

**THE EFFECT OF COMPLIANCE AND CERTIFICATION ON
COMMERCIALIZATION OF VANILLA IN GREATER MUKONO DISTRICTS OF
MUKONO, KAYUNGA AND BUIKWE IN CENTRAL UGANDA**

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Abstract

Vanilla has a unique aroma, is widely preferred by food and cosmetics industries and Uganda is second to Madagascar in global exports. However, despite premium prices, compliance with food safety and organic standards and certification remained very low among vanilla exporters; significantly leading to quality and food safety non-conformances, low export volumes, low incomes to market actors and commercialization. This study sought to determine how compliance to food safety and organic standards and certification affects commercialization of vanilla in Uganda. Specifically, examining the factors influencing adoption of organic and food safety standards and certification by vanilla exporters; determining the effect of the standards and certification on commercialization and unravelling the relationship between adoption of food safety and organic standards and the processes of vanilla exporters. 150 respondents from 30 vanilla exporters; 3 focus group discussions and 5 key informant interviews were conducted.

Only 26.67% of exporters were certified, demand for certifications was driven by premium prices, institutional membership (coefficient = 2.417, $p = 0.045$), and access to bank financing (coefficient = 4.804, $p = 0.007$) respectively. The Netherlands and Canada led to more certifications and high export quality shown by (coefficient = 2.245, $p = 0.037$) and (coefficient = 8758.075, $p = 0.04$) respectively. Certification transformed processes, documentation, training, and market as buyers increased from 2 to 9. Limitations include high certification costs, training gaps, limited finance, price fluctuations, and taxation. To enhance adoption and compliance there is need for capacity building, promotions, strategic marketing, and institutional membership.

Declaration

I, RWAMBUMBE JOVIEN, hereby declare that this is my original work, is not plagiarized and has not been submitted to any other institution for any award.

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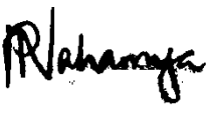
A handwritten signature in blue ink, consisting of a stylized 'R' and 'J' followed by a horizontal line.

Date: May 20, 2026

Approval

I, PAMELA KABOD, hereby declare that this work has been done under my supervision and has been approved for submission.

Supervisor's Name: PAMELA KABOD

Signature: 

Date: May 20, 2026

Dedication

I dedicate this book to my mother, Olive Karamagi Mugiina, my wife, Esther Sanyu and my children, Vian Gabriel Rwambumbe, Ryan Uriel Rwambumbe and Damian Othniel Rwambumbe whose endless support and interest in my academic journey have been a key inspiration for success in my studies.

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List acronyms and abbreviations.

MAIIF: Ministry Of Agriculture Animal Industry and Fisheries

HACCP: Hazard analysis critical control points

Iso: International Organization of Standardization

FSMS: Food Safety Management Systems

FSSC: Food Safety Systems Certification

EU: European Union

NOP-US: National Organic Program of the United States

JAS: Japan Agriculture Standards

USD: United States Dollar

EPOPA: Export Promotion of Organic Products from Africa

NOGAMU: National Organic Movement of Uganda

VANEX: The Vanilla Exporters Association

GDP: Gross Domestic Product

CRS: Catholic Relief Services

TNS: Techno Serve

USDA (FFPr): United States Department of Agriculture (Food for Progress).

USAID: United States Agency for International Development

UNBS: Uganda National Bureau of standards

UEPB: Uganda Export Promotions Board

OCPP: Organic Certifications include ProCert.

QAI: Quality Assurance International

OCIA: Organic Crop Improvement Association

CSI: Centre for Systems Integration

LFP: Local Food Plus

GMOs: Genetically Modified Organisms

KII: Key Informant Interviews

FGDs: Focus Group Discussions

DLGs: District Local Government

OLS-Ordinary Least Squares

BRC-British Retail consortium food safety standards

CHAPTER ONE

INTRODUCTION

1.1 Background

Vanilla, *Vanilla fragrans* syn. *V. planifolia*, a member of the *orchidaceae* family is a semi-terrestrial orchid (Kifelew et al., 2016). It is one of the most desired flavors in the world and the second most expensive spice after saffron (Shriver, 2020). There are three species of vanilla which include *Planifolia*, *Tahitensis* and *Pompona* species. *Planifolia* and *Tahitensis* are used in the food industry while *Pompona* is used in the cosmetics industries for manufacturing perfumes (*Vanilla and Coffee Diversification for Resilient Farming In*, 2019 ,Crosby & Frau, 2022). *Planifolia* vanilla is widely grown in Uganda due to its suitability to the local climatic conditions as well as its unique aroma profile (Tamura, 2014, Wahyudi et al., 2021).

Vanilla is grown in over 25 districts in the West, East, and central regions of Uganda and the country's tropical climate offers a comparative advantage as farmers harvest vanilla twice annually (Watteyn et al., 2022, Kosanke, 2019). According to (*MAAIF May, 2022.Pdf*, n.d., Watteyn et al., 2022,Kosanke, 2019), Mukono, Kayunga and Buikwe districts in Greater Mukono are currently among the high vanilla producing areas in Uganda. Vanilla was introduced in Greater Mukono by British Farmers in the 1940s and spread to the surrounding areas of Kayunga in the 1980s. The districts have favorable climatic conditions for producing and processing vanilla with an annual average relative humidity of 77.8 - 88.5% and temperature of 21.1 °C (Kosanke, 2019 ,Shriver, 2020). In these areas, average land holding is 0.5-0.8 acres, farmers have 50-100 vines per field, and average seasonal yield estimates of 0.24g per plant and 65kg per acre per (Kosanke, 2019, *MAAIF May, 2022.Pdf, n.d.*).

Globally, the main vanilla producing countries are Madagascar, Indonesia, India, China, Comoros and to a lesser extent Tonga, Reunion, Turkey, Guadeloupe, and Uganda. Madagascar accounts for 80% of the global vanilla supply, with Uganda and others sharing the deficit of 20% as alternative sources (Watteyn et al., 2022). Uganda's major export markets for vanilla include USA, France, United Kingdom, Germany, Japan, Canada, Denmark, Netherlands, Israel, South Africa, Turkey, and Hungary (Shriver, 2020). Commercialization of the vanilla subsector in Uganda is growing as

evidenced by the total green bean production in 2021 which was estimated at 654.3Metric tons and there remains tremendous potential for expansion (MAAIF May, 2022.Pdf, n.d., Watteyn et al., 2022).

Commercialization is a process through which a new idea, product or service is brought to the market and as a result farmer, innovators derive a monetary value in form of profits (Kisaame, 2023). Commercialization entails a chain of activities including the idea generation step which is complemented by research and development and encompasses licensing as well as marketing and monitoring (Li & Li, 2022). Commercialization also requires changing from traditional practices to more efficient and sustainable vanilla production technologies to enhance production (Damircheli, 2023). It plays a significant role in ensuring efficiency in the vanilla sector and enhances employment, incomes, improves quality as well as meeting of customer and market requirements (Watteyn et al., 2022).

Certification refers to an official document awarded to a company that meets defined industrial standards, level of performance, conduct or excellence in a specified industry or activity (Kononets et al., 2023). Food safety certification focuses on proper handling of food to prevent consumers predisposition to food borne illnesses (Tamura, 2014). Food safety certifications include HACCP (Hazard analysis critical control points), Iso 22000:2018 FSMS and Iso 22000:2018 FSSC (Kankya et al., 2020). Other certifications include those focusing on organic products and are unique to the various trade regions.

Ugandan vanilla exporters are compelled by off takers to obtain certifications for organic standards specifically, the European Union regulation for organic products (EU), NOP-US National Organic Program or JAS-Japan Agriculture Standards (Government of Uganda, 2019 , Gibbon, 2006). However, only 5% of Uganda's total exports are organic and yet the global organic market is highly lucrative and currently worth US\$ 54.9 billion (The World of Organic Agriculture Training Manuals for Organic Agriculture, n.d, Sibiko et al., 2013). Organic certification has not yet been adopted by most vanilla processors in Uganda (Sibiko et al., 2013). For example, a total of 22 exporters were certified to export organic agricultural products by 2005 and of these only 5 were exporting over 30 metric tons of cured vanilla (Gibbon, 2006). Organic vanilla exports are low despite the fact that Uganda currently has over 210,352 farmers that produce about 115,062 metric

tons of organic products for export (Kral et al., 2018). Furthermore, the agrifood industry in Uganda and other Sub-Saharan countries currently make significant losses amounting to USD 16.7 billion due to lack food safety and organic certification hence affecting commercialization (Kankya et al., 2020).

Compliance is when a company doing export business adheres to practices and guidelines which are set by organizations with mandate to regulate a given industry (Kononets et al., 2023). Compliance helps to minimize sector risks, ensure good business practices among exporters, prevent unlawful activities and ensure the exporters maintain good ethics and responsibility (Government of Uganda, 2019). Compliance to food safety and organic standards and certification are crucial for improving the quality and safety of food in the local and international markets (Government of Uganda, 2019). The standards guide the food industry in the reduction of food hazards attributed to poor practices of production, handling, and processing of food as well as management of waste, pests, training of personnel, hygiene practices, storage, and transportation of food (Handschuch et al., 2013). Adoption refers to an instance whereby an entity, team, organization, or company transits from one system or method of work to another (Shinyekwa et al., 2021). The company embraces new methods of work or fully implements new behaviors, practices, and technologies in their operations (Handschuch et al., 2013).

1.2 Problem statement

The current value for Uganda's organically certified export is currently US\$ 50m with vanilla among the most traded crops and the sector has elevated potential for growth (Watteyn et al., 2022). However, the knowledge and compliance to food safety certification schemes is low among actors i/n the vanilla marketing channels and is estimated at 1% (Government of Uganda, 2019). According to (Jones & Gibbon, 2011, Gibbon, 2006), of the 22 companies which were organically certified in 2006, only 5 were for vanilla and 2 of these were in Mukono district. 12 of the certified companies attained certification through donor support by EPOPA and NOGAMU reported that there were only seven organic certified exporting companies (Kononets et al., 2023). Currently only 2 of the 31 registered vanilla exporters under VANEX were reported to have adopted and complied with the required food safety practices (Shriver, 2020). Certification has been reported to have a direct impact on prices paid in the vanilla marketing channels, for instance Esco Uganda

Limited paid certified vanilla and cocoa farmers prices that were 30% higher than others (Jones & Gibbon, 2011).

However, despite the high premium prices, compliance with food safety and organic standards and certification was still very low among vanilla exporters in Greater Mukono and this has been reported to have significant effect on quality and safety of vanilla exported to the international market (Chiputwa et al., 2015 ,Kankya et al., 2020). Compliance with organic and food safety standards and knowledge on certification has also remained low in the vanilla marketing channels (Government of Uganda, 2019, *MAAIF May, 2022.Pdf*, n.d.). As a result, Uganda's organic export volumes have remained very low which has affected the incomes for actors in the vanilla marketing channels, commercialization of the sector and foreign exchange earnings (Zaied et al., 2023). There is limited knowledge regarding adoption and compliance with organic and food safety standards and certification and their effect on commercialization among vanilla exporters in Greater Mukono, which this study aims to determine.

1.3 General objective

To determine how compliance with food safety and organic standards and certification by exporters influences commercialization of vanilla in Greater Mukono.

1.4 Specific objectives

1. To examine the factors that influence the adoption of organic and food safety standards and certification by vanilla exporters in Greater Mukono.
2. To determine the effect of organic and food safety standards on commercialization of vanilla by exporters in Greater Mukono.
3. To determine the relationship between adoption of food safety and organic standards and the processes of vanilla exporters in Greater Mukono.

1.5 Research questions

1. What are the processes implemented by vanilla exporters after adoption of organic and food safety and certification?

2. How have vanilla exporters been influenced by adoption and non-adoption of organic and food safety standards?
3. How has certification improved commercialization of vanilla among exporters in Greater Mukono?

1.6 Justification

Development of the Vanilla sector is key to Uganda's economy which relies on the agricultural sector that employs 85% of the population and contributes 24% to GDP (Government of Uganda, 2019). Adoption of certification by actors in the vanilla marketing channels, especially among vanilla exporters, has not been given priority in the current interventions (Celio et al., 2023). This study therefore emphasized the need for Certification to enhance the supply of premium quality vanilla to the international market and to enhance profitability (Wahyudi et al., 2021). Certification could serve as a marketing tool for exporters and provide assurance to consumers about the quality and safety of Uganda's vanilla (Shinyekwa et al., 2021).

The findings from the study could provide more information to support current interventions by government, private sector actors and Nongovernmental organizations operating in the vanilla sector like Catholic Relief Services (CRS), Techno serve (TNS), Frontier Co-op, Purdue University, Sustainable Vanilla Initiative (SVI), and VANEX. The study could augment interventions by CRS through projects like Vines and Revitalizing vanilla which aimed at increasing production and productivity, environmental conservation, enhancing quality and safety as well as branding of Uganda's vanilla.

The findings from this study could enable actors in the vanilla sector to establish sustainable production and processing systems to meet global export quality and food safety requirements. It will also provide a solid base for developing strategies for the existing market challenges ((Shriver, 2020). Development of the vanilla sector will help in driving economic transformation through creation of employment opportunities and improving the welfare of the citizens (Wahyudi et al., 2021). Information from the study shall highlight the market opportunities and provide valuable information on challenges faced by vanilla exporters and propose recommendations as derived by the different value chain actors (Watteyn et al., 2022).

Information from the study could also contribute to driving changes among vanilla processors and exporters to meet the international quality and food safety requirements. This could catalyze an increase in the country's vanilla exports, foreign exchange, incomes, and profitability for actors in the vanilla marketing channels and exporters in Greater Mukono (Shriver, 2020)

1.7 Significance

This study shall generate knowledge on the adoption of food safety and organic certification which will inform vanilla exporters, policy makers and the general Agrifood industry on the value of certification (Kankya et al., 2020, Kononets et al., 2023). The findings will promote awareness on food safety risks among processors, prevent consumers from unsafe products by encouraging vanilla processors to follow industry standards to prevent food borne illnesses like fungi, bacteria, protozoa, parasites, and viruses (Gojković et al., 2021). It will promote adoption of Food safety certification to prevent food contamination by heavy metals (lead, mercury, arsenic), insecticides, residues from pesticides and animal drugs as well as physical hazards like glass and human hair (Kankya et al., 2020).

The study will provide awareness on how compliance to organic and food safety standards and certification improves sustainability, production, quality, and profitability in the vanilla supply chain. The study will inform the sector on the best industrial practices in processing and handling of vanilla (FiBL and IFOAM, 2022 ,Zaied et al., 2023). The study will generate information on available organic and food safety certification schemes and their effect on commercialization. By engaging both certified and non-certified exporters, information from the study will be used by certification bodies like UNBS, policy makers like UEPB and MAIIF to design outreach programs, capacity building programs, and policies for the vanilla sector.

1.8 Theoretical/Conceptual Framework

The dependent variable for the study is commercialisation of vanilla which is reliant on the different factors that influence adoption of organic and food safety certification by vanilla exporters in Greater Mukono. The independent variables include among others, social, institutional and market factors. They include age, level of education, cost of certification, access to credit, access to quality specification, need to improve safety of vanilla, access to training on organic and food safety certification among others (FiBL and IFOAM, 2022).

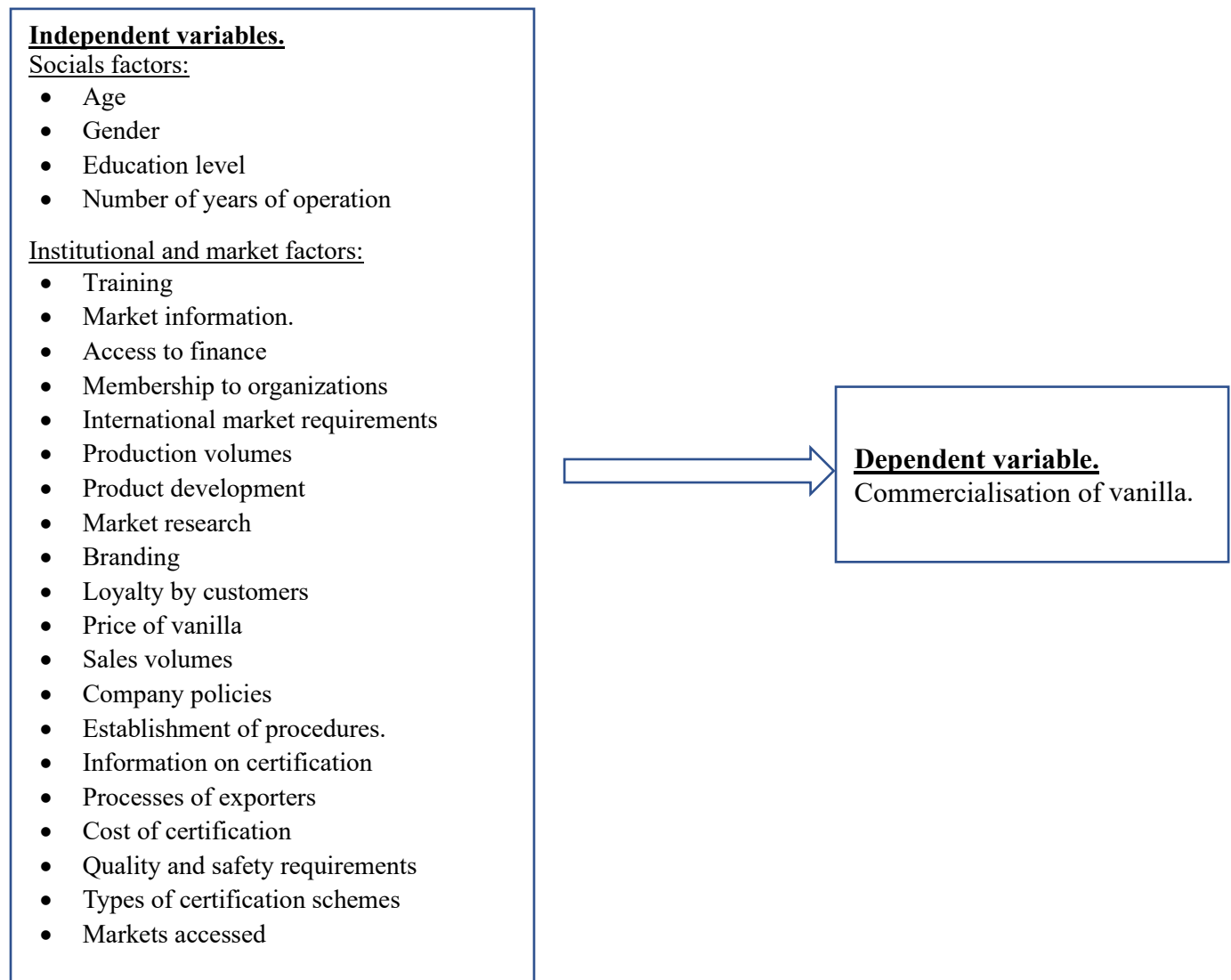


Figure 1.8. 1 Conceptual framework

CHAPTER TWO

LITERATURE REVIEW

2.1 Food safety and organic certification.

In general, any business directly involved in food production and food processing can be certified, including seed suppliers, farmers, [food] processors, retailers and restaurants (Kankya et al., 2020). Adoption of food safety certification has been emphasized in Uganda since the 1990s primarily to ensure production of safe products to meet consumer requirements (Wahyudi et al., 2021). Currently food safety certification schemes in Uganda are certified and awarded by Uganda National Bureau of standards (UNBS) (Kankya et al., 2020). The food safety certifications schemes include HACCP (Hazard analysis critical control points) Halal, Iso 22000:2018 FSMS-Food safety management systems, Iso 22000:2018 FSSC-Food safety systems certification (Kankya et al., 2020).

