

**STAKEHOLDERS' PERSPECTIVES ON THE EFFECTS OF THE EUROPEAN
UNION'S GREEN DEAL POLICY INITIATIVES ON HORTICULTURE
EXPORT IN KENYA**



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Declaration

I declare that this work has not been previously submitted and approved for the award of a degree by this or any other University. To the best of my knowledge and belief, the dissertation contains no material previously published or written by another person except where due reference is made in the dissertation itself.

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FLORENCE KITHIRA M'KAIBI



Approval

The dissertation of Florence Kithira M'Kaibi was approved by the:

Supervisor: Prof. Simon W. Ndiritu

Senior Lecturer

Strathmore University Business School



ABSTRACT

The European Union (EU) started implementing the European Green Deal (EGD) policy initiatives through several strategies in 2020 to ensure that Europe attains climate neutrality by 2050. Farm to Fork (F2F) and Biodiversity strategies are among the EGD initiatives implemented by the EU. Data show that the EU is the largest export destination for Kenyan horticultural produce. Adopting the EGD policy initiatives will not only lead to changes in market conditions but also affect the market readiness and competitiveness of Kenya's horticultural products. This study examined Stakeholders' Perceptions on the effects of F2F and Biodiversity strategies on horticulture exports in Kenya. It also established the challenges and opportunities of implementing the two strategies. The underpinning philosophy of this inquiry was pragmatism. The study adopted the concurrent mixed-method research design. The target population were technical persons in charge of horticulture exports to the EU and horticulture export stakeholders. The stakeholders were export firms and key informants that comprised government agencies, industry associations, and international organisations. Census, stratified, proportionate and simple random sampling techniques were used to select the sample within the identified inclusion criteria. Data was collected from the horticulture exporters using a questionnaire, and interview guides were used to collect data from the key informants. The study's findings indicate that implementing F2F and Biodiversity initiatives was perceived to affect all value chain activities. The initiatives brought about changes in export market requirements and regulations and promoted the production of safe food and the sustainability of the environment. They also caused a decline in the volume of crops produced and exported and an increase in bureaucracy and red tape. The stakeholders believed that lack of resources and inadequate support, loss of jobs, and decline in production and revenues were the main challenges presented by the two initiatives. Controlling pests due to the reduced usage of plant protection products and getting alternatives to chemical fertiliser were also challenges. The stakeholders felt that some EGD requirements are not implementable in Kenya due to ecological and weather factors and resource constraints. The ecological and weather challenges were frequent attacks by pests, disease, unpredictable hot and dry spells and heavy rains, while resource constraints included funds, technology and skills. The findings, however, indicate that F2F and Biodiversity present stakeholders with opportunities to diversify and expand the market, transition to the production of healthier and safer food and adopt practices that promote environmental protection and sustainability. The study recommends adopting and mainstreaming EGD policies in the horticulture sector to tap into the associated opportunities. It also recommends adopting innovative technologies, consultative engagements, and capacity building for the horticultural stakeholders to improve horticultural exports' market readiness and competitiveness.

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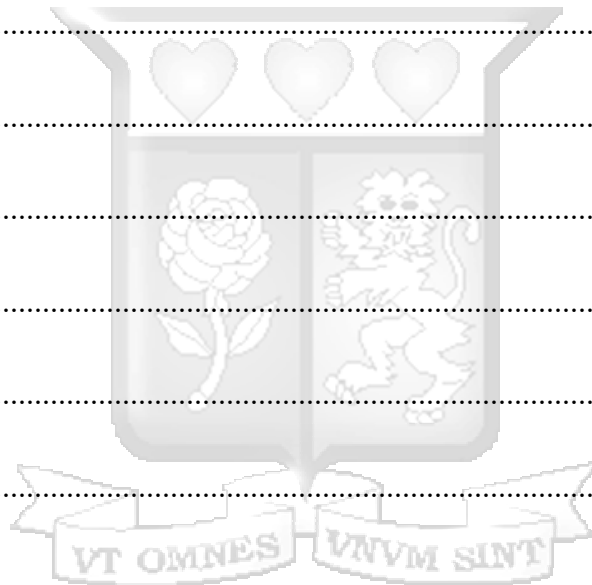
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LIST OF ABBREVIATIONS

AFA	Agriculture and Food Authority
AGRINFO	AGRINFO is a programme funded by the European Union and implemented by COLEAD (Committee Linking Entrepreneurship-Agriculture-Development)
CABI	Centre for Agriculture and Biosciences International
CBAM	Carbon Border Adjustment Mechanism
COLEAD	Committee Linking Entrepreneurship Agriculture Development
CSS	Chemical Strategy for Sustainability
EC	European Commission
EGD	European Green Deal
EPA	Economic Partnership Agreement
EU	Europe Union
F2F	Farm to Fork
FTA	Free Trade Area
GAP	Good Agricultural Practice
GDP	Gross Domestic Product
IPM	Integrated Pest Management
KNBS	Kenya National Bureau of Statistics
MRLs	Maximum Residue Levels
PPPs	Plant Protection Products
SDGs	Sustainable Development Goals
SMEs	Small and Medium enterprises
TMA	Trademark Africa
TSD	Trade and Sustainability Development Policy
UNDP	United Nations Development Programme

OPERATIONAL DEFINITION OF TERMS

The following are the operational definitions of the terms used in this study:

Biodiversity Strategy is a comprehensive, ambitious, and long-term plan to protect nature and reverse ecosystem degradation. It aims to put Europe's biodiversity on the path to recovery for the benefit of nature, people, and the climate. (EC, 2020a; 2021a).

Challenges in this study refer to difficulties that the horticulture stakeholders in Kenya face in adapting to and complying with the requirements and standards of implementing the EGD (EU F2F and Biodiversity strategies).

Effects in this study refer to horticulture stakeholders' Perspectives on how the implementation of the EGD has so far impacted horticulture exports to the EU in terms of cost of production, volumes of produce exported, and market share. They further refer to the expected or anticipated impact on the full implementation of EGD.

Exports in this study are operationalised as a process that ensures market readiness and competitiveness of horticulture products.

Farm to Fork (F2F) aims to make food systems fair, healthy, and environmentally friendly by shifting the current EU food system towards a sustainable model that ensures sufficient, affordable, and nutritious food within planetary boundaries, supporting and promoting sustainable food production, consumption, and healthy diets. The F2F strategy aims to make the EU food system *"a global standard for sustainability."* (EC, 2020a). *This refers to the various processes in the food chain, from agricultural production to consumption.*

Opportunities in this study refer to potential advantages such as a larger market, increased premium market, demand for sustainable products, innovation, and technology transfer due to the implementation of the EU F2F and Biodiversity strategies.

Perspectives in this study refer to how the stakeholders attribute the EGD policy initiatives to (have and will affect) the horticulture exports based on their experiences and realities.

Stakeholders: The Cambridge dictionary defines a stakeholder as “*a person or group that has a direct interest in and is affected by a situation*” (Cambridge, 2021). In this study, stakeholders refer to value chain actors directly involved in exporting horticultural produce. They include exporters, government agencies, international organisations, and industry associations. The stakeholders in this study were represented by technical persons in charge of horticulture exports, who were chosen based on their expertise in that area.



CHAPTER ONE

INTRODUCTION

1.1 Background Information

The European Green Deal (EGD) refers to a set of initiatives published in 2019 and signed in 2020 to make member countries of the European Union (EU) climate-neutral by the year 2050 (EC, 2020a). This integrated and comprehensive framework seeks to address the interconnected challenges of climate change, biodiversity loss, and pollution while promoting principles of sustainable development (Killock et al., (n.d); United Kingdom [UK], 2021).

The EU expects collaboration and commitment from member countries in supporting local industries to adopt disruptive green technologies in production (Killock et al., (n.d); Claeys et al., 2019) and further ensure sustainability in the agricultural sector such that food eaten is cultivated in line with the initiative's goals (EC, 2020a; Usman et al., 2021). The EGD is progressively implemented through legislative and non-legislative actions such as directives and regulations (EC, 2020a).

Environmental protection was encapsulated within the Sustainable Development Goals (SDGs) of 2015. The SDGs can be summarised into three main objectives: to end poverty, protect the planet, and ensure that by the end of 2030, people can enjoy prosperity and peace (Donchin et al., 2024; United Nations Development Programme [UNDP], 2015). The SDGs' social, economic, and environmental pillars work together to achieve the goals. The SDGs emphasise the need for development that meets the needs of the present without jeopardising the prospects of future generations meeting their needs (UNDP, 2015). Unfortunately, in most instances, the economic and environmental objectives are always in conflict. However, analysts have established a trade-off between ecological conservation and economic development (UNDP, 2015).

Implementation of EGD, therefore, is informed by the fact that environmental protection is at the centre stage of all forms of economic activities as envisaged by the SDGs (UNDP, 2015). The EGD is essential to achieving a sustainable agricultural system through the

Farm to Fork (F2F) and Biodiversity Strategies. The World is no longer just driven by profits and value creation but by the sustainability of the processes undertaken to arrive at the goals set by every business or institution (Rivera et al., 2009). The journey towards sustainability starts with a business valuing the social environment in which it operates, such that restoring the quality of the environment of operation is now considered a necessity (Rivera et al., 2009).

However, in a report advocating for a fair and inclusive trade that promotes openness and global welfare (High-Level Groups on EU Policy Innovation [HLPG] (2024), the authors assert that trade is one of the central connectors of the EU with the outside world, with the *ensuing legal and policy ramifications going well beyond trade stricto sensu* (Larik, 2011). The team advises that as the EU attempts to shape global developments, it should be based on an attractive narrative based on the SDGs (HLPG, 2024).

A European Commission (EC) (EC, 2023) report on the main drivers to food security in the EU and the rest of the world identifies biophysical and environmental protection as key aspects supported by research, innovation, and technology. Further, the report identifies the economy and market, food supply chain performance, political and institutional, sociocultural, and demographic as the critical drivers of socio-cultural food security (EC, 2023). This report highlights the complexity of any debate about food security whereby it is not a matter of prioritising one driver over another; instead, it is vital to understand the drivers' short and long-term dimensions and interlinkages (EC, 2023). Therefore, the real challenge for policymakers is to pave the way for a transition towards a sustainable and resilient food system that meets and reconciles short and long-term needs. This report asserts that consistent and comprehensive implementation of the EGD, including the F2F, Biodiversity, and other relevant strategies, should help the EU secure a sustainable, inclusive, and resilient food system within a realistic timeline and with necessary support instruments (EC, 2023).

According to the EU, the agri-based elements of the EGD will be implemented through the (F2F) and Biodiversity strategies (Henning & Witzke, 2021). The F2F strategy enhances sustainability across the food supply chains, while the Biodiversity strategy

supports biodiversity and soil health by encouraging biodiversity-friendly farming practices (EC, 2020a). It is important to note that F2F and Biodiversity strategies complement each other and are coherent in their ambitions. Both are related to the reduction of pesticide use and risk, as well as the improvement in nutrients by 50%, a 20% drop in fertiliser use, and an increase to 25% of total farmland under organic farming (EC, 2020a; EC, 2020b).

The EU seeks to achieve the objectives of F2F and Biodiversity Strategies by promoting new global food standards that emphasise sustainability (EU, 2020a). The policies are expected to make the EU agricultural products less competitive both domestically and in the export markets and, therefore, intend to extend the sustainability strategies to apply to their trading partners to ensure an equal playing field for EU producers (Beckman et al., 2020; Matthews, 2022). This means that exports from third countries will be required to comply with these standards to access the EU market (Usman, 2021). These standards will be in the form of rules of origin and sanitary and phytosanitary standards. Additionally, Beckman et al. (2020) assert that the F2F strategy will impose restrictions on agriculture in the EU through targeted reductions in land use, chemical fertilisers, antimicrobials, and pesticides, which will decline food production by 12% in the EU.

The Biodiversity strategy, on the other hand, aims to protect and restore EU biodiversity to benefit the people, the planet, the climate and the economy (EC, 2020a). The Biodiversity strategy has an essential aspect of soil conservation ‘that has the target of setting aside a minimum of 30 % of the EU's land mass as protected areas, reducing the rate of urban sprawl, reducing the risks of pesticides and bringing back at least 10 % of agricultural area under high-diversity landscape features. In addition, the strategy aims to put forward 25% of the EU's agricultural land as organically farmed, reclaiming contaminated sites, reducing land and forest degradation, and planting at least three billion trees..’ (EC, 2020b; Montanarella & Panagos, 2021).

Many African countries rely heavily on exporting agricultural produce to the international market for economic development, which makes them vulnerable to demand-side constraints (Ismail, 2017). Subsequently, any change in European regulations affects the

demand for African horticultural outputs such as tropical fruits, vegetables, and flowers (Usman et al., 2021). It has been argued that the cost and impact of the European Green Transition on Africa, as envisaged in the EGD, has been underestimated (HLPG, 2024). The EGD has been designed from a Eurocentric perspective, whereby the negative externalities of European industrial production have been exported to Africa and other developing regions worldwide. Further, though the objectives of the EGD are legitimate, their extraterritorial impact on African countries and businesses, especially SMEs, has been overlooked (Seutame, 2023). This is more apparent in the horticulture sector, where, without prior information and consultation, African exporters receive notices of new rules whenever there is a change in EU market access regulations (HLPG, 2024).

Kenya's economic growth has been dominated by agriculture, with the horticulture sector (fruits, cut flowers, and vegetables) being the third leading contributor to agricultural GDP after dairy and tea (Kenya National Bureau of Statistics [KNBS], 2022). The horticulture sector plays a substantial role in the economy, contributing 26% of the agricultural GDP (KNBS, 2020), with 81% of the crops grown in Kenya being horticulture (COLEAD, 2022). The sector plays a significant role in the Kenyan economy as a foreign exchange earner (KNBS, 2022). The foreign exchange earned from horticulture produce and products grew by 21.8% in 2021 compared to 2020 and amounted to approximately Ksh.157.7 billion (Agriculture and Food Authority [AFA], 2021; KNBS, 2022).

Kenya is the largest horticulture exporter in Sub-Saharan Africa, with a 16 per cent market share in the EU, accounting for more than 90% of the total Kenya horticulture exports, signifying over-reliance on the European market (Nzomo et al., 2022; COLEAD, 2022). The total exports to the EU rose significantly from Kshs 99.3 billion in 2020 to Kshs 115.9 billion in 2021, translating to a 16.7 per cent increase (KNBS, 2022). The increase was attributed to the export of cut flowers and fruits, especially avocados, in 2021. However, horticulture exports decreased in volume and value in 2022 due to the low demand for cut flowers and vegetables in the export market (KNBS, 2023). The volume declined from 405.5 thousand tonnes in 2021 to 392.0 thousand tonnes in 2022, while the value of these exports declined to Kshs146.1 billion from Kshs157.7 billion.

The horticulture sector is considered essential for Kenya's economy as it earns over one billion dollars annually, employs over one million people, and is, therefore, one of the major employers in the country (Josphat, 2020). Implementing the EGD will adversely affect Kenya and other third-world countries that export horticulture produce to the EU (COLEAD, 2022) due to EGD requirements on pesticides, traceability, fair trade, food miles and carbon footprint, among other provisions. The EGD, especially the F2F strategy, brings additional regulatory requirements to a sector already experiencing challenges in complying with the existing sanitary and phytosanitary requirements in the EU market (Usman et al., 2021).

The expected stricter residue limits and quality standards of fresh produce exports to the EU will affect the exporters while producers must adapt to alternative pest management practices (EC, 2018). The tropical nature of Kenya's climate is favourable for pest infestation and infection; therefore, pest control is mandatory to ensure food safety, security, and product quality. Due to the evolving EU regulations, the number of authorised and approved pesticides is shrinking due to the high prevalence of pest attacks on produce and resistance to available pesticide regimes (Nzomo et al., 2022). A report analysing the likely impact of withdrawal of active ingredients contained in more than one hundred and forty-two pest control products in Kenya by the Pest Control Products Board (PCPB) not only raises policy issue concerns but also the adverse effects this will have on the management of quarantine pests and export crops. The withdrawal of the active ingredients is due to the EU export market requirements. The report further estimates a drop in agriculture export earnings by 19.3% in 2024 (Agrochemical Association of Kenya [AAK], 2024).

