentives for horticulture, but it is as if floriculture is not considered as part of horticulture because we do not get the incentives which farmers of other crops get. Other horticulture farmers receive subsidized seeds and agro–chemicals. Still, when we apply for those incentives, they reject our applications because they support food producers only"*. One farmer stressed the burden faced by floriculture farmers when they are not adequately supported, mentioning that *"Flowers require a high investment; we sometimes think twice and reconsider additional investments into the business. I grow flowers in the Rulindo district, where the CIP [Crop Intensification Program] is practised to promote horticulture. Still, they exclude flowers, which leaves us wondering whether flowers are indeed part of horticulture as per official classifications"*.

Another farmer had a similar view and suggested that the government reconsider revising the classification of crops to distribute incentives equally among crop categories, mentioning that *"Perhaps floriculture should be classified as part of horticulture because whenever the government provides incentives for horticulture, flower farming is always excluded because it is not part of food production yet it is a practice that can earn income for the people to buy food as well"*.

The shortage of land and uncertainty about land access were highlighted as key impediments to the effective functioning of the floriculture value chain, which several actors linked to limited policy prioritization. According to one farmer, *"I have been cultivating flowers in a marshland, only to learn that the Kigali City administration has handed over the valley to a different investor. Shockingly, this decision was made without any consultation with me. There hasn't been a single assessment of my investments in the valley. I have already nurtured flowers and installed my irrigation system, which is expensive, and I will have to forfeit those investments"*.

Actors in the floriculture value chain expressed concern over some tax regulations, such as using electronic billing machines (EMBs). Rwanda Revenue Authority requires that all eligible taxpayers provide evidence of operational expenses so they can be deducted from gross income when assessing the net income subjectable to tax. While this arrangement is meant to streamline payments and increase transparency, some actors cannot obtain EBM receipts from their suppliers. According to one actor, *"The government has ordered that we should always have EBM receipts to justify our expenses. This is a challenge for us, considering the nature of our business. We work with part–time workers and use motorbike taxis for transportation, but many other suppliers and partners cannot issue us EBM receipts. I work with many out–growers from rural areas who supply me with flowers, but they have not yet reached the level of issuing EBM receipts for the flowers they supply me. In this case, RRA [Rwanda Revenue Authority] audits don't recognize my purchases because an EBM receipt does not justify them, making me pay more taxes than I am meant to"*.

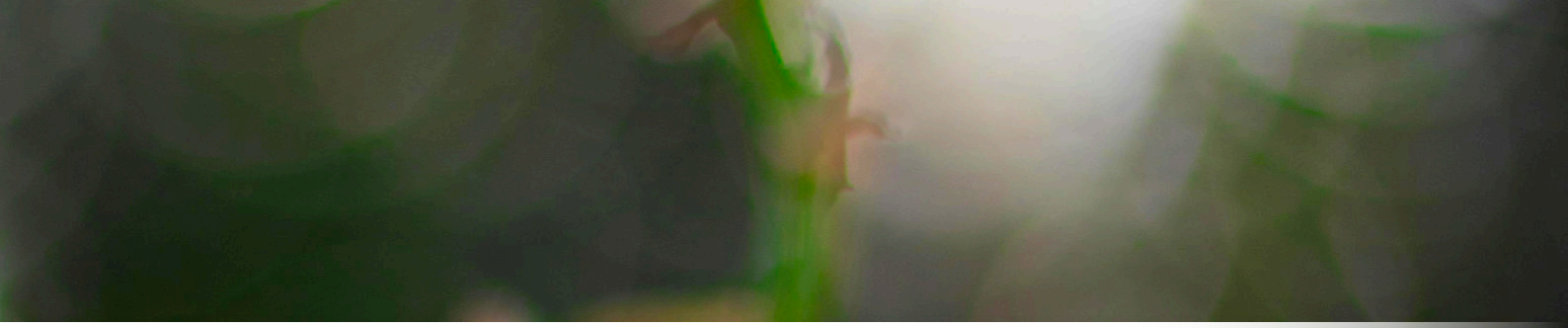
Another tax–related challenge that floriculture value chain actors face is that customer payments are often delayed. Yet, once sales are declared, they must be paid in the respective tax period. According to one actor, *"Sometimes clients delay payments, yet we submit an EBM invoice, and there is no strategy to declare unreceived payment for an invoice. This leaves us with no choice but to pay tax for the money we have not yet received. I would suggest that the RRA have a strategy where taxpayers can declare invoices whose payments are pending and only pay associated taxes once the money is received"*. This observation highlights the need for support to farmers that goes beyond farming but encompass other support systems, for example,

dialogues between the government and the private sector to understand tax–related challenges and find a common ground for both parties to function the value chain effectively.