Organic certification is a certification process for producers of organic food and other organic agricultural products and in Uganda it began in 1994 and in 2000 for the vanilla sector (Gibbon, 2006, Government of Uganda, 2019). The main purpose of certification is to address a growing worldwide demand for safe food and is intended to assure quality and prevent fraud, and promote commerce. While such certification was not necessary in the early days of the organic movement when small farmers would sell their produce directly at farmers' markets, organics have grown in popularity. Consumers are increasingly purchasing safe and organic food through traditional channels, such as supermarkets (FiBL and IFOAM, 2022).

The certifying bodies for organic certification include ProCert (formerly OCPP), Eco Cert, Quality Assurance International (QAI), Organic Crop Improvement Association (OCIA), Centre for Systems Integration (CSI), Demeter International, Local Food Plus (LFP) (FiBL and IFOAM, 2022). The key requirements for registration with a certification body include the registration form, production questionnaire, and the history sheet. The company organic plan, production records, field activity summary, animal health records, field and farmyard maps, proofs of purchase for inputs are also required. Also needed are data sheets, non-GMO certificates, affidavits, proof of non-availability and documents from other inspection agencies and health departments (FiBL and IFOAM, 2022) (Zaied et al., 2023).

2.2 Requirements for compliance with organic and food safety certification.

Requirements for food safety certification vary from country to country but generally involve a set of production and food processing standards that food handlers adhere to (Kankya et al., 2020). Practices for organic and food safety span the various stages of food handling such as growing/production of food, storage, processing, packaging, and shipping/transportation (Kosanke, 2019). The requirements help in avoidance of contamination from synthetic chemical inputs which are not on the national list of allowed and prohibited substances (e.g. fertilizers, pesticides, antibiotics, food additives, etc.), genetically modified organisms (GMOs), irradiation, and the use of biosolids (FiBL and IFOAM, 2022). Other key requirements include the use of farmland that has been free from prohibited synthetic chemicals for three years (or more) and keeping detailed written production and sales records (audit trail) (Zaied *et al.*, 2023). Food manufactures and handlers are required to prevent cross contamination and maintain strict physical separation of organic products from non-certified products and undergo periodic on-site inspections to ensure compliance (Kankya et al., 2020).

Vanilla market actors lack market information, access to extension and training on standards and the available certification schemes as well as capital to invest in the schemes (MTIC, 2015). This hampers commercialization because traceability, which is a key requirement for marketing and certification of organic products, is not met by farmers' fields and processing systems for exporters (Kankya et al., 2020). Also, production systems are unsustainable and affect environmental ecosystems as well as biodiversity and soil health attributed to the use of chemicals such as organochlorine and organophosphorus pesticides (Producers, n.d.). The use of inorganic fertilizers and herbicides which pose a health hazard to vanilla consumers (Watteyn et al., 2022, FiBL and IFOAM, 2022).

Key interventions have been orchestrated to improve the vanilla sector by agencies like Catholic Relief Services (CRS), Techno serve (TNS), Frontier Co-op, Purdue University, Sustainable Vanilla Initiative (SVI), and VANEX (Shriver, 2020. Co-op, n.d.). Other interventions were through the Vines project and Revitalizing vanilla project funded by (USDA FFPr) and USAID respectively and were implemented by Catholic Relief Services (CRS). The interventions targeted increasing production, productivity, promoting agroforestry systems, enhancing quality and safety,

branding Ugandan vanilla through VANEX (Watteyn et al., 2022). They also aimed at reaching over 16,200 vanilla value chain actors, developing a regulatory framework for the vanilla sector, and providing grants to develop capacity for local processors (Co-op, n.d., Shriver, 2020).

The certification process for exporters includes various steps, the first is earmarking a suitable standard that can be certified or is demanded by the buyers in the international market. This is followed by establishing a system to develop capacity of staff to conduct internal audits as a mechanism for self-assessment (Kankya et al., 2020). The exporters then contact external auditors to conduct audits at their facility to examine whether the facility has effectively implemented the required practices to meet the standard requirements. After the company maintains the required documents and records for the various processes and steps to show that they can meet audit needs (Shinyekwa et al., 2021). When they meet all the requirements, they gain a mark which enables the exporters to get credibility to enter the international markets.

After attaining the certification mark, vanilla exporters ensure that they continuously improve in the processes and practices and regularly review and enhance their systems to remain up to date (Kosanke, 2019). Exporters also frequently address the challenges that are identified in the system like developing documents, meeting requirements by regulators, and complying with standards in international markets. Exporters also adopt the required practices like periodic audits, developing the required documentation and promptly solving constraints in the system determined during audits (Kankya et al., 2020).

2.3 Vanilla market channels.

In the vanilla marketing channels, the actors that require certification include farmers in vanilla production, processors, exporters, and retailers (Celio et al., 2023, Kononets et al., 2023). For a market channel to perform effectively as a system, the different players need to be coordinated and work effectively at various levels to ensure that the product is effectively managed (Shinyekwa et al., 2021). The coordination of the relationships drives the market players towards trying to maximize profit while sustaining the marketing system (Kosanke, 2019). However, due to poor regulation of the vanilla sector, opportunistic actors take advantage of the information gap in the market channels to cheat other actors which affect market relationships. (Navrátil, 2022).

Vanilla travels from the producers through intermediaries and local traders to processors; however, there are also channels where vanilla moves from farmers direct to processors or through processors intermediaries who aggregate and supply vanilla to processors (Hänke & Fairtrade International, 2019). The channels are both direct and indirect business to business engagements. In the direct marketing channels, there are business transactions between farmers who are the producers and suppliers of vanilla engaging with the intermediaries or middlemen in the local areas (Bolwig, 2012). There are also business engagements between small scale intermediaries and the large-scale intermediaries who oversee greater volumes of vanilla aggregated from various small-scale traders (Crosby & Frau, 2022).

However, most of the vanilla business transactions from producers to processors are not direct and involve lot of intermediaries which affects quality of vanilla and distorts efficiency in the market (Wahyudi et al., 2021). The existence of many intermediaries along the market channels are problematic for the vanilla sector as it reduces the profit margins for the core industry players (Hänke & Fairtrade International, 2019). The numerous market players are also liable to market failure through speculation and are the source of inefficiencies in quality management, distortion of market information, insecurity problems for farmers and increased cases of vanilla theft from the fields (Santeramo et al., 2018). For Uganda to increase its stocks of organic vanilla export volumes, more capacity building on certification is a critical control mechanism for reducing market inefficiencies (Zaied et al., 2023).

An increase in demand for Uganda's vanilla will positively affect all players in the market channel hence the need to build sustainable business relationships (Stanley et al., 2015). An efficient market channel will lead to an improvement in quality of vanilla compared to vanilla from other origins in the world which will increase Uganda's vanilla exports and foreign exchange (Shinyekwa et al., 2021). There is need to build opportunities for direct market relationships between farmers and processors through certification (Khan et al., 2022). Efficient business engagements between vanilla farmers and intermediaries that link them to processors are critical to curb exploitation of farmers (Shriver, 2020a). Direct linkages with processors would lead to prefinancing mechanisms, assure farmers of high value for their vanilla, and reduce risks of low farmgate prices being paid to farmers (Crosby & Frau, 2022).

2.4 Vanilla market margins.

Analysis of the vanilla markets and different players in the marketing channels facilitates building of a sustainable and profitable vanilla sector (Khan et al., 2022). The prices earned by the different players during the transfer of vanilla from the different areas to the market as well as the cost incurred of marketing are the key determinants of the margins earned by the players in the sector (Zaied et al., 2023). Additionally, certification affects the prices earned by market actors including village collectors or aggregators that collect vanilla from individual farmers, especially those without a defined market (Espling, 2022). Collectors constitute of middlemen that buy vanilla at a lower price from uninformed farmers and capitalize on their need for cash to meet their economic needs (Bolwig, 2012). They are also responsible for harvesting or buying immature vanilla from unsuspecting farmers; therefore, interventions to regulate their activities are imperative (Shriver, 2020).

2.5 Market opportunities

Uganda's vanilla industry is export led and out of 98% of the exports by Kampala- based exporters, only 2% is exported by intermediary organizations and individuals while at the local market 80% of the green beans are traded through the middleman or aggregator channels (Hänke & Fairtrade International, 2019). For efficiency in the market channels, there is a need to build the capacity of the small-scale traders that handle the bulk of the green vanilla in post-harvest handling (Tadesse et al., 2014,). There is a need for market players to build sustainable trade relationships to collectively meet the international market requirements in a consistent manner both in terms of quality and quantity to enhance Uganda's vanilla brand (Tadesse et al., 2014, Shriver, 2020). Additionally, there is a tangible opportunity to build a competitive advantage by maintaining good quality and safety of vanilla and this could increase price premiums for exporters (Hänke & Fairtrade International, 2019).

2.6 Commercialization of vanilla

Commercialization of agriculture takes stock of produce that is sold to the market and the key area for measuring commercialization is at the household level (Kisaame, 2023). This takes stock of the sum of volumes of vanilla sold in the previous year's harvests as well as volumes of vanilla

harvested in the current year (Chelkeba et al., 2017). It also entails production of premium quality products that meet the consumer's needs and enhances consumer confidence (Navrátil, 2022). Commercialization of vanilla would feed directly into the agricultural development agenda of the government to shift Ugandan farmers from subsistence farming and enable them to engage in farming which is more market oriented (Kisaame, 2023).

It envisages the innovative ideas, product or service produced and marketed and how value is derived by the market players in form of profits (Kisaame, 2023). Commercialization entails the different activities by value chain actors and also focuses on research and development as well as marketing and monitoring activities that enhance value chain performance (Li & Li, 2022). Additionally, changes in practices such as adoption and compliance with new practices like certification and movement from traditional to more efficient technologies, could enhance production and processing functions and enhance export (Damircheli, 2023).

The vanilla sector is comprised of a market structure which is oligopolistic and this is because there are few market actors that dominate the vanilla sector and these firms handle significant volumes that are exported from Uganda to the international market (Tadesse et al., 2014, Shriver, 2020). In the vanilla market channels, the conduct of the firms is such that individual firms determine their own strategies for determining prices, developing their supply chains both locally and internationally. The firms also conduct marketing and advertising their products to flavour houses, conducting research in processing practices as well as product development (Hänke & Fairtrade International, 2019). Performance of vanilla exporters and their market activities is measured in terms of profitability, process efficiency and technology used for curing and handling processes (Shinyekwa et al., 2021). In the international for vanilla market certification is critical in ensuring consumer safety and international market requirements (Khan et al., 2022).

2.7 Research methods

To effectively determine the effect of compliance and certification on commercialization, it's imperative for the study to obtain both qualitative and quantitative data, identifying the target population to provide the required information (Saunders et al., 2019). Further information is required through one-on-one interviews, focus group discussion and Key informant interviews (If, 2018). Data analysis was done using Poisson regression is the appropriate to be used as a modeling

framework for analyzing dependent variables which are count variable (Cameron & Trivedi, 2013). Ordinary least squares appropriate for determining significant variables and for generating Frequency tables and percentages for descriptive statistics (If, 2018).

CHAPTER THREE

MATERIALS AND METHODS

3.0 Research design

The study adopted a cross-sectional study design where both qualitative and quantitative data was collected and a mixed method convergent parallel approach was employed (Saunders et al., 2019). Qualitative data was complemented by quantitative data to evaluate how independent variables affect the dependent variable when discussing results from the study (Çaparlar & Dönmez, 2016). The limitations of qualitative data during the study were effectively balanced by KII (Key informant interviews) and FGDs (Focus Group Discussions) (Saunders et al., 2019). The data was assessed to ensure that it provided adequate information from respondents regarding adoption of organic and food safety standards and certification.

A survey method was employed using pre-tested semi-structured questionnaires for individual interviews which were conducted with key entities in the vanilla sector like CRS, MAAIF, UEPB and VANEX. To enrich the data collected, FGD questions were employed while conducting FGDs with DLGs in Greater Mukono. Consideration was given to the independent variables like the social, institutional and market factors that influenced adoption and their effect on commercialization of vanilla among exporters.

3.1 Study area

This study was conducted in Greater Mukono which includes Mukono, Kayunga and Buikwe districts in central Uganda which is a pioneer vanilla producing area and one of the high Vanilla producing areas in the country (Hänke & Fairtrade International, 2019). In Mukono, vanilla production was started in 1960 by the British farmers in Ntenjeru Subcounty, Kooja parish (Kosanke, 2019). The districts experience tropical climate with rainfall distribution throughout the year and approximately 2015 mm of rainfall. Greater Mukono has fertile, well drained, dark clay loam and red clay loam soils which are ideal for vanilla production (Shinyekwa et al., 2021). The area has annual average relative humidity of 77.8 - 88.5% and temperature of 21.1 °C and hosts a substantial number of vanilla exporters (Kosanke, 2019, Shriver, 2020).

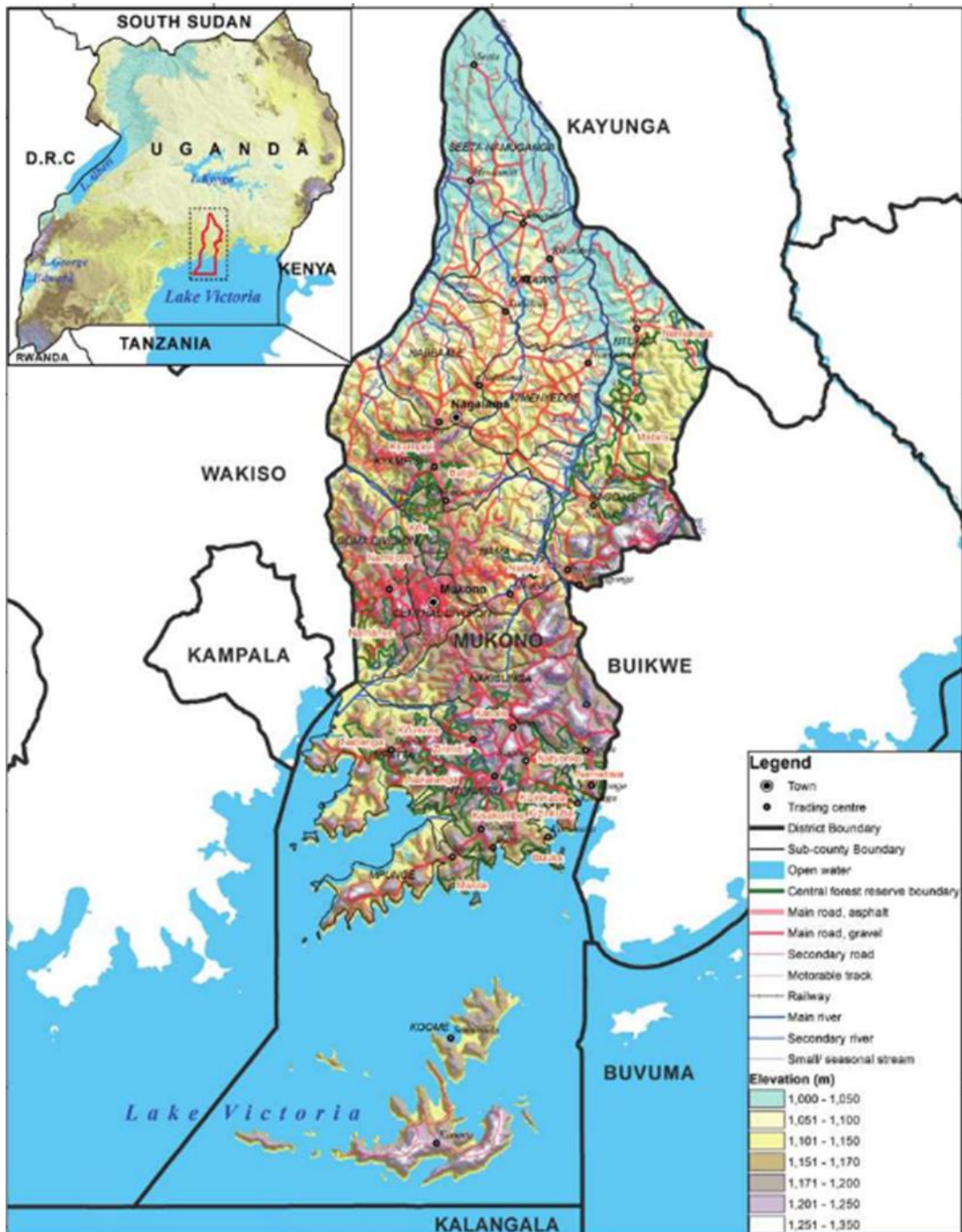


Figure 3.1. 1 Map of greater Mukono showing Mukono, Kayunga and Buikwe districts.

3.2 Scope of the study

This study focused on determining the effect of compliance and certification to organic and food safety standards on commercialization of vanilla. The study targeted vanilla exporters in greater Mukono districts which included Mukono, Buikwe and Kayunga districts. During the study, 30 vanilla exporters were targeted from which 150 respondents were interviewed also 3 Focus Group Discussions and 4 Key Informant Interviews were conducted. To collect the required data, one on one interviews, semi structured questionnaire, Key informant questionnaire, FGD questions and field observations were used.