The Key stakeholders in the Kenya horticulture export sector include the Ministry of Agriculture and Livestock Development (MOALD), Horticulture Crops Directorate (HCD), Kenya Plant Health Inspectorate Services (KEPHIS), Pest Control and Produce Board (PCPB), the Exporters, Industry associations and international Organisations that support the sector. Through Executive Order No.2 of 2023, the MOALD was assigned the

functions of national agricultural policy formulation and management, crop development and promotion, phytosanitary services and international standards compliance (Republic of Kenya [ROK], 2023).

The Crops Act No.16 of 2013, enacted by the Crops (horticultural crops) Regulations 2020, gives HCD statutory authority to facilitate and regulate the marketing of horticultural produce, including the issuance of export licenses through articles 28 and 29 of the Crops Act, 2013 (Republic of Kenya [ROK], 2020). Through the KEPHIS Act number 54 of 2012, the institution is the designated National Plant Protection Organization (NPPO). This competent authority liaises with other plant protection organisations in export destinations on SPS issues related to Kenya's horticulture exports. KEPHIS has statutory authority to regulate the export of plants and plant materials, undertake inspections at exit ports, and administer and enforce phytosanitary safety measures (Republic of Kenya [ROK], 2012).

On the issue of the safe use of Plant Protection Products (PPPs) on the horticulture crops for the export market, PCPB has statutory authority through the Pest Control Products Act, Cap 346, of 1982, to regulate the importation and exportation, manufacture, distribution and use of pest control products in Kenya. They facilitate training on the safe use of pest control products and mitigate potential harmful environmental effects (Republic of Kenya [ROK], 1982).

Mathews (2022) indicates that while the EGD policy initiatives may pose challenges in implementation, there are opportunities for those who align with the envisaged regulations while pushing out those who are non-compliant, as EU importers may favour sustainable products. Hence, the first-mover advantage may affect access to the EU market (Gereffi & Stark, 2011), such that diversified and value-added products attract higher returns (Osman, 2021). However, reducing the use of chemical pesticides and fertilisers that are considered adequate in tropical countries will likely affect market access readiness and decrease the competitiveness of Kenyan horticultural exports.

COLEAD (2023a) reports that in June 2022, the EU, in line with the EGD policy initiatives, proposed legally binding targets to reduce the use and risk of chemical pesticides by 50% by 2030. Reducing chemical pesticides goes hand in hand with promoting environmentally friendly pest control, the practice of Integrated Pest Management (IPM), and a ban on pesticides that threaten pollinators. While the proposed regulation addresses the use of Plant Protection Products (PPPs) within the EU, the changes in authorisations and loss of EU Maximum Residue Levels (MRLs) will reduce the availability of PPPs for use on crops for export to the EU (COLEAD, 2023b).

The horticulture market in the EU is experiencing stringent regulatory requirements, resulting in increased notifications due to the failure of exports to meet pesticide Maximum Residue Limits (MRLs) and interceptions due to quarantine pests (Nzomo et al., 2022). Further, the sanitary and phytosanitary concerns, which include the presence of harmful pests, microbial contaminants and presence of pesticide residues, are a significant cause of interceptions and rejection of Kenyan horticulture exports at the port of entry to the EU and remain a bottleneck to market access in the EU market (COLEAD, 2022). The exported produce is expected to be free from quarantine and regulated non-quarantine pests, pest damage, and pesticide residues above the stipulated maximum residue levels (MRLs) (Lengai et al., 2022). Kenya and other developing countries depend on these PPPs to export quality products to the EU.

Based on the preceding discussions, implementing EGD is bound to yield different outcomes for countries that export horticultural products to the EU. From the key stakeholders' point of view, it is necessary to understand the effects of the EGD policy initiatives on Kenya's horticulture exports and further establish the associated challenges and opportunities to retain and expand the export market to the EU.

1.2 Statement of the Problem

The EU is the largest export destination for Kenya's horticulture products, accounting for over 90% of the total exports, signifying over-reliance on the European market. Implementing the EGD through the F2F and Biodiversity strategies has an explicit external dimension, requiring imports from third countries to meet the relevant EU

regulations and standards (EC, 2020a; EC, 2020b). Therefore, any changes in the EU market conditions, such as those inherent in the EGD, will likely affect horticultural exports from Kenya. The effects of the EGD on Kenyan horticulture exports, the challenges of compliance with the EGD regulatory requirements and the opportunities that the EGD presents are unknown. However, it may be challenging to quantify the full impact of the EU F2F and Biodiversity strategies on horticulture exports (Mwololo, 2021) as the implementation extends to 2030.

Studies on EU food production systems have predicted mixed results regarding the effects of EU F2F and Biodiversity strategies. Some studies suggest a significant reduction of production in the EU, hence an increase in imports from third countries, while other studies suggest no change (Beckman et al., 2020; Barreiro-Hurle et al., 2022; Bremmer et al., 2021; Henning & Witzke, 2021; Mathews, 2022). The main goal of F2F and Biodiversity strategies is a shift towards more sustainable diets by increasing the consumption of fruits and vegetables. While the EU is self-sufficient in vegetables, it is responsible for around 50% of worldwide imports of fresh fruits, especially tropical fruits and counter-seasonal vegetables such as tomatoes, beans and peppers (Mathews, 2022).

The success of the EU F2F and Biodiversity strategies will be affected by the imports consumed in the EU (Knaepen et al., 2021), hence the resolve by the EU to promote the global transition of sustainable agriculture through trade agreements and green alliances with Africa (EC, 2021b). Market and trade opportunities for countries trading with the EU come with EGD conditions, such as reducing farm inputs like chemical fertilisers and pesticides, which is expected to lower the volume of produce available for export (Knaepen et al., 2021). The changes associated with the EGD policy initiatives impact consumers' choices and preferences, affecting the demand for horticultural produce, revenues, and trade dynamics from third countries. Though implementing the EGD poses challenges to countries that export to the EU, there are expected opportunities for third countries (Cameron et al., 2021; Mathews, 2022; Usman, 2021).

The volume and value of Kenya's horticulture exports significantly declined in 2022 compared to 2021. The volume decreased from 405.5 thousand tonnes in 2021 to 392.0 thousand tonnes in 2022, while these exports declined to Kshs146.1 billion from Kshs157.7 billion (KNBS, 2023). The decline in export earnings could be attributed to decreased market readiness and production competitiveness. This decline could partly be due to stringent market access regulations that horticulture stakeholders must implement, particularly those related to F2F and Biodiversity. It was, therefore, vital to understand the effects of initiatives on Kenya's horticulture export and the associated opportunities and challenges.

This study was deemed necessary to understand the stakeholder's perspectives and the need to develop policies and strategies that would aid exporters in adopting the EGD requirements if they are to maintain the EU markets. Further, there is a dearth of literature on the effects of EGD policy initiatives on Kenya's horticulture exports sector. Available published works mainly focus on transitions to comply with EGD in other African countries or have a limited scope. Such studies include Cameron et al. (2021), whose focus was on the context, challenges, and opportunities for South Africa Small and Medium enterprises (SMEs) operating in the Green economy. The Eastern Africa Farmers Federation (EAFF, 2023) study focused on the impact of EGD on farmers in Eastern Africa.

1.3 Research Objectives

1.3.1 General Objective

The study's general objective was to investigate stakeholders' perspectives on the effects of F2F and Biodiversity strategies of the EGD policies on Kenya's horticulture exports and the challenges and opportunities they presented.

1.3.2 Specific Research Objectives

The following were the specific objectives of this study:

- i. To examine stakeholders' Perspectives on the effects of the F2F and Biodiversity Strategies on Kenya's horticulture exports.

- ii. To examine Kenya's horticulture export challenges from implementing F2F and Biodiversity Strategies.
- iii. To establish opportunities presented to Kenya's horticulture export by F2F and Biodiversity Strategies.

1.4 Research Questions

The study sought answers to the following research questions:

- i. What are the stakeholders' Perspectives on the effects of the F2F and Biodiversity Strategies on Kenya's horticulture export?
- ii. What challenges does Kenya's horticulture export face from implementing F2F and Biodiversity Strategies?
- iii. What opportunities are presented to Kenya's horticulture export by F2F and Biodiversity Strategies?

1.4 Scope of the Study

This study was conducted in Kenya and involved horticulture exporters, relevant government organisations and agencies, industry associations and international organisations. The study investigated the stakeholders' Perspectives on the effects, challenges and opportunities of implementing the EGD on Kenya's horticulture exports. The study focused on two EGD policy initiatives, namely F2F and Biodiversity. Horticulture export was operationalised as cost of production, volumes exported and market share. Opportunities associated with implementing the EGD were growth in market share, diversification, and safeguarding the environment. At the same time, the challenges were related to policy interpretation and implementation, finding alternatives to chemical fertiliser, reduced usage of plant protection products, and providing limited support.

1.5 Significance of the Study

The horticultural sector is a pivotal contributor to Kenya's economy. The EU is a significant market for Kenyan flowers, fruits and vegetable exports; therefore, any regulatory environment change is substantial. The study findings provide valuable insights

into how the EU F2F and Biodiversity strategies affect horticulture exports, hence providing possible solutions to challenges envisaged in the full implementation of the EGD while taking advantage of the opportunities to enhance competitiveness and long-term viability. Specifically, the research findings are of significance to the areas specified in the subsequent paragraphs:

1.5.1 Significance to Policy

Government and Policy Makers: The study findings provide information that could benefit the Government of Kenya and Policymakers in policy formulation and development of appropriate policies and strategies that foster trade and align with international sustainability goals, which is beneficial to the horticulture sector.

Industry associations: This study provides data and insights that may benefit industry associations in policy advocacy, knowledge sharing among their members, and market intelligence, which can help the sector grow.

1.5.2 Significance to Practice

Horticulture Exporters: This study provides valuable insights for horticulture exporters to understand the EU market compliance requirements based on the F2F and Biodiversity strategies. This may benefit the exporters who can proactively adapt to the EU sustainability requirements to ensure retention, expansion and exploration of new market opportunities.

International organisations: The study findings serve as a resource for international organisations to advocate and dialogue with partners to support key horticulture stakeholders in sustainable practices and explore new market opportunities.

1.5.3 Significance to Theory

The study area has limited literature; hence, this inquiry will provide literature for future research.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter presents a theoretical and empirical literature review. A theoretical and empirical literature review was essential in setting the context of this research, providing a framework for developing the research methodology and understanding the theoretical background of an inquiry. Three theories on which the study was grounded have been reviewed, providing both their strengths and weaknesses. The empirical literature review aligned with the study objectives, and research gaps have been identified and presented. Further, a diagrammatic conceptualisation of the study has been discussed based on the researchers' understanding of the study.

2.2 Theoretical Literature Review

The study used three theories to anchor the research and to determine how the EGD affect Kenya's horticulture exports to the EU. These theories were The Triple Bottomline (Elkington, 1997), Ecological Modernization (Mol & Spaargaren, 2000), and Global Value Chain (Gereffi, 1994) theories. The principles of the three theories are interconnected and cross-cutting and apply to the three study objectives. By adopting sustainable practices that align with the EGD, Kenya can enhance horticulture exports by fitting into the global value chains, contributing to economic development and environmental protection.

2.2.1 The Triple Bottomline Theory

The Triple Bottomline theory (TBL) was introduced by John Elkington in 1994 in an article where he proposed the concept of TBL as a framework for measuring and evaluating the sustainability performance of business organisations (Elkington, 1997). TBL emphasises the interplay between social, environmental, and economic factors and how they can be balanced to achieve sustainability (Srivastava et al., 2022). The TBL theory explains that production processes have to factor in the profits of the businesses, the people, and the planet's sustainability (Slaper & Hall, 2013).

The EGD policy initiatives (EU F2F and Biodiversity strategies) intend to promote sustainable agricultural practices that protect the environment while supporting the producers and consumers (EC, 2020a; EC, 2020b). Convergence in approach was observed between the TLB theory and the EGD policy initiatives as both seek to achieve sustainability in primary production industries such as the horticulture sector (Nogueira et al., 2022). Applying the TBL theory brought an understanding of the interconnected nature of social, environmental, and economic factors and how they interact to shape the effects of the EGD policy initiatives as perceived by the horticulture stakeholders (EC, 2020a; EC, 2020b). This analysis examined the potential benefits, challenges and associated opportunities for achieving a more sustainable horticulture sector (Nogueira et al., 2022), aligning with the study objectives.

While the Triple Bottom Line (TBL) theory provides a valuable framework for understanding the effects of the EGD on the horticulture sector, its aim of achieving a balance in social, environmental, and economic dimensions may not be possible (Singh & Srivastava, 2022). As observed in the EGD policy initiatives, prioritising ecological conservation over other dimensions results in trade-offs that may increase production costs for horticulture stakeholders, affecting their competitive advantage in the market. Secondly, the TBL theory is not contextualised to the realities, for instance, of the developing countries, hence quantifying the social and environmental benefits such as those accrued from reduced pesticide use and evaluating other long-term effects and unintended consequences of these strategies that may require extensive data collection and analysis which was not feasible for this study.

The TBL theory aims to promote social equity. However, EGD policy initiatives may have differential effects on different stakeholders. In conclusion, while the TBL theory provided a valuable framework for understanding the effects of the EGD on horticulture exports, implementation challenges need to be appreciated so that opportunities are maximised while minimising potential negative consequences for horticulture stakeholders (Srivastava et al., 2022).

2.2.2 The Ecological Modernization Theory

The ecological modernisation theory, which emerged in 2000 (Mol & Spaargaren, 2000), posits that economic development and environmental protection can be pursued simultaneously. The theory emphasises that innovation, market mechanisms and environmental policies are precursors to sustainable development (Mol et al., 2009). The EGD policy initiatives (EU F2F and Biodiversity strategies) encourage innovative technologies and practices, such as integrated pest management practices and robotics, that would promote sustainability requirements (EC, 2020a; 2020b).

Implementing the two strategies introduces market access regulations and standards that require the application of sustainable cultivation practices with reduced pesticide use while applying biodiversity conservation (EC,2020a; Çakmakçı et al., 2023). The EU involves traceability and transparency in the entire food value chain, coupled with information on the production processes, such as inputs that promote accountability and encourage stakeholders to adopt sustainable practices (Centre for the Promotion of Imports from Developing Countries [CBI], 2023). Ecological modernisation theory acknowledges the influence of consumer demand and preference on driving environmental change (Mol et al., 2009).

Horticulture exporters targeting the EU must adopt sustainable practices to maintain and expand their market share (CBI, 2023). The principles of the ecological modernisation theory, therefore, provided an understanding that the Kenyan horticulture stakeholders need to adapt their production methods, supply chains, and marketing strategies to align with the EU sustainability requirements as espoused by the EU F2F and Biodiversity strategies to ensure long-term access to the EU market (EC, 2022a).

While the Ecological modernisation theory provided a valuable framework for understanding the potential effects of the EGD policy initiatives on horticulture exports, it does not consider inequalities and power imbalances of different stakeholders in the horticulture sector (Mathews, 2022). For example, exporters from developing countries who sometimes double up as producers may need help meeting the EU's sustainability requirements due to limited resources and eventually drop out of the global value chains

(Lee et al., 2012; Azmi et al., 2024). Further, the theory is not inclusive nor considers the specific circumstances of stakeholders from diverse regions. For instance, horticulture stakeholders from developing countries face unique challenges and realities due to their socio-economic contexts, which may hinder their ability to adopt sustainable practices (Asfaw et al., 2010; Azmi et al., 2024).

Further, the theory must consider the trade-offs and unintended consequences of implementing the two strategies. For instance, strict sustainability requirements imposed by the EU potentially impact the competitiveness of Kenyan horticulture products. The Ecological modernisation theory primarily focuses on individual or organisational actions to achieve ecological sustainability (Mol et al., 2009). However, achieving transformative change in the horticulture sector in Kenya will require broader systemic changes to enable sustainable practices among horticulture stakeholders, including addressing market pressures, government policies, and international trade dynamics. However, the theory provided an understanding of the study and the dynamics therein.

2.2.3 Global Value Chain Theory

The Global value chain theory (GVT), authored in the 1990s, provided a framework for understanding the dynamics of global production networks (Gereffi, 1994). The theory provided a framework that emphasises the interdependence and integration of economies in the worldwide marketplace (Gereffi & Stark, 2011), whereby it recognises that Kenya is part of a global value chain (Bair & Werner, 2011) for horticultural products. The EGD policy initiatives (EU F2F and Biodiversity strategies) impact on the different stages of the horticulture value chain in the quest to promote sustainable food systems by reducing the use of chemical fertilisers and PPP to improve environmental sustainability (EC, 2020b).