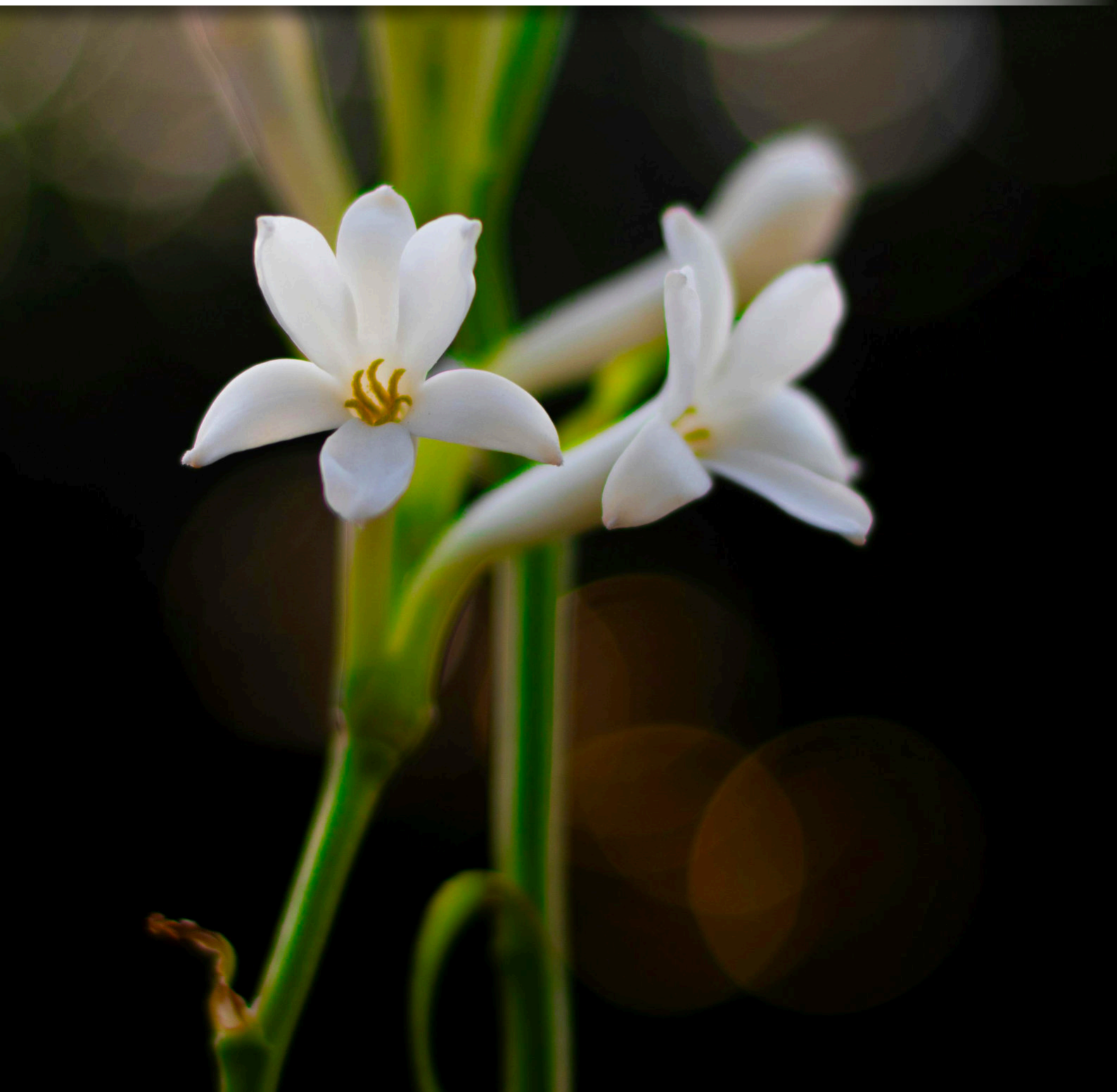
As highlighted by floriculture value chain actors, the low policy prioritisation also extends to education, training and extension services where floriculture receives less attention than other crops, leading to critical skills gaps in the sub–sector, as value chain actors claim. One flower farmer was concerned about skills gaps in the value chain, highlighting that *"The reason why the flower value chain has skill gaps is that we do not get technical support from the government. I hear maize farmers have the Smart Nkunganire System, where they can purchase seeds and fertilisers at a discount, but there is no such incentive for flower farmers. Other farmers attend multiple trainings about different agriculture practices, but flower farmers are not invited. It is like supporting flower farmers is not part of the responsibilities of the Sector agronomist"*.

According to some actors, the current education system is partly to be blamed for the skills gaps in the floriculture sector. According to one company representative, *"Our major challenge is a shortage of floriculture expertise; we import knowledge from Kenya and the Netherlands since we lack qualified agronomists for flowers. I once employed an agronomic who had graduated from Rwanda, but I was the one who taught him everything. I had to guide him in caring for the plants and choosing the appropriate fertiliser, yet he had a degree in agriculture. He was more of a liability to me than an asset, and I ultimately let him go because his value addition was minimal. Even the agronomists at the Sector level do not know anything about flower farming. Perhaps it is because floriculture is new in the country, or students lack practical education as they do not know anything"*.

The issue of inadequate practical skills goes beyond the production stage and applies to the operation of machines related to flower preparation and packaging. To illustrate the severity of this challenge and the need for deliberate government policy to provide practical skills in the education system, one actor mentioned, *"The challenge we face is to get skilled employees because we get many applicants who have qualified mechanical engineering degrees but do not know mechanical practices including maintenance and repair of tools and machines. Welding and simple installations are the only skills they possess regarding mechanical activity"*.



Floriculture activity has marked as a viable and profitable trade area with a potential to activate self-employment among low– and middle–income farmers and earn the very essential foreign exchange in the developing countries.



Review of International Experience and Best Practice for the Floriculture Sector

Introduction

The international comparison aims to see how countries have developed their value chain for flowers and to consider the implications for Rwanda, especially regarding how they might develop skills and employment opportunities. The selection of case studies was based on a number of criteria. The first is what lessons can be gained from the other countries' experiences. In practice, this meant selecting countries that have successfully grown their flower industry and have similar development characteristics. There is no point in selecting country case studies where the lessons are not applicable. The second criterion for selecting case studies was the availability of data. Without the data, it would have been difficult to understand how other countries' value chains operate, their policy rules' effectiveness, or the government's support.

Our approach focuses upon five related parts to comprehensively understand the flower value chain in different countries. The first is how the value chain developed and what factors made it successful in the three countries selected. The second part is the stakeholders involved in the value chain and their corresponding relationship. The third part turns to the rules and supportive environment, including the roles played by the government and how they are facilitating the success of the three different value chains. The fourth part turns to employment and skill issues. It should be noted that there was limited data on this topic in some cases. Finally, the challenges facing the value chain and the implications for Rwanda are tackled.

International Case Studies on the Flower Value Chain

An overview of the case studies selected for the analysis is outlined in Table 3. A total of three different case studies were chosen. The first case study, the Netherlands, was selected due to its importance in the global value chain for flowers and because most of the world's flowers are still auctioned in the Netherlands, having implications for all countries, including Rwanda. The other two case studies were selected since they are some of the large producers of flowers and can be viewed as traditionally less developed countries. Each country has a slightly different value chain, and their approaches to the industry can offer lessons for Rwanda.

Case Study 1: The Netherlands — the Global Centre of the World Flower Value Chain

The Netherlands, traditionally the global centre of the world flower value chain, has experienced significant changes in its composition. The number of cut flower companies is declining, with larger companies taking over smaller ones and the industry structure beginning to change. The value of the flower sector is still significant, but overseas flower producers are increasingly contributing an essential part of the total output. A significant 83,000 people are employed in the sector, but this is declining due to the use of technology and