3.3 Selection of vanilla processors.

Before the research study commenced, discussions were conducted with the relevant stakeholders in the vanilla sector and these were Catholic Relief Services (CRS), Ministry of Agriculture Animal Industry and Fisheries (MAIIF), Uganda Export Promotions Board and The Vanilla Exporters Association (VANEX), and the District Local Governments for Mukono, Kayunga and Buikwe (Hänke & Fairtrade International, 2019). The stakeholders provided a list of vanilla exporters from which 30 exporters were selected, and these provided 150 respondents that were targeted for the study, and these were purposively selected. The key stakeholders also participated in KIIs and FGDs which provided additional information for the study.

3.3.1 Positionality and potential sponsorship bias

The researcher acknowledges that employment with Catholic Relief Services (CRS), an organization that implements vanilla sector development projects in Uganda, creates potential for sponsorship bias and conflicts of interest. The following measures were implemented to mitigate these risks: To ensure transparency

a) Transparency of affiliation, prior

Prior to data collection, the researcher disclosed employment with CRS to all respondents, key informants, and focus group participants. This disclosure was repeated at the beginning of each interview session, and participants were informed that:

- i. Participation was voluntary and refusal would not affect any relationship with CRS
- ii. Responses would be anonymized and not shared with CRS program staff.

- iii. The research was conducted independently for academic purposes. To mitigate the
 - b) Mitigation of sampling bias and to

To avoid over-representation of CRS-affiliated exporters, the sampling frame was obtained from multiple independent sources, including:

- i. which included The Vanilla Exporters Association (VANEX)
- ii.), Uganda Export Promotions Board (UEPB)
- iii. and Ministry of Agriculture, Animal Industry and Fisheries (MAAIF)

). Both CRS-affiliated and non-CRS-affiliated exporters were included. Of the 30 exporting companies sampled, only those with direct CRS project collaboration were identified, allowing for comparison.

c) Mitigation of response and interpretation bias

- i. Semi-structured questionnaires were pre-tested and standardized to reduce leading questions
- ii. Data analysis was conducted using STATA 14 with predetermined statistical models
- iii. Key informant interviews included non-CRS stakeholders (UEPB, MAAIF, VANEX) to provide independent perspectives
- iv. Focus group discussions were facilitated without CRS staff presence
- v. Negative findings (limitations to certification, price fluctuations, taxation fears) are reported alongside positive findings

3.4 Methods and tools for data collection.

During the study a mixed-methods approach was employed which includes convergent parallel design, collecting quantitative and qualitative data simultaneously, analyzing each separately, and then integrating findings during interpretation (Creswell & Plano Clark, 2017). This approach allowed for triangulation of findings and a more comprehensive understanding of certification's effect on commercialization. Data was collected from vanilla exporters using the techniques including face-to-face interviews, observations and FGDs. Additionally, key informant interviews were conducted, and critical observations were made at the facilities of vanilla exporters to obtain additional information. A semi-structured questionnaire was designed and pretested and was used

to collect adequate data following the objectives of the study and the research questions (Saunders et al., 2019).

3.4.1 Quantitative data collection tools and procedures

3.4.1.1 Semi-structured questionnaire design

A semi-structured questionnaire (Appendix A) was developed based on the conceptual framework and research objectives. The questionnaire was organized into four sections where Section A (Company profile) captured demographic and firm characteristics (age, education, years in business, facility size, employment, association membership). Section B (Adoption factors) examined factors influencing certification adoption, using Likert-scale and multiple-response formats. Section C (Commercialization effects) captured prices, volumes, markets, buyers, and product development before/after certification. Lastly Section D (Process changes) examined documentation, hygiene, traceability, training, and verification activities before/after certification.

The questionnaire used a mixed-response format and included Closed-ended yes/no questions, Multiple-response tick boxes (e.g., "Tick all that apply"), Categorical response options (e.g., price ranges, volume categories) and the Before/after comparison items.

3.4.1.2 Questionnaire pretesting

The questionnaire was pretested with 5 vanilla exporters (not included in the final sample) in Mukono district. Pretesting assessed the Clarity and comprehension of questions, appropriateness of response categories, average completion time (established at 35-45 minutes) and Translation accuracy (English to Luganda for Luganda-speaking respondents). Pretesting also based on pretesting feedback, three modifications were made and price response categories were expanded from 5 to 12 ranges to capture wider price variation.

3.4.1.3 Quantitative data collection procedures

Face-to-face interviews were conducted by the researcher and two trained research assistants between October and December 2023. In the process, prior appointments were scheduled with each vanilla exporter, interviews were conducted at the exporter's facility to allow observation of operations, each interview lasted 35-45 minutes on average. Respondents were the company

owner, general manager, or quality assurance manager (n=5 per company as specified in sampling). Where respondents preferred Luganda, the questionnaire was administered using the Luganda translation with back-translation to verify accuracy. Responses were recorded directly onto printed questionnaires and later digitized in STATA 14. For quality control, completed questionnaires were reviewed daily for completeness and consistency and inconsistent responses triggered follow-up telephone calls for clarification.

3.4.2 Qualitative data collection tools and procedures

3.4.2.1 Focus Group Discussions (FGDs)

Three FGDs were conducted, one in each district (Mukono, Kayunga, Buikwe), during November 2023. In the FGD participant selection process, each FGD comprised 8-12 participants intentionally selected to represent diverse vanilla value chain actors. Participants included: vanilla farmers, local traders/aggregators, and district local government staff. Participants were recruited through district production offices with assistance from local extension staff. No CRS staff or CRS project beneficiaries were included in FGDs to reduce sponsorship bias

During facilitation, FGDs were held at district local government offices (neutral locations), each FGD lasted 90-120 minutes, the researcher served as facilitator; a research assistant served as note-taker. A semi-structured FGD guide (Appendix B) was used with 8 open-ended questions which covered: types of certifications known to participants, markets for certified vs. uncertified vanilla, factors influencing certification adoption, benefits and challenges of certification and recommendations for enhancing certification. The discussions were conducted in Luganda for participant comfort and all FGDs were audio-recorded with participants' written consent. FGD documentation, audio recordings were transcribed verbatim and translated into English. Field notes were taken documenting non-verbal cues, group dynamics, and key themes and photographs were taken (with consent) for documentation purposes.

3.4.2.2 Key Informant Interviews (KIIs)

Four KIIs were conducted with institutional stakeholders during October-November 2023. In the key informant selection, informants were purposively selected based on their institutional knowledge of vanilla certification. While conducting KIIs, each KII lasted 45-60 minutes,

interviews were conducted at the informant's place of work, a semi-structured KII guide (Appendix C) was used with 6 open-ended questions. Topics covered sector-wide adoption factors, policy environment, institutional support, market trends, challenges, and recommendations. All KIIs were audio-recorded with written consent and interviews were conducted in English at informants' preference. Following the convergent parallel design, quantitative and qualitative data were analyzed separately and then integrated during interpretation.

3.5 Sampling method and sample determination.

The purposive and quota sampling methods were employed for selection of vanilla exporters to ensure that the sample was mutually exclusive (Çaparlar & Dönmez, 2016). The methods were applied from the list provided by stakeholders to get the targeted number participants that operated in Greater Mukono (Wicaksana & Rachman, 2018). The participants included members of VANEX, unregistered exporters that were working with CRS as well as certified and uncertified exporters. The purposive method was used during selection to ensure suitability of the sample and heterogeneity of the selected participant populations (Espling, 2022). From each selected vanilla exporter, 5 respondents were selected purposively for engagement, and a pretested questionnaire was used to gather the required information, and a flexible selection criterion was applied (Saunders et al., 2019). The sample size was determined using the formula for simple random sampling adjusted for the stratification.

Table 3.5. 1 Sampling process and method

Objective	Sampling process	Method	References
1. To examine the factors that influence the adoption of organic and food safety standards and certification among vanilla exporters in Greater Mukono.	150 respondents were interviewed from 30 vanilla exporters; 3 Focus Group Discussions and 4 Key Informant Interviews were conducted.	Purposive and Quota sampling methods were used.	(If, 2018) (Saunders et al., 2019)

2. To determine the effect of organic and food safety standards on commercialization of vanilla by exporters in Greater Mukono.	150 respondents were interviewed from 30 vanilla exporters; 3 Focus Group Discussions and 4 Key Informant Interviews were conducted.	Purposive and Quota sampling methods were used.	(If, 2018) (Saunders et al., 2019)
3. To determine the relationship between adoption of food safety and organic standards and the processes of vanilla exporters in Greater Mukono.	150 respondents were interviewed from 30 vanilla exporters; 3 Focus Group Discussions and 4 Key Informant Interviews were conducted.	Purposive and Quota sampling methods were used.	(If, 2018) (Saunders et al., 2019)

The formula is:

$$n = (Z^2 * p * (1 - p)) / (d^2).$$

Equation 3.5.1.1

where:

- **Z** is the standard normal deviate for the desired level of confidence (e.g., Z=1.96 for a 95% confidence level). **p** is the estimated population of interest. **d** is the desired level of precision (e.g., 0.05 for 5%).
- With a 95% confidence level and 5% precision, and adoption rate of 10%. The sample size for each would be:

$$n = (1.96^2 * 0.10 * (1 - 0.11)) / (0.05^2) \text{ and } n = (3.8416 * 0.11 * (1 - 0.11)) / 0.0025 = 150 \text{ Respondents.}$$

During the study, 150 respondents from 30 vanilla exporters were engaged; three (3) focus group discussions in Mukono, Kayunga and Buikwe district local government offices as well and four (4) key informant interviews were conducted to provide additional information to enrich the study. The key informants included CRS, MAAIF, UEPB and VANEX and these helped in providing

additional information which complemented the information from vanilla exporters and helped to close the research gap on the effect on compliance and certification on commercialization.

3.5.1 Objective one: To examine the factors that influence the adoption of organic and food safety standards and certification among vanilla exporters in Greater Mukono.

A semi-structured questionnaire was used to obtain primary data from vanilla exporters on the factors which included the type of certification, cost of certification, branding purposes, sustainability practices, access to training, differentiation of products, market requirements, access to bigger markets, regulatory requirements, better prices, improving safety, improving quality, product development, bigger profit margins, poor brand name, prevention against low prices, current market trends and customer assurance.

Also included were lack of technical capacity, access to information on certification, age, level of education number of people employed, location, size of the facility, years in the vanilla business, role in the vanilla sector, price fluctuation, source of finance, membership to a vanilla exporters association and access to finance. The other factors included high recertification costs, resistance to changing in operational practices, unrealistic expectations, lack of management commitment, reduced global demand, fear that certification can become obsolete, shift in market demand, lack of time, fear of taxation, too many documents, small volumes produced, temporary facilities and equipment required.

3.5.2 Objective two: To determine the effect of organic and food safety standards on commercialization of vanilla by exporters in Greater Mukono.

Vanilla exporters were engaged to provide primary data through Face-to-face interviews using a semi-structured questionnaire in addition to FGDs and KIIs. Vanilla exporters were examined on how certification has affected their processes, production volumes, improved quality of vanilla, affected vanilla handling practices, improved curing practices, improved documentation, Access to bigger markets, product development, market research, enhanced trust by customers, better prices for vanilla, increased sales, increased profits and improved branding.

3.5.3 Objective three: To determine the relationship between adoption of food safety and organic standards and the processes of vanilla exporters in Greater Mukono.

Face to face interviews were conducted among Vanilla exporters using a semi-structured questionnaire to obtain primary data from certified and non-certified exporters. The factors interrogated included Improvement in the product quality, improvement in personnel hygiene, Improvement in facility hygiene, Improvement in trainings for staff, Improved process documentation, Improved traceability of the product, Improved waste management, establishment of food safety policies, improved product analysis, more customer feedback, reduced food safety incidents. Also included were Improved storage, Improved cleaning programs, Establishment of purchasing specifications, Establishment of supplier approval programs and improved pest management. The other areas included work instructions for vanilla handling processes: Reception, Sorting, Grading, Blanching, Drying, Conditioning, Packaging and Transportation of vanilla. Analysis for objective 3 focused on the changes in the processes of vanilla exporters before and after certification.

3.6 Tools used for data analysis

STATA 14 was used to generate descriptive statistics and like frequency tables and percentages which were used to show variables of higher and lower significance. Then followed a Poisson regression analysis which is a generalized linear model (GLM) designed for modeling count data and was used for determining the number of certifications adopted by the different vanilla exporters. The OLS-Ordinary least squares and a simple linear regression were also used to generate inferential statistics to get the significant variables that influenced compliance to organic and food safety standards and the challenges (If, 2018). The statistical results included coefficients, R squared, Chi square, t-values as well as P Values and these were used to make inferences to the population (Saunders et al., 2019).

This section also covers econometric modeling and assumption testing and the two econometric models that were used in the study. The section also covered the assumptions underlying each model, the diagnostic tests performed to verify these assumptions, and the corrective measures applied where assumptions were violated. Data analysis focused on vanilla exporters and followed the specific objectives for the study.

3.6.1 Poisson regression model (Objective 1: Determinants of number of certifications)

3.6.1.1 Model specification

For Objective 1, the dependent variable was the number of certification standards adopted by each vanilla exporter (Y_i) where Y_i takes non-negative integer values (0, 1, 2, 3, or 4 certifications). Because the dependent variable is a count, Poisson regression is the appropriate modeling framework (Cameron & Trivedi, 2013). The probability of mass function is specified as:

$$P(Y_i = y_i) = \frac{e^{-\mu_i} \mu_i^{y_i}}{y_i!}, y_i = 0, 1, 2, \dots$$

Equation 3.6.1.1

The model links the expected count μ_i to explanatory variables X_i through a logarithmic link function:

$$\log(\mu_i) = \beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + \dots + \beta_k X_{ki}$$

Equation 3.6.1.1

3.6.1.2 Poisson model assumptions and diagnostic testing

The Poisson regression model rests on three key assumptions (Cameron & Trivedi, 2013; Greene, 2018):

Table 3.6.1. 1 Assumption of the Poisson regression model

Assumption	Description	Test Applied	Result
1. Independence	Observations are independent of each other	Design-based (sampling without replacement, one observation per firm)	Satisfied by design
2. Distributional assumption	The dependent variable follows a Poisson distribution	Goodness-of-fit chi-square test	$\chi^2 = 8.247$ (df=6), p=0.221 → Fail to reject Poisson distribution

3. Equi dispersion	Mean equals variance: $E[Y_i] = \text{Var}[Y_i]$	Cameron-Trivedi dispersion test; Pearson chi-square dispersion statistic	
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3.6.1.3 Testing and handling overdispersion

A critical assumption of the Poisson model is Equi dispersion, that the conditional mean equals the conditional variance. In practice, count data often exhibits overdispersion (variance > mean), which leads to underestimated standard errors and inflated test statistics. The diagnostic tests conducted the Cameron-Trivedi dispersion test: The Null hypothesis: No overdispersion (variance = mean): Test statistic: $z = 1.42$; p-value = 0.156. The result: Fail to reject null; no evidence of overdispersion. Pearson chi-square dispersion statistic:

- Dispersion statistic = Pearson $\chi^2_{df=52.41330}=1.747$ Pearson $\chi^2=3052.413=1.747$
- A value between 0.8 and 2.0 indicates acceptable fit (Long & Freese, 2014)
- Result: Acceptable (1.747)

Robust standard errors: As an additional safeguard, all Poisson regression results reported in Table 4.2.2 use Huber-White robust standard errors, which provide consistent inference even if minor overdispersion is present.

3.6.2 Ordinary Least Squares (OLS) regression model (Objective 2: Effect on quantity exported)

3.6.2.1 Model specification

For Objective 2 (Table 4.2.3), the dependent variable was the quantity of vanilla exported (in kilograms), measured as a continuous variable. The linear regression model is specified as:

$$Y_i = \omega_0 + \omega_i V_i + \varepsilon_i, \text{-----} \quad (1)$$

Equation 3.6.2. 1

where ε_i is the error term assumed to be independently and identically distributed (i.i.d.) with mean zero and constant variance σ^2 .

3.6.2.2 Classical linear regression assumptions (CLRM) and diagnostic tests

OLS estimation requires five key assumptions (Gujarati & Porter, 2009; Wooldridge, 2015):

Table 3.6.2. 1 Assumptions of the linear regression model

Assumption	Test Applied	Test Result	Satisfied?
Linearity	Ramsey RESET test	$F(3, 22) = 1.342$, $p=0.285$	Yes
No perfect multicollinearity	Variance Inflation Factor (VIF)	Mean VIF=1.89 (all <5)	Yes
Zero conditional mean (exogeneity)	No formal test	; ensured by design	Theoretical justification
Homoscedasticity	Breusch-Pagan test	$\chi^2=4.231$, $p=0.238$	Yes
Normality of errors	Shapiro-Wilk test; Jarque-Bera test; Q-Q plot	$W=0.972$, $p=0.312$	Yes
No autocorrelation	Durbin-Watson test	$d=1.87$ (close to 2)	Yes

3.6.3 Paired t-test (Objective 3): Effect of certification on processes of vanilla exporters.

STATA 14 was used to generate descriptive statistics and like frequency, tables and percentages. Objective 3 sought to determine the relationship between adoption of food safety and organic standards and the operational processes of vanilla exporters. The dependent variables were binary (presence/absence of specific processes, documentation, training programs, hygiene practices, and traceability systems) measured at two time points: before certification and after certification. The analysis was restricted to the subsample of certified vanilla exporters ($n=8$), as non-certified exporters have no "after certification" state for comparison. Data was collected using Section D of the semi-structured questionnaire (Appendix A), which asked respondents to indicate whether each process, policy, or practice was present before certification and after certification. Several alternative statistical approaches were considered for analyzing the before-after certification data:

For each binary outcome variable (e.g., presence of cleaning schedule), the proportion of firms with the attribute was calculated before certification and after certification. The paired t-test was then applied to test the null hypothesis that the mean difference equals zero.

3.7.1 Determinants of certification standards

In this study, the dependent variable represented the number of certification standards adopted by each vanilla exporter. The model assumed that the dependent variable, Y_i , follows a Poisson distribution with a mean μ_i , which is strictly positive. Mathematically, the probability of mass function is expressed as

$$P(Y_i = y_i) = \frac{e^{-\mu_i} \mu_i^{y_i}}{y_i!}, y_i = 0, 1, 2, \dots$$

Equation 3.7.1. 1

In this framework, the mean and variance of the Poisson distribution are assumed to be equal ($E[Y_i] = \text{Var}[Y_i] = \mu_i$), a property known as *Equi dispersion*.