Anchoring the GVT in this study provided a framework for analysing how the EU F2F and Biodiversity strategies influence the competitiveness and positioning of horticulture exports from Kenya within the global value chain (Bair & Werner, 2011). This provided an understanding of the potential impacts on product quality, market access, and the ability

of Kenyan horticulture produce to meet the sustainability requirements demanded by the EU market (EC, 2020d).

Further, the global value chain theory provided a framework to examine the complex interactions between policies, value chain dynamics, and the competitiveness (Gereffi & Stark, 2011) of Kenya's horticulture exports in the context of the EGD policy initiatives. Analysis of the GVT assisted in identifying and understanding the potential opportunities and challenges Kenyan horticulture exporters face in the evolving EU market dynamics to position themselves for sustainable growth and success. The GVT has limitations in that it assumes that all actors in the value chain have equal bargaining power and power balance (Bair, 2005; Bair & Werner, 2011).

However, the findings of this and other studies (Cameron et al., 2021; Dekeyser & Woolfrey, 2021; Mathews, 2022) show a power imbalance between the EU retailers and the Kenyan exporters (Ponte, 2008). The global value chain theory assumes that participating in global value chains will lead to economic growth and development while not acknowledging other factors, such as political and institutional contexts (Coe & Yeung, 2015). Heavy reliance on foreign markets (COLEAD, 2022) makes Kenya's horticulture exporters vulnerable to changes in EU regulations and consumer preferences. The GVT assumes a standardised approach to production and quality standards (Ponte, 2005); hence, the specific challenges and contexts the Kenya horticulture exporters face make it difficult for them to meet the stringent market requirements (Nzomo et al., 2022).

Further, the GVT needs to adequately address sustainability measures' potential trade-offs and unintended consequences (Coe & Yeung, 2015). For instance, while the EU F2F and Biodiversity strategies aim to promote sustainability, they may inadvertently lead to negative social and economic impacts such as high compliance costs and loss of market, which could hinder the sector's competitiveness and impact the livelihoods along the value chain (EAFF, 2023).

2.3 Empirical Literature

2.3.1 Overview of the European Green Deal (EGD)

The EGD is a comprehensive set of policies not limited to attaining climate neutrality in Europe by 2050 but also has other goals geared towards making the EU economy sustainable (EC, 2023). One purpose of EGD is to reduce regional and social inequalities (Wolf et al., 2021) within the European continent that result from differences in job opportunities, economic growth, and price stability.

However, the focus is on the environment, such as emission reduction, which could change businesses' activities and make Europe carbon-neutral, a feat which can only be achieved if the other aspects of the EGD are taken care of (Wolf et al., 2021). Further, EGD seeks to promote the use of green energy in Europe. This deal aims to ensure a transition in energy demand from traditional fossil fuels to renewable, environmentally friendly energy sources (EC, 2020a). Figure 1 shows all the elements of the EGD; however, this study focuses on F2F and Biodiversity strategies that promote sustainable food production and encourage healthy diets while protecting and preserving biodiversity (EC, 2020a; EC, 2020b; EC, 2021a).

Hafner and Raimondi (2020) posit that the EU has identified energy efficiency and renewable energy sources as measures to reduce greenhouse gases and achieve carbon neutrality. The energy policy set by the EGD policy is a shared responsibility between the EU and its member states.

Figure 1

Elements of the European Green Deal



Note. Source. <https://euinasean.eu/eu-green-deal/>

The EGD also seeks to create a circular economy. A circular economy ensures that non-renewable resources are maximally used through economic and technical cycles. The goal is to develop sustainable consumption systems where resources are decoupled from production (Jaeger-Erbena et al., 2021). A circular economy is replacing the economy of take-make-and-dispose-off. All EU member states must work together to achieve efficiency in attaining EGD and a circular economy.

While there has been a consensus on the benefits of EGD, studies have highlighted several shortcomings. Siddi (2020) expresses concern that EGD may not be a priority for most European nations since they prefer to pursue other objectives. In addition, the COVID-19 pandemic struck when the program was being implemented. The programme also needs funding and a shift of resources from hydrocarbons to renewable energy. Further, the EU must evaluate its legal mandate and jurisdiction to enforce the standards set by the EGD (Siddi, 2021). Sikora (2021) posits that the EGD framework is quite ambitious and

requires more than a commitment from the signatories. Its implementation also needs to be anchored on the financial and legal aspects of the framework.

"...the EGD's purposes of addressing this financial needs of the project, among others, through viable investments, mobilising private and public funds, dedicating a part of the European Union budget to climate action and providing support through the European Investment Bank." (Sikora, 2021).

The legal and financial aspects of the EGD must also be anchored in the European Union constitution and other countries' laws. A study by Beckman et al. (2020) indicates that limiting agricultural inputs per the EGD may affect international food security, whereby the world's most insecure populations become worse off. The results of this study also indicate that the consequences of implementing the EGD include reduced competitiveness of produce from third-world countries in the export markets (Beckman et al., 2020). Further, during the green transition, resilience thinking should be a key driver considering the food system's multiple dimensions. It demands creativity to design alternative transition pathways that compete and cross-fertilise and offer new entrepreneurial opportunities for farmers, for example, regenerative agriculture, ecology and organic farming and the use of new growth technologies that are envisaged in the EGD (HLP, 2024).

Researchers have noted that implementing the EGD policies has a significant *spillover effect* on the neighbouring countries that are indirectly bound to EU regulations and standards (Cevik et al., 2023). This has, for instance, been evident in initiatives like the Carbon Border Adjustment Mechanism (CBAM) (Weiss, 2023) and the European Union Deforestation Free Regulation (EUDR) (Fossum et al., 2020), where countries are required to keep pace with EU climate policies without having a say in their design. Despite the EU's proclaimed emphasis on flexibility in its relations with non-member states, it often experiences a rigid approach, which risks ignoring neighbouring countries' social, economic and environmental situations (HLP, 2024).

The agricultural and food-based elements of the EGD are espoused in the Farm to Fork and Biodiversity Strategies, whose focus is a food chain with a neutral or positive environmental impact (EC, 2020a; EC, 2021a; Matthews, 2022). The strategies aim to ensure affordable food with high nutrition, fair supply chain returns, and maintenance of public health standards (Matthews, 2022).

2.3.2 Effects of EGD Policy Initiatives on Horticulture Export

Published works show that implementing EGD will be guided by initiatives impacting related agricultural activities. Further, the strategy focuses on the EU farming sector's stewardship of the environment, food security, and human health outcomes, which are fundamental shifts in the food and agriculture sector (Schebesta & Candel, 2020).

COLEAD's (2023) inquiry on the potential implications of the EGD on agri-food exports from low—and middle-income countries identified several regulatory and non-regulatory initiatives that will be implemented to achieve the EGD. These initiatives include sustainable food systems framework legislation, the directive on corporate Sustainability due diligence, and sustainable use of pesticides regulation (COLEAD, 2023).

The horticulture industry stakeholders in Africa never foresaw a situation where the resources necessary for farming would be scarce (Conijn et al., 2011). This could be because agriculture is generally considered a rural venture, with the only resources required being fertilisers, seedlings, and plant protection products. This being the case, the continent's biodiversity loss and agricultural resources have significantly risen (Conijn et al., 2011).

Many areas of agriculture will face difficulties due to the implementation of EGD. Stringent import standards without adequate transition periods have resulted in only a few exporters supplying the EU market. This has led to an increase in the prices of vegetables and a decline in those commodities (Matthews, 2022). As Prandecki et al. (2021) proposed, overcoming these difficulties and expanding the market require practical solutions.

The market for ornamental horticulture in Europe, which demands adherence to the set standards of the EGD, is now on competitiveness (Gabellini & Scaramuzzi, 2022), and hence, those stakeholders intending to continue exporting to this market have to be innovative to remain competitive. Retailers in the European markets have adopted the EGD and are influencing global standards in food production and agricultural production in general (Asfaw et al., 2010). Horticulture exporters from Kenya who adopt the required market standards will benefit from the expanded markets (Asfaw et al., 2010), which have become highly competitive and sensitive to sustainability requirements. However, a study in South Africa also suggested that the first-mover advantage for EU value chain actors may potentially displace sub-Saharan exporters in the market if adopting the regulations takes more time than initially envisaged (Sihlobo, 2021).

2.3.2.1 Effects of Farm to Fork on the Horticulture Export

The EU F2F strategy is a comprehensive plan developed by the EU Commission in 2020 to create a sustainable and environmentally friendly food system (EU, 2020a). The strategy aims to create a European food system that ensures food security with a reduced environmental and climate footprint by promoting sustainable food production, consumption, processing and distribution with reduced food loss and waste (EC 2020a, 2020b; Dekeyser & Rampa, 2021).

The Strategy has specific targets that include the reduction of mineral fertiliser use by 20%, reduction of pesticide use by 50%, reduction of Nitrogen-balance surplus by 50% and placing at least 25% of agricultural land use on organic farming by 2030 (EU, 2020a). These ambitious targets are intended to put the EU food system on a transformative path to greater Sustainability (Figure 2) (EU 2020a, 2020b; Matthews, 2022).

Figure 2

Overview of the Farm-to-Fork Strategy



Source: EU commission n.d

Henning & Witzke (2021), in a study focused on the economic and environmental impacts of the F2F on Germany, projected a decline in the production of fruits and vegetables and an increase in the price of about +15% on fruits and +36% on vegetables. Based on this increase in horticulture produce price effects, the study projected an increase in net imports of these commodities from –10 million tonnes to -22 million tonnes.

This study further established a “leakage effect”, which implies that the F2F measures directly affect the consumption and production of agricultural commodities in non-EU countries. These leakage effects were especially prominent in Africa at 27%. Interestingly, however, this study established that F2F is not effective against climate change but would lead to an addition of Greenhouse gas emissions of 54.3 million tonnes of CO₂ equivalent in the Agricultural sector of non-EU countries (Henning & Witzke (2021). Beckman et al.’s (2020) study on the economic and food security impacts of Farm to Fork identified

reduced agricultural outputs, increased commodity prices and international food insecurity for the world's most vulnerable populations.

Implementation of the EU F2F strategy is not limited to the EU as part of the Strategy states that “imported foods must continue to meet the relevant EU regulations and standards” and that import tolerances will be reviewed for “substances meeting the cut-off criteria and presenting a high level of risk for human health” (EC, 2020a). Many African countries export fresh produce to the EU (Ismail, 2017), implying that compliance with stricter EU regulations will negatively affect their exports.

An analysis by COLEAD (AFRINFO, 2024) based on Eurostat of 2020 to 2022 indicates that African exports to the EU, in terms of volumes, for example, the fruit and nuts sector made up 29% of the total volume of trade with vegetables taking up 14%, a reflection of the importance of the EU market to the African continent. Studies carried out before the launch of the EU F2F indicated that the main restriction to Agri-based African export access to the EU market was non-tariff barriers. Especially on product regulations and standards, due to difficulties in meeting and proving social and sustainability standards in their production (Czubala et al., 2009), underscoring the impact of expected increased sustainability requirements.

In analysing how the EGD will impact South African agricultural exports, a study by Sihlobo (2021) identified regulatory and policy uncertainty as one of the challenges the F2F strategy will pose to South African producers, as the regulators and food system actors needed time to align with the F2F requirements. The study further identified the high cost of compliance for the agribusinesses that have to conform to the stringent EU regulatory standards and the ever-increasing requirements for traceability systems, sustainable farming practices and certifications whose costs are prohibitive to small-scale producers. The study concluded that without financial support, small-scale producers would inevitably be excluded from participating in the export market (Sihlobo, 2021).

A recent study by EAFF (2023) identifies trade barriers and trade-distorting policies, such as stringent MRLs, as reducing the competitiveness of non-EU suppliers to the EU. Further, an update report by Crop Life Africa and the Middle East (September 2023)

reported that the EU has been discussing the application of ‘mirror clauses’ of the EU health and environmental standards to imported agricultural and agri-food products to reduce competition from cheap rival imports. Mirror clauses “guarantee that imported products are produced under the same sanitary, phytosanitary, welfare and environmental standards as those imposed on domestic products within the European Union” (Rees, 2022).

Based on the foregoing, the EU Farm to Fork strategy impacts market prices, trade, and exports of products to the EU. The EU market is an important destination market for Kenya's horticulture produce; hence, there is a need to examine the effects of EGD on the sector to retain and expand the market sustainably.

2.3.2.2. Effects of EU Biodiversity Strategy on the Horticulture Export

The EU Biodiversity strategy for 2030 aims to put Europe's biodiversity on the path to recovery for the benefit of nature, people and climate. Some of the commitments in the strategy that impact agriculture include restoring degraded agricultural land, reducing pollution, reversing pollinators' decline, and reducing the risk and use of chemical and hazardous pesticides by 50%, among others (EC, 2021a). The EU's Biodiversity strategy, launched with the Farm to Fork, complements it with pesticide and land use targets (EC 2020a, 2020b; EC, 2021a) and, therefore, the possibility of overlaps in the discussions and analysis.

The external dimension of the EU Biodiversity strategy is being pursued through developing green alliances on sustainable food systems in bilateral, regional and multilateral fora (Matthews, 2022). For instance, the EU Deforestation and Forest Degradation Regulations (Reg. 2023/1115) intends to address deforestation and forest degradation within and outside the EU by targeting commodities exported from third countries associated with deforestation (EC, 2023a).

Further, the EU supports incorporating, adopting, and enforcing a trade and sustainability chapter in all the EU bilateral Economic Partnerships (Matthews, 2022). The EU communicated the intention of a comprehensive trade policy review in 2021 (EC, 2021b) and has embarked on a review of trade and sustainability development (TSD) chapters in

EU free trade agreements (FTAs) (Matthews, 2022). Based on this, the TSD provisions were included in the EU-Cariforum EPA and the EU-Korea FTA, which came into force in 2011 (Matthews, 2022) and the EU-Kenya Economic Partnership Agreement (EC, 2023b).

The Biodiversity Strategy states that “trade policy will actively support and be part of the ecological transition” and that there will be “full implementation and enforcement of the biodiversity provisions in all trade agreements (EU, 2020b; Mathews, 2023). The ¹Sustainable Use of Pesticides Directive (SUR) (EC, 2022b), derived from the EU F2F and Biodiversity Strategies, is one of the legislations that, if implemented, will affect horticulture exports. Of interest to the proposed reduction in pesticide use on biodiversity, simulations based on the CAPRI-Model in a study targeting Germany implied limited positive effects of a 50% pesticide reduction on Biodiversity with a modest (Biodiversity production unit) BFP-Index increase of 0.05 units or +1.6% (Henning & Witzke, 2021).

The Corporate Sustainability Due Diligence Directive (CSDDD) (EC, 2021c) is an integral part of the EU Biodiversity strategy that introduces stringent rules to companies who intend to export to the EU market as they are expected to meet transparency and accountability sustainability practices addressing the environment and social impacts of the food supply chain as the EU companies (EU, 2020b).

Further, a South African study opined that shifting to low chemical fertiliser and chemical use reduces soil contamination, improving soil health and biodiversity. This will create a niche food market driven by beneficial organic and low-input farm production systems (Sihlobo, 2021). Horticulture exporters are, therefore, expected to meet these standards to remain competitive in the EU market.

¹ *This proposal was withdrawn from the EU parliament and shelved; however, it was active at the time of data collection for this study and the decision to retain it in the study*

2.3.3 Challenges to Horticulture Export Presented by F2F and Biodiversity Strategies

Usman et al. (2021), in a study of what the EGD means to Africa, identify the new agricultural standards that are part of the Farm to Fork Policy package as that will pose a challenge in implementation. The study further indicates that compliance with the new agricultural standards that will be set as a condition to accessing the EU market will make the agricultural exports from African countries that are already challenged (EAFF, 2023) with meeting the current rules of origin and SPS requirements less competitive as the EU farmers benefit since they enjoy the EU Common Agricultural Policy (CAP subsidy).

Cameron et al. (2021) also concur that SMEs who endeavour to export agricultural produce to the EU will face the challenge of compliance with the SPS requirements that will be a requirement; for the Mediterranean countries, increased production costs are cited as the main challenge in meeting the high standards and regulations set by the F2F strategy. The study, however, presents mixed findings regarding the F2F strategy. Some countries, such as Tunisia and Morocco, have made significant progress in promoting organic agriculture and increasing the area of land dedicated to organic farming. Hence, they may benefit from these initiatives.