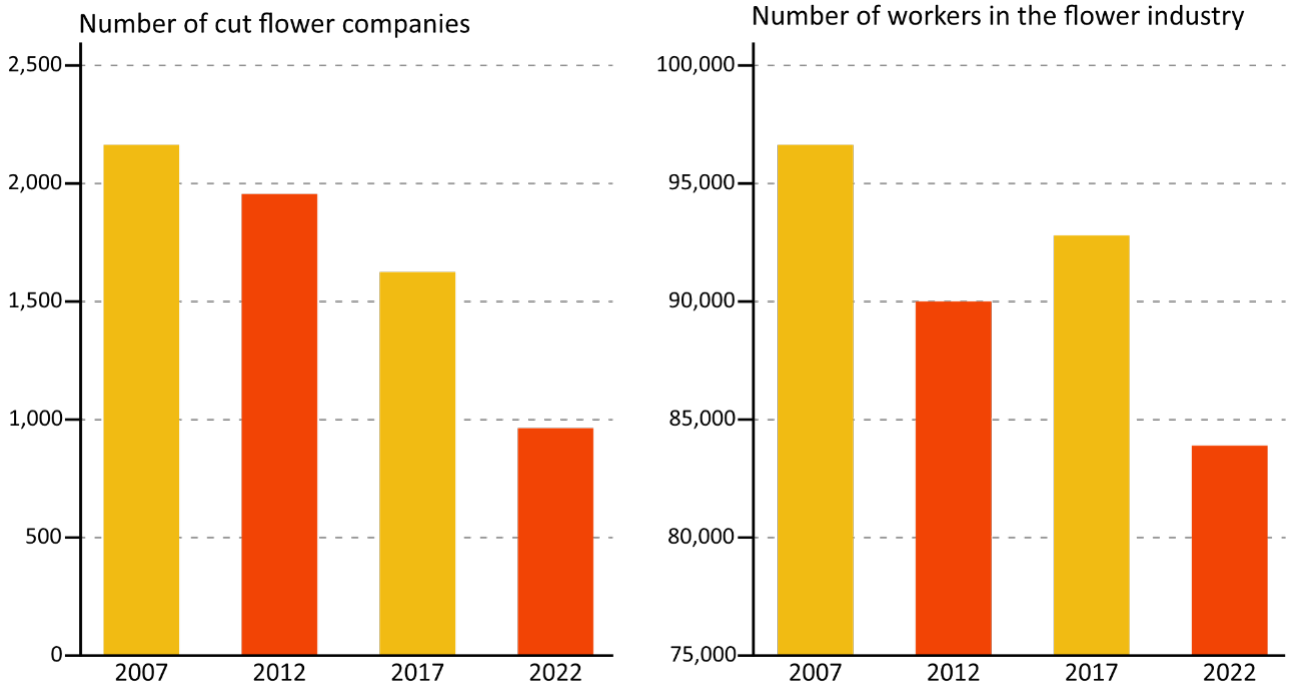
larger producers. The overriding concentration occurs in growers and nurseries and, to a lesser extent, in transportation and logistics, auctions, and retail sub–sectors.

The Dutch flower auction system, which accounts for 65% of all flowers traded in the world, offers transparency in pricing due to its position in the value chain and ability to differentiate production from sales. This method emphasizes the importance of harnessing collective power among smallholders and the institutional power of government support in policy, which enables a strong bargaining position in an otherwise buyer–driven industry.

Current energy crises in Europe have led to the relocation of flower production to alternative destinations in developing countries like Ecuador, Colombia, and Kenya. These countries typically exhibit lower levels of labour strength and less robust labour legislation aimed at safeguarding workers against capitalist exploitation.

Despite these challenges, the Dutch system has effectively addressed these changes by implementing various solutions and maintaining a prominent position in the worldwide flower industry. The first step involved granting international cut flower imports access to the Dutch auction, marking the commencement of global competition within the auctions. The second measure was the implementation of the Tele Flower Auction (TFA), an electronic platform for the Dutch flower market that enables growers to sell their products to purchasers worldwide through direct online means.

Figure 17: Number of companies and workers in the flower industry in the Netherlands



Stakeholders and Industry Structure

The Dutch flower industry includes a significant number of large companies with over 5 hectares of land and 60% market share. Small–scale farmers and micro–growers comprise 35% and 10% of the flower market, respectively. The Royal FloraHolland Cooperative, the world's largest flower auction house, connects producers and buyers, creating a transparent and efficient floral market.

Table 3: Key data on floriculture value chains for the Netherlands, Colombia and Kenya

Country	Types of Flowers	Structure of the Value Chain	Contribution to GDP	Number Employed	Rules	Supportive Functions	Key Challenges
Netherlands	• A diverse variety (tulips, daffodils, hyacinths, crocuses, carnations, as well as lilies & roses.	• Around 50% of the growers are large–scale farmers, but a significant 45% are SMEs. • Royal FloraHolland Cooperative, an auction house which covers 45% of global trade for flowers. • Ministry of Agriculture, Nature, and Food Quality, responsible for regulation and health & safety. • Ministry of Foreign Affairs, foster favourable trade agreements. • Various universities that support research & development. • International agencies, such as the EU, which facilitates growth & employment.	• 2.8%	• 120,000 directly employed in the sector	• The government has stringent regulations to ensure the health and quality of exported flowers. • There are high labour standards, ensuring fair wages and working conditions. There is a high level of collaboration between different stakeholders in the sector. • Extensive use of data analysis to optimise production, logistic, and marketing.	• The government and the EU provide financial assistance to flower growers and exporters through grants and subsidies for investing in new technology, expanding production facilities, and conducting research and development.	• Global competition and lower–cost producers in the south. • Labour availability and rising wages. • Having to meet increasing regulatory and compliance costs.
Colombia	• Mainly focused on roses, carnations, and Orchids, as well as hydrangeas, lilies & proteas.	• Large–scale farmers control around 70% of production and 30% of SMEs. • Asocolflores, the Colombian Association of Flower Exporters, supports exports. • Maersk. As a logistics company, they play an important role in supporting integrated solutions.	• 1.7%	• 110,000 are directly employed in the sector.	• Colombia has free trade agreements with over 60 countries, including the United States, the European Union, and Canada. • Strict regulations are in place to ensure the health and quality of its flowers. • Implementation of tax advantages, export promotion programs, and investments in research and development.	• The government plays a key role in trade and opening up new markets. They plan to expand exports from 1.2 billion to 3 billion annually by 20230.	• The narrow focus of the market on key events, such as Valentines Day. • Difficulties caused by pests. • Bad perception of labour practices. • Climate change.

Country	Types of Flowers	Structure of the Value Chain	Contribution to GDP	Number Employed	Rules	Supportive Functions	Key Challenges
Kenya	• Main flowers include roses, carnations, Alstroemerias, gypsophila, lilies, eryngiums, arabicum, hypericum, and statice.	• Large–scale farmers control around 70% of production and 30% of SMEs. • Asocolflores, the Colombian Association of Flower Exporters, supports exports. • Maersk. As a logistics company, they play an important role in supporting integrated solutions.	• 1.45%	• 150,000 directly employed in the sector.	• The Export Promotion Fund (EPF) and the Agriculture and Rural Development Credit Facility (ARDCF) have facilitated growth in the sector. • The Duty Drawback Scheme in Kenya allows flower exporters to recoup import fees and taxes on flower–producing inputs, lowering their expenses.	• The government's special economic zones attract flower industry investment. • The sector is guided by "Kenya Flower Sector Strategy 2023–2033.	• High production costs. • Environmental concerns about the production process • Instability of global. markets.