The Poisson regression model links the expected count μ_i to a set of explanatory variables X_i through a logarithmic link function. The model specification can be expressed as:

$$\log(\mu_i) = \beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + \dots + \beta_k X_{ki}$$

Equation: 3.7.1. 1

where β_0 is the intercept, β_j are the parameters to be estimated, and X_{ji} are the predictor variables. This log-link ensures that the predicted mean count remains positive for all values of the explanatory variables. The exponential transformation of the coefficients, e^{β_j} , is interpreted as the incidence rate ratio (IRR), representing the multiplicative effect of a one-unit change in the predictor variable on the expected count, holding other variables constant. The Pearson chi-square and residual plots facilitated to detect systematic patterns in the results in the different variables that were analyzed and were used to assess the statistical significance of individual coefficients and the overall model and to provide accurate estimates.

3.7.2 Linear model for effect of certification standards on quantity of vanilla exported.

In this study, the effect of certification and other factors on the quantity of vanilla exported were analyzed using a linear regression model. A linear regression is used when the dependent variable follows a continuous distribution. The dependent variable in this study (the quantity of vanilla exported) follows a continuous distribution. A model formulated as follows was used:

$$Y_i = \omega_0 + \omega_i V_i + \varepsilon_i, \text{-----} \quad (1)$$

Equation 3.7.2. 1

Where:

Y_i refers to quantity of vanilla exported by vanilla exporting company.

i , and V_i are the independent variables believed to influence the quantity of vanilla exported including the certification standards.

These independent variables are provided in Table 2 below. ω_0 is the constant and ε_i is the error term assumed to be independently and normally distributed with zero mean and constant variance. The model was estimated using the Ordinary Least Squares (OLS) technique. The Ordinary Least Squares (OLS) is a method that assumes a linear relationship between the dependent variable and the independent variables. It estimates the coefficients for the independent variables that minimize the sum of squared residuals (the differences between observed and predicted values). OLS relies on several assumptions, including linearity, homoscedasticity (constant variance of errors), independence of errors, and normally distributed errors (Poole & O'Farrell, 1971).

Diagnostic tests to detect the presence of multicollinearity were performed by computing the correlation coefficients and Variance Inflation Factor (VIF) for all variables in the model. The Breusch-Pagan test to detect heteroskedasticity was also conducted. The normality of the errors was checked using a density plot of the error terms. A test for autocorrelation was also conducted using the Durbin-Watson test.

3.8 Summary of the data collection, analysis process and tools.

Table 3.8. 1 Data analysis

Objective	Data collection tools	Analysis Process	Data Analysis tools	References
1. To examine the factors that influence the adoption of organic and food safety standards and certification among vanilla exporters in Greater Mukono.	One on one interviews, semi structured questionnaire, Key informant questionnaire, FGD questions and making field observations.	Data cleaning, coding, transcribing, Data entry, Data analysis, Presentation of results, Interpretation of results	Poisson regression model was run in STATA Software. Frequency tables and percentages were generated using Stata for descriptive statistics	(If, 2018) (Saunders et al., 2019)
2. To determine the effect of organic and food safety standards on commercialization of vanilla by exporters in Greater Mukono.	One on one interviews, semi structured questionnaire, Key informant questionnaire, FGD questions and making field observations.	Data cleaning, coding, transcribing, Data entry, Data analysis, Presentation of results, Interpretation of results	Ordinary least squares: STATA Software. Frequency tables and percentages were generated using Stata for descriptive statistics	(If, 2018) (Saunders et al., 2019)
3. To determine the relationship between adoption of food safety and organic standards and the processes of vanilla exporters in Greater Mukono.	One on one interviews, semi structured questionnaire, Key informant questionnaire, FGD questions and making field observations.	Data cleaning, coding, transcribing, Data entry, Data analysis, Presentation of results, Interpretation of results.	Paired t-test: STATA Software. Frequency tables, means and percentages were generated using Stata for descriptive statistics	(If, 2018) (Saunders et al., 2019)

3.9 Ethical consideration

The study adhered to the rules and regulations of the Uganda Christian university while conducting research with the human subjects. All aspects of ethical considerations were abided to during planning and execution of the research. The research proposal was submitted to the research ethics committee of Uganda Christian University (REC) before commencing the study and approval was granted by (REC) to proceed. The Code of conduct of the university was followed when developing the research design and aims for the study. Before the study, the research team were enlightened on how to anticipate issues during the study and advised on how to mitigate them. These ethical considerations were observed during collection of both quantitative and qualitative data. The ethical issues that were observed during my study included honesty, integrity, objectivity, non-discrimination, respect for the work of others and acknowledgement, sincerity, and equity.

3.10 Sources of funds to conduct the study.

The funds used for the study were from my personal savings and these were used for facilitating the data collection processes including facilitation for the data collecting team and transport. Catholic Relief Services (CRS) my employer at the time also co-sponsored the study by allowing me to use organizational facilities and granted me a study leave to engage vanilla exporters in greater Mukono. They also provided valuable information for vanilla exporters that were in direct collaboration directly with CRS through the Vines project.

CHAPTER FOUR

RESULTS and DISCUSSION

4.1 Objective one: Factors influencing the adoption of organic and food safety standards and certification among vanilla exporters in Greater Mukono.

4.1.1 Certification for vanilla exporting companies

Table 4.1. 1 Certification status of vanilla exporters

Certification status	Number of companies	Percentage
Certified Vanilla exporters	8	26.67
Number of certifications		
1	2	25.00
2	3	37.50
3	1	12.50
4	2	25.00
Types of certifications obtained		
Fair trade certification	4	13.33
Food safety management systems	5	16.67
HACCP certification	5	16.67

Table 4.1.1 above shows the number and certification types adopted by vanilla exporters and only 26.67% of the companies were found to be certified and compliant with food safety and organic certification standards, Figure 4.1.1 below also indicates that organic certification was the most highly demanded type of certification with 93.33%, followed by Fair Trade and HACCP at 56.67% and 50%, respectively. However, despite the demand, adoption was low among vanilla exporters. Certified companies mostly had two certifications and types that were adopted including Food Safety Management Systems (16.67%), Fair Trade (13.33%), and HACCP (16.67%). These findings agree with (Baseline Evaluation of the CRS Uganda VINES Project, 2020; Jones & Gibbon, 2011; Shriver, 2020) who all highlighted that the organic export sector and the number of certified exporters was increasing rapidly in Uganda as well as demand for organic certification.

The findings are also in line with the KIIs conducted at UEPB, CRS and the FGDs conducted in Mukono Buikwe and Kayunga which all mentioned that the common types of certifications were Fair trade and organic certification. The major vanilla exporters were Enimiro, Uvan, Tambiisa and Esco Uganda Limited and all had diverse types of certifications.

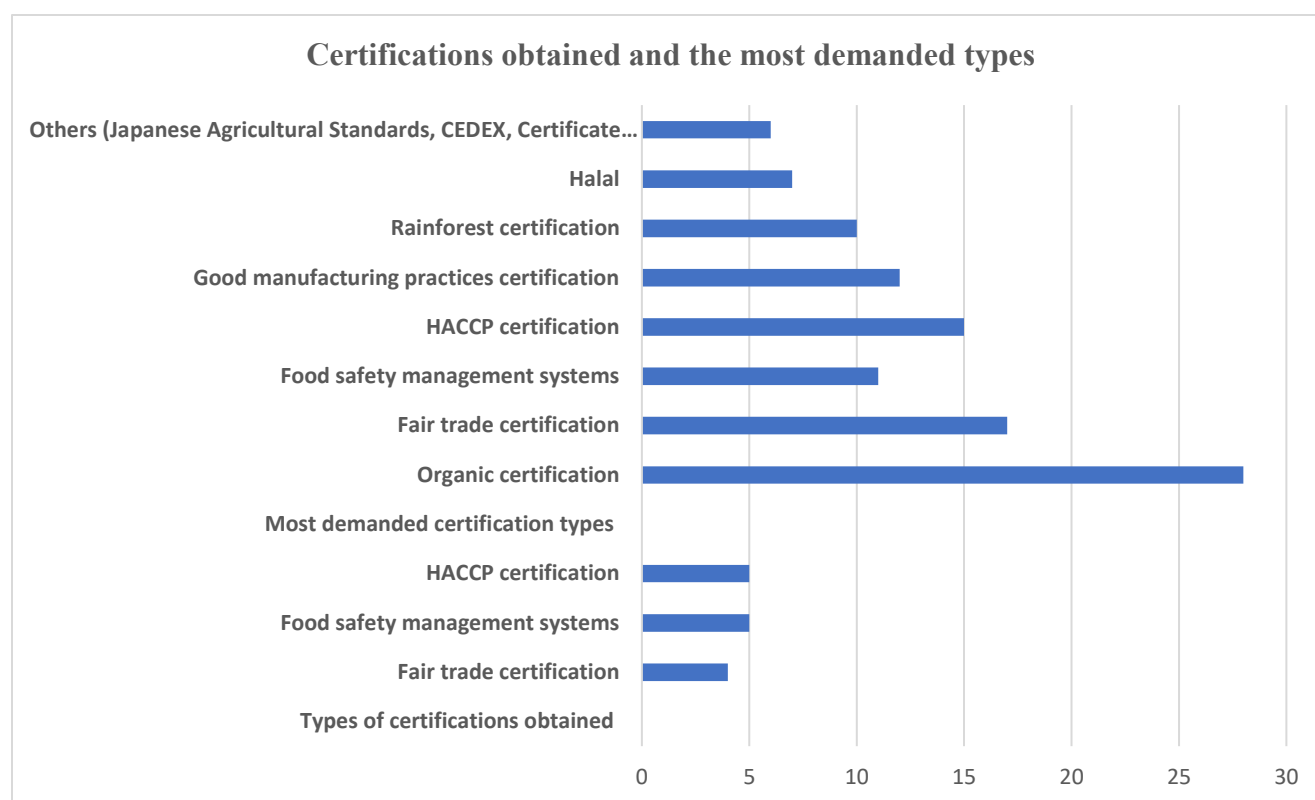


Figure 4.1. 1 Most demanded types of certifications and those obtained by vanilla exporters.

4.1.2 Characteristics of vanilla export firms.

Table 4.1.2 below presents the characteristics of vanilla exporters in Greater Mukono that affect certification. There were 30 vanilla exporting companies in Greater Mukono which were involved in the study. The average age of the company owner was about 48 years, and vanilla exporters employed on average 69 people, though with a remarkably high standard deviation of 95.31 indicating variability in company size. This could affect adoption of certification given that smaller companies have lower capacity. The average time operating a vanilla business was about 15 years, suggesting vanilla market actors in the study were experienced in the dynamics of the sector and knew the market dynamics in terms of certification. This finding agrees with *(Peter et al., 2023)*

who states that commercialization can only be achieved through adequate training, agricultural education, improved infrastructure, institutions, and internet connectivity.

Table 4.1. 2 Characteristics of vanilla exporting companies

Number of Vanilla exporters	30
Age of the company owner	48
Total number of employees	69
Size of the exporters' facility (Acreage)	1.18
Years in vanilla business	15

4.1.3 Level of education, roles, and membership to VANEX

Table 4.1.3 below shows education level of vanilla company owners are high with half holding a university degree and over 10% having a master's or PhD. This suggests that decision-making in vanilla exporting companies on adoption and compliance to certification was informed and strategic. Results indicated that in the vanilla value chain, all the companies are both exporters and processors, while 63% are also traders and 30% are producers, indicating strong vertical integration.

This finding agrees with the arguments of (*Baseline Evaluation of the CRS Uganda VINES Project, 2020*) which alludes to the fact that weak relations and between sellers and buyers would lead to poor productivity at farm level. This was further supported by the FGD in Buikwe and Kayunga where it was noted that successful certification schemes are those employed with organized groups of farmers, therefore organizing farmers to effectively monitor the internal quality control measures is critical.

Table 4.1. 3 Effect of education and institution membership.

Level of education of company owner	Frequency	Percentages
A Level	3	10.00
Degree	14	46.67
Diploma	2	6.67
Masters	1	3.33
Ordinary level	3	10.00
PhD	1	3.33
Primary	6	20.00
Roles in the vanilla value chain		
Exporter	30	100.00
Processor	30	100.00
Trader	19	63.33
Farmer	9	30.00
Membership to a vanilla exporter's association	5	16.67

4.1.4 Access to finance for certification.

Figure 4.1.2 below shows that finance is a critical factor in certification and the main sources of funds for certification were personal savings and donor funding and to a less extent banks and other sources. The findings agreed with (Baseline Evaluation of the CRS Uganda VINES Project, 2020; Jones & Gibbon, 2011; Shriver, 2020) who all highlighted that access to finance for the vanilla value chain actors is a critical factor in the sectors growth. The KIIs conducted at UEPB, CRS and the FGDs conducted in Mukono Buikwe and Kayunga also highlighted that access to finance was a key factor in increased adoption and compliance to certifications.

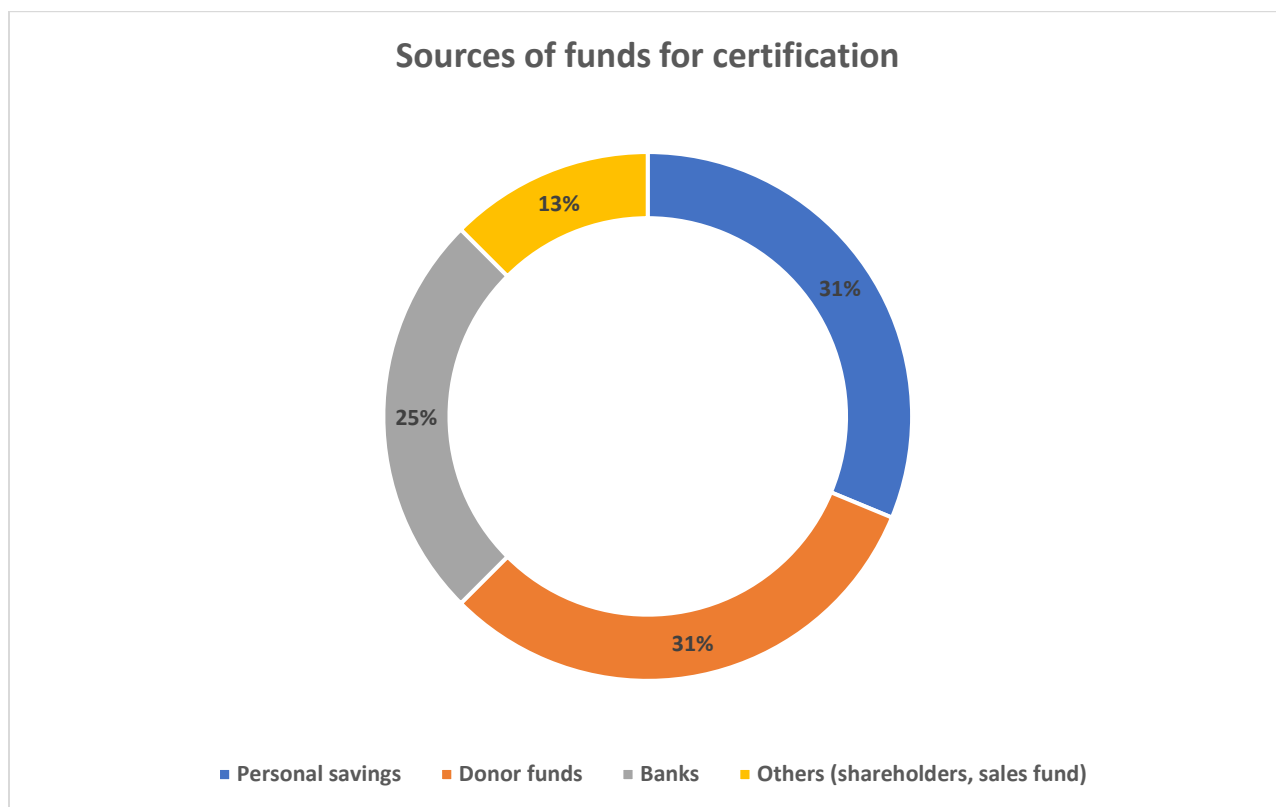


Figure 4.1. 2 Sources of funds for certification.

4.1.5 Challenges for maintaining certifications among certified vanilla exporters.

When it came to maintaining certification, exporters faced several operational and market-based challenges as shown in Table 4.1.4 below. The factors included high recertification costs, resistance to change in operational practices and unrealistic expectations from certifiers or buyers and each was cited by 30% of the exporters. The lack of management commitment (23%) and reduced global demand (23%) were all cited to affect sustainability. A notable challenge was that certification can become obsolete or uncompetitive if market demand shifts, as mentioned by 13% of exporters who found it “no longer compelling”. These findings collectively demonstrated that despite the apparent commercial and operational benefits of certification, most exporters struggled to overcome the financial, informational, and institutional hurdles necessary for sustained compliance. The above findings concur with (Kral & Probst, 2016) who suggested the need to create an enabling environment to make it easy for actors involved in production, processing, and marketing of certified products to meet international requirements.

The findings also agree with the recommendations by (Bremm & Ingenbleek, 2015; Kral & Probst, 2016; Yadav et al., 2023) to develop the domestic, regional, and international markets for certified products. They also urged support to value chain actors at all levels with knowledge, skill and information on quality assurance principles and practices to leverage the benefits for sustainable certification. The KII at MAAIF highlighted that high cost of certification reduced incentives and climate change increased vulnerability to Pests and diseases for organic products. Limited knowledge on methods of organic food production, limited consumer awareness and lack of education are the other factors that were emphasized.

Table 4.1. 4 Challenges for maintaining certification

Challenge	Frequency	Percentage
Certification no longer compelling	4	13.33
Reduced global demand	7	23.33
High cost of recertification	9	30.00
Resistance to change practices	9	30.00
Inadequate management capacity	4	13.33
Unrealistic expectations	9	30.00
Lack of management commitment	7	23.33
Change in product scope	5	16.67
Lack of sponsorship or support	7	23.33

4.1.6 Limiting factors to acquiring certification among vanilla exporters.

Table 4.1.5 provides insights into the factors that impeded maintaining vanilla certification among exporters and the most prominent limitation was the cost of certification which was cited by all companies (100%). This underscores the financial burden which is posed by audits, infrastructure improvements, documentation systems, and compliance verification. Other significant barriers included lack of training (90%), limited access to finance (97%), and information gaps (87%), all of which pointed to a systemic lack of support infrastructure. This finding was supported by (Peter et al., 2023; Rizal et al., 2022) who highlighted that support infrastructure, training and education and development of digital services, access to credit and commercial institutions were fundamental

for commercialization of agriculture and market access.