However, other countries in the Mediterranean region will likely face significant challenges in promoting organic agriculture due to a lack of infrastructure and support systems for organic farmers, including access to organic inputs, technical assistance, marketing channels, and access to funds (Sandri et al., 2023). A study conducted in South Africa identified the challenge of increased inequality if interventions are not made to support regulatory compliance for resource-poor producers. These producers will be left out of the sustainable agro-food systems due to insufficient financial and technical capacity to conform to the new standards (Sihlobo, 2021).

A study conducted in South Africa among SMEs identified market, supply chain and technology risks as potential challenges due to the anticipated shift in market regulations and consumer expectations (Cameron et al., 2021). Additionally, compliance with the sustainable global food standards that the F2F strategy aims to achieve may constitute an

additional non-tariff market barrier for African agriculture exports to the EU (Usman et al., 2021). Part of the market risk is due to the tightening of the control standards for chemicals and pesticides, which will require investments by agricultural exporters. At the same time, weak domestic organic certification structures may limit opportunities among environmentally conscious consumers. Regarding the supply chain risks, the report identifies the need to adapt to clients' more rigorous environmental monitoring requirements (Cameron et al., 2021). This risk, however, creates an opportunity to prioritise and invest in long-term sustainability initiatives as they will attract long-term benefits and environmentally conscious consumers.

Despite financing challenges in Kenya, the horticulture sector faces many challenges, including inadequate market infrastructure, high cost of inputs, stringent and evolving destination market regulatory requirements, and insufficient training and access to quality extension services (COLEAD, 2022). European countries serve as the primary export market for this industry, and therefore, Kenyan exports must comply with the requirements provided by the EGD to remain relevant market players.

Though Kenya has attempted to diversify the export of flowers and fruits from to other destinations, such as the United Arab Emirates and the United States of America (USA), the quest of the EU to become the leader in sustainability agenda (EC, 2020a) the requirements set in EGD could soon be applicable in these other markets (Fresh Produce Exporters, 2021). The industry is continuously forced to adopt new production technologies and reduce agricultural pesticide usage (Fresh Produce Exporters 2021) to integrate into the global value chains (Lee, 2010).

A study by AAK (2024) in an analysis of the withdrawal of eight active ingredients contained in more than one hundred and forty two pest control products announced by PCPB in 2023, asserted that this action was driven by export market needs and not based on risk assessment. According to AAK, this withdrawal did not take into account the need to promote and accelerate alternative pest control tools, prior to withdrawing existing tools as is the norm. This in their opinion will impact trade and national security as it may lead to surge in mortalities, morbidities and mass financial distress due to crop losses. The

report recommends the need for government of Kenya to initiate an urgent public information campaign informing farmers of the pest control withdrawals while providing solutions (AAK, 2024).

2.3.4 Opportunities to Horticulture Export Presented by F2F and Biodiversity Strategies

The EU has one of the world's most stringent regimes for plant protection products (PPPs) (Matthews, 2022). Consequently, the number of active substances approved for use by EU farmers is much less than in third countries with a similar scale of agricultural production (EU, 2020c). However, farmers in third countries can continue to use PPPs authorised under their domestic regulations that are not approved in the EU as long as exports to the EU comply with a risk assessment that they pose no threat to consumer health or safety. Pesticides in this context, PPPs, such as herbicides and fungicides, are covered by the Pesticides Regulation (Matthews, 2022).

Higher regulatory standards will require a change in crop production practices while stimulating the development of alternatives to less hazardous pesticides by the global PPP industry (Ecorys, 2018). While stringent requirements may appear as technical or non-technical barriers to developing countries' access to the EU market, the proposed introduction of mirror clauses on MRLs may provide the required regulatory stimulus to bring about the desired behavioural changes among farmers and companies (Matthews, 2022). This may create the required impetus for sustainable agriculture that provides horticulture products for export that can attract a premium market in the EU that has seen increased demand for sustainable and organic products.

An analysis of the challenges and opportunities of the EGD in the Mediterranean countries, Sandri, 2023, indicates that the F2F strategy could provide new economic opportunities for these countries by promoting sustainable agriculture practices and increasing demand for organic and sustainably produced food. Based on this study, this could help boost rural economies and create new jobs in the agriculture sector. A study in South Africa further identified technology transfer as an opportunity to leverage and benefit from the EU. This is based on the fact that the EU is dependent on technology as

a critical driver of agro-food systems to increase productivity. South Africa can leverage the envisaged sustainable technologies and increase yields (Sihlobo,2021).

While transitioning to sustainable food systems may be costly for farmers and SMEs along the value chains, economic opportunities exist for producers and processors who make Sustainability their trademark and guarantee the EU food chain before their competitors (Cameron et al., 2021). This confirms the EU's assertion that this transition presents a first-mover opportunity for all actors in the EU food chain, including those from third countries, and market differentiation that Kenyan exporters can leverage (EC, 2020b).

Therefore, the EGD provides opportunities for African countries to leverage opportunities such as exporting organic products with a foreseeable expanded market and benefit from partnerships and envisaged technological transfer that the EGD presents to improve trade and economic development. This may also lead to access to new markets, reducing reliance on the EU market.

2.4 Research Gaps

Several studies have analysed how EGD policy initiatives will affect the agricultural sector in the EU. However, limited studies have examined how third countries that export products to the EU will be affected. Though it is clear from the literature reviewed that the EGD policy initiatives will affect countries exporting products to the EU, how it will affect the horticulture exports from Kenya has yet to be examined. Therefore, this study sought to understand the effects of the EGD policy initiatives on horticulture exports from the stakeholder perspective, focusing on market access preparedness and competitiveness. The study sought to identify perceived opportunities and challenges. The area of study needs more literature. Thus, this study has attempted to fill the gap by providing an exploratory analysis and literature for future research. Table 1 summarises research gaps identified in the empirical literature review.

Table 1*Summary of Empirical Literature Gaps*

<i>Author</i>	<i>Title</i>	<i>Findings</i>	<i>Gaps</i>	<i>How it was addressed</i>
Usman et al., 2021	<i>What Does the European Green Deal Mean for Africa?</i>	Compliance with sustainable global food standards that the F2F aims to achieve is an additional non-tariff market barrier for African agriculture exports to the EU.	The study focused on Africa. It is necessary to confirm whether the same applies in Kenya, given that each country has its tax and other related regulatory policies.	This study identified the transition to sustainable global standards as challenging due to dependent supply chain complexities and the need for alignment to country-specific realities.
Mathews 2020	<i>Implications of the European Green Deal for agri-food trade with Developing Countries</i>	Implementation of EGD Policy Initiatives may create opportunities for producers and exporters who adopt the envisaged regulations	The opportunities in terms of market readiness and competitiveness of the Kenyan horticulture export were not examined.	Opportunities arising from the implementation of the EGD include: -Diversifying the horticulture exports to other emerging markets reduces over-reliance on a single market.

<i>Author</i>	<i>Title</i>	<i>Findings</i>	<i>Gaps</i>	<i>How it was addressed</i>
				-Early adoption of sustainable and organic practices provides an opportunity for a high-demand premium market.
Cameroon et al., 2021	<i>The European Green Deal: Context, Challenges and Opportunities for South African SMEs Operating in the Green Economy</i>	The stringent organic certification requirements negatively impact the competitiveness of South African organic exporters in the EU market.	The study is specific to South Africa and may not apply to Kenya, which has a different horticulture regulatory framework. Therefore, Kenya's position needed to be established.	The study identified a lack of a formal organic standard in Kenya, and hence, Kenyan organic certification that aligns with the export market may have to be developed for the organic products to be competitive.
Beckman et al., 2020	<i>Economic and Food Security Impacts of Agricultural Input Reduction Under the European</i>	Implementing the EGD will reduce the competitiveness of produce from third-world countries in the export markets.	This study focused on agricultural produce from third-world countries, not horticulture exports. Therefore, it was	The study identified increased demand for compliance with sustainability standards, challenges in adhering to them, and an increase in interceptions as

<i>Author</i>	<i>Title</i>	<i>Findings</i>	<i>Gaps</i>	<i>How it was addressed</i>
	<i>Union Green Deal's Farm-to-Fork and Biodiversity Strategies</i>		necessary to explore whether horticulture exports from Kenya would be affected similarly or differently.	factors affecting the competitiveness of horticulture exports to the EU.
Gabelli ni & Scaramuzzi, 2022	<i>Evolving Consumption Trends, marketing strategies, and governance settings in ornamental horticulture</i>	To remain competitive, stakeholders intending to continue exporting to the EU have to be innovative.	This study focused on ornamental horticulture, so it was necessary to establish whether the competitiveness of other types of horticulture products would also be affected.	The study identified that the EGD affected the entire horticulture value chain across all the horticulture products.
Hennig & Witzke, 2021	<i>Economic and Environmental Impacts of the Green Deal on the Agricultural Economy: A</i>	The study projected a decline in fruit and vegetable production in Germany, which would increase net	The study focused on the economic and environmental impacts of the F2F on Germany and the need to examine the	The study identified that some horticulture products, such as French and fine beans, which enjoyed a significant market share in the

<i>Author</i>	<i>Title</i>	<i>Findings</i>	<i>Gaps</i>	<i>How it was addressed</i>
Sandri, 2023	<i>Simulation Study of the Impact of the F2F-Strategy on Production, Trade, Welfare and the Environment based on the CAPRI-Model The European Green Deal: Challenges and Opportunities for the Southern Mediterranean</i>	imports of horticulture commodities.	effects on Kenya's Exports.	EU market, had experienced a sharp decline due to frequent interceptions, affecting the produce's competitiveness.
		Promoting Sustainable agriculture practices and increasing the demand for organic food could provide new economic opportunities.	The study identified increased demand for organic products in the EU as an opportunity for Mediterranean countries; hence, considering the difference in geolocations, it is necessary to establish whether this applies to	The study identified organic horticulture production as an opportunity Kenya may explore and the need for Kenya to explore organic standards accepted in the EU market.

<i>Author</i>	<i>Title</i>	<i>Findings</i>	<i>Gaps</i>	<i>How it was addressed</i>
Kenya.				

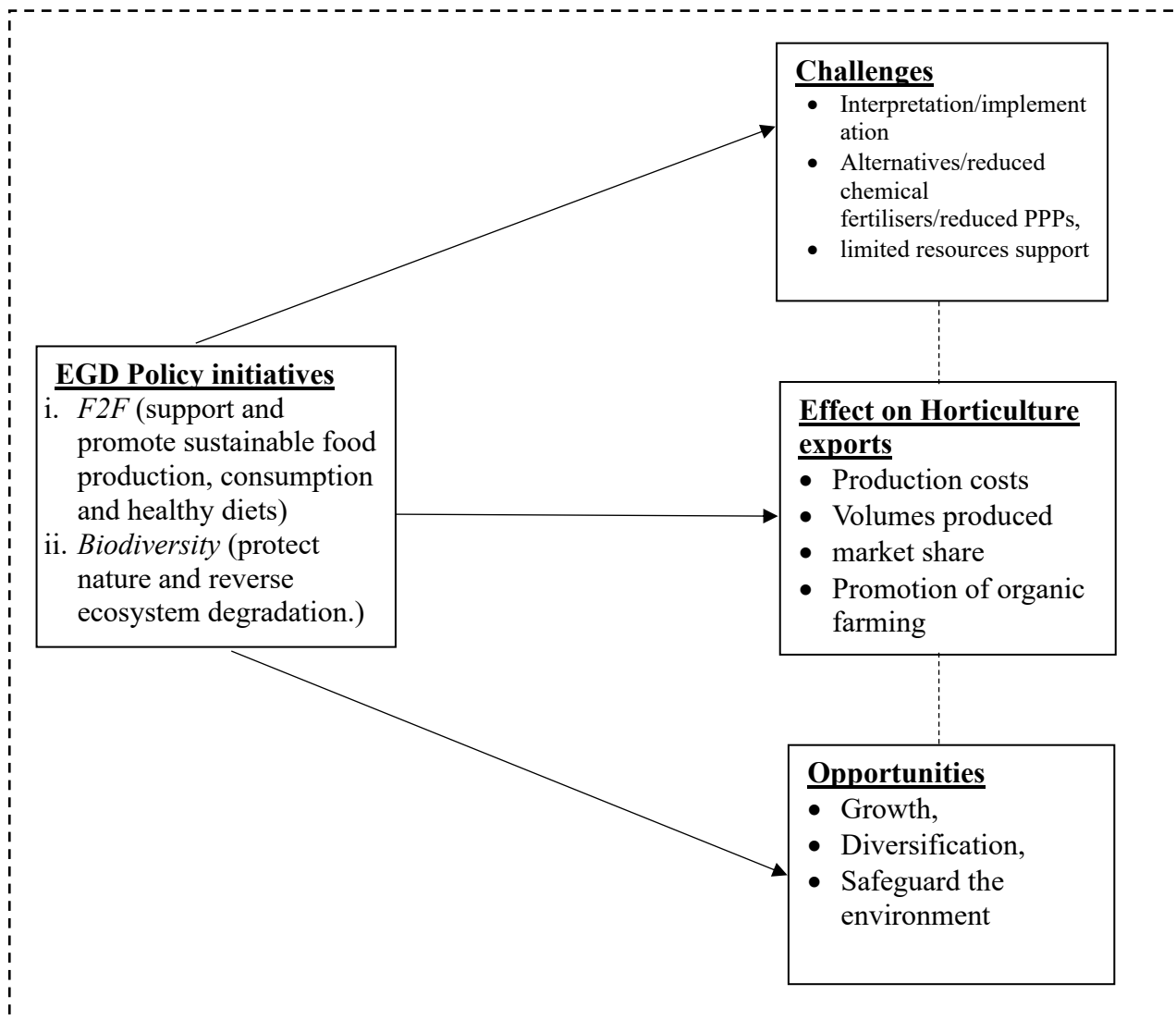
2.5 Conceptual Framework

The EGD advocates for a practice in which the produce from the farm goes directly into consumption (F2F strategy) (EC, 2020a). The marketing of agricultural produce relies heavily on the market environment and the marketing capacities of the agricultural market system (Meulenbergh, 1986). The influence of the market environment on the sales of agricultural produce is significant, and those who do not comply with market needs are eventually phased out of the market. The transition perspective to horticulture farming has shifted the practice globally to greenhouses (Palomaki & Noble, 1995) and is currently towards minimising farm chemicals.

This study evaluated the effects of EGD policy initiatives on horticulture exports in Kenya based on the stakeholders' Perspectives. The F2F strategy supports and promotes sustainable food production and the consumption of healthy diets. The Biodiversity strategy, in addition to promoting sustainable food production, also protects nature to reverse ecosystem degradation. Figure 3 presents a diagrammatical representation of the conceptualised relationships between and within the study variables.

Figure 3

Conceptual Framework

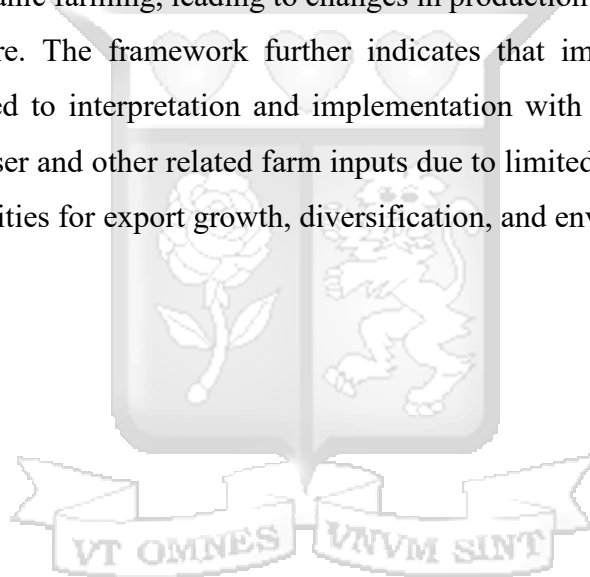


Key

	Directional Effect
-----	Relationship between the variables does not imply causation.

Figure 3 illustrates that implementing the EGD policy initiatives affects horticulture exports, with emerging challenges and opportunities. The framework clearly and directly links the EGD policy initiatives and their effects on horticulture exports, challenges, and opportunities. The diagram further shows a non-causal relationship between the effects on horticulture exports and the emerging opportunities and challenges. The framework underscores the multifaceted and nuanced nature of the horticulture export sector, whereby the EGD initiatives can trigger a cascade of beneficial and adverse reactions.