The Dutch flower industry is a vital hub for logistics, with a vast network of suppliers that ensures fresh, fast delivery. The industry uses advanced technology and data analytics to optimize routes and reduce flower respiration. The Ministry of Agriculture, Nature, and Food Quality (LNV) regulates the sector, ensuring compliance with environmental requirements, quality control procedures, and sustainable practices. The Netherlands Food and Consumer Product Safety Authority (NVWA) oversees the adherence of flower producers to safety and quality laws, ensuring the credibility of Dutch flowers in global markets.

The Ministry of Foreign Affairs, in collaboration with the Netherlands Enterprise Agency (RVO), plays a vital role in promoting Dutch flowers on the global stage. The RVO implements trade promotion strategies, organises trade missions, and facilitates participation in international flower exhibitions. The Ministry also engages with foreign governments to foster favourable trade agreements and remove barriers to Dutch flower exports.

In research and development, Wageningen University & Research (WUR) collaborates closely with the Ministry of Economic Affairs and Climate Policy, providing funding and support for innovative projects aimed at enhancing productivity, sustainability, and resilience of the flower sector. Sustainability organisations like FSI promote sustainable practices among growers, such as using less water, pesticides, and energy.

International agencies play an important role in the Dutch flower industry, such as the European Fund for Rural Development, providing a massive subsidy of 600 million euros to flower producers in response to the COVID–19 crisis. The EC has played a significant role in supporting the sector through improvements to the processing, marketing, and distribution of flowers and environmental measures.

The Business Environment and Supportive Infrastructure

The Dutch flower industry is active and competitive, encouraging innovation, collaboration, and sustainability. The country's strategic location provides a controlled and transparent platform for buyers and sellers, while its supply chain is more collaborative than many other countries. The Dutch flower sector's regulatory framework is comprehensive, ensuring high quality, safety, and sustainability standards.

Skills and Employment

The education and training system in the Netherlands supports the flower sector through vocational programs designed for the horticulture and floriculture industry. Employers are crucial in guiding educational institutions, providing career guidance services and practical training components like internships or apprenticeships. The Dutch Flower Group, established in 2007, brings together talent from various companies to support human capital formation through an online platform and internships and graduate assignments.

Challenges Facing the Sector

However, the flower sector faces challenges such as environmental sustainability, global competition, labour availability, rising wage costs, and regulatory compliance costs. These issues require ongoing attention to ensure fair wages and cost–effective operations. Small–scale producers may find it challenging to bear the financial burden of regulatory compliance.

Lessons for the Value Chain in Rwanda

Lessons for Rwanda's flower sector include replicating the auction system, leveraging comparative advantages, adopting innovative technologies, prioritizing sustainability, building infrastructure and logistics, developing skills and expertise, competing with established players, and accessing finance and resources. Rwanda could establish a flower auction similar to Royal Flora Holland, fostering transparency, fair pricing, and direct access to international buyers.

Rwanda can leverage its favourable land and climate conditions for flower cultivation, capitalizing on these advantages to attract foreign investment and establish itself as a competitive flower producer in East/Central Africa. Adopting cutting–edge technologies like climate–controlled greenhouses and hydroponics can enhance productivity, optimize resource use, and improve flower quality. Implementing sustainable practices like water conservation, waste management, and responsible pesticide use can cater to the growing demand for eco–friendly flowers and align with Rwanda's green development goals.

Building efficient transportation and cold chain infrastructure is essential for rapid and fresh delivery of flowers to international markets. Developing skilled labour for cultivation, post–harvest handling, and marketing is essential. Differentiating Rwandan flowers through quality, sustainability, and innovative varieties is crucial to gaining market share.

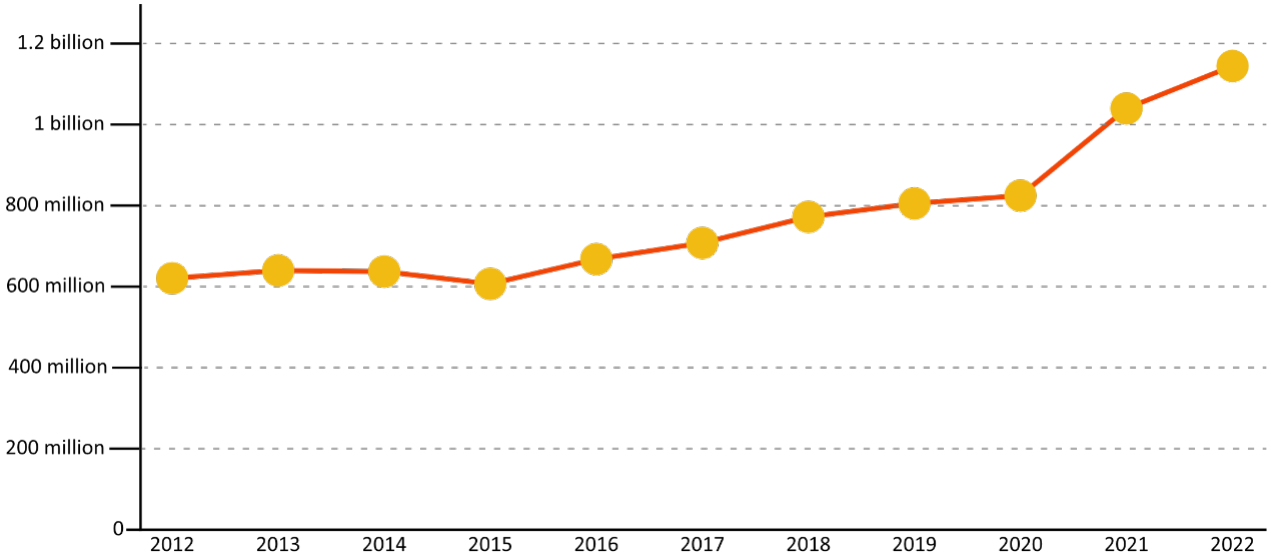
Access to finance and resources for technology adoption and infrastructure improvements may challenge smallholder farmers. Government support and partnerships with financial institutions can bridge this gap. The Netherlands offers valuable lessons for Rwanda's flower sector, demonstrating how strategic adaptation, innovation, and sustainability can empower smallholder farmers, create jobs, and contribute to economic growth.

Case study 2: Colombia — the Emergence of a Global Flower Producer in Latin America

Colombia, a prime location for flower cultivation, has emerged as a global flower producer in Latin America due to its favourable environmental conditions, abundant land, and access to low and semi–skilled female labour. The climate of the Savana de Bogota plateau region is characterized by consistent and mild temperatures throughout the year, with 12–hour days and high levels of light intensity. Colombian growers can maintain their flower production during the winter months in the United States, corresponding to the country's peak demand.