Additionally, price fluctuations (97%) and fear of taxation (77%) reduced the willingness of firms to formalize, due to the perception that visibility through certification, invited regulatory or financial scrutiny. Firms also expressed concerns over the administrative complexity of the certification processes, with 86.7% citing that too many documents were a deterrent. This finding agrees with (*Baseline Evaluation of the CRS Uganda VINES Project, 2020; Yadav et al., 2023*) who all argued that price fluctuations coupled with lack of technical capacity are major impediments to vanilla production, processing, and bar vanilla market actors from establishing inclusive supply chains. In the FGDs conducted in Kayunga, Mukono and Buikwe, it was further noted that it is only exporters that majorly benefit from certification because the resulting premium prices never get to the lower market actors and most vanilla farmers cannot bargain for better prices because they are not organized. Additionally, the FGDs lack of knowledge of good post-harvest handling practices, weak government extension system, lack of information, weak linkages as well as the Uganda export promotions board.

Table 4.1. 5 Limitations of acquiring certifications.

Limitation	Frequency	Percentage
Cost of certification	30	100.00
Lack of information	26	86.67
Lack of training	27	90.00
Price fluctuation	29	96.67
Access to finance	29	96.67
Lack of interest	25	83.33
Lack of time	22	73.33
Fear of taxation	23	76.67
Too many documents	26	86.67
Small volumes produced	20	66.67
Temporary facilities	24	80.00
Improved facility	5	16.67
Equipment required	27	90.00

4.2 Objective two: The effect of organic and food safety standards on commercialization of vanilla by exporters in Greater Mukono.

4.2.1 Markets for certified vanilla.

Figure 4.2.1 below shows how certification directly affects Uganda's vanilla exports. It indicated that Certified vanilla was exported to high-value international markets with USA and Germany being the highest off takers followed by Canada and South Africa. Other key international markets for Certified Vanilla included South Africa, France, Japan, and Turkey, among others. The findings highlight that certification is strongly associated with market diversification and access to premium export markets and agrees with (*Yadav et al., 2023*) who explained that implementation of food safety management standards is critical for companies to access international market. The KII at CRS also emphasized that the target markets for certified vanilla were France, UK, Netherlands, Germany, Italy, and USA.



Figure 4.2. 1 Markets for certified vanilla

4.2.2 Markets for uncertified vanilla.

Figure 4.2.2 below indicates that lack of certification affected vanilla exports an uncertified vanilla was predominantly sold domestically with limited international sales to USA and Germany as cited by 57% of exporters. The findings highlight that domestic sales could be influenced by lack of certification, and this agrees with (Faour-Klingbeil & Todd, 2018) who argued that lack of process standards, traceability requirements, and product analysis hinder market access. This was further observed from the FGDs in Mukono, Buikwe and Kayunga which revealed that most local processors could not access international market premiums due to lack of certification.

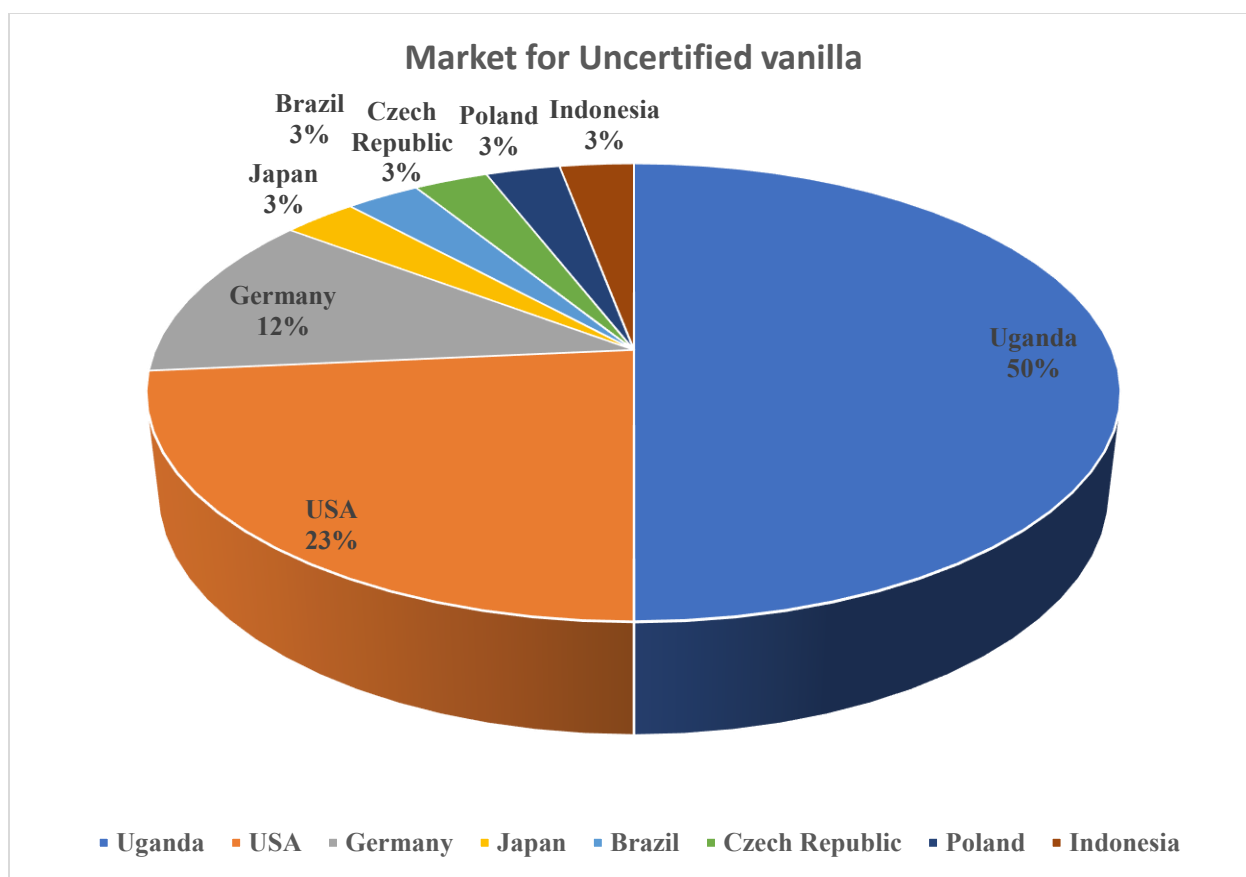


Figure 4.2. 2 Markets for uncertified vanilla.

4.2.3 Prices and volumes exported for certified and uncertified vanilla.

Table 4.2.1 below shows that Certified vanilla fetched significantly higher prices, in season 1 of 2023, certified vanilla cost UGX 17,222 while uncertified vanilla cost UGX 6,333. Similarly, in season 2 of 2023, certified vanilla cost UGX 14,444 while uncertified vanilla cost UGX 6,476. Despite certification involving only a portion of the volume sold, the higher price premium clearly demonstrates the financial incentive of certification. The standard deviation also reveals higher variability in vanilla prices from the mean for both certified and uncertified vanilla indicating different market offerings and how Certification plays a bigger role in determining prices.

This finding is in line with (Bomba & Susol, 2020) who asserts that international markets in European Union, United States of America and Japan are stringent but high value markets. The finding also agrees with (Yadav et al., 2023) who stated that nonadherence to food safety management standards can lead to rejection of consignments of food products that pose food safety

concerns for consumers. The findings are confirmed by the FGD in Mukono where it was noted that vanilla exporters in Greater Mukono gained from certification because they could access the niche markets globally. In Buikwe and Kayunga, respondents mentioned that certified products were better quality, fetched more income and received better prices than conventional vanilla.

Table 4.2. 1 Types of vanilla sold (kg) and average price (UGX)

Type of vanilla (kg)	Average Price (UGX)	Standard deviation
Volume of green vanilla (kg)	29,915	33,334.72
Certified green vanilla (kg)	18,033.33	33,547.17
Price of certified vanilla in Season 1 (UGX)	17,222.22	3632.42
Price of certified vanilla in Season 2 (UGX)	14,444.44	3908.68
Price of uncertified vanilla in Season 1 (UGX)	6,333.33	1683.25
Price of uncertified vanilla in Season 2 (UGX)	6,476.19	1364.52
Volume of cured vanilla exported in Season 1(kg)	2870.77	3341.06
Volume of cured vanilla exported in Season 2(kg)	3117.3	3356.29
Volume of certified cured vanilla exported in Season 1(kg)	1,836.53	3387.89
Volume of certified cured vanilla exported in Season 2(kg)	1,773.57	3335.67

4.2.4 Determinants of the number of Certifications among certified vanilla exporters.

Table 4.2.2 below presents the results of a Poisson regression model analyzing factors that influence certified exporters to adopt and comply to more certifications standards. The dependent variable was the count of certification standards held by an exporter, ranging from one to four. The model's pseudo-R-squared value of 0.691 indicated a good explanatory fit, and the model as a whole was statistically significant ($p < 0.001$). This strength of the model was validated by the large Chi square value of 52.413, which showed that variation in the number of certifications attained by vanilla exporters is collectively explained by the selected predictor variables. The model also had t-values showing variables with high significance and effect ≥ 2 and those < 2 showing less significance and effect.

Results indicated that membership in a vanilla exporters' group had a positive and significant effect on the number of certifications standards (coefficient = 2.417, $p = 0.045$ and $t\text{-value}=2.00$). This suggests that firms involved in collective action or associations may benefit from shared knowledge, peer influence, or institutional support, all of which encourage adoption and compliance with multiple standards. This finding contradicts the arguments of previous reports (*Baseline Evaluation of the CRS Uganda VINES Project, 2020; Yadav et al., 2023*) which indicated that even though actors in the vanilla market channel had membership in associations, the organizations were weak and needed support to build their requisite capacities.

The study further found out that accessing bank financing to fund certification was strongly associated with certified exporters going for more certifications (coefficient = 4.804, $p = 0.007$, $t\text{-value}=2.69$). This indicated that financial capacity was a critical enabler for certification uptake, as it helps cover the significant costs associated with audit fees, documentation, facility upgrades, and training. This finding agrees with (*Baseline Evaluation of the CRS Uganda VINES Project, 2020*) which stated that farming as a business will lead to improved financial and technical capacity that will result into an increase in income and profitability of the enterprise.

Exporters targeting the Netherlands as a key market had significantly more certifications (coefficient = 2.245, $p = 0.037$, $t\text{-value}=2.09$), reflecting how stringent import standards in European markets pushed exporters toward higher compliance. This finding agrees with (*Ferreira et al., 2023; Kankya et al., 2020*) who argue that global standards including food safety management systems, food safety systems certification, hazard analysis and critical control points, Rainforest Alliance, Organic Certification, and others are gaining global attention.

However, the results indicated less significant variables like location of the company, experience in vanilla and companies involved in both exporting and local trading of vanilla. These all tended to have fewer certifications and had weak effect on certification, which is evidenced by their negative $t\text{-values}$ of -0.15, -0.02 and -0.25, respectively. Overall, this regression highlights that certification was not random but driven by institutional membership, financial capacity, and external market incentives, especially those tied to European buyers. This finding indicates that despite the fact that voluntary standards are gaining prominence in international food markets, especially the high value international markets, adoption of other certification scheme was still

quite low. Fair trade and organic certification were the most predominant types, and these were reported to transform the standards and quality of the core vanilla market actors by up to 30% (*Chiputwa et al., 2015; Ferreira et al., 2023*). The findings are further supported by the KII conducted at MAAIF where it was indicated that the factors that enhanced certification included increased demand by global consumers for healthy foods and better price incentives.

Table 4.2. 2 Determinants of the number of certification standards among certified vanilla exporters - Poisson regression results.

Number of certifications	Coef.	St. Err.	t-value	p-value	[95% Conf	Interval]
Age of exporter	.13	.089	1.45	.146	-.045	.305
Exporter/Vanilla farmer	1.207	1.494	0.81	.419	-1.721	4.136
Exporter/local-Vanilla trader	-2.495	1.582	-1.58	.115	-5.596	.607
Experience in Vanilla sector (years)	-.024	1.087	-0.02	.983	-2.154	2.107
Membership of the vanilla exporters group	2.417	1.208	2.00	.045	.049	4.785
Years in current location	-.272	1.088	-0.25	.803	-2.405	1.861
Source of funds for certifications (Banks)	4.804	1.784	2.69	.007	1.308	8.301
Export market (Netherlands)	2.245	1.075	2.09	.037	.138	4.351
Constant	-7.118	4.003	-1.78	.075	-14.963	.727
Mean dependent var	0.633		SD dependent var		1.217	
Pseudo r-squared	0.691		Number of observations		30	
Chi-square	52.413		Prob > chi2		0.000	
Akaike crit. (AIC)	41.399		Bayesian crit. (BIC)		54.010	

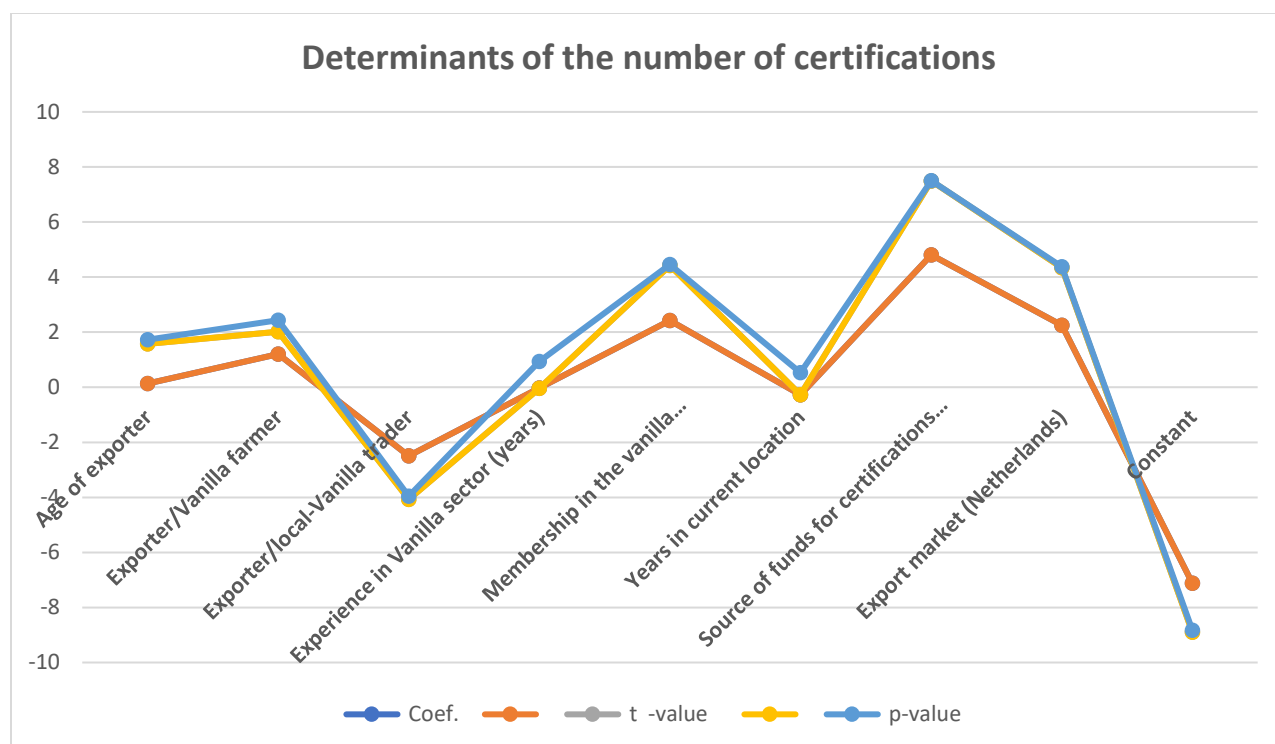


Figure 4.2. 3 Determinants of the number of certifications among certified vanilla companies.

4.2.5 Effect of vanilla certification on vanilla export

Table 4.2.3 below shows the results of an ordinary least square (OLS) regression examining certification among other factors influences the quantity of vanilla exported. The model had a solid explanatory power with an R-squared of 0.641, and the overall regression is highly significant ($p < 0.001$). The findings showed that the number of certifications held by a company positively affected export volume. Each additional certification was associated with an increase of approximately 1,659 kg of exported vanilla. This suggested that certification not only improved a company's credibility to access high-value markets but also facilitated larger trade volumes, through stronger buyer confidence and expanded distribution channels. This finding concurs with (Bomba & Susol, 2020; Chiputwa et al., 2015) who reported that the changing realities in the food systems and high value markets are compelling actors to integrate more where modern retailers, private standards and more vertically integrated supply chains are gaining more prominence.

On the other hand, those that identified as both vanilla farmers and exporters, were also found to export significantly less vanilla compared to non-farmer exporters. This negative relationship was shown by coefficient = -5644.12, $p = 0.04$ and $t\text{-value} = -3.19$ and by Figure 4.2.4. It also showed the need for vanilla exporters to specialize, ensure market linkage, and export readiness rather than focusing on primary production. The role of being a vanilla trader had no significant effect on export volume as shown by the coefficient = 1752.763, $p = 0.81$. The findings agree with (Gizaw, 2019; Shriver, 2020) who made a similar conclusion that the vanilla sector in Uganda is anchored by vanilla processing companies with discrete supply chains.

Export to Canada significantly required high export quantity (coefficient = 8758.075, $p = 0.04$) suggesting that Canadian buyers demanded or accepted higher volumes from Ugandan exporters. Bomba & Susol, 2020; Yadav et al., 2023 also reported that Canada like other international countries had made certification mandatory for access to their markets. This was as a mechanism of safeguarding their consumers and ensuring that consumers demand and access food free from safety hazards. Furthermore, the key informant interviews at VANEX revealed that export markets in Europe, Canada and USA pay premium prices which enabled the exporters to meet the high costs associated with organic farming and certification.

