



**van hall  
larenstein**  
university of applied sciences

**Ways of Mhonda Juu Agricultural Marketing  
Cooperative Society  
to Access Export Market:  
A Case Study of Mhonda Juu Cooperative in Mvomero District,  
Morogoro-Tanzania**



**By**

**Lazaro Arnold Kanuti**

**14 September 2022**

**© Copyright Lazaro Arnold Kanuti 2022, All rights reserved**



**van hall  
larenstein**  
university of applied sciences

A thesis submitted in partial fulfilment of the requirements for  
the degree of Master of Agricultural Production Chain  
Management, Specializing in Horticulture Chains.

**AUTHOR** LAZARO ARNOLD KANUTI

**DATE** September 2022

**SUPERVISOR**

ALBERTIEN KIJNE

**ASSESSOR**

LEYEQUIENE ABARCA EURIDICE

**Copyright© Lazaro Arnold Kanuti 2022.All Rights Reserved**

## **ACKNOWLEDGEMENT**

I express gratitude to the Omnipresent God for giving me the health and well-being I needed to finish this thesis. I grateful the VHL staff for their assistance with this study. I would also like to thank the Dutch government (NUFFIC) for providing me with this tremendous scholarship opportunity .

I would like to express gratitude to my specialization coordinator, Mr. Marco Verschuur.

I would like to express my heartfelt gratitude to Albertien Kijne, my mentor and supervisor lecturer, for guiding and encouraging me throughout my entire academic year at Van Hall Larenstein. It was a wonderful experience to be under her supervision.

I would like to express my gratitude to Mvomero District Council for granting me permission to attend this scholarship.

I would really like to express my sincere thanks to my friends Muhoja Silvester Nyandi, Mercy Kemboi, and Cynthia Onyangore.

Finally, would like to express my sincere appreciation to my mother and father.

**DEDICATION**

This thesis is dedicated to my beautiful wife, Oliver Anacredo Gasper, and my wonderful daughters, Charity Lazaro, and Holliness Lazaro, for their perseverance and endurance while I was away from our wonderful home.

<b>Table of Contents</b>	
<b>ACKNOWLEDGEMENT</b> .....	iii
<b>DEDICATION</b> .....	iv
<b>List of Figures</b> .....	viii
<b>List of Tables</b> .....	ix
<b>List of Acronyms</b> .....	ix
<b>ABSTRACT</b> .....	1
<b>CHAPTER 1: INTRODUCTION</b> .....	2
<b>1.1 Background</b> .....	2
<b>1.2 Agriculture Sector Overview in Tanzania</b> .....	2
<b>1.3 Opportunities for vanilla in Tanzania</b> .....	3
<b>1.4 Problem statement</b> .....	3
<b>1.5 Research Justification</b> .....	5
<b>1.6 Research objective</b> .....	5
<b>1.7 Main and sub-research questions</b> .....	5
<b>CHAPTER 2: LITERATURE REVIEW</b> .....	6
<b>2.1 Chapter overview</b> .....	6
<b>2.2 Agricultural Marketing Cooperative Society</b> .....	6
<b>2.3 Export marketing</b> .....	6
<b>2.4 Market access</b> .....	6
<b>2.5 Factors hindering agricultural marketing cooperative society from accessing export market</b> . 6	
<b>2.6 Conceptual framework</b> .....	7
<b>2.6.1 Value chain Map</b> .....	8
<b>2.6.2 Main Stakeholders (actors, supporters, and influencers) and chain relation</b> .....	8
<b>2.6.3 Opportunities of the vanilla</b> .....	8
<b>2.6.4 Export market requirements</b> .....	11
<b>CHAPTER 3: RESEARCH METHODOLOGY</b> .....	15
<b>3.1 Description of the study area</b> .....	15
<b>3.2 Research strategy</b> .....	15
<b>3.3 Sampling procedure</b> .....	16
<b>3.4 Data collection</b> .....	17
<b>3.4.1 Primary data</b> .....	17
<b>3.4.2 Secondary data</b> .....	20
<b>3.5 Data processing and analysis</b> .....	20
<b>3.5.1 Focus group discussion and Interview</b> .....	21
<b>3.6 Ethical considerations</b> .....	21