The initial Colombian cut flower enterprises were established by four American individuals, one of them being a Californian cultivator troubled by the escalating expenses of land and fuel in the United States. The flower varieties imported into Colombia were identical to those previously cultivated in the United States, but roses were included due to their delicate and intricate cultivation methods. Commercial air transportation facilitated the utilization of Colombia's favourable environmental and labour conditions for cultivating flowers.

Figure 18: US cut flower imports from Colombia — value in USD



Colombia also has a surplus of low–skilled, predominantly inexpensive female workforce, making producers four times less expensive than US producers. Government policy changes during the 1990s and the transition from import substitution industrialization to a more liberalized economy facilitated the growth of the flower business. Colombian firms gradually assumed a prominent position in the industry, and the Colombian export sector has evolved into a globally renowned industry predominantly owned by Colombian entities.

Stakeholders and Industry Structure

Asocolflores, the Colombian Association of Flower Exporters, is a crucial stakeholder that advocates for the interests of Colombian flower cultivators and exporters. The organization comprises more than 600 members, including major global flower enterprises such as Agrícola El Rosario, Agroexport S.A., Flores Andinas S.A., Flores La Mansión S.A., Juan B. Aristizabal S.A., M.A. Montoya S.A., Proagrícola S.A., SAF, and Santa Marta Flowers Ltda. Asocolflores promotes flower exports, opens foreign markets, and grows the sector by chartered planes to facilitate export transit, effective loading, unloading, and cold storage in Miami, and establishing importer–distributor companies in Miami and Europe to increase direct marketing and distribution.

Maersk, a logistics company in Colombia, plays a crucial role in the flower sector by supporting integrated solutions and ensuring an efficient and sustainable supply chain. They collaborate closely with Asocolfores at every stage of the value chain and have organized events like Proflora, one of the most significant events for the flower industry in Latin America.

Colombian government agencies promote flowers through various means, including the Ministry of Agriculture (MARD), which regulates and promotes R&D and opens markets. MARD benefits the industry by providing technical assistance, funding research, enforcing phytosanitary standards, and funding infrastructure development. ProColombia, the Executive Branch of the Government of Colombia, supports domestic companies by offering comprehensive advisory services and assistance for international trade activities. It also provides foreign companies valuable information on Colombia's market, products, services, and companies, including trade regulations, legal aspects, and educational resources.

Florverde, a Colombian non–profit organization dedicated to advocating sustainable practices within the floriculture industry, has established a universally acknowledged certification method that establishes environmental and social accountability criteria for flower farms. The organization aims to advance sustainable practices in flower production, prioritize the welfare of flower workers and their communities, and advocate for responsible consumer decisions.

Supporting Business Environment and Infrastructure: Nurturing Growth

The Colombian government intends to increase its exports to more than 3 billion annually by 2030, with a particular focus on Asia and Latin America, with a specific focus on China, Japan, South Korea, and Mexico. The Colombian government has implemented proactive initiatives to promote the sector's expansion, such as tax advantages, export promotion programs, and investments in research and development. The primary tax incentive for the agricultural sector is the exemption of income at a 0% rate derived from investments aimed at enhancing agricultural productivity.

Main Constraints

The demand for sustainably farmed flowers has significantly changed the business climate over the past decade, with consumers now demanding certifications to highlight their origins. Florverde, an NGO, has created an environmental certification to promote energy–efficient procedures and water storage and conservation methods. Colombia's transportation infrastructure, including air cargo ports and specialized logistics facilities, plays a crucial role in ensuring timely and effective flower delivery to foreign markets.

However, the industry faces several challenges, including financing for key export markets, hiring and training temporary female staff, and the need to carry blooms over extensive distances. Climate change has also made it difficult for flower producers to meet significant demand quickly, leading to increased costs and reduced profit margins.

Skills and Employment: Cultivating Human Capital

Based on the existing facts, approximately 110,000 direct employment opportunities are generated. Out of the total number of direct jobs, 60% are held by women, and 55% are the primary earners in their households. The floricultural industry accounts for 28% of all formal positions in the agricultural sector, with women occupying 70% of the total formal agricultural jobs.

On the downside, there is evidence of poor working conditions amongst some workers in the flower industry, especially those in the large greenhouses. Key issues raised centred around women working in cold and damp conditions, often for up to 100 hours during peak demand seasons. As a consequence of such practice, women experience physical injuries due to the fact that they are engaged in repetitive actions over a sustained period of time.[7]

Another concern raised in the literature is that most workers are temporary and cannot unionise and pro-

[7] "Workers get the thorns": the moral ugliness of rose factories – Rebecca Solnit – The Guardian

tect themselves against the above mentioned practices. One of the main reasons is not because they are on temporary contracts but because collective agreements at the factories are signed by non–union worker representatives and employers [which] offer benefits to non–unionised workers.[8]

Implications for Rwanda

Rwanda has the potential to replicate the favourable climate of Colombia, capitalizing on skilled labour, focusing on sustainability, developing a strong value chain, and competing with established players. Rwandan flowers can tap into the growing global demand for ethically sourced and environmentally friendly products through sustainable practices like rainwater harvesting and integrated pest management. Building infrastructure like cold storage facilities and efficient transportation networks is essential for fresh flower delivery to international markets. Establishing cooperative structures like Asocolflores in Colombia can empower smallholder farmers and improve bargaining power.

Furthermore, Rwanda faces stiff competition from established flower producers, which can be differentiated through quality, sustainability, and niche varieties. Access to finance and technology is a challenge for smallholder farmers, and expanding into new markets like Asia and the Middle East can mitigate risk and create new opportunities. Ensuring fair wages, safe working conditions, and opportunities for unionization for flower workers is crucial to maintaining a positive brand image and avoiding negative public relations

Case study 3: Kenya — the Lead Exporter of Flowers in Africa

Kenya is Africa's leading exporter of cut flowers, generating over $1 billion annually and employing over 150,000 people. The country's central highlands are ideal for cultivating roses, carnations, Alstroemerias, gypsophila, lilies, eryngiums, arabicum, hypericum, and statice. The horticulture sub–sector is one of Kenya's top foreign exchange earners, contributing 1.45% to the national GDP in 2015, while flower exports contributed 1.01%.