However, as seen in Figure 4.2.4 below, exporter group membership is important for certification, but did not significantly impact export volumes as represented by coefficients = -2306.322, $p = 0.62$ and $t = 0.50$. This implied that certification was a more direct mechanism for enhancing trade rather than social capital alone. This analysis reinforces the proposition that certification translates into commercial advantages in terms of quantity exported, particularly when aligned with access to developed markets. This finding contradicts (Shriver, 2020) who emphasized the need for involvement of institutions in helping by-processors to access the international market. He added that preventing chemical and pesticide contamination in food would help producers to meet requirements for consumers that require healthier, high quality and safer products. The finding also contradicts (Diro et al., 2016; Rizal et al., 2022) who observed that commercialization can be achieved through building institutional sectors like cooperatives as a mechanism of removing impediments to market access. On the other hand, the finding answers research question three which interrogated how certification had improved commercialization of vanilla among exporters in Greater Mukono.

Table 4.2. 3 Effect of certification on vanilla export and quality.

Quantity of vanilla exported	Coef.	St. Err.	t-value	p-value	[95% Conf	Interval]
Age of exporter	190.278	135.607	1.40	.175	-90.953	471.509
Exporter/Vanilla farmer	-5644.12	1770.896	-3.19	.004	-9316.735	-1971.506
Exporter/Vanilla trader	1752.763	2153.34	0.81	.424	-2712.99	6218.516
Experience in Vanilla (yrs)	-193.527	106.972	-1.81	.084	-415.372	28.319
Membership in the vanilla exporters group.	-2306.322	4591.421	-0.50	.62	-11828.346	7215.702
	1658.976	868.727	1.91	.069	-142.653	3460.606
Export market (Canada).	8758.075	4010.042	2.18	.04	441.757	17074.393
Constant	-1728.435	5932.742	-0.29	.774	-14032.188	10575.318
Mean dependent var	5988.067	SD dependent var		6671.018		
R-squared	0.641	Number of observations		30		
F-test	9.017	Prob > F		0.000		
Akaike crit. (AIC)	597.730	Bayesian crit. (BIC)		608.940		

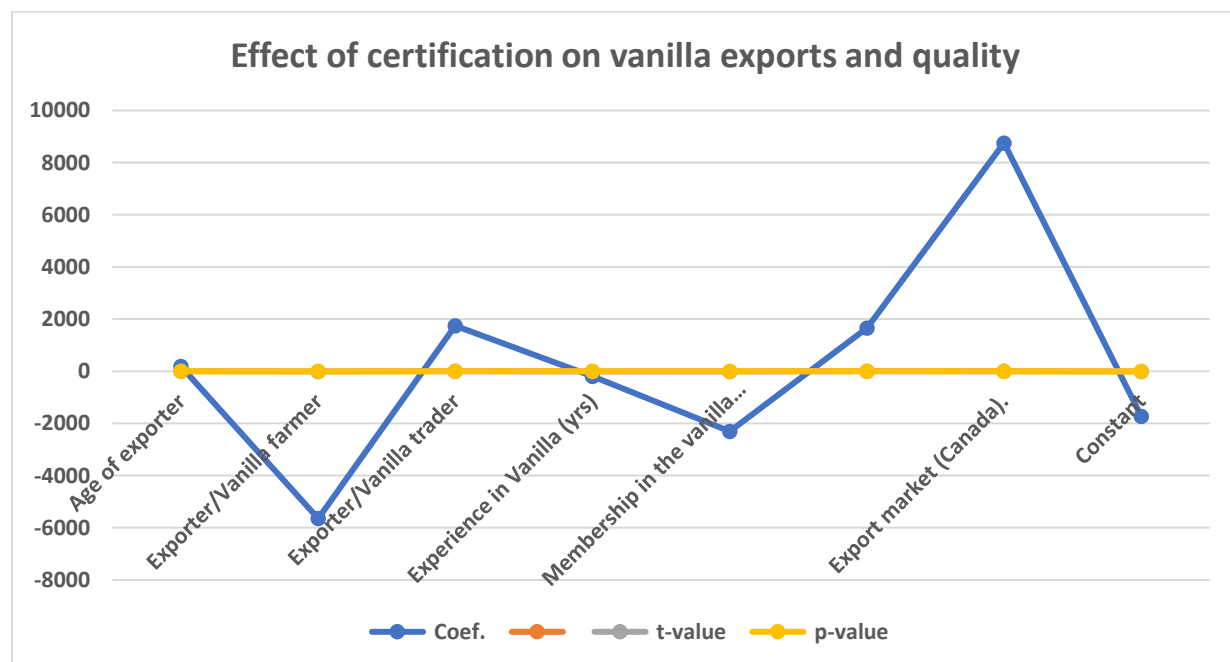


Figure 4.2. 4 Effect of certification on vanilla exports and quality.

Number of buyers

4.2.6 Effect of certification on the number of buyers

Figure 4.2.5 below highlights the transformative effect certification has on vanilla exporters and one of the most striking changes is the increase in the number of buyers, from an average of 2 before certification to 9 after certification. This expansion reflects enhanced credibility and international market acceptance, showing that certification opens broader sales channels. This finding is emphasized by (Bomba & Susol, 2020; Erinoso et al., 2021) who discussed the impact that global, local policies and procedures have on the international market for vanilla. He emphasized that exporters of flavored products targeting markets in USA, Canada and European Union need to be mindful of international policies to open or expand their global trade opportunities.

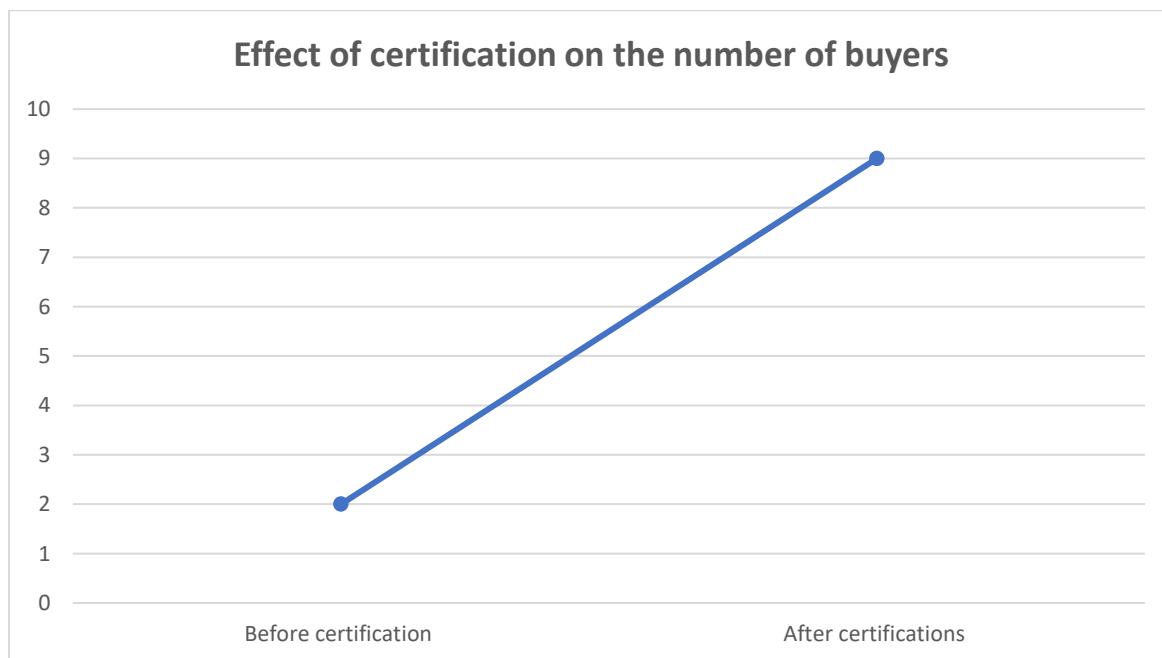


Figure 4.2. 5 Effect of certification on the number of buyers.

4.3 Objective three: The relationship between adoption of food safety and organic standards and the processes of vanilla exporters in Greater Mukono.

4.3.1 Effect of vanilla certification on vanilla processes.

Table 4.3. 1 Effect of certification on marketing and policies

Status	Before certification	After certifications
Policies and procedures		
Supplier approval procedure	25.00	100.00
Product specification	25.00	100.00
Human resources policy	12.50	100.00
Food safety policy	0.00	100.00
Procurement policy	0.00	100.00
Product specification	0.00	100.00
Procedure for non-conforming products	0.00	100.00
Procedure for control of hazards	0.00	100.00
Procedure for documentation	0.00	100.00
Procedure for pest control	0.00	100.00
Procedure for product testing	0.00	100.00
Procedure for dispatch	0.00	100.00

Table 4.3.2 above indicates that certified vanilla exporters had diversified their product range significantly. For instance, all certified exporters produced vanilla extract and vanilla cuts, up from only 12.5% before certification. The production of vanilla powder had also increased from 50% to 75%, indicating greater emphasis on value addition and differentiation. This finding agrees with (Gizaw, 2019; Kral & Probst, 2016) who stated that for more sustainable results in marketing of certified products, it is imperative to support value chain actors in the vanilla sector to improve post-harvest handling and processing.

Table 4.3.1 shows more of the significant changes that vanilla exporting firms achieved after certification as most adopted a comprehensive suite of policies and procedures that were previously absent. These included supplier approval processes, product specifications, food safety policies, human resource policies, pest control procedures, and protocols for non-conforming products, all of which increased from 0% to 100%. It is also further emphasized by (*Shriver, 2020*) who argues about the need to build a culture of quality across the vanilla value chain by establishing traceability systems and documentation. The finding was also concretized by the KIIs conducted at CRS and MAIF which all emphasized that documentation is key to attaining and maintaining certification.

Table 4.3. 2 Effect of vanilla certification on product development.

Status	Before certification	After certifications
Vanilla powder	50.00	75.00
Vanilla extract	12.50	100.00
Vanilla cuts	12.50	100.00
Vanilla seeds	25.00	25.00
Vanilla paste	0.00	12.50

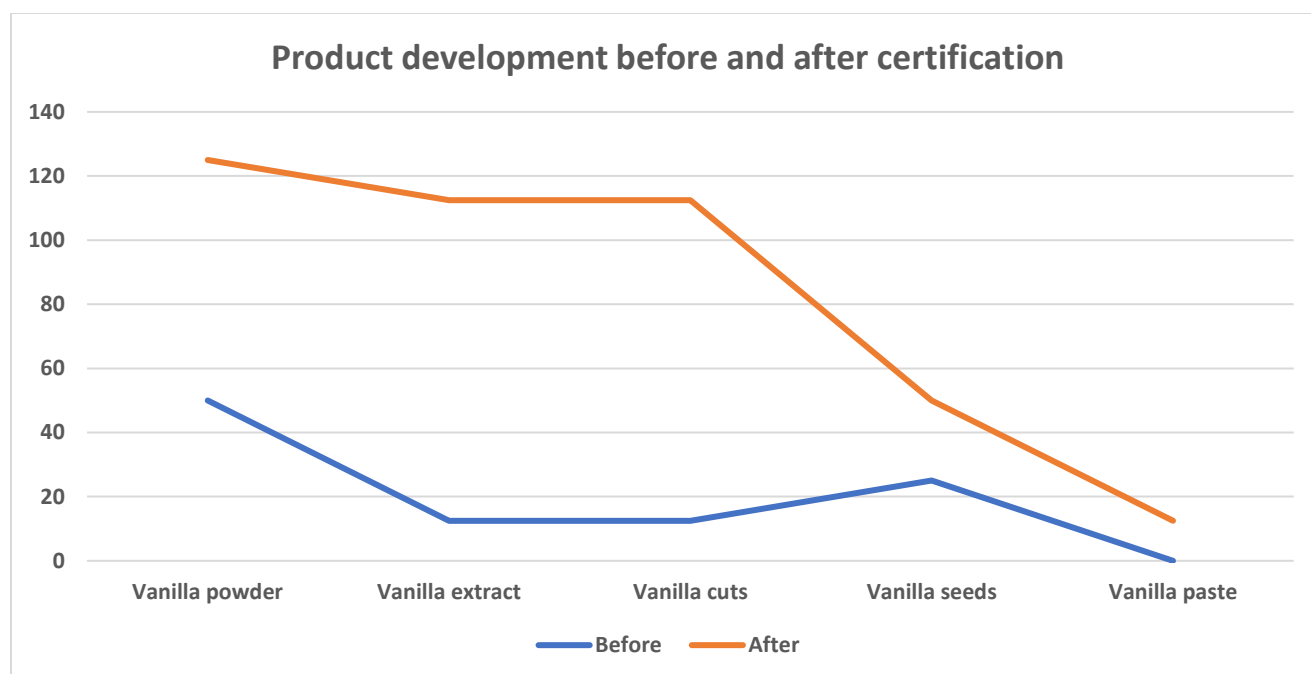


Figure 4.3. 1 Product development before and after certification.

Table 4.3.2 and figure 4.3.1 above indicates that certified vanilla exporters had diversified their product range significantly. For instance, all certified exporters produced vanilla extract and vanilla cuts, up from only 12.5% before certification. The production of vanilla powder had also increased from 50% to 75%, indicating greater emphasis on value addition and differentiation. This finding agrees with (Gizaw, 2019; Kral & Probst, 2016) who stated that for more sustainable results in marketing of certified products, it is imperative to support value chain actors in the vanilla sector to improve post-harvest handling and processing.

4.3.2 Effect of vanilla certification on documentation and product specifications

As shown in Figure 4.3.3 below, core production activities like reception, sorting, blanching, drying, conditioning, packaging, and transportation were fully documented and formalized after certification. Process documentation and development of product specifications for raw materials and final products all rose from 0 to 100%, indicating that certification forced firms to implement quality assurance measures aligned with international standards. This agrees with (Chiputwa *et al.*, 2015) who highlighted the impact of adoption of food safety standards and certification in Uganda.

He cited prevention of contamination through establishing internal control systems and documentation. This was further concretized by (Bomba & Susol, 2020; Gizaw, 2019) who emphasized the establishment of systems to meet food safety system requirements to produce good quality and safe products. These finding answers research question one which probed the processes implemented by vanilla exporters after adoption of organic and food safety and certification.

Table 4.3. 3 Effect of vanilla certification on documentation and product specification.

Status	Before certification	After certifications
Documented processing stages		
Reception	0	100.00
Sorting	0	100.00
Grading	0	100.00
Blanching	0	100.00
Drying	0	100.00
Conditioning	0	100.00
Packaging	0	100.00
Transportation	0	100.00
Process documentation		
Policies	0	100.00
Procedures	0	100.00
Records	0	100.00
Work instructions	0	100.00
Signage	0	100.00
Specification developed		
Raw materials	0	100.00
Inputs	0	100.00
Final products	0	100.00

4.3.3 Effect of vanilla certification on hygiene and sanitation, traceability, and training.

Table 4.3.4 indicates that the implementation of a hygiene and sanitation program including

cleaning procedures, schedules, records, and handwashing stations became universal. Furthermore, traceability systems, staff and supplier training in food safety, good manufacturing practices, and HACCP became standard for all certified firms. These transformations grew from 0 to 100% among certified firms and suggest that certification acts as a catalyst for professionalization, improving not only market access but also the internal capacity, credibility, and consistency of vanilla exporters. These changes align closely with international buyer expectations and are likely to improve competitiveness, especially in stringent markets.

This finding concurs with (Bomba & Susol, 2020, Shriver, 2020) that highlights that commercialization is dependent on meeting the consumers requirements and controlling food safety hazard by establishing critical control points at all stages including production, processing, and marketing of vanilla. This finding also agrees with the KIIs conducted at CRS, UEPB and MAAIF which all mentioned that some key Vanilla exporters that have adopted organic and food safety certification are able to put in programs and a traceability system that can track the product from the farm to the market. It also agrees with the findings of the FGDs conducted in Mukono, Kayunga and Buikwe where it was mentioned that major exporters like Enimiro Uganda limited, Uvan, Esco Uganda Limited had adopted different types of certifications like Fair trade and organic certification and were compliant with the certification requirements. These finding answers research question two which interrogated how vanilla exporters had been influenced by adoption and non-adoption of organic and food safety standards.

Table 4.3. 4 Effect of vanilla certification on hygiene and sanitation, traceability and training.

Status		Before certification	After certifications	Test
Exporters with Hygiene and sanitation programs		0	26.67%	26.67%***
Hygiene and sanitation program				
Cleaning and sanitation procedure		0	26.67%	26.67%***

Cleaning schedule	0	26.67%	26.67%***
Cleaning records	0	26.67%	26.67%***
Handwashing stations	0	26.67%	26.67%***
Traceability system	0	26.67%	26.67%***
Exporters with training programs for staff and suppliers	0	26.67%	26.67%***
Training program for staff and suppliers			
Food safety training	0	26.67%	26.67%***
Good manufacturing	0	26.67%	26.67%***
Good hygiene practice	0	26.67%	26.67%***
Hazard analysis and critical control points training	0	26.67%	26.67%***
Traceability			26.67%***
Exporters with traceability	0	26.67%	26.67%***
Traceability system			26.67%***
Documented traceability	0	26.67%	26.67%***
Digitized	0	26.67%	26.67%***

CHAPTER FIVE

CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusion

From the study findings in objective one, adoption was influenced by experience of the processors, level of education and vertical integration, institutional membership, financial capacity, and external market incentives. Demand for certification was high in international markets, but adoption was still low with organic, Fair Trade and HACCP certification were the most highly demanded types. Certified vanilla was exported to high-value international markets like the USA, Germany, France, Japan, and Canada while uncertified vanilla was mostly sold domestically. Certified vanilla fetched significantly higher prices and the higher price premiums demonstrated the financial incentive for certification. Membership in vanilla exporters association and access to bank financing were strongly associated with having more certifications.

From objective two, Commercialization was evident after adoption and compliance to certification because the number of certifications held by exporters had a positive effect on their export volumes. Certification was a more direct mechanism for enhancing trade and translated into commercial advantages in terms of quantity exported to international markets and the most striking effect being the increase in the number of buyers and broadening of sales channels (*Baseline Evaluation of the CRS Uganda VINES Project, 2020*). The limitations to acquiring certification included cost, lack of training, limited access to finance, information gaps, lack of support infrastructure, price fluctuations, fear of taxation and too many documents. The limitations to maintaining certification among certified vanilla exporters were high recertification costs, resistance to changing operational practices, unrealistic expectations from certifiers or buyers, lack of management commitment, low global demand and certification becoming uncompetitive.