Further details in the framework indicate that the EGD policy initiatives affect exports by promoting a reduction in plant protection products and the use of chemical fertilisers while encouraging organic farming, leading to changes in production costs, volume of produce, and market share. The framework further indicates that implementing EGD creates challenges related to interpretation and implementation with the use of alternatives to chemicals fertiliser and other related farm inputs due to limited resources. The EGD also creates opportunities for export growth, diversification, and environmental protection.



CHAPTER THREE

METHODOLOGY

3.1 Introduction

This section describes the methodology used to collect and analyse the study's data. The methodology comprised the study design, population, sampling process, data collection instruments, procedures, and research quality. This chapter further presents the data analysis techniques and addresses ethical issues.

3.2 Research Philosophy

Research philosophy refers to beliefs and assumptions about knowledge development (Creswell, 2014). For example, a researcher develops knowledge by studying how implementing the EGD policy initiatives will affect the horticulture exports in Kenya. In this study, the researcher makes assumptions (Burrell & Morgan, 1979) such as about human knowledge (epistemological assumptions), the realities the researcher encounters in research (ontological assumptions) and the extent and ways the researchers' values influence the research process (axiological assumptions). These assumptions shape how the researcher interprets the research findings (Crotty, 1998).

This study was guided by pragmatism research philosophy, which supports using qualitative and quantitative approaches (Dawadi et al., 2021). The philosophy was chosen because this study examined stakeholders' perspectives on the effects of F2F and Biodiversity Strategies on horticulture export in Kenya and associated challenges and opportunities. This called for the collection of both qualitative and quantitative data, such as export volumes in tons. Poth and Munce (2020) contend that doing so provides a richer insight into a research phenomenon that cannot be realised using only qualitative or quantitative data.

3.3 Research Design

A research design is a plan for organising all parts of an inquiry to make the results credible (Dannels, 2018). This study adopted the concurrent mixed method design. It entails collecting quantitative and qualitative data simultaneously and analysing them in parallel (Nagpal et al., 2020). The results are then merged for a complete understanding

of the phenomena. This design is considered superior because it can be implemented so that the qualitative component offsets the weaknesses of the quantitative methods and vice versa (Poth & Munce, 2020). Further, it supports triangulation, which uses multiple data sources to answer research questions effectively. Mixing the two methods thus provides a rich insight into a research phenomenon that cannot be realised using only qualitative or quantitative methods.

This study investigated stakeholders' perspectives on the effects, challenges, and opportunities of the EGD policy initiatives on horticulture export. The concurrent mixed methods were deemed appropriate because they enabled the researcher to widen the inquiry in depth and breadth for a more complete picture of the perspectives of the various stakeholders. The stakeholders were exporters, government agencies, industry associations and international organisations. The design produced a more complete picture with divergent views, opening avenues for future inquiries. The concurrent collection of qualitative and quantitative data using a survey (questionnaire) and interviews also justifies the use of the design. Qualitative and quantitative data from horticulture exporters was collected using a questionnaire, while qualitative data was collected from the other stakeholders in the study. Further, qualitative and quantitative data collected using both instruments were analysed in parallel and utilised to determine the stakeholders' perspectives.

3.4 Population of the Study

This study was conducted in Kenya and targeted key stakeholders in Kenya's horticultural export sector. These actors included firms that export horticultural produce to the EU, the Government of Kenya's regulatory agencies, industry associations, and international organisations. The government agencies were the Ministry of Agriculture and Livestock Development (MOALD), Horticulture Crops Directorate (HCD), Kenya Plant Health Inspectorate Services (KEPHIS) and Pest Control Products Board (PCPB). Industry associations which participated in the study were the Fresh Produce Exporters Association of Kenya (FPEAK), Avocado Society of Kenya (ASOK), Agrochemicals Association of Kenya (AAK), Fresh Produce Consortium of Kenya (FPCK), Kenya Flower Council (KFC) and Avocado Exporters Association of Kenya (AEAOK). The international

organisations were the Europe-Africa-Caribbean-Pacific Liaison Committee (COLEAD,) Trade Mark Africa (TMA) and the Centre for Agriculture and Biosciences International (CABI). The unit of analysis was thus the exporting firm, government agencies, industrial associations and international organisations. In contrast, the units of observation were the technical persons in charge of the export of these entities.

The target population was 315 technical persons in charge of exports in firms that export horticulture produce to the EU located in Nairobi and its environs, which included Thika, Machakos, Kiambu and Kajiado, the four government agencies, six industrial associations and three international organisations. Government agencies were targeted because they create an enabling environment for exporting horticulture products by providing a regulatory framework, market access, and export facilitation through certification, inspection, and compliance. Industrial associations were selected because they represent the horticulture stakeholders and support advocacy and market access. International organisations were involved in the study because they support horticulture exporters in accessing the EU market. The technical persons (table 2) were selected because they are best placed to provide information on export policies, processes and practices due to their training and experiences.

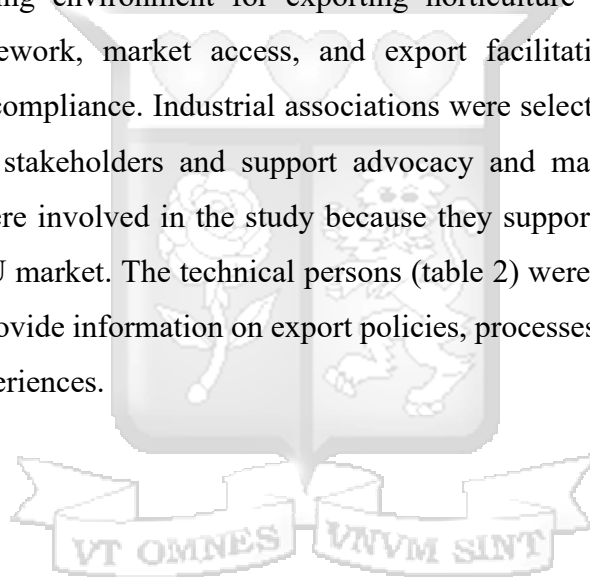


Table 2

Target Population of the Study

<i>Stakeholder</i>	<i>Population of technical persons in charge of exports</i>
Exporters (Small, Medium and Large scale)	315
GOK Organizations and agencies (MOALD), HCD, KEPHIS, PCPB)	4
Industry Associations (FPEAK, ASOK, AAK, FPCK, KFC, AEAOK)/ International Organizations (COLEAD, TMA, CABI)	9

Source: Horticulture Crops Directorate (HCD), 2023

3.5 Sampling Design and Sample Size

3.5.1 Sampling Design

The study employed probability and non-probability techniques to select samples of stakeholders. Stratified, proportionate and simple random sampling techniques were used to select a sample of exporters based on HCD records. Stratification ensured that all categories (small, medium and large) of export firms were included in the study. Proportionate techniques ensured that the portion of a sample is allocated to a stratum related to its population. At the stratum level, where there were many exporters, simple random sampling was used for participants to reduce bias and enhance the findings' validity and reliability (Babbie, 2016). The census (all were selected) was used to select the technical persons in charge of export in government agencies, industry associations and international organisations.

3.5.2 Sample Size

The sample size of the technical persons in charge of exports was determined using a formula for finite populations developed by Krejcie and Morgan (1970). The formula is:

$$n = \frac{z^2 p (1 - p) N}{e^2 (N - 1) + z^2 p (1 - p)}$$

Where:

n = the sample size

N = the target population size

p = the estimated proportion or the incidence of cases in the population, which was set at p = 0.50 to yield the maximum possible sample size

z = the value of the standard variate at the desired level of confidence; the desired level of confidence was 95% (0.95), hence z = 1.96

e = the amount of tolerable error of 5% (0.05) acceptable, e = 0.05

The calculated sample size of the technical persons in charge of exports was eighty-seven (87), given that there were three hundred and fifteen (315) active horticulture exporters to the EU registered with HCD (AFA, 2022). Goodrich and St. Pierre (1979) in Borg and Gall (1989) recommend incrementing the calculated sample by 20 per cent to take care of attrition and non-response for realistic planning of an inquiry. The sample of the technical persons in charge of exports in exporting firms was one hundred and five (105).

The census (including all) method was used to choose the technical persons in charge of exports from the other entities participating in the study. Four were drawn from government agencies, six were from industry associations, and three were from international organisations. Table 3 presents a summary of the study sample sizes.

Table 3

Sample sizes of the study

<i>Stakeholder</i>	<i>Sample size</i>
Exporter (Small, medium and large scale)	105
GOK Organizations and agencies	4
Industry Associations/ International Organizations	9

3.6 Data Collection Instruments

This study relied on qualitative data with limited descriptive statistics, such as the demographic characteristics of the exporters. The instruments used to gather data are crucial to the success of the research (Kerlinger & Lee, 2000). This study utilised various instruments to collect primary data to address the objectives.

Primary data was collected using the horticulture exporters' questionnaire (Appendix I), critical informant interview guides for the government agencies/regulators (Appendix II), industrial associations and international organisations (Appendix III).

The horticulture exporters questionnaire had open- and closed-ended questions that elicited qualitative data for in-depth understanding and quantifiable data, which was comparable and provided a comprehensive view of the research study (Creswell, 2014). The key informant interview guides provided a flexible yet structured in-depth exploration of participants' responses, hence, a better understanding of the stakeholders' perspectives

on the study topic (Creswell, 2014). Table 4 describes the research tools utilised in the study, the research tool items and the objective each measured.

Table 4

Description of the research instrument and the research questions

<i>Research tool</i>	<i>Research tool Items</i>	<i>Measured Objective</i>	
1. <i>Horticulture exporter questionnaire</i>	Questions 1,2,3	Background information of the technical persons in charge of exports in exporting firms	
	Questions 4 to 10	Background information of the exporting company	
	Questions 11-25	Objective one	
	Questions 26-31	Objective two	
2. <i>Interview guides</i>	Questions 32-34	Objective three	
	i. Government agencies and regulators	Questions 1,2,6,8,9,10,11,12	Objective one
		Questions 3,4,7,11	Objective two
Questions 3,4,5,7,11		Objective three	
ii. International Organisations and Industry Associations	Questions 2,3	Objective one	
	Questions 4,8,9,10	Objective two	
	Questions 5,6,7,10	Objective three	

3.7 Data Collection Methods

Trained research assistants helped collect data from the horticulture exporters' using an open-ended questionnaire. This questionnaire was administered by the research assistants in their field offices. The principal researcher conducted key informant interviews with government agencies, industry associations, and international organisations. The key informant interviews were recorded and transcribed verbatim for analysis.

3.8 Data Analysis

Data from the questionnaires administered to the horticulture exporters was cleaned, organised and analysed using Stata version 18. Descriptive statistics were used to analyse this data set and are presented in frequencies, percentages, means, and standard deviations. Qualitative data collected through key informant interviews were transcribed, coded and analysed using ATLAS.ti software (Friese, 2012). This involved grouping the responses into meaningful broader category areas, then computing the frequency counts and presenting relative frequencies to draw meaningful patterns. The themes and categories generated from this data aligned with the research objectives. A summary of the key themes and narratives with select excerpts enriched the data. Data triangulation was achieved by using different data collection methods while examining variables using different groups of respondents, which provided valuable insights (Teddlie & Tashakkori, 2011).

3.9 Research Quality

Piloting the horticulture exporters' questionnaire was done to ensure the reliability and validity of the research instruments (Drost, 2011). Ten exporters were identified and interviewed based on the inclusion criteria. The participants involved in the pilot study had characteristics similar to those of the sample population. The respondents who participated in the pilot study were excluded from the main study. A meeting was held with the research assistants after the pilot study to discuss issues noted with the research instrument, time used to administer the questionnaire and evaluate the quality of data collected (Drost, 2011).

The pilot study informed the need for the questionnaire to be administered by the research assistants as the initial self-administering questionnaires had a high non-response rate, and

quite a number were half-filled. Based on the pilot study, some research questions were reviewed, especially those on revenue outlay, which had been left unanswered in the pre-test questionnaires to improve specificity. The pilot further informed the researcher of the time it took to conduct one interview and the distances from one exporting facility to the other, assisting with the logistics and restructuring of the questionnaires. The research assistants were trained from a central venue to ensure consistency in data collection.

3.10 Ethics Considerations

Daka (2022) contends that researchers should adhere to ethical standards as they ensure that the welfare and safety of the objects of a study are taken care of. Ethics refers to defining norms of conduct and differentiating between acceptable and unacceptable behaviour (Dooly et al., 2017). It is concerned with consent, courtesy, respect, integrity, privacy and safety of the subjects, and equitably treatment of people in studies that involve human beings (Yip et al., 2016).

The research proposal was approved by Strathmore University Institutional Scientific and Ethical Review Committee (SU-ISERC) (Ref. SU-ISERC1665/23) (Appendix vi). In addition, a permit to conduct the research (License No. NACOSTI/P/23/25211) (Appendix vii) was obtained from the National Commission for Science, Technology and Innovation (NACOSTI). The purpose of the study was explained to the participants, and their consent was sought. The participants were guaranteed that all responses obtained would only be utilised for academic purposes.

Participation in the study was entirely voluntary, and respondents were free to decline to participate and withdraw from the study at any point without consequences. The researcher assured the respondents of their anonymity and confidentiality. During data collection, the respondents were not segregated, and the principle of justice was upheld, with ethical standards embraced (Hoyle et al., 2002).

CHAPTER FOUR

PRESENTATION OF RESEARCH FINDINGS

4.1 Introduction

This chapter presents the study's findings by objective. It begins with the instruments' return rates and respondents' characteristics. It then presents the stakeholders' perceptions of the effects of F2F and Biodiversity strategies on horticulture exports. The last two sections of the chapter examine challenges and opportunities presented in the horticulture export sector by implementing the two EGD strategies.

4.2 Instrument Response Rate

The study used three instruments to collect data: a horticulture exporters questionnaire, government agencies, industry associations, and international organisations' interview guides. It involved 105 technical persons in charge of exports from export firms, four representatives of government agencies, and 9 participants from industry associations/international organisations. Consequently, 105 questionnaires were administered, and invitations for interviews were sent to the four technical persons from government agencies and nine from industry associations/international organisations. The return rates of these instruments are summarised in Table 5.



Table 5*Instruments return rates*

Instrument	Administered/invited for interview	Filled and returned/Interviewed	Return/participation rate (%)
Exporter questionnaire	105	105	100.0
Government agency interview guide	4	4	100.0
Industrial associations/ international organisation interview guide	9	8	88.9

The instrument return rates ranged from 88.9% for the industrial association/international organisation interview guide to 100% for both the exporter questionnaire and the government agencies interview guide.

4.3 Profile of the Respondents

The characteristics of the organisations and stakeholders who participated in the study were analysed before answering the research questions. Table 6 gives the characteristics of the participating organisations.

Table 6*Characteristics of Stakeholders that participated in the study*

Stakeholder	Characteristic	Frequency	Percentage
Exporting firm (n = 100)	Microenterprise	8	8.0
	Small	33	33.0
	Medium	59	59.0
Organisation (n= 12)	Government Agencies	4	33.3
	Industry Association	5	41.7
	International organisations	3	25.0

Most (59.0%) of the exporting firms were medium-sized businesses, while the rest were small (33.0%) and micro-scale (8.0%) enterprises. The other entities involved in the study were government agencies, industry associations, and international organisations. One technical expert in charge of exports from MOALD, KEPHIS, HCD, and PCPB represented government agencies. The industry association participants were technical persons from FPEAK, ASOK, AAK, FPCK, KFC, and AEAOK, while those from international organisations were from COLEAD, TMA, and CABI.

The characteristics of technical persons in charge of exports in the exporting firms were also analysed and summarised using frequencies and percentages, as shown in Table 7.

Table 7*Characteristics of Technical persons in charge of exports in exporting firms*

Scale	Characteristics	Percentage
Age in years (n = 103)	20 to 29 years	10.7
	30 to 39 years	47.6
	40 to 49 years	27.2
	50 to 59 years	14.6
Number of years in education (n = 103)	11 to 16 years	75.7
	17 to 22 years	20.4
	23 to 28 years	3.9
Gender (n = 104)	Male	76.9
	Female	24.0

Table 7 indicates that the majority (74.8%) of the technical people were in the 30 to 49-year age bracket. Further analysis revealed that the oldest technical person was 59 years old, the youngest was 21, and the overall mean age of this sample group was 39.15 years. The technical persons' education level was measured in years spent in school. The number of years spent in school by the majority (75.7%) of the technical persons was between 11 and 16 years, while the rest had between 17 – 22 (20.4%) and 23 to 28 (3.9%) years of education. Additional analysis showed that the years in school ranged from 12 to 28 years, and the overall mean was 16.54 years. Concerning gender, the results show that over three-quarters (76.0%) of the technical persons were male, while the rest (24.0%) were females.