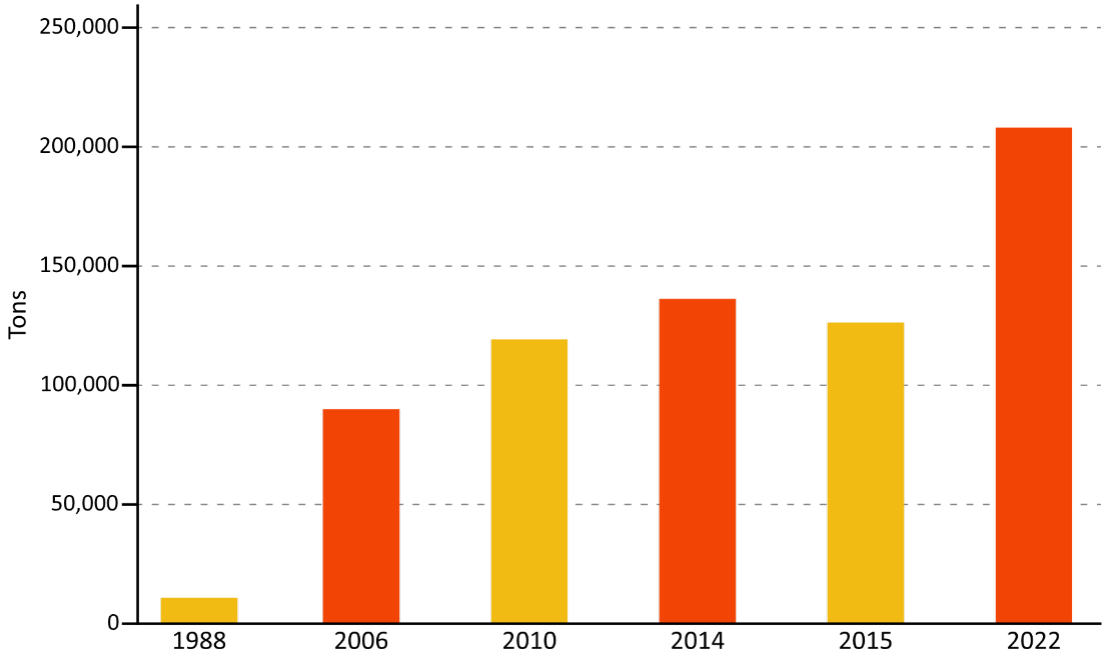
Kenya is the primary supplier of rose–cut flowers to the European Union, accounting for 38% of the market. The Netherlands, UK, Germany, and Norway are the leading destinations for these exports. Over 25% of flowers are directly supplied to retailers, enhancing their value through sleeving, labelling, and bouquet production. Kenyan flowers are distributed to over 60 countries.

The development of the Kenyan flower market can be attributed to several factors, including its favourable high–altitude climate, strong market access in Europe and North America, and a solid foundation of capabilities. The government plays a pivotal role in fostering the growth of robust value chains for the sector.

The flower sector's early success can be attributed to efforts made throughout the 1960s and 1970s to attract foreign investment, leading to the creation of large–scale flower farms and sophisticated farming techniques. The Horticultural Crops Development Authority facilitated private sector investment without encountering any hurdles to entrance. The growth of flower exports from Kenya relied on investors' capacity to achieve a significant scale to rationalize expenses associated with chartering airplanes to Europe.

[8] https://www.somo.nl/wp-content/uploads/2018/10/case-study-Working-conditions-of-flower-packers-and-coffee-pickers-in-Colombia.pdf

Figure 19: Output of flowers in Kenya in tons



The Kenyan flower industry has evolved significantly since the 1990s, with the introduction of structural adjustment programs and the gradual move from traditional markets in North and Western Europe to non–traditional markets in East Asia, Australia, and the UAE. The key partners in the value chain include producers, exporters, government partners, and logistics providers.

Major Stakeholders Shaping the Value Chain

The Kenya Flower Council (KFC) promotes and advocates for Kenya's flower industry, representing about 80% of the country's small, medium, and extensive flower farmers.

The Kenya Flower Council (KFC) is a key organization in Kenya that works with county and national governments to promote the country's flower industry. It lobbies the government to recognize Kenya's flower industry's contributions and ensures local and international standards compliance. The KFC also plays a significant role in ensuring commitment to major standards, managing, auditing, and certifying the Kenya Flower Council Certification Scheme.

The Fresh Produce Exporters Association of Kenya (FPEAK) is another key participant in Kenya's flower sector, serving as a vital repository of knowledge and expertise for Kenya's flower exporters. FPEAK actively disseminates technical and market information, empowering exporters to make informed decisions and optimize their operations.

The Business Environment and Supportive Infrastructure

Government partners play a crucial role in supporting the flower sector, including the Ministry of Agriculture, Livestock and Fisheries (MoALF), Horticultural Crops Directorate (HCD), Kenya Plant Health Inspectorate Service (KEPHIS), Kenya Bureau of Standards (KEBS), and Export Promotion Council (EPC). MoALF has developed

the "Kenya Flower Sector Strategy 2023–2033," which aims to increase the value of Kenyan flower exports to US$1 billion by 2033, create 200,000 new jobs, become the leading producer of organic flowers in Africa by 2033, and achieve a 50% reduction in greenhouse gas emissions from the flower sector by 2033.

The Kenya Bureau of Standards and the Export Promotion Council are other government agencies responsible for developing and implementing standards for products and services in Kenya. At the same time, EPC provides market intelligence, trade facilitation services, and training to Kenyan exporters.

The Kenyan government has implemented various incentives and mechanisms to enhance the competitiveness of the flower sector, such as financial incentives, regulatory incentives, market access, and promotion. The Duty Drawback Scheme allows flower exporters to recoup import fees and taxes on flower–producing inputs, while special economic zones offer tax benefits, streamlined customs, and good infrastructure. The KFC and EPC have worked with the government to enhance market access.

Technical and capacity–building support, as well as infrastructure, is also essential for the flower sector. The Kenya Industrial Research and Development Institute (KIRDI) conducts research and development activities to support the flower sector, focusing on varietal improvement, post–harvest handling, and value–added products.

Skills and Employment

There is anecdotal evidence Kenya has developed a good skills base for supporting the floriculture sector. There is a hard time finding skills programs for floriculture in Kenya. However, a quick search of the web reveals that there are lots of different skills training programs. These range from formalised programs delivered at colleges and universities[9] to programs targeted at managers that provide them with skills to improve productivity or deal with stress and training for supporting inclusivity in the sector.