Objective three findings lead to a conclusion that Certification had a transformative effect on product development; documentation, staff training. After certification vanilla exporters adopted a comprehensive suite of policies and procedures like supplier approval, product specifications, food safety policies, human resource policies, pest control procedures, and procedure for non-

conforming products. Core production activities like reception, sorting, blanching, drying, conditioning, packaging, and transportation were fully documented and formalized after certification. Exporters also established traceability systems, process documentation, product specifications for raw materials and final products, hygiene and sanitation program, cleaning procedures, schedules, records, handwashing stations, staff, and supplier training programs. Certification proved to be a catalyst for improving not only increasing market access but also building the internal capacity, credibility, and consistency of vanilla exporters and aligns closely with international market requirements (Kankya et al., 2020).

5.2 Recommendations

To increase adoption of certification, capacity building is critical for vanilla value chain actors on organic and food safety management and traceability systems. Institutions need to provide training for vanilla processors to bridge information gaps on international requirements and build critical support infrastructure for the vanilla industry to harness international market opportunities presented by certification schemes. Strategic marketing and market expansion initiatives are required to diversify and enhance access to premium export markets, broaden sales channels and increase consumption of certified vanilla in international markets like the USA, Germany, France, Japan, and Canada.

To drive commercialization, promotion of vanilla production is crucial as a mechanism for increasing export volumes and improving foreign exchange for the country. Institutional membership is critical to support collective action, knowledge sharing and peer influence. Enhancing financial access, especially bank financing is needed to enable exporters to fund will enable vanilla exporters t for certification, join the international supply chains,, cover costs associated with certification such as surveillance audits, process infrastructure improvements, establishment of documentation systems, compliance verification activities and training Bench marking is also required for Exporters targeting international markets like Netherlands to familiarize local exporters with the stringent import standards in European markets to push local firms toward higher compliance for higher returns. As a way of growing the countries' stock of certified vanilla exporters, Uganda needs to incentivize the certification process for example conducting market campaigns in high value export destinations like Canada and Netherlands. This should only improve exporters credibility, provide access to high-value markets, and facilitate

larger trade volumes, it will also build buyers confidence in Uganda's vanilla and expand the countries distribution channels.

There is a need to promote inclusive business models, market linkages, improve export readiness, promote quantity specifications for export markets, design favorable policies to cushion processors from market volatilities, reduce the fear of taxation to increase formalization. Investment is also required to increase product development, value addition, and differentiation to increase foreign exchange. Government needs to treat certification as a catalyst for professionalization and not just for enhancing market access but building internal capacity, credibility, and consistency of vanilla exporters. These changes will enable vanilla exporters to align closely with international buyer expectations, and improve competitiveness, especially in stringent European markets. The KIIs at CRS, MAAIF and VANEX and the FGD in Mukono emphasized that Vanilla should be included under the Parish Development Model program and prioritized at national level as one of the national priority sectors and supported with resources to enhance certification and adoption of good practices. The FGDs in Buikwe and Kayunga also emphasized that players in the vanilla market channels need to work through cooperatives to benefit from premium prices and avoid exploitation.

5.3 Limitations of the study

Increased logistical costs during data collection due to the large number of processors covered during the study. The team also had to cope with changing weather during data collection while trying to access facilities in the countryside. However relevant PPEs were acquired to enable the team effectively to conduct data collection. Synchronizing interview times to effectively utilize each respondent's availability. Flexibility on the part of the researcher was necessary. Some respondents were unwilling to share information, which was thought to be confidential, especially about the prices for green vanilla, prices for cured vanilla and the markets where they sell. This was mitigated by reassuring them about the confidentiality of the information shared and the non-disclosure of the respondents.

5.4 Suggestions for further research

More studies need to be done to establish the actual commercial incentive from the different international markets and which certifications are required for the different countries. Further studies could determine actual commercial and operational benefits of certification.

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Appendix A : Semi structured questionnaire

QUESTIONNAIRE: DETERMINING THE EFFECT OF COMPLIANCE AND CERTIFICATION ON COMMERCIALIZATION OF VANILLA IN GREATER MUKONO.

Section 1: Consent

My name is **Rwambumbe Jovien**. I am a student at Uganda Christian University Mukono pursuing a **Master of Science in Agribusiness and Entrepreneurship**. I am conducting research on the effect of compliance and certification on commercialization of vanilla in Greater Mukono. This study will help to provide insights into how to enhance adoption of organic and food safety standards. The important aspect of this study is to engage with Vanilla exporters and key stakeholders to gather their perceptions on compliance and certification.

The responses received from this engagement will be used for research purposes only. The outcome of this study shall not be attributed to you or other participants in this study. Your personal details will not be recorded and the information you provide will be kept confidential. Your name will not be made public in connection with any statement you make.

Your participation is voluntary and whether you will give this interview or not will totally depend on your personal will. If you are unwilling to participate/answer any of the questions, you may stop this interview at any time or you may refrain from answering any specific question (s). Your views and cooperation are very important for this study. I request that you spare some of your valuable time for this interview. I would like to ask you some questions which will take about 30 minutes.

For report writing purposes, a voice recording, and some pictures will be taken with your consent, and these will be held with maximum confidentiality. Thank you for considering this request. I look forward to the opportunity to learn from your experiences.

Do you agree to participate?

1. Yes (continue interview) 0. No (end interview)

Do you have any questions before we start? (Answer questions)

Participant Name : _____

Signature : _____

Section 2 : Study Information

General details			
District			
Sub-county			
Village			
Vanilla exporter respondent ID			
Sub-Section A – Company profile			
A.1	Who is the head of the company? Is it a man or a woman? (Tick one)	Male _____	Female _____
A.2	What is the age of the Company head? (Tick one)	_____ years	
A.3	Highest education level attained by Company head (Tick one)	1. No formal education _____ 2. Completed Primary Education _____ 3. Completed Secondary Education-Ordinary level _____ 4. Completed Secondary Education-Advanced level _____ 5. Completed Tertiary education _____	
A.4	What is your role in the vanilla sector? [Tick <i>all that apply</i>]	1. Exporter _____ 2. Processor _____ 3. Trader _____ 4. Farmer _____ 5. Civil society technical personnel _____ 6. Government Technical personnel _____ 7. Others specify _____	
A.5	Please record the number of people currently working in the company. (Fill in the gaps that apply)	Male	Female

	5 - 10 years	_____	_____
	11 - 17 years	_____	_____
	18 - 29 years	_____	_____
	30 - 64 years	_____	_____
	Elderly (+ 65 years)	_____	_____
	TOTAL	_____	_____
A.6	Which year did the company start doing vanilla business?		
A.7	What is the size of the facility (Tick one)	1. Below 1 Acre 2. 1–2 Acres	3. 3-5 Acres 4. Above 5 Acres
A.8	Please record the number of years that the company has been operating in the vanilla sector. [<i>Check all that apply</i>]	1. 0 – 4 years 2. 5 – 9 years 3. 10 – 14 years	4. 15 – 19 years 5. Above 20 years
A.9	Does the company have membership of the vanilla exporters or any association (Tick one).	Yes _____ No _____	
A.10	If yes, which vanilla exporters or any association membership of the [<i>Tick all that apply</i>]	1. VANEX 2. Others, specify.....	
Sub-Section B – Factors that influence the adoption of organic and food safety standards and certification by vanilla exporters:			
B.1	Has the company attained certification (Tick one)	Yes _____ No _____	
B.2	If yes, which type of certification has your	1. Organic certification trainings _____	

	company attained [Tick <i>all that apply</i>]	2. Fair trade certification _____ 3. Food safety management system training _____ 4. UNBS HACCP or any certification trainings _____ 5. Good manufacturing practices trainings _____ 6. Rainforest certification _____ Others specify																				
B.3	What are the main reasons for getting certification? <i>(Circle all that apply)</i>	<table border="1"> <tr> <td>1= Low cost of certification</td><td>2= For Branding</td></tr> <tr> <td>3= Available of Information</td><td>4=For Sustainable practices</td></tr> <tr> <td>5=Access to training</td><td>6=To differentiate products</td></tr> <tr> <td>7=Market requirements</td><td>8=Access bigger markets</td></tr> <tr> <td>9=Regulatory requirements</td><td>10=Get better prices</td></tr> <tr> <td>11=To improve safety</td><td>12=To improve quality</td></tr> <tr> <td>13=Product development</td><td>14=Copied other exporters</td></tr> <tr> <td>15=Bigger profit margins</td><td>16=Poor brand name</td></tr> <tr> <td>16=Low prices</td><td>17=Market trends</td></tr> <tr> <td>18=To assure customers</td><td>Others, specify.....</td></tr> </table>	1= Low cost of certification	2= For Branding	3= Available of Information	4=For Sustainable practices	5=Access to training	6=To differentiate products	7=Market requirements	8=Access bigger markets	9=Regulatory requirements	10=Get better prices	11=To improve safety	12=To improve quality	13=Product development	14=Copied other exporters	15=Bigger profit margins	16=Poor brand name	16=Low prices	17=Market trends	18=To assure customers	Others, specify.....
1= Low cost of certification	2= For Branding																					
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5=Access to training	6=To differentiate products																					
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11=To improve safety	12=To improve quality																					
13=Product development	14=Copied other exporters																					
15=Bigger profit margins	16=Poor brand name																					
16=Low prices	17=Market trends																					
18=To assure customers	Others, specify.....																					
B.4	What are the benefits for complying to standards and certification? <i>(Circle all that apply).</i>	<table border="1"> <tr> <td>1=Enhanced quality</td><td>2=Improved safety</td></tr> <tr> <td>3=Improved brand name</td><td>4=increase in sales</td></tr> <tr> <td>5=Improved loyalty</td><td>6=Few rejections</td></tr> <tr> <td>7=More markets reached</td><td>8=Improved relationships</td></tr> </table>	1=Enhanced quality	2=Improved safety	3=Improved brand name	4=increase in sales	5=Improved loyalty	6=Few rejections	7=More markets reached	8=Improved relationships												
1=Enhanced quality	2=Improved safety																					
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5=Improved loyalty	6=Few rejections																					
7=More markets reached	8=Improved relationships																					

		9=More profits	10=Better prices
		11=sustainable practices	12=Improved confidence
		13=Others, specify.....	
B.5	Which type of certification is more demanded to be complied to by exporters or for certification? <i>(Tick all that apply).</i>	1. Organic certification trainings ☐ 2. Fair trade certification ☐ 3. Food safety management system trainings ☐ 4. UNBS HACCP or any certification trainings ☐ 5. Good manufacturing practices trainings ☐ 6. Rainforest certification ☐ Others specify	
B.6	Which challenges do you face to maintain certification after it has been attained by exporter? <i>(Tick all that apply).</i>	1=Certification is no longer compelling.	2=Reduced global demand
		3=High cost of recertification	4=Resistance to change practices
		5=Inadequate management capacity	6=Unrealistic expectations
		7=Lack of management commitment	8=Change in product scope.
		9=lack of sponsorship or support.	Others, specify.....
B.7	What are the main limitations for vanilla exporters in complying	1=Cost of certification	7=Lack of time
		2=Lack of Information	8=Fear of taxation
		3= Lack of training	9= Too many documents
		4=Price fluctuation	10=Lack of market

	with standards and acquiring certification? (Tick all that apply).	5=Access to finance	11=Small volumes produced.
		6=Lack of interest	12=Temporary facilities
		13=Improve safety	14=To improve quality
		15=Price fluctuation	16=Equipment required
		17=Lack of trainers	Others, specify.....
B.8	What is your source (s) of finance to fund the certification process	1=Personal savings	4=SAACOs
		2=Donor funds	5=Government fund
		3=Banks	6=Others, specify.....
B.9	How can compliance with standards and certification be enhanced among vanilla exporters? (Tick all that apply).	1=Reduced cost of certification	2=Provision of Information on certification
		3=Targeted training for exporters.	4=Increased regulation by government.
		5=Tailored support for financial access.	6=Provision of market information.
		7. Having more trainers for certification.	8. Others, specify

Sub-Section C – To determine the effect of organic and food safety standards on commercialization of vanilla by exporters in Greater Mukono.

C.1 What volumes of green vanilla did the company buy locally in Season 1 2023? (Tick one).	1. 0 –1000kg 2. 1001– 10,000kg 3. 10,001 – 20,000kg	4. 20,001 – 30,000kg 5. Above 30,000kg
C.2 What volumes of green vanilla did the company buy locally in Season 2 2023.	1. 0 –1000kg 2. 1001– 10,000kg 3. 10,001 – 20,000kg	4. 20,001 – 30,000kg 5. Above 30,000kg
C.3 What percentage of green vanilla was from certified farmers in Season 1 2023? (Tick one).	1. Less than 10% 2. 20% 3. 30% 4. 40% 5. 50%	6. 60% 7. 70% 8. 80% 9. 90% 10. 100%

C.4 What percentage of green vanilla was from certified farmers in Season 2 2023? <i>(Tick one)</i> .	1. Less than 10% 2. 20% 3. 30% 4. 40% 5. 50%	6. 60% 7. 70% 8. 80% 9. 90% 10. 100%
C.5 What percentage of the green vanilla was from uncertified farmers Season 1 2023? <i>(Tick one)</i> .	1. Less than 10% 2. 20% 3. 30% 4. 40% 5. 50%	6. 60% 7. 70% 8. 80% 9. 90% 10. 100%
C.6 What percentage of the green vanilla was from uncertified farmers in Season 2 2023? <i>(Tick one)</i> .	1. Less than 10% 2. 20% 3. 30% 4. 40% 5. 50%	6. 60% 7. 70% 8. 80% 9. 90% 10. 100%
C.7 What price did the company pay for green vanilla from certified farmers in Season 1 2023? <i>(Tick one)</i> .	1. 1000-5000 Shs 2. 5001-10000 Shs 3. 10001-15000 Shs 4. 15001-20000 Shs 5. 20001-25000 Shs 6. 25001-30000 Shs	7. 25001-30000 Shs 8. 30001-35000 Shs 9. 35001-40000 Shs 10 40001-45000 Shs 11. 45001-50000 Shs 12 Above 50000 Shs
C.8 What price did the company pay for green vanilla from certified farmers in Season 2 2023? <i>(Tick one)</i> .	1. 1000-5000 Shs 2. 5001-10000 Shs 3. 10001-15000 Shs 4. 15001-20000 Shs 5. 20001-25000 Shs 6. 25001-30000 Shs	7. 25001-30000 Shs 8. 30001-35000 Shs 9. 35001-40000 Shs 10 40001-45000 Shs 11. 45001-50000 Shs 12 Above 50000 Shs
C.9 What price did the company pay for green vanilla from uncertified farmers in Season 1 2023? <i>(Tick one)</i> .	1. 1000-5000 Shs 2. 5001-10000 Shs 3. 10001-15000 Shs 4. 15001-20000 Shs	7. 25001-30000 Shs 8. 30001-35000 Shs 9. 35001-40000 Shs 10. 40001-45000 Shs

	5. 20001-25000 Shs 6. 25001-30000 Shs	12. 45001-50000 Shs 13. Above 50000 Shs
C.10 What price did the company pay for green vanilla from uncertified farmers in Season 2 2023? <i>(Tick one)</i> .	1. 1000-5000 Shs 2. 5001-10000 Shs 3. 10001-15000 Shs 4. 15001-20000 Shs 5. 20001-25000 Shs 6. 25001-30000 Shs	7. 25001-30000 Shs 8. 30001-35000 Shs 9. 35001-40000 Shs 10. 40001-45000 Shs 12. 45001-50000 Shs 13. Above 50000 Shs
C.11 What volumes of cured vanilla did the company sell to the international market/exported? In season 1 2023 <i>(Tick one)</i> .	1. 0 –100kg 2. 101–500 kg 3. 501–1000kg 4. 1001– 5000kg 5. 5001– 10000kg	6. 10001– 15000kg 7. 15001– 20000kg 8. 20001– 30000kg 5. Above 30,000kg
C.12 What volumes of cured vanilla did the company sell to the international market/exported in season 2 2023 <i>(Tick one)</i> .	1. 0 –100kg 2. 101–500 kg 3. 501–1000kg 4. 1001– 5000kg 5. 5001– 10000kg	6. 10001– 15000kg 7. 15001– 20000kg 8. 20001– 30000kg 5. Above 30,000kg
C.8 What percentage of the cured vanilla exported was certified in season 1 2023? <i>(Tick one)</i> .	1. None 2. Less than 10% 3. 20% 4. 30% 5. 40% 6. 50%	6. 60% 7. 70% 8. 80% 9. 90% 10. 90% 11. 100%
C.9 What percentage of the exported cured vanilla was certified in season 2 2023?? <i>(Tick one)</i> .	1. None 2. Less than 10% 3. 20% 4. 30% 5. 40% 6. 50%	6. 60% 7. 70% 8. 80% 9. 90% 10. 90% 11. 100%

C.10 Where do you sell your certified cured vanilla? <i>(Tick all that apply)</i> .	1. Uganda 2. USA 3. France 4. United Kingdom 5. Germany 6. Japan 7. Canada	8. Denmark 9. Netherlands 10. Israel 11. South Africa 12. Turkey 13. Hungary 14. Others, specify
C.11 Where do you sell your uncertified cured vanilla? <i>(Tick one all that apply)</i> .	1. Uganda 2. USA 3. France 4. United Kingdom 5. Germany 6. Japan 7. Canada	8. Denmark 9. Netherlands 10. Israel 11. South Africa 12. Turkey 13. Hungary 14. Others specify
C.12 At what price did you export your certified cured vanilla in season 1 2023? <i>(Tick one)</i> .	1. Less than 20,000 Shs 2. 20,001– 30,000 Shs 3. 30,001– 40,000 Shs 4. 40,001– 50,000 Shs 5. 50,001– 60,000 Shs	6. 60,001– 70,000 Shs 7. 70,001– 80,000 Shs 8. 80,001– 90,000 Shs 9. 90,001– 100,000 Shs 10. Above 100,000 Shs
C.13 At what price did you export your certified cured vanilla in season 2 2023? <i>(Tick one)</i> .	1. Less than 20,000 Shs 2. 20,001– 30,000 Shs 3. 30,001– 40,000 Shs 4. 40,001– 50,000 Shs 5. 50,001– 60,000 Shs	6. 60,001– 70,000 Shs 7. 70,001– 80,000 Shs 8. 80,001– 90,000 Shs 9. 90,001– 100,000 Shs 10. Above 100,000 Shs
C.14 What price did the company locally sell its certified cured vanilla in season 1 2023? <i>(Tick one)</i> .	1. Less than 20,000 Shs 2. 20,001– 30,000 Shs 3. 30,001– 40,000 Shs 4. 40,001– 50,000 Shs	6. 60,001– 70,000 Shs 7. 70,001– 80,000 Shs 8. 80,001– 90,000 Shs 9. 90,001– 100,000 Shs 10. Above 100,000 Shs