Analysis of the characteristics of the exporting firms revealed that most (92.0%) of them were wholly owned by Kenyans, while the rest were co-owned (7.7%) by Kenyans and foreigners and foreign owned (1.0%). The results further revealed that the export companies did not have permanent employees but depended wholly on workers on contract or seasonal/temporary terms. The number of contractual employees of the exporting firms ranged between 1 and 50 (76.9%), 51 and 100 (11.7%), 101 and 1000

(6.8%), and 1001 and 3500 (4.6%) workers. For temporary/seasonal employees, the numbers ranged from 1 to 50 (62.4%), 51 to 100 (18.8%), 101 to 1000 (15.8%) and 1001 and 2500 (3.0%) workers.

The technical heads provided data on the horticultural produce and the tons of volumes exported to the EU. This data was analysed, and the results are presented in Table 8.

Table 8

Horticulture products/produce exported to EU (n = 103)

Product/produce	Frequency	Percentage	Volume in tons
Fruits	57	53.3	137,954
Vegetables	31	30.1	721,878
Flowers	29	28.2	180,755
Herbs	16	15.5	103,672

The results in Table 8 show that the firms exported fruits (53.3%), vegetables (30.1%), flowers (28.2%), and herbs (15.5%). An examination of the results indicates that the total percentage was more than 100%, suggesting that some firms export more than one product. Concerning volumes exported, vegetables (721,878 tons) recorded the highest, followed by flowers (180,755 tons), fruits (137,954 tons), and herbs (103,672 tons).

The horticulture exporters' annual turnover analysis showed that the mean revenue was 2.08 (SD = 2.48) billion Kenya Shillings. The high standard deviation implies wide variations in the estimated value of exports among the firms.

4.4 Stakeholders Perspectives on the Effects of F2F and Biodiversity Strategies on Horticulture Exports

Objective one aimed at determining stakeholders' perspectives on the effect of F2F and Biodiversity strategies on horticulture exports to the EU. The objective was achieved using data from the technical persons in charge of exports in exporting firms, government agencies, industry associations and international organisations.

The exporting firms' technical persons were asked whether implementing the F2F and Biodiversity strategies affected the EU export market requirements. Over three-quarters (76.2%) of the respondents agreed that implementing the strategies affected EU market requirements, while the rest (23.8%) indicated they had not. The reasons given by those who felt that the implementation of F2F and Biodiversity strategies had affected EU export requirements.

Table 9

Reasons why EU export requirements have been affected by the implementation of F2F and Biodiversity strategies (n = 105)

Reason	Frequency	Percentage
Strict market access measures imposed affect the whole supply chain.	75	71.4
Increased need for sustainability reporting for EU buyers	64	61.0
EU regulations on Maximum Residue Levels were revised	75	71.4
Production of quality products that comply with export requirements	15	14.3

The changes in requirements were attributed to strict market access regulations, which affect the whole supply chain (71.4%), increased sustainability reporting for EU buyers (61.0%) and revision of EU regulations on Maximum Residue Levels (71.4%).

Government agencies also reported changes in export market regulations and requirements. The technical person from KEPHIS expressed their awareness of the changes as illustrated by the statement below:

We are aware of changes in market requirements brought about by F2F and Biodiversity strategies, such as the proposed reduction in the use of chemical pesticides and fertilisers in the EU by 50% and 20%, respectively.

The PCPB technical person's sentiments below imply that market conditions changed upon implementing the F2F and Biodiversity strategies by 2030.

If you look at compliance requirements, Maximum Residue Limits (MRLs) and import tolerances have been set for exports to the EU market.

The technical persons from FPC reported having seen the new regulations that listed the molecules to be excluded from use in producing exports destined for the EU market. The technical person was also aware of other changes in market requirements, as portrayed by the below remark:

I have seen the EU pronouncement on changing the mode of assessment from risk analysis to hazard-based ones.

The stakeholders also believed that the F2F and Biodiversity strategies had led to a loss of market for horticultural produce. Most (81.0%) of the technical persons from exporting firms believed there was a loss of market, as evidenced by a decline in the volumes of horticulture products exported to the EU. Table 10 summarizes why they believed implementing F2F and Biodiversity strategies led to a loss of market.

Table 10

Reasons why implementation of F2F and Biodiversity strategies implementation have led to the loss of the EU market for Horticulture produce (n = 105)

Reason	Frequency	Percentage
Stricter market access rules and regulations	76	72.4
Some exporters are opting out due to inability to comply	72	68.6
Exporters who do not comply cannot be able to sell to the EU market	81	77.1
Competition from EU markets and environs	86	81.9
Others (instability due to war in Europe, high production costs but low prices, emergence of brokers)	4	3.8

The technical persons from exporting firms attributed the decline in the market to competition from products from the EU countries and environs (81.9%), stricter market access rules (72.4%), banning exporters who cannot comply (77.1%) and others opting out due to inability to comply (68.8%).

The technical persons in charge of export from government agencies such as HCD also associated implementing F2F and Biodiversity strategies with the loss of the EU export market due to strict requirements that lead to interceptions, as illustrated in the excerpt below:

If these notifications (interceptions) continue, we will stop growing French beans and green peas and lose a significant portion of our market because Kenya exports 70% of this produce to Europe.

Similar sentiments were expressed by the representative of FPC, a member of an industrial association, who was of the view that these two strategies affected the EU export market, as shown by the below remarks:

Our exports into the EU have been declining due to the challenges and pressure our members face to meet the stringent requirements of F2F and Biodiversity strategies.

The stakeholders also cited high production and exporting costs as one of the impacts of implementing F2F and Biodiversity strategies. The results indicated that nearly all (91.4%) of the technical heads of exporting firms believed that implementing F2F and Biodiversity strategies affected the cost of production and export. In comparison, the rest (8.6%) believed they did not. Those who felt that implementing F2F and Biodiversity strategies increased the cost of production and export attributed it to the factors summarized in Table 11.

Table 11

Causes of increase in the cost of Production and Exporting associated with the implementation of F2F and Biodiversity strategies (n = 105)

Cause	Frequency	Percentage
Adherence to new regulations, such as the shift to organic farming	93	88.6
Use of more expensive alternatives to chemical pesticides	61	58.1
Frequent inspections due to stricter market access rules	101	96.2

The increase in costs was attributed to adherence to new regulations such as the shift to organic farming (88.6%), usage of more expensive alternatives to chemical pesticides (58.1%) and inspections due to stricter market access rules (96.2%).

Technical persons from PCPB, a government entity, were also of the opinion that implementation of F2F and Biodiversity strategies had cost implications, as expressed by the following sentiment:

All players in the value chain, from producers to exporters, will experience increased business costs after implementing F2F and Biodiversity strategies

because the new conditions require infrastructure and technology, all of which have cost implications.

The people from COLEAD and FPEAK, as well as industrial associations and international organisation affiliates, believed that implementing F2F and Biodiversity strategies led to high production costs. The remarks by the technical person from FPEAK below affirm this view:

Imagine growing tomatoes without using fungicides and pest controls to comply with F2F and Biodiversity guidelines. Productivity would go down, meaning larger pieces of land would be required to produce the same volume of exports. Naturally, the cost of the product would go up.

The FPEAK technical person was also of the opinion that the implementation of F2F and Biodiversity strategies increased the cost of production and exporting, as denoted by the excerpt below:

Another impact of F2F is that the cost of production and exporting will increase, and yield will decline due to reduced usage of fungicides and other pest control products, replacing them with expensive alternatives, and inspections.

The results also showed that the stakeholders believed that F2F and Biodiversity implementation promoted the production of safe, healthy foodstuffs and enhanced environmental sustainability. Representatives of exporting firms believed that implementing F2F and Biodiversity strategies protected the air, water sources, and soils and safeguarded biodiversity (72.4%). They also believed that the horticultural produce produced under the new regulations was safer for human consumption (16.7%).

The technical person from PCPB, a government agency, believed that implementing F2F and Biodiversity strategies promoted organic farming, recycling, and waste disposal in a way that reduced the environment's impact. Further, implementing F2F and Biodiversity strategies emphasised reduced chemical fertiliser and plant protection product usage, as expressed in the excerpt below.

The F2F and Biodiversity strategies promote the usage of biocontrols, biofertilisers, and biopesticides, which are more environmentally friendly and ensure that conservation agriculture is practiced and soils are not degraded.

Representatives of industrial associations and international organisations also felt that F2F and Biodiversity strategies promoted the production of safe food and the protection of the environment. FPC and CABI technical persons pointed out that the two strategies promoted stressed production environments as they were against using chemicals to control pests:

Some of our partners are reducing the use of high-risk crop protection inputs and promoting the use of biopesticides, which has led to the production of healthier and safer produce.

The stakeholders believed that implementation of F2F and Biodiversity impacted on horticulture exports and affected jobs, incomes and revenues. Analysis of data from exporting firms' technical indicated that more than half (57.1%) of the respondents reported a decrease in annual revenue.

The technical person from HCD, a government body, also opined that implementation of F2F and Biodiversity strategies had led to a reduction and stoppage of production of some crops and loss of jobs and incomes. The below sentiments of the technical person confirm this:

If these notifications (interceptions) continue, we will stop growing French and fine beans and green peas and lose a significant portion of our market and revenue because Kenya exports 70% of this produce to Europe.

The technical person from FPC, an industrial association member, pointed out that implementing F2F and Biodiversity strategies had negatively impacted the volume of crops produced and exported, as well as jobs and revenue in the value chain. The technical person from CABI, an international organisation, listed the loss of revenue by exporters

and farmers as the main effect of implementing F2F and Biodiversity strategies. The technical person from FPCK expressed similar sentiments:

The conditions imposed by F2F and Biodiversity will lead to a drop in business. Doing business with the EU is no longer attainable, meaning we will lose revenue heavily, jobs will be lost, and families will be punished.

Analysis of the data provided showed that the stakeholders were of the view that there was a decline in volumes of horticulture crops produced and exported as a result of implementing F2F and Biodiversity strategies. Most (78.1%) of the technical persons from exporting firms were of the opinion that there was a decline in the volume of horticulture products produced and exported to the EU due to implementing F2F and Biodiversity strategies. They attributed the decline to difficulties adhering to labelling and traceability rules (88.6%) and increased cases of chemical residues through strict checks (96.2%).

Government agencies represented by a technical person from HCD were of the view that implementation of the two strategies impacted negatively on production and export, as portrayed by the statement below:

If these notifications continue, we will stop growing French beans and peas, among other produce, and the volume of produce exported to the EU will fall.

The technical persons from international organisations believed that F2F and Biodiversity strategies impacted all value chain activities, from aggregation and processing to export and its value when products were intercepted. The CABI and TMA technical person lamented that:

As proposed, reducing the use of pesticides by 50% will start affecting production, especially for exporters. This is because, despite the many efforts already made to address many pests, the challenge remains that we are in a tropical environment, and pests will remain a problem no matter how much we try.

The technical person also pointed out that:

The strict rules and regulations discouraged farmers from producing and reduced the volumes produced and exported.

The technical person from FPEAK concurred, as shown by the comment below:

Yields will decline when F2F and Biodiversity strategies are fully implemented. Imagine growing tomatoes without using fungicides and pest controls.

The stakeholders felt that implementing F2F and biodiversity strategies increased red tape and bureaucracy. The technical person from HCD, a government body associated with implementing F2F and Biodiversity strategies to reduce red tape. The technical person lamented that:

The F2F and Biodiversity strategies have created much red tape, as too many requirements and procedures must be followed before one can export.

Bureaucracy and red tape were cited as effects of F2F and Biodiversity by technical persons from HCD, an industrial association member and COLEAD, an international organisation. The persons believed that implementing the strategies enhanced red tape and bureaucracy, as evidenced by their complaint below:

There are too many rules, regulations, and procedures, such as MRLs and residue checks, and to export, one needs a certificate from KEPHIS.

Findings from the four categories of respondents concurred that market access to the EU had become increasingly stringent due to the continued implementation of the two strategies. They agree that the EU is tightening the plant health regulations, for example, regulations (EU) 2016/2031 and Regulation (EU) 2019/2072, hence increasing the number of inspections and sampling at the border of the importing country and the exporting country exit port by the country NPPO for example KEPHIS in Kenya. These regulations have become increasingly complex, not only affecting compliance, hence market access, but also the cost and efficiency of the supply chain. For instance, the

number of interceptions of the Kenyan cut rose flowers due to false codling moth had increased from eighteen interceptions in 2022 and 2023 to thirty-nine in 2024². This is happening against the backdrop of PCPB withdrawing pesticide molecules that are considered effective in eradicating such pests in compliance with the EU market access requirements.

Though the EU regulations address the use of PPPs within the EU, the sustainable use of pesticides does not include provisions for operators in non-EU countries. Hence, the changes in authorisation and loss of EU MRLs have reduced the availability of PPPs for export to the EU. Further export bans on chemicals prohibited in the EU may lead to reduced quality and quantity of food produced in Kenya, and affect food security. The stakeholders agreed that market access requirements had affected the export of horticulture produce in terms of increased compliance costs that affect the produce's competitiveness and, in some instances, are technical trade barriers (TBT). There was concurrence, however, that the requirements for sustainability will promote organic farming and improved biodiversity.

4.5 Challenges posed by the implementation of F2F and Biodiversity Strategies

The study's second objective examined the perceived challenges encountered by the stakeholders during the implementation of F2F and Biodiversity strategies. Technical persons of exporting firms, government agencies, industry associations, and international organisations provided data on the challenges. These stakeholders identified several challenges emanating from implementing F2F and Biodiversity strategies.

The technical persons of exporting firms reported that they were finding it hard to adhere to labelling and traceability rules (88.6%) and worried about increased cases of chemical residues due to strict checks (96.2%).

The technical persons in charge of horticulture exports of PCPB and HCD reported that stakeholders had problems implementing F2F and Biodiversity strategies. They felt that it

² 2024 data is up to 30th September 2024

was not clear who should do what and how, as exemplified by the excerpt below from the HCD technical person:

We are supposed to shift to organic farming, meaning fertilisers and pesticides will not be used. I am sceptical of organic farming because the challenges of growing crops in the tropics do not allow it. We also do not know the alternatives the EU suggests, like using grass, which they consider safe. I am not sure which ones they are referring to.

The PCPB technical person also pointed out that:

If one is ever to export to the EU, the most significant challenges are meeting MRLs and import tolerance requirements.

The technical person of FPCK, an industrial association, considered the proposed reduction of chemical fertiliser by 20% by 2030 as a challenge, given that most of Kenya's agriculture is dominated by small-scale producers with limited resources. This was considered a challenge, as portrayed in the excerpt below:

Reducing the usage of chemical fertilisers and plant protection inputs means that we urgently need to look for alternatives that have not been provided. This puts us in a very awkward position because crops must be protected. They are asking us to get into organic production, which requires skills and resources; these cannot be done overnight.

The Avocado Association technical person also pointed out the difficulties encountered during the implementation of the two strategies:

Accessing crop protection products is a big challenge, as the ones we have been using must be phased out due to F2F and Biodiversity requirements. If you screen out the unrecommended crop protection products, only a few can be used; the recommended alternatives are pretty expensive and out of reach to many.

The stakeholders also perceived that the lack of resources by horticulture export stakeholders was among the challenges associated with implementing F2F and Biodiversity strategies. Representatives of government agencies like PCPB believed that most producers, some of whom were exporters, lacked farmland due to an ever-increasing population and resources to implement land use systems proposed by F2F and Biodiversity strategies. They also pointed out a lack of skills as a hindrance to implementing and sustaining organic production to feed citizens and export. The below excerpt confirms this:

Implementing F2F and Biodiversity guidelines will be a real challenge because we cannot access recommended chemicals for controlling every pest and crop, and farmers still lack the required skills and knowledge.

The technical persons of industrial associations and international organisations like CABI and Avocado Association acknowledged the inadequacies in the knowledge and skills required to implement F2F and Biodiversity strategies. The person from CABI considered these inadequacies as hindrances, as evidenced by the assertion below:

As you can see from the impact of the strategies, most farmers were not prepared, and some of them did not even know of these requirements, nor did they have the skills and resources to implement them

Inadequate resources as a hindrance to the implementation of F2F and Biodiversity strategies was also highlighted by the Avocado Association:

These requirements will require infrastructure, skills, technology, and documentation. All these have cost elements, but remember that raising funds for them is a challenge for many, especially small producers and exporters.