Non–governmental agencies also target women and provide skills training for employment in the floriculture sector. An example can be found in Fairtrade, where marginalised women have been provided with skills training for work in the floriculture sector. An initial assessment found that most women who participated had been able to diversify their income sources by scaling up their existing flower business or starting a new one.[10]

No major surveys are conducted on the numbers employed in the flower sector. However, according to the flower sector of Kenya, approximately 350,000 people are directly engaged in the floriculture sector, and a much higher 3.5 million people benefit indirectly from related activities. There is significant gender implementation since, according to KFC, there is a high concentration of women and youth at various value chain stages. Between 2012 and 2020, employment in the cutflower industry witnessed a steady growth in job creation, accounting for over 65% of all new jobs created in the agriculture sector.[11]

[9] List of agriculture courses in Kenya (certificate, diploma, and degree) – Tuko.co.ke
[10] https://www.fairtrade.org.uk/media-centre/news/fairtrade-premium-helps-kenyan-flower-workers-to-boost-wages-and-overcome-financial-challenges/
[11] How much employment is generated by the industry? – Horticulture Kenya LTD

Challenges Facing the Sector

However, the flower sector faces challenges like logistical issues, high production costs, environmental concerns, and the instability of global markets. Kenyan flower exporters face stiff competition from producers in countries like Colombia, Ecuador, and Ethiopia, who often enjoy lower production costs due to favourable climate conditions and lower labour costs. The average unit value of Kenyan flower exports declined from $1.80 per stem in 2010 to $1.60 per stem in 2020, indicating a decline in profitability over time.

Implications for Rwanda

Rwanda can learn from Kenya's success by learning from its established infrastructure, logistical networks, and flower production and export expertise. Rwanda could diversify export markets and cater to niche demands, focusing on organic production or Fairtrade practices. The flower industry has the potential to create significant employment opportunities in Rwanda, contributing to poverty reduction and economic growth.

Rwanda's high altitude and favourable climate offer advantages similar to Kenya's for flower cultivation, attracting foreign investment and boosting the sector's growth. However, Rwanda must differentiate itself from established players in the highly competitive global flower market.

Logistical hurdles, such as high initial investment in greenhouses, technology, and skilled labour, pose challenges to timely delivery and maintaining flower quality. Rwanda should prioritize sustainable practices and responsible resource management, adopt eco–friendly technologies, reduce pesticide use, and manage wastewater effectively.

Building human capital is essential for the industry's long–term success. Investing in training programs and skills development for flower growers, technicians, and other workers is critical to the industry's long–term success. Collaboration with experienced Kenyan or international flower industry players can provide Rwandan producers with valuable knowledge, technology transfer, and market access.

Recommendations for Policy Reform and Conclusions

The analysis of employment and skills in the Rwandan floriculture value chain reveals a promising yet nascent sector with significant potential for growth and contribution to the national economy. The study highlights critical areas where policy interventions could bolster employment opportunities, address skills gaps, and enhance the sector's competitiveness.

Key Issues for Policy Reform

Based on the analysis, the following areas emerge as priorities for policy reform:

Skills Development and Employment

- **Targeted Skills Development**: The skills gaps identified highlight the need for targeted skills development programs tailored to the specific needs of the floriculture sector. This involves technical skills in production, post–harvest handling, quality control, and business and marketing skills. One possible way to equip floriculture value chain actors with practical skills is to expand the horticulture center of excellence, a joint initiative between the governments of Rwanda and Israel, to cover flower farmers. As is the case for other horticulture farmers, the center of excellence would ensure that flower farmers have access to the latest technologies, equipment, inputs, technical know-how and skills to do floriculture as a profitable business, leveraging knowledge from peers and international best practices.
- **Vocational Education and Training**: Strengthening vocational training institutions and agricultural colleges can provide a steady stream of skilled workers to meet the growing demand for specialized skills in the floriculture sector. While designing education curricula for agriculture TVET schools, a comprehensive skills needs assessment ought to be made in order for training institutions to provide practical skills that are critically needed in the floriculture value chain. Among others, these include skills that were identified in this study as critically lacking, such as proper fertiliser and pesticide application, packaging as per market requirements, propagation of planting materials, floral arrangements, and high-level market intelligence for grater access to niche markets.

Role of Government and Policy Reform

- **Access to Inputs**: Addressing the availability, affordability, and quality of inputs, particularly specialized seeds and fertilisers, is critical. The government can play a role in facilitating access through developing domestic input industries, negotiating trade agreements, and incentivising greater private sector involvement in input supply. Several approaches could be used to enhance greater access to high-quality inputs among flower farmers, starting with joint research programs to identify specialised fertilisers and pesticides for flowers and incentivising private sector involvement in their production, marketing and distribution.
- **Market Development**: Concerted efforts are needed to expand domestic and international markets for Rwandan flowers. This includes targeted promotion campaigns, participation in international trade

shows, establishing quality standards, and developing export infrastructure. The National Agriculture Export development Board (NAEB) and the Ministry of Trade and Industry (MINICOM) have a role to play in ensuring floriculture value chain actors have access to the relevant domestic and international markets. This could be done through market linkage initiatives, training and information access related to market requirements and technical support for exporters to comply with regulations and quality standards needed in international markets. Additionally, developing a reliable market information system can aid farmers and other value chain actors in making informed production and marketing decisions based on real–time market demand and price trends.

- **Cooperative Development**: Encouraging and supporting the formation and strengthening of farmer cooperatives can help enhance production, improve bargaining power, and facilitate access to markets and support services. Rwanda Cooperative Agency (RCA) needs to play an active role in encouraging flower farmers to form cooperatives and building the capacity of those cooperatives through trainings to professionalize them in doing floriculture as a business. This includes specialized training in cooperative management, financial management, marketing, planting, harvesting, post-harvest handling of flowers, among other activities along the value chain.

Blockages to the Value Chain

- **Post–Harvest Losses**: Reducing post–harvest losses remains a significant challenge. There is need for greater investment by the government and private sector actors in cold storage facilities, refrigerated transport, and post–harvest handling training for farmers and other actors along the value chain. For post-harvest handling facilities to be sustainable, it would be worthwhile exploring solar-powered cold rooms which even in remote areas with limited access to hydroelectricity to ensure continuous storage of flowers under suitable conditions before they are transported to domestic and/or international markets.
- **Logistics and Infrastructure**: Upgrading logistics infrastructure, such as roads and airports, is necessary to reduce transportation costs and ensure timely delivery of fresh flowers to domestic and export markets. One practical recommendation to achieve this is to establish one flower processing center in each of the major growing regions, which center would be equipped with basic infrastructure such as well-maintained feeder roads and cold rooms where flower farmers can bring their flowers for proper packaging and handling as they proceed to domestic and/or international markets.
- **Access to Quality Seeds**: Floriculture value chain actors expressed great need for the establishment of a national breeding programme from which the flower growing companies or cooperatives can buy seeds as at an affordable prices.
- **Information Sharing**: During the stakeholder consultations for this study, it was discovered that information flow among stakeholders is not well streamlined and some actors don't have access to useful information on initiatives by the government and non-governmental organisations. It is therefore recommended that up-to-date information on available floriculture-centered initiatives be maintained and disseminated regularly among actors along the various stages of the value chain. Regular engagements among policy makers, regulators, implementors and the private sector players in floriculture are necessary to keep all actors abreast of available initiatives to boost floriculture farming and how each actor could benefit from the initiatives for the effective functioning of the value chain.