	5. 50,001– 60,000 Shs	
C.15 What price did the company locally sell its certified cured vanilla in season 2 2023? <i>(Tick one)</i> .	1. Less than 20,000 Shs 2. 20,001– 30,000 Shs 3. 30,001– 40,000 Shs 4. 40,001– 50,000 Shs 5. 50,001– 60,000 Shs	6. 60,001– 70,000 Shs 7. 70,001– 80,000 Shs 8. 80,001– 90,000 Shs 9. 90,001– 100,000 Shs 10. Above 100,000 Shs
C.16 What price did the company sell its exported uncertified cured vanilla in season 1 2023? <i>(Tick one)</i> .	1. Less than 20,000 Shs 2. 20,001– 30,000 Shs 3. 30,001– 40,000 Shs 4. 40,001– 50,000 Shs 5. 50,001– 60,000 Shs	6. 60,001– 70,000 Shs 7. 70,001– 80,000 Shs 8. 80,001– 90,000 Shs 9. 90,001– 100,000 Shs 10. Above 100,000 Shs
C.17 What price did the company sell its exported uncertified cured vanilla in season 2 2023? <i>(Tick one)</i> .	1. Less than 20,000 Shs 2. 20,001– 30,000 Shs 3. 30,001– 40,000 Shs 4. 40,001– 50,000 Shs 5. 50,001– 60,000 Shs	6. 60,001– 70,000 Shs 7. 70,001– 80,000 Shs 8. 80,001– 90,000 Shs 9. 90,001– 100,000 Shs 10. Above 100,000 Shs
C.18 What price did the company sell locally its uncertified cured vanilla in season 1 2023? <i>(Tick one)</i> .	1. Less than 20,000 Shs 2. 20,001– 30,000 Shs 3. 30,001– 40,000 Shs 4. 40,001– 50,000 Shs 5. 50,001– 60,000 Shs	6. 60,001– 70,000 Shs 7. 70,001– 80,000 Shs 8. 80,001– 90,000 Shs 9. 90,001– 100,000 Shs 10. Above 100,000 Shs
C.19 What price did the company sell locally its uncertified cured vanilla in season 2 2023? <i>(Tick one)</i> .	1. Less than 20,000 Shs 2. 20,001– 30,000 Shs 3. 30,001– 40,000 Shs 4. 40,001– 50,000 Shs 5. 50,001– 60,000 Shs	6. 60,001– 70,000 Shs 7. 70,001– 80,000 Shs 8. 80,001– 90,000 Shs 9. 90,001– 100,000 Shs 10. Above 100,000 Shs

C.20 How many buyers did the company have before certification? <i>(Tick one)</i> .	1. One Buyer 2. Two Buyers 3. Three Buyers	4. Four Buyers 5. Others, specify
C.21 How many buyers did the company have after attaining certification? <i>(Tick one)</i> .	1. One Buyer 2. Two Buyers 3. Three Buyers	4. Four Buyers 5. Others, specify
C.22 Did the company conduct any product development before certification? <i>(Tick one)</i> .	Yes ☐ No ☐	
C.23 If yes, which ones? <i>(Tick all that apply)</i> .	1. Vanilla powder 2. Vanilla extract	3. Vanilla cuts 4. Others, specify
C.24 Did the company conduct any product development after attaining certification? <i>(Tick one)</i> .	Yes ☐ No ☐	
C.25 If yes, which ones? <i>(Tick all that apply)</i> .	1. Vanilla powder 2. Vanilla extract	3. Vanilla cuts 4. Others, specify
C.26 Did the company conduct any market research before certification? <i>(Tick one)</i> .	Yes ☐ No ☐	
C.27 If yes, where? <i>(Tick all that apply)</i> .	1.Uganda 2.USA 3.France 4.United 5.Kingdom 6.Germany 7.Japan 8.Canada	9.Denmark 10. Netherlands 11.Israel 12.South Africa 13.Turkey 14.Hungary 15 Others, specify
C.28 Did the company conduct any market research after certification? <i>(Tick one)</i> .	Yes ☐ No ☐	

C.29 If yes, where? <i>(Tick all that apply)</i> .	1.Uganda 2.USA 3.France 4.United 5.Kingdom 6.Germany 7.Japan 8.Canada	9.Denmark 10. Netherlands 11.Israel 12.South Africa 13.Turkey 14.Hungary 15 Others, specify
C.30 Did the company have any policies and procedures before certification? <i>(Tick one)</i> .	Yes ☐ No ☐	
C.31 If yes, which ones? <i>(Tick all that apply)</i> .	1. Food safety policy 2. Supplier approval procedure 3. Hygiene policy 4. Procurement policy 5. Product specifications 6. Procedure for non-conforming products 7. Procedure for control of hazards	8. Procedure for documentation 9. Procedure for pest control 10. Procedure for cleaning and sanitation 11. Procedure for product testing 12. Procedure for dispatch 13. Others, specify
C.32 Did the company have any policies and procedures before certification? <i>(Tick one)</i> .	Yes ☐ No ☐	
C.33 If yes, which ones? <i>(Tick all that apply)</i> .	1. Food safety policy 2. Supplier approval procedure 3. Hygiene policy 4. Procurement policy 5. Product specifications 6. Procedure for non-conforming products	

	7. Procedure for control of hazards 8. Procedure for documentation 9. Procedure for pest control 10. Procedure for cleaning and sanitation 11. Procedure for product testing 12. Procedure for dispatch 13. Others specify	
C.34 Did the company brand grow when it attained certification? <i>(Tick one)</i> .	Yes ☐ No ☐	
C. 35 If yes, how? <i>(Tick all that apply)</i> .	1. More buyers 2. More orders 3. More sales volumes	4. Reduced customers complaints 5. Others, specify
C. 36 Did the company brand grow when it was uncertified? <i>(Tick one)</i> .	Yes ☐ No ☐	
C. 37 If yes, how? <i>(Tick all that apply)</i> .	1. More buyers 2. More orders 3. More sales volumes	4. Reduced customers complaints 5. Others, specify
C. 38 Did the company brand grow when it attained certification? <i>(Tick one)</i> .	Yes ☐ No ☐	
C. 39 If yes, how? <i>(Tick all that apply)</i> .	1. More buyers 2. More orders 3. More sales volumes	4. Reduced customers complaints 5. Others, specify
C.39 Did the company have documented vanilla handling	Yes ☐ No ☐	

practices before certification? (Tick one).			
C.40 If yes, which ones? (Tick all that apply).		1. Reception 2. Sorting 3. Grading 4. Blanching 5. Drying	5. Conditioning 6. Packaging 7. Transportation 8. Others specify
C.41 Did the company have documented vanilla handling practices before certification? (Tick one).		Yes _____ No _____	
C.42 If yes, which ones? (Tick all that apply).		1. Reception 2. Sorting 3. Grading 4. Blanching 5. Drying	5. Conditioning 6. Packaging 7. Transportation 8. Others specify
Sub-Section D: To find out the relationship between adoption of food safety and organic standards and the processes of vanilla exporters in Greater.			
D.1	Did the company establish process documentation before certification? (Tick one)	Yes _____ No _____	
D.2	If yes, which ones? (Tick all that apply)	1. Policies 2. Procedures 3. Records	4. Work instructions 5. Signage 6. Others, specify.....
D.3	Did the company establish process documentation after certification? (Tick one).	Yes _____ No _____	
D.4	If yes, which ones? (Tick all that apply).	1. Policies 2. Procedures	4. Work instructions 5. Signage

		3. Records	6. Others, specify.....
D.5	Did the company have specifications before certification? <i>(Tick one)</i> .	Yes ☐	No ☐
D.6	If yes, which ones? <i>(Tick all that apply)</i> .	1. Raw materials 2. Inputs	3. Final product 4. Others, specify.....
D.7	Did the company have specifications after certification? <i>(Tick one)</i> .	Yes ☐	No ☐
D.8	If yes, which ones? <i>(Tick all that apply)</i> .	1. Raw materials 2. Inputs	3. Final product 4. Others, specify.....
D.7	Did the company have a hygiene and sanitation program including structures, personnel, and equipment before certification? <i>(Tick one)</i> .	Yes ☐	No ☐
D.8	If yes, which ones? <i>(Tick all that apply)</i> .	1. Cleaning and sanitation procedure 2. Cleaning schedule 3. Cleaning records	4. Handwashing stations 5 Others, specify.....
D.9	Did the company have a hygiene and sanitation program including structures, personnel, and equipment after certification? <i>(Tick one)</i> .	Yes ☐	No ☐
D.10	If yes, which ones? <i>(Tick all that apply)</i> .	1. Cleaning and sanitation procedure 2. Cleaning schedule 3. Cleaning records	4. Handwashing stations 5 Others, specify.....

D.11	Did the company have a traceability system for vanilla from its source to the final products before certification? <i>(Tick one)</i> .	Yes ☐ No ☐
D.12	If yes, which ones? <i>(Tick all that apply)</i> .	1. Documented traceability system 2. Digitized traceability system 3. Others, specify.....
D.13	Did the company have a traceability system for vanilla from its source to the final products before certification? <i>(Tick one)</i> .	Yes ☐ No ☐
D.14	If yes, which ones? <i>(Tick all that apply)</i> .	1. Documented traceability system 2. Digitized traceability system 3. Others, specify.....
D.15	Did the company have a Training program for staff and suppliers before certification? <i>(Tick one)</i> .	Yes ☐ No ☐
D.16	If yes, which ones? <i>(Tick all that apply)</i> .	1. Food safety training 2. Good manufacturing practices training 3. Good hygiene practices training 4. Hazard analysis and critical control points training 5. Others, specify.....
D.17	Did the company have a training program for staff and suppliers after certification? <i>(Tick one)</i> .	Yes ☐ No ☐

D.18	If yes, which ones? <i>(Tick all that apply)</i> .	1. Food safety training 2. Good manufacturing practices training 3. Good hygiene practices training 4. Hazard analysis and critical control points training 5. Others, specify.....	
D.19	Did the company have a supplier approval program before certification? <i>(Tick one)</i> .	Yes ☐ No ☐	
D.20	If yes, which ones? <i>(Tick all that apply)</i> .	1. Suppliers of raw materials 2. Suppliers of inputs	3. Others, specify.....
D.21	Did the company have a supplier approval program after certification? <i>(Tick one)</i> .	Yes ☐ No ☐	
D.22	If yes, which ones? <i>(Tick all that apply)</i> .	1. Suppliers of raw materials 2. Suppliers of inputs 3. Others, specify.....	
D.23	Did the company conduct Product testing before certification <i>(Tick one)</i> .	Yes ☐ No ☐	
D.24	If yes, which ones? <i>(Tick all that apply)</i> .	1. Vanillin content 2. Moisture 3. Microbiology 4. Chemicals like pesticides and heavy metals	5. Others, specify.....
D.25	Did the company conduct Product testing after certification <i>(Tick one)</i> .	Yes ☐ No ☐	

D.26	If yes, which ones? <i>(Tick all that apply)</i> .	1. Vanillin content 2. Moisture 3. Microbiology 4. Chemicals like pesticides and heavy metals	5. Others, specify.....
D.27	Did the company conduct verification activities before certification? <i>(Tick one)</i> .	Yes ☐ No ☐	
D.28	If yes, which ones? <i>(Tick all that apply)</i> .	1. Management review meetings 2. Customers surveys 3. Food safety audits 4. Organic certification audits	5. Others, specify.....
D.29	Did the company conduct verification activities after certification? <i>(Tick one)</i> .	Yes ☐ No ☐	
D.30	If yes, which ones? <i>(Tick all that apply)</i> .	1. Management review meetings 2. Customers surveys 3. Food safety audits 4. Organic certification audits.	5. Others, specify.....
D.32	Which processes improvements were in place before the facility got certification <i>(Tick all that apply)</i> .	1. Improvement in the product quality, 2. Improvement in personnel hygiene	9. More product analysis done 10. More customer feedback 11. Reduced food safety incidents 12. Improved storage 13. Improved cleaning programs

		3. Improvement in facility 4. Improvement in trainings for staff. 5. Improved process documentation 6. Improved traceability of the product 7. Improved waste management 8. Established food safety policies	14. Establishment of product specifications 15. Establishment of supplier approval program 16. Improved pest management 17. Others specify.
D.33	Which general processes improvements were established after the facility got certification <i>(Tick all that apply)</i> .	1.Improvement in the product quality, 2. Improvement in personnel hygiene 3. Improvement in facility 4. Improvement in training for staff. 5. Improved process documentation 6. Improved traceability of the product 7. Improved waste management 8. Established food safety policies	9. More product analysis done 10. More customer feedback 11. Reduced food safety incidents 12. Improved storage 13. Improved cleaning programs 14. Establishment of product specifications 15. Establishment of supplier approval programs 16. Improved pest management 17. Others specify.

D.34	Did the company have work instructions for vanilla handling processes before certification? <i>(Tick one)</i> .	Yes ☐	No ☐
D.35	If yes, which ones? <i>(Tick all that apply)</i> .	1. Reception process 2. Sorting process 3. Grading process 4. Blanching process 5. Drying process	6. Conditioning process 7. Packaging process 8. Transportation process 9. Others specify
D.36	Did the company have work instructions for vanilla handling processes before certification? <i>(Tick one)</i> .	Yes ☐	No ☐
D.37	If yes, which ones? <i>(Tick all that apply)</i> .	1. Reception process 2. Sorting process 3. Grading process 4. Blanching process 5. Drying process	6. Conditioning process 7. Packaging process 8. Transportation process 9. Others specify

Thank you for your time and responses.

Appendix B ; Focus Group Discussion Questionnaire

FOCUS GROUP DISCUSSION GUIDE

QUESTIONNAIRE: DETERMINING THE EFFECT OF COMPLIANCE AND CERTIFICATION ON COMMERCIALIZATION OF VANILLA IN GREATER MUKONO.

Section 1. Consent:

My name is **Rwambumbe Jovien**. I am a student at Uganda Christian University Mukono pursuing a **Master of Science in Agribusiness and Entrepreneurship**. I am conducting research on the effect of compliance and certification on commercialization of vanilla in Greater Mukono. This study will help to provide insights on how to enhance adoption of organic and food safety standards. The important aspect of this study is to engage with Vanilla exporters and key stakeholders to gather their perceptions on compliance and certification.

The responses received from this engagement will be used for research purpose only. The outcome of this study shall not be attributed to you or other participants in this study. Your personal details will not be recorded and the information you provide will be kept confidential. Your name will not be made public in connection with any statement you will make.

Your participation is voluntary and whether you will give this interview or not will totally depend on your personal will. If you are unwilling to participate/answer any of the questions, you may stop this interview at any time or you may refrain from answering any specific question (s). Your views and cooperation are very important for this study. I request that spare some of your valuable time for this interview. I would like to ask you some questions which will take about 30 minutes. For report writing purposes, a voice recording, and some pictures will be taken with your consent, and these will be held with maximum confidentiality. Thank you for considering this request. I look forward to the opportunity to learn from your experiences.

Do you agree to participate?

1. Yes (continue interview) 0. No (end interview)

Do you have any question before we start? (Answer questions)

Participant Name : _____

Signature : _____

Section B : FGD Profile

FGD..... LOCATION.....

DISTRICT.....DATE.....TIME.....

S/N	Name	Contact	Consent to voice recording	Consent to pictures
1				
2				
3				
4				
5				
6				
7				
8				

1. In your engagement in the vanilla sector, are there any types of certifications that you know? Mention the ones which you know.
2. Which markets do certified vanilla exporters sell their vanilla and why?
3. Which factors do you think have influenced the adoption of organic and food safety certification among vanilla exporters.
4. How have actors in the vanilla marketing channels been influenced by adoption of food safety standards and certification?
5. How have actors in the vanilla marketing channels been affected by non-adoption of organic and food safety standards and certification?
6. What benefits have vanilla exporters in Greater Mukono gained from certification?
7. How can certification be enhanced among vanilla exporters in greater Mukono
8. Do you have any questions for us?

Thank you for your time and responses.

Appendix C: Key Informant Questionnaire

Key Informant Interview

Section 1: Introduction

MUKONO.

Section A. Consent:

Dear

Section A: Consent

My name is **Rwambumbe Jovien**. I am a student at Uganda Christian University Mukono pursuing a **Master of Science in Agribusiness and Entrepreneurship**. I am conducting research on the effect of compliance and certification on commercialization of vanilla in Greater Mukono. This study will help to provide insights on how to enhance adoption of organic and food safety standards. The important aspect of this study is to engage with Vanilla exporters and key stakeholders to gather their perceptions on compliance and certification. The responses received from this engagement will be used for research purpose only. The outcome of this study shall not be attributed to you or other participants in this study. Your personal details will not be recorded and the information you provide will be kept confidential. Your name will not be made public in connection with any statement you will make.

Your participation is voluntary and whether you will give this interview or not will totally depend on your personal will. If you are unwilling to participate/answer any of the questions, you may stop this interview at any time or you may refrain from answering any specific question (s). Your views and cooperation are very important for this study. I request that spare some of your valuable time for this interview. I would like to ask you some questions which will take about 30 minutes. For report writing purposes, a voice recording, and some pictures will be taken with your consent, and these will be held with maximum confidentiality. Thank you for considering this request. I look forward to the opportunity to learn from your experiences.

Do you agree to participate? 1. Yes (continue interview) 0. No (end interview)

Do you have any question before we start? (Answer questions)

Participant name: _____

Signature: _____

Section B: Key Informant Profile

1. Informant Background

Name	
Age	
Sex	
Education level	
location	
Organization	
Occupation	
Telephone	
Email or other	
Membership to association/Group/SACCOs	
Experience/Years in the vanilla industry	
Other details	

2. From your perspective, what factors influenced the adoption of organic and food safety certification among vanilla exporters?
3. How does the current environment in Uganda affect adoption of organic and food safety certification among vanilla exporters?
4. What has been your experience working with vanilla exporters in adoption of organic and food safety certification by vanilla exporters?
5. Any additional comments or suggestions related to compliance to organic and food safety certification?
6. Do you have any questions for us?

Thank you for your time and responses.