The results indicated that the stakeholders felt that the decline in production, incomes, and revenues and the loss of jobs due to implementing F2F and Biodiversity strategies significantly hindered their operations. Data analysis from technical heads of exporting firms revealed that a majority (81.0%) believed there was a decline in the volume of

horticulture products exported to the EU. Over half (57.1%) of these respondents reported decreased annual revenue.

Government agencies representatives reported fear of loss of jobs and revenue challenges associated with implementing the F2F and Biodiversity strategies. The technical person from KEPHIS indicated that there was fear that people would lose jobs and livelihoods if the F2F and Biodiversity strategies requirements were unmet, as had happened in some firms that produced and exported French and fine beans and green peas, as articulated in the below excerpt:

We fear people will lose jobs and livelihoods if the EGD policy initiative's requirements are unmet. This is a scary issue.

The technical person from PCPB concurred with the sentiments of their counterpart from KEPHIS by asserting that:

Revenue loss due to punitive standards, where some products were rejected, leaving exporters with huge losses, is among the challenges associated with F2F and Biodiversity strategies.

The technical persons of industrial associations and international organisations were of the opinion that stakeholders' operations were constrained by a decline in production, incomes and revenues and loss of jobs that emanated from the implementation of F2F and Biodiversity strategies. The technical person from CABI believed that the strategies impacted all value chain activities, from aggregation to processing, the final export, and its value when products are intercepted. They pointed out that:

Reduced use of chemical pesticides has started affecting production, especially for exporters.

Bureaucracy and red tape were also cited as one of the challenges emanating from implementing the F2F and Biodiversity strategies. The technical persons of government agencies like HCD associated implementing F2F and Biodiversity strategies with losing the export market due to increased red tape. They complained that:

We have taken the initiative to change provisions in our laws to make it easy to implement the EU Green Deal. Still, the challenge is that changes in the regulations are taking too long due to the lengthy procedures in Kenya.

The HCD technical person also pointed out that the government was lax in the fast-tracking enactment of laws to support F2F and biodiversity strategies and enforce them, thus making the horticulture export process too long. They lamented that:

There is no goodwill from those in authority, and there is a lot of red tape, interference, and impunity among politicians and top government officials.

Analysis of data provided by industrial associations and technical persons in international organisations revealed that implementing F2F and Biodiversity strategies has increased bureaucracy and red tape. The below sentiments of the FPC technical person confirm this:

We are losing quite a portion of the export market due to red tape and bureaucracy caused by too many rules, regulations, and procedures.

The stakeholders highlighted the lack of commitment and support from the relevant bodies as a challenge to the horticulture export sector. Technical persons of government bodies like HCD and KEPHIS opined that the National Government hardly budgeted for F2F and Biodiversity strategies-related activities, even though horticulture export was a key foreign exchange earner. The technical persons lamented that the horticulture export sector was also not supported by county governments, even though agriculture was a devolved function. The excerpt below explicitly expresses this:

Compliance with these requirements will require additional infrastructure and documentation. However, funding is lacking to train horticulture export stakeholders on new technologies and acquire the knowledge and skills to successfully implement F2F and Biodiversity strategy requirements.

The technical persons lamented that county governments had limited funds and trained personnel to promote horticulture exports and agriculture. Thus, horticulture exporters were left on their own to run their affairs.

The technical person from HCD also complained that the national government reduced funding for the State Department of Crops in the 2022/2023 budget. The budget reduction had negative implications as the department's agencies could not effectively support horticulture farmers and other actors in the export value chain. The KEPHIS technical person also complained that F2F and Biodiversity strategies heavily touch on the environment, but bodies like NEMA showed no interest in representing Kenya's environmental perspectives. Further, there was a lack of support from the EU; they gave conditions but did not offer any solutions.

Inadequate support was also listed as a challenge by representatives of industrial associations and international organisations. The FPC technical person pointed out that a lack of support and teamwork was a bottleneck, as it limited the ability of stakeholders to work together. The technical person felt that all stakeholders must pull together, learn, support and talk to each other to comply with F2F and Biodiversity strategies and standards. The statement below affirms that feeling:

It looks like the issues of F2F and Biodiversity strategies are currently the private sector's concern. I believe the government has not taken these things seriously or may not have considered the impacts.

The technical officers from the exporting companies and the other stakeholders interviewed concurred that while the two strategies were essential in promoting sustainability and environmental protection within the EU, externalising the implementing instruments to importing countries had posed a challenge in the implementation in the horticulture sector. The EU's lack of consultation contradicts the tenets of the SDGs for a fair and gradual transition to sustainable practices, especially for small-scale holders who are the majority producers of horticulture produce in Kenya due to their differential circumstances. The withdrawal of pesticide molecules banned in the EU, while it addresses the export market requirement, may adversely affect food production and Kenya's security. For instance, the EU has further updated the (EU) Regulation (2024/2004) due to high non-compliance from exporting countries. Exporters of Kenyan cut rose flowers are expected to adopt a verifiable systemic approach in production

sites. Lack of compliance with these requirements will lead to a ban on exports to the EU market. This new regulation may require resource support as it will increase production costs and reduce Kenya Flowers' competitiveness in the EU market.

The EGD regulations require a demonstration that proper assessments have been done, a transparent systems approach to addressing the pests has been implemented, and different protocols dealing with harmful organisms have been implemented. For instance, pests such as the fall armyworm, the fruit flies and other harmful organisms of quarantine nature that the EU will not want to see and therefore given specific prescription pathways or methods to address the problem. These methods require heavy investments, which are challenging for a developing country like Kenya.

Further, there was agreement that Kenya faces much competition from countries closer to the EU regarding market destinations. In terms of being able to account for a more efficient logistics system that reduces carbon footprints, Kenya's proximity to the EU does not give the country any advantage compared to other countries competing for the same market. Hence, the stakeholders proposed a trade arrangement that balances the sustainability aspects of the supply chain without killing trade.

4.6 Opportunities in Horticulture Export Presented by F2F and Biodiversity Strategies

Objective three sought to determine stakeholders' perceptions of opportunities presented to horticulture export stakeholders by implementing F2F and Biodiversity strategies. The technical persons in charge of exports of exporting firms, government agencies, industry associations, and international organisations were asked to highlight the opportunities and benefits presented to horticulture exporters stakeholders by implementing these strategies. As expressed in the subsequent paragraphs, they believed that implementing the policies presented horticulture export stakeholders with a number of opportunities.

The majority (74.0%) of the technical persons of the exporting firms believed that implementing F2F and Biodiversity strategies provided them with opportunities to grow. This view was based on the premise that export demand increased with compliance with F2F and Biodiversity strategies (81.0%). In addition, EU buyers bided only after ensuring exporters complied through reporting, monitoring and verifications (81.0%).

The technical person from PCPB, a government agency, believed that despite the initial challenges, implementing the F2F and Biodiversity strategies presented exporters with several opportunities. The technical person was of the view that:

There was still time to seek to implement the provisions associated with F2F and Biodiversity Strategies, maintain the EU market, and expand it.

Representatives of industrial associations and international organisations, COLEAD and CABI, believed that F2F and Biodiversity strategies presented many opportunities. They argued that if Kenya could work towards compliance in time, it could retain and get an even more significant share of the EU horticulture market. Their sentiments confirm this potential benefit of compliance:

Compliance might be expensive initially, but if we take the initiative and prepare well, we may be able to compete favourably, retain our market share, and expand it.

The technical person from CABI pointed out that the National Horticulture Traceability System being developed will help brand Kenya's export quality. This will benefit the farmers and exporters, as it will enhance the marketability of their produce.

The stakeholders believed that implementing F2F and Biodiversity strategies allowed them to transition to producing healthier and safer food for the domestic market and export. The technical persons of the exporting firms indicated that compliance made exports safer for human consumption (21.9%) as the strategies promote organic farming and environmental protection through less chemical fertiliser and pesticides. Representatives of government agencies such as PCPB were of the view that:

F2F and Biodiversity strategies were good ideas as they provided horticultural export producers with opportunities to ensure the production of healthy, safe food and exports to Europe.

The Technical Persons from CABI and Trade Mark Africa, which are international organisations, also expressed similar sentiments. They believed that F2F and Biodiversity strategies provided farmers who produce for export with opportunities to adopt agricultural practices that ensured their produce was safe, healthy, and met EU market requirements.

The stakeholders believed that implementing F2F and Biodiversity strategies provided an opportunity to cure the degraded environment, protect it, and enhance its sustainability. Most (72.4%) of the technical personnel of exporting firms believed that adopting F2F and Biodiversity strategies boosted their chances of safeguarding the environment, ensuring that fresh air, clean water, healthy soils, and biodiversity were available.

Technical persons of government agencies like PCPB concurred that F2F and Biodiversity strategies promoted the protection of the environment, as evidenced by the following statement:

F2F and Biodiversity strategies provide horticulture producers with opportunities to safeguard the environment. They promote the usage of bio-pesticides and fertilisers, and a 50% reduction in nutrient loss. These strategies are more friendly to biodiversity and the environment as they ensure that soils are not degraded and conservation agriculture is practised, leading to less degradation of ecosystems.

Industrial associations and international organisations' technical persons also felt that implementing F2F and Biodiversity strategies presented key horticulture sector players with many avenues for safeguarding the environment. The technical person from CABI believed that environmental and biodiversity restoration could be achieved through afforestation, farmers planting tree crops, and leaving some free-fall areas for pollinators. The technical person made similar sentiments from FPEAK:

The biodiversity strategy presents many positive opportunities. It focuses on conservation, planting trees, and taking the environment seriously. If these strategies are fully implemented, Kenya will also ask countries that export apples and beef to us, like Spain and Ireland, to comply.

Further, the stakeholders believed that implementing F2F and Biodiversity strategies gave horticulture export-sector players a chance to diversify. Nearly three-quarters (74.0%) of the technical persons of the exporting firms believed that implementing F2F and Biodiversity strategies provided them with opportunities to diversify in terms of the variety of produce exported and explore other markets besides the EU.

The technical person of PCPB, a government entity, was also of the view that F2F and Biodiversity strategies promoted produce and market diversification, as affirmed by the comment below:

This is the time to look for alternative markets. Given the issues arising from implementing F2F and Biodiversity strategies, we need to develop our African markets as a safeguard.

Industrial associations and international organisations' technical persons agreed with their counterparts from the exporting firms and government agencies that F2F and Biodiversity strategies allowed them to diversify. The FPC technical person argued that:

It was the right time to diversify by looking for alternative markets, should implementing and sustaining F2F and Biodiversity strategies be untenable.

The technical person from CABI also vouched for market expansion through crop diversification, such as avocados and mangoes, and training farmers on good production practices. The technical person was of the opinion that:

Crop diversification and training will give Kenya an advantage because it already has a significant presence in the EU market.

The technical officers in exporting companies and the stakeholders interviewed concurred that there were long-term benefits of implementing F2F and Biodiversity initiatives. They also acknowledged the high initial costs of adopting sustainable practices and investing in organic production. However, the targeted EU consumers demanded sustainable and ethically sourced products and were willing to buy at premium costs. Therefore, adhering to EU requirements such as traceability and transparency was an opportunity to access this premium market comprising eco-conscious consumers. The two strategies allow organic farming growth and IPM practices to create diversity and a niche market. Further, exporters invest in certification, packaging and labelling and demonstrate commitment to biodiversity and sustainability.



CHAPTER FIVE

DISCUSSIONS, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter discusses the results in the order in which the objectives have been stated. It also presents the conclusions, recommendations, and limitations. The last section recommends areas that require further research.

5.2 Discussion of Findings

5.2.1 Stakeholders' Perspectives on the effect of F2F and Biodiversity strategies on horticulture export

The findings revealed that implementing F2F and Biodiversity strategies were perceived to affect horticulture export in various ways, which include changes in regulations and export requirements to the EU. These findings support those of COLEAD (2024), which noted that the strategies required value chain actors to demonstrate compliance with sustainable production practices by implementing effective and auditable traceability systems. A study by Mathews (2022) and the Food and Agriculture Organisation (2024) also noted that several requirements are either mandatory, as set by F2F and Biodiversity and other EGD strategies, or privately requested by buyers for one to sell fruits and vegetables. Private requirements are in the form of certifications related to social and environmental issues. The requirements have cost implications, which inevitably affect the ability of small-scale producers, most of whom have limited resources, to participate in the export market (Sihlobo, 2021).

The findings showed that increases in the cost of production and exporting were perceived as an effect of F2F and Biodiversity Strategies. These findings concur with studies conducted in South and East Africa, which noted that it would be costly for horticulture producers and SMEs along the value chain to transition to sustainable food systems (Cameron et al., 2021; EAFF, 2023). They argued that these transitions had cost implications since adhering to the initiative guidelines requires additional infrastructure and trained personnel, which have cost implications. Faichuk et al. (2022) also established

that implementing the initiatives had cost implications. They contend that implementing the initiatives called for a shift to organic farming, reduced use of fertilisers and pesticides and adoption of recommended alternatives, which tended to be more expensive.

The findings indicated that implementing the two EGD initiatives led to a decline in the volume of crops produced. These findings support those of a study by Bremmer et al. (2021), which observed that the realisation of objectives of F2F and Biodiversity strategies would negatively impact the volumes of crops in the entire EU by 10% and 20%. Similar observations were made by EAFF (2023) and Nzomo et al. (2021) in studies conducted among farmers in Eastern Africa. The studies noted that implementing F2F and Biodiversity strategies reduced the number of authorised pesticides for controlling pests. This resulted in increased incidences of pests and diseases and decreased production of vegetables for export.

The stakeholders felt that implementing F2F and Biodiversity strategies increased bureaucracy and red tape. Similar observations were made by Villalobos (2023), who noted that implementing the initiatives had enhanced red tape and bureaucracy through many certifications, aligning export operations with EU export regulations, governance of the PPP policies, coupled with inefficiencies by government institutions responsible for horticulture export. A study by Mukabi (2022) also pointed out cumbersome regulatory frameworks and bureaucratic and multiple screening and approval systems put in place by the government to export as outcomes of implementing rules and regulations associated with F2F and Biodiversity.

Further, the findings showed that implementing F2F and Biodiversity strategies was perceived to affect safe food production and enhance environmental sustainability. These findings are similar to the observations made by Sihlobo and Kapuya (2021), which state that the two strategies promote safe food production and environmental protection. The observation was attributed to F2F and Biodiversity strategies, which aim to reduce the ecological and carbon footprint of food production, encourage less use of fertiliser and chemicals, and reduce soil contamination. Villalobos (2023) also established that implementing the F2F initiative reduced pesticide usage and promoted organic farming.

Sarkar et al. (2021) contend that long-term usage of pesticides and chemicals to control pests has profound implications for biodiversity and the environment.

5.2.2 Challenges posed by the implementation of F2F and Biodiversity Strategies

The stakeholders pointed out several challenges that affected their operation, which they felt emanated from implementing F2F and Biodiversity strategies. These challenges included implementing the strategies. A study by Usman et al. (2021) had also made similar observations. The study attributed confusion in interpreting and implementing F2F and Biodiversity strategies to new agricultural standards that are part of the EGD package, the circular economy action plan to reduce inputs through recycling and reuse, and the deployment of new technologies to scale up green technology innovations and biodiversity. These sentiments were supported by Li et al. (2023) and Ritchie (2020), who also noted a lack of clarity on implementing these strategies.

The findings showed that limited resources and a lack of budgetary support from the government for the horticulture sector impede stakeholders' implementation of F2F and Biodiversity strategies. These results are in tandem with those of COLEAD (2024), which observed that low and medium-income countries like Kenya are not well equipped to adjust to changes in EU rules. They may face difficulties implementing policies due to limited funds and human resources. During the implementation stage, stakeholders are assigned policy areas and formally made responsible for implementing related policy actions. Bullock and Lavis (2019) contend that adhering to F2F and Biodiversity strategies guidelines often requires resources such as structures, technology, funds and skilled labour. This means that policy implementation is not possible without resources. Horticulture export stakeholders and the government should be aware of this in their endeavour to implement these EGD initiatives and maintain the EU market.