Technology and Digitalisation

- **Technology Adoption**: Promoting greater adoption of relevant technologies can significantly improve production efficiency and product quality. This includes irrigation systems, disease and pest control equipment, and digital tools for the supply chain management. Government and development partners can play a role in demonstrating technologies, providing subsidies, and supporting technological capacity–building. As far as irrigation is concerned, adoption among farmers remains quite low. To increase the rate of adoption, floriculture value chain actors could be assisted to access subsidized irrigation systems which would enable them produce flowers throughout the year and, specifically to satisfy demand for summer flowers which European countries are in winter.
- **Mobile Payments**: Expanding the use of mobile payments and other digital financial services throughout the value chain can streamline transactions, improve financial inclusion, and reduce transaction costs, especially for small–scale farmers and traders. This could be done through a combination of initiatives including digital literacy training for small floriculture businesses, and regulations to encourage small enterprises to accept at least one form of digital payment, among others.

Women, Youth, and Inclusiveness

- **Gender–Sensitive Interventions**: Given the high representation of women in floriculture, policy interventions should be designed with a gender lens. This includes ensuring equal access to land, finance, and training resources and addressing gender–specific barriers to participation and leadership. Examples of interventions include encouraging women's participation in the leadership of floriculture cooperatives; special programs that link women–led cooperatives to domestic and international markets and input suppliers; enabling access to finance through training in business proposal development and public guarantee schemes to incentivise financial institutions to lend to female floriculture farmers and cooperatives who wish to expand their businesses.
- **Youth Engagement**: Developing targeted programs to attract and retain youth in the floriculture sector is essential for long–term sustainability. This involves promoting floriculture as a viable career path, providing financial incentives for young entrepreneurs, and creating opportunities for skills development and mentorship. Among other initiatives, the Israel internship program for young graduates in agriculture could have special schemes for those seeking to do floriculture as a business by enabling them to acquire floriculture skills abroad and providing them with start–up funds to establish and/or expand floriculture businesses.

Concluding Comments

Limited research has been conducted on the relationship between value chain and their impact on skills and employment, especially in the floriculture sector. The current study has attempted to shed light on this subject and unpack the complex relationship between the two. From the policymakers' perspective, the following messages need to be taken on board:

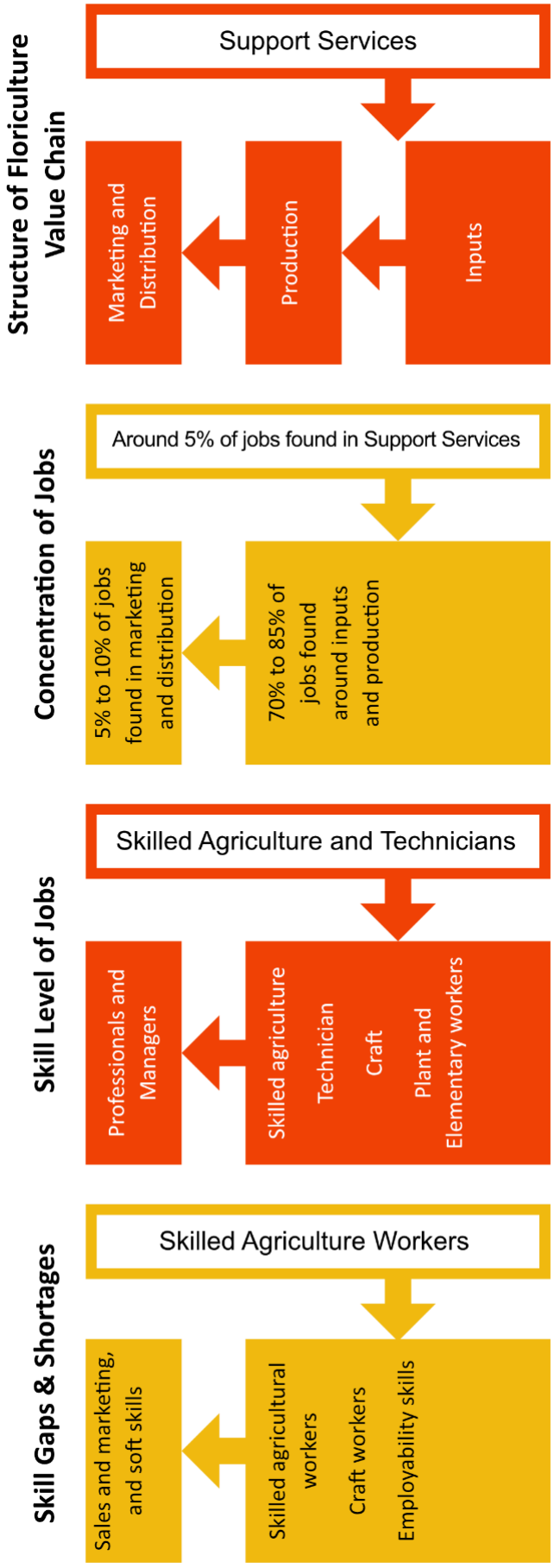
- A value chain's structure and performance can positively and negatively impact skills development and employment opportunities. Governments, in collaboration with stakeholders such as businesses and educational institutions, can help ensure that this relationship is more positive.

- The floriculture value chain offers a significant concentration of jobs in the production stage, primarily requiring skilled or semi–skilled labour. This presents a substantial opportunity for unemployed youth and individuals with minimal skills, particularly those residing in rural areas where floriculture operations are often located. By focusing on targeted upskilling initiatives for this demographic, the sector could achieve significant gains in productivity and overall efficiency. Strategic investment in workforce training programs would improve the livelihoods of these individuals and bolster the competitiveness of the floriculture industry as a whole.

- The floriculture value chain offers a wide range of skilled and fulfilling career paths beyond the traditional focus on production. Highly skilled jobs can be found in areas like marketing, distribution, research and development, and support services such as logistics and technical expertise. Career guidance officers and schools should actively promote these diverse opportunities to young people, highlighting the potential for growth and innovation within the floriculture sector.

- Finally, strategically targeting resources towards addressing critical skill shortages is imperative to unlock the floriculture value chain's full potential. Our current study reveals alarming gaps in areas such as marketing, soft skills, skilled agricultural labour, craft work, and broader employability skills. These deficiencies undoubtedly hinder the value chain's performance, stifle innovation, and limit growth. Prioritizing investment in training programs, educational partnerships, and targeted recruitment initiatives to fill these skill gaps is essential for the long–term health and competitiveness of the sector.

Figure 20: Skills and employment issues for the floriculture value chain



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