The findings show that it was perceived that the implementation of F2F and Biodiversity strategies caused a decline in production, incomes and revenues. These findings support a study by Schneider et al. (2023), which revealed that adopting F2F and Biodiversity strategies, such as reduced fertiliser and pesticide use, reduced crop yields, export volumes and revenues. Sihlobo and Kapuya (2021) also noted that compliance with Farm to Fork

requirements, such as removing PPPs containing active ingredients that are not considered safe, had cost implications that negatively affected the production and revenue of value chain players. They considered the drop in production, volumes exported, and revenue a significant hindrance to the operations of the value chain actors, especially the micro-enterprise ones with limited resources.

An impact assessment study by the Agrochemical Association of Kenya (2024) on the withdrawal of active molecules associated with PPPs raised the alarm about the adverse effect this measure will have on controlling pests to allow compliance with the EU market requirements. Like the current one, the study anticipated losses in output due to the withdrawal of the pest controls, which will affect not only the export market but also the local food security.

5.2.3 Opportunities to Horticulture Export Presented by F2F and Biodiversity Strategies

The results revealed that the stakeholders were of the view that implementing F2F, and Biodiversity strategies presented exporters with various opportunities, among which was the chance to expand the market. This view was informed by the belief that there was demand and a market for Kenya's exports in the EU on compliance. This is consistent with the EU (EC, 2022) recommendation that horticulture stakeholders must adapt production methods, supply chains, and marketing strategies to align with EU sustainability requirements espoused by the F2F and Biodiversity strategies for long-term access to the EU market. These findings support a study by Aseto et al. (2020), which noted a high demand for healthy and sustainable food in the EU. It also noted that meeting the requirements stipulated by F2F, Biodiversity, and other EGD strategies improves exporters' chances of not only holding onto this market but also expanding it.

The findings show that the stakeholders believed implementing F2F and Biodiversity could fast-track the transition to producing healthier and safer food for the domestic market and export through compliance. This is so because some of the provisions of F2F and Biodiversity strategies require farmers to reduce mineral fertiliser use by 20%, pesticide use by 50%, Nitrogen-balance surplus by 50% and placing at least 25% of

agricultural land use on organic farming by 2030 (EU, 2020a). It is envisaged that meeting these targets can lead to food production systems that are safe, healthy, and sustainable. These findings concur with Guyomard et al., (2023) contention that F2F and Biodiversity strategies allow horticulture exporters to reduce chemical inputs in agriculture, decreasing post-harvest losses and market produce that contains fewer animal-based products.

Implementation of EGD was also perceived to offer exporters a chance to diversify and grow. The EU expressed similar sentiments (EC 2020a, 2020b), which felt that Kenya should actively engage with it as a trade partner for a smooth transition towards sustainable food production and promotion of alternative plant protection methods. In addition, Kenya had some of the best scientists in Africa and a clear regulatory framework. Sarkar et al. (2023) contend that the country could use these resources in collaboration with the EU to enhance its ability to sustain the production of quality crops, diversify to other products and remain a key supplier of the European market.

Further, the stakeholders believed that the F2F and Biodiversity strategies provided them with opportunities to safeguard the environment and biodiversity. This is in harmony with the strategies guidelines that advocate reduced carbon emissions, the use of environmentally friendly energy sources and organic fertilisers, and better protection of soil health and biodiversity (EC, 2020a). The findings support those of Hereu-Morales et al. (2023), who highlighted the importance of conserving natural capital as elucidated in the EU Biodiversity Strategy and opportunities for preserving the environment if implemented. These results are also in tandem with those of a study done in South Africa by Sihlobo and Kapuye (2023). The study observed that F2F policies offered horticulture export sector players a chance to be key players in environmental protection by shifting towards low fertiliser and chemical usage and reducing soil contamination.

5.3 Conclusions

This study concluded that the stakeholders perceived that implementing F2F and Biodiversity initiatives affected horticulture export. The initiatives changed horticulture export regulations and requirements, increased production and exporting costs, and caused a decline in crop volumes produced and exported. The initiatives were perceived as the

cause of a decline in volumes produced and exported, loss of market, jobs, incomes and revenues, red tape and bureaucracy. However, it was believed that they promoted the production of safe foodstuff and enhanced environmental sustainability.

The challenges associated with implementing F2F and biodiversity strategies were perceived as a lack of resources, a decline in production volumes, incomes, and revenues, job loss, bureaucracy and red tape, and inadequate support from stakeholders.

Implementation of F2f and biodiversity strategies was believed to present the horticulture value chain actors with the opportunity to diversify and grow on compliance. The actors can transition to producing healthier and safer food, protecting the environment, and enhancing sustainability.

These findings support the theories of the Triple Bottom Line, Ecological modernisation and the Global value chain, upon which this study was grounded. These theories are about the interplay between social, environmental, and economic factors and how they can be balanced to achieve sustainability through innovation, market mechanisms and environmental policies. The theories and findings converge as they relay the same message that horticultural produce exporters are part of a value chain whose dynamics are ever-changing, posing challenges to the actors and presenting them with opportunities. The exporters targeting the EU must adopt sustainable practices based on EGD strategies to maintain and expand their market share.

5.4 Recommendations of the Study: effects, challenges, opportunities

Based on the findings, the following recommendations were made:

- i. The stakeholders are encouraged to mitigate the effects of F2F and Biodiversity initiatives by developing and disseminating commodity-specific guidelines to enhance the initiatives' implementation and diversify product ranges to caution against a decline in production and exports and a loss of jobs.
- ii. To mitigate against challenges emanating from implementing F2F and biodiversity, export value chain actors should be supported and provided with

resources, technologies, and training to develop products that meet EU market regulations.

- iii. The stakeholders should also be encouraged to seize the opportunities presented by implementing F2F and biodiversity initiatives through compliance, diversification, and boosting the production of healthy food and environmental sustainability.

5.5 Limitations of the Study

Implementation of F2F and Biodiversity elements of EGD started in 2020 and was not fully implemented when this study was conducted in mid-2023. This could have affected the data quality as respondents sometimes mixed observed and anticipated effects. The impact of this mix-up was minimised by guiding respondents during the interviews and seeking clarifications when necessary. The other limitation was that the approach used in this inquiry treated all horticulture export firms (fruits, vegetables, flowers, herbs) equally. This may not be the case in the field, as some sectors are more adept at adjusting to changes in export requirements and regulations. Further, organisational characteristics such as firm size were not considered, even though such factors affect the ability of value chain actors to adapt to changes in the EU regulatory requirements.

5.6 Suggested areas for further research

Even though the study has provided valuable insight into the stakeholders' perceptions of the effects of F2F and Biodiversity on horticulture export, challenges, and opportunities, several issues that require further investigation have emerged.

The findings showed that the stakeholders were of the view that implementing F2F and Biodiversity Strategies led to high production costs, a decline in volumes produced and exported, and a loss of market share, jobs, and revenues. The export value chain involves farmers, input providers, and logistics. From these findings, it is unclear which players in the value chain were most affected by these changes; this calls for a study that includes an analysis of all the value chain actors.

The stakeholders had issues with interpreting and implementing F2F and Biodiversity Strategies. It was unclear whether these challenges were due to inadequate knowledge of the value chain actors or other factors, hence the need for a study exploring the relationship among these variables. The findings of such an inquiry on knowledge of the value chain actors on the EGD could help overcome interpretation and implementation challenges.

The stakeholders believed that implementing the initiatives gave them opportunities to diversify by growing crops and targeting other markets. However, they did not identify which crops and markets. A survey should be carried out to identify the crops and potential markets, which will go a long way in boosting horticulture exports.



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APPENDICES

Appendix I: Horticulture Produce Exporters' Questionnaire

(Only exporter aware of the EGD based on the inclusion criteria).

Section A: RESPONDENTS' BACKGROUND DATA			
1.	What is your age in years?	In years	
2.	What is your gender?	Male	1
		Female	2
3.	How many years have you spent in school?	In years	<hr/> <hr/> <hr/>
4.	Location of the company		
5.	What is the ownership of your company?	1	100% Kenyan owned
		2	100% Foreign owned
		3	Co-owned- (indicate ownership in percentage)
6.	How many employees do you have? (Numbers)	Contractual	
		Seasonal/Temporary	

7.	How long have your company been exporting horticulture produce to the EU	(In Months)	
8.	What horticultural produce and products do you export to the EU in volumes?	Produce	Volume in Tonnes
		i.	
		ii.	
		iii.	
		iv.	
	v.		
9.	What is the average turnover of your exports per year?	Kshs.	
10.	What classification is your business in terms of size?	1	Small Scale
		2	Medium scale
		3	Large scale
Section B: KNOWLEDGE AND EFFECTS OF THE EUROPEAN GREEN DEAL			
11.	Which strategies/elements of the European Green Deal are you aware of? Name at least three	i.	
		ii.	
		iii.	
12.	Do you believe the European Green Deal will /influence Kenya's export sector?	Yes	1
		No	2
13.	In what ways do you think the EGD will/has affected the	i.	
		ii.	

	horticulture sector? Give at least three ways.	iii.	
14.	In what ways have the EGD-Farm to Fork and Biodiversity strategies affected your exports to the EU?	i.	
		ii.	
		iii.	
15.	Do you think the EGD has/will lead to significant changes in the cost of production of produce destined for export to the EU?	Yes	1
		No	2
16.	If Yes, how (Give at least three reasons for the change, if any)	i.	
		ii.	
		iii.	
17.	Have the EU export market requirements been affected by the EGD?	Yes	1
		No	2
18.	If Yes, In which ways have the export market requirements been affected by EGD?	i.	
		ii.	
		iii.	
19.	Has the EGD affected your revenue outlay? Explain in terms of percentage increase or decrease.	i.	Increase _____ _%
		ii.	Decrease _____ _%
		iii.	No effect on revenue
20.	The cost of production will/has increase/increased in the horticulture sector due to the European Green Deal strategies	Yes	1
		No	2

21.	If Yes, how (Give at least three reasons)	i.	
		ii.	
		iii.	
22.	There will/has /been a loss of market for horticulture products	Yes	1
		No	2
23.	If Yes, how (Give at least three reasons)	i.	
		ii.	
		iii.	
24.	The European Green Deal strategies will/have/led to a decline in horticultural production.	Yes	1
		No	2
25.	If Yes, how (Give at least three reasons)	i.	
		ii.	
		iii.	
Section C: CHALLENGES AND OPPORTUNITIES OF THE EUROPEAN GREEN DEAL STRATEGIES			
26.	There is regulatory uncertainty following the implementation of the EGD	Yes	1
		No	2
27.	If Yes, how (Give at least two reasons)	i.	
		ii.	
28.	Do you think the EGD has offered stakeholders a chance for growth	Yes	1
		No	2

29.	If Yes, how (Give at least two ways)	i.	
		ii.	
30.	The deal increases demand for exports on compliance	Yes	1
		No	2
31.	If Yes, how (Give at least two reasons)	i.	
		ii.	
32.	The long-term benefits of EGD outweigh the challenges	Yes	1
		No	2
33.	If Yes, how (Give at least three reasons)	i.	
		ii.	
		iii.	
34.	How should the sector implement the EGD requirements to benefit from the provisions? Give at least three solutions.	i.	
		ii.	
		iii.	

Appendix II: Government Agencies/Regulators Interview Guide

Inform the participant that you will record the session, ensure confidentiality, and use the information.

Be sure to speak to the recorder, interviewer and interviewee to ensure recording.

- 1) Introduction yourself and your team
- 2) Summarize the purpose of the visit
 - To investigate the effects of the European Green Deal strategies on the horticulture sector in Kenya.
- 3) Turn on the recorder.

Questions

1. To what extent has the EGD (Farm to Fork and Biodiversity strategies) affected horticulture stakeholders in Kenya? Specific to each stakeholder?
2. To what extent have the EGD affected the performance of the horticulture sector?
3. What are some of the opportunities/challenges of the European green deal strategies for each of the stakeholders identified, e.g.,
 - i. The Horticulture producers (Small and large scale)
 - ii. Exporters
4. What have/will be the implications for the competent authorities?
5. What changes to the regulatory provisions could mitigate the risk or enhance the opportunities identified in the EGD?
6. What practical changes in the organisation of the value chain are envisaged to respond to the changes?
7. What type of technical assistance-(including research and innovative technologies) is still required to mitigate the risk or enhance the opportunities that EGD presents?
8. How should the sectors implement the EGD to reap its provisions?

Specific to GOK Regulators (HCD and KEPHIS)

9. Which EU plant health law provisions are intended for amendment, and what will impact the horticultural sector?
10. Which specific changes in the EU Plant Health Law impact trade?
11. What are the implications of the changes to the sector?
12. What does this mean to growers, processors, packers, exporters, etc.?

Source: COLEAD, 2022.



Appendix III: International organisations/Industry associations Interview Guide

Inform the participant that you will record the session, ensure confidentiality, and use the information.

Be sure to speak to the recorder, interviewer and interviewee to ensure recording.

- 1) Introduction yourself and your team
- 2) Summarize the purpose of the visit
 - To investigate the effects of the European Green Deal strategies on the horticulture sector in Kenya.
- 3) Turn on the recorder.

Questions

1. What horticulture sub-sector do you represent or support?
2. In what ways have the European Green Deal strategies (EGD) affected horticulture stakeholders in Kenya? Specific to each stakeholder?
3. What are some benefits of the European green deal strategies to your sector?
4. What challenges do you expect in implementing EGD in the horticultural sector in Kenya?
5. What opportunities do you expect from implementing EGD in the horticultural sector in Kenya?
6. How should the sector prepare for the implementation of EGD?
7. How could changes to the regulatory provisions be envisaged to mitigate the risk or enhance the opportunities identified in the EGD?
8. What practical changes in the organisation of the value chain are envisaged to respond to the changes?
9. What clarity and practicability of the EGD is required for the implementation?
10. What technical assistance is required to mitigate the risk or enhance the opportunities that EGD presents?



Appendix IV: Institutional Ethics Permit



3rd April 2023

Dr M'Kaibi Florence,
florence.mkaibi@strathmore.edu

Dear Dr M'Kaibi,

RE: The Effects of the European Green Deal Framework on the Horticulture Sector in Kenya

This is to inform you that SU-ISERC has reviewed and **approved** your above **SU-masters** research proposal. Your application reference number is **SU-ISERC1665/23**. The approval period is from **3rd April 2023 to 2nd April 2024**.

This approval is subject to compliance with the following requirements:

- i. Only approved documents including (informed consents, study instruments, MTA) will be used
- ii. All changes including (amendments, deviations, and violations) are submitted for review and approval by SU-ISERC.
- iii. Death and life-threatening problems and serious adverse events or unexpected adverse events whether related or unrelated to the study must be reported to SU-ISERC within 48 hours of notification
- iv. Any changes, anticipated or otherwise that may increase the risks or affected safety or welfare of study participants and others or affect the integrity of the research must be reported to SU-ISERC within 48 hours
- v. Clearance for export of biological specimens must be obtained from relevant institutions.
- vi. Submission of a request for renewal of approval at least 60 days prior to expiry of the approval period. Attach a comprehensive progress report to support the renewal.
- vii. Submission of an executive summary report within 90 days upon completion of the study to SU-ISERC.

Prior to commencing your study, you will be expected to obtain a research license from National Commission for Science, Technology, and Innovation (NACOSTI) <https://research-portal.nacosti.go.ke/> and obtain other clearances needed.

Yours sincerely,

A handwritten signature in blue ink, appearing to read "Ben Ngoye".

for: **Dr Ben Ngoye,**
Secretary; SU-ISERC

Cc: Mr Ambrose Rachier,
Chairperson; SU-ISERC



Appendix V: NACOSTI Research Permit


REPUBLIC OF KENYA


**NATIONAL COMMISSION FOR
SCIENCE, TECHNOLOGY & INNOVATION**

RefNo: **235099** Date of Issue: **25/April/2023**

RESEARCH LICENSE




This is to Certify that Dr. Florence Kithira M'Kaibi of Strathmore University, has been licensed to conduct research as per the provision of the Science, Technology and Innovation Act, 2013 (Rev.2014) in Kirinyaga, Nairobi, Nakuru on the topic: THE EFFECTS OF THE EUROPEAN GREEN DEAL FRAMEWORK ON THE HORTICULTURE SECTOR IN KENYA for the period ending : 25/April/2024.

License No: **NACOSTI/P/23/25211**

235099

Applicant Identification Number


Director General
**NATIONAL COMMISSION FOR
SCIENCE, TECHNOLOGY &
INNOVATION**

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See overleaf for conditions