3.7 Limitations of the Research .....	22
<b>CHAPTER 4: RESULTS .....</b>	<b>23</b>
4.1 Chapter Overview.....	23
4.2 Gender, Age and Level of education of questionnaire respondents.....	23
4.2.1 Gender .....	23
4.2.2 Age .....	23
4.2.3 Level of education .....	24
4.2.4 Number of farmer’s own phone .....	25
4.3 Number of stakeholders and their roles .....	25
4.3.1 Number of actors and their roles in the vanilla value chain.....	25
4.3.2 Number of supporters and their roles in the vanilla value chain.....	30
4.4 Stakeholder matrix.....	31
4.5 Chain relations.....	32
4.5.1 Relationship between farmers .....	32
4.5.2 Market information.....	32
4.6 Vanilla production.....	33
4.6.1 Production volume.....	33
4.6.2 Good agricultural practices .....	34
4.7 Vanilla quality, food safety and certification for the export market requirement .....	36
4.7.1 Vanilla bean length .....	36
4.7.2 Food safety .....	36
4.7.3 Certification .....	37
4.8 Opportunities for cooperative to meet the export market requirements.....	37
4.8.1 Why is there an opportunity?.....	37
4.8.2 Researched whether there was a possibility of meeting export market requirements...	37
4.9 Other opportunities .....	39
4.9.1 Source of income.....	39
4.9.2 Forest conservation.....	39
5.0 District agricultural officer and field officers advised on how to access export markets .....	39
<b>CHAPTER 5: DISCUSSION .....</b>	<b>40</b>
5.1 Vanilla value chain .....	40
5.1.1 Number of farmers.....	40
5.1.2 Market Information .....	40
5.1.3 Relationships between actors and supporters in the vanilla value chain.....	41
5.1.4 Characteristics of vanilla production .....	41

<b>5.2 Opportunities for Mhonda Juu Agricultural Marketing Cooperative Society to meet export market requirements .....</b>	<b>42</b>
<b>5.2.1 Better meeting requirements for vanilla quality and food safety for the export market</b>	<b>42</b>
<b>5.2.2 Change in the farming system would support farmers to meet export market requirements.....</b>	<b>42</b>
<b>5.2.3 Change to mixing with more crops would support farmers to meet export market requirements .....</b>	<b>43</b>
<b>5.3 Chosen research design and methodology .....</b>	<b>43</b>
<b>5.4 Sustainability (3P).....</b>	<b>43</b>
<b>5.4.1 Planet.....</b>	<b>43</b>
<b>5.4.2 Profit .....</b>	<b>44</b>
<b>5.4.3 People .....</b>	<b>44</b>
<b>5.5 Limitation.....</b>	<b>44</b>
<b>CHAPTER 6: CONCLUSIONS AND INTERVENTIONS.....</b>	<b>45</b>
<b>6.1 CONCLUSIONS .....</b>	<b>45</b>
<b>6.1.1 Current value chain .....</b>	<b>45</b>
<b>6.1.2 Opportunities for Mhonda Juu Agricultural Marketing Cooperative Society to meet export market requirements .....</b>	<b>46</b>
<b>6.2 INTERVENTIONS .....</b>	<b>47</b>
<b>6.2.1 To link Mhonda Juu cooperative with the Tanzania Mercantile Exchange Online Trading Platform.....</b>	<b>47</b>
<b>6.2.2 To assist vanilla smallholder farmers to use their phones to find market information ...</b>	<b>47</b>
<b>6.2.3 Interactions between actors in the value chain.....</b>	<b>48</b>
<b>6.2.4 Train farmers on post-harvest technology.....</b>	<b>48</b>
<b>6.2.5 Establishment of a vanilla bean chart grading system .....</b>	<b>49</b>
<b>6.2.6 Establishment of four (4) tree nurseries .....</b>	<b>49</b>
<b>6.2.7 Formation of 4 vanilla pollination farm field school group.....</b>	<b>50</b>
<b>6.2.8 Establishment of certifications .....</b>	<b>50</b>
<b>APPENDICES.....</b>	<b>61</b>
<b>Annex 1: Questionnaire for vanilla smallholder farmers in Mvomero District.....</b>	<b>61</b>
<b>Annex 2. Interview checklist for the key-informants.....</b>	<b>65</b>
<b>Annex 3: Receipt of the green bean’s vanilla per kg.....</b>	<b>67</b>
<b>Annex 4 : Mean .....</b>	<b>67</b>
<b>Annex 5: Relationship .....</b>	<b>67</b>
<b>Annex 6: Accessed market information .....</b>	<b>67</b>
<b>Annex 7: Vanilla production (kilograms) per gender .....</b>	<b>68</b>
<b>Annex 8 : Difference in yield (vanilla production) per age groups.....</b>	<b>68</b>

<b>Annex 9: Difference in yield per education level</b> .....	68
<b>Annex 10 : Difference in yield between farmers mixing with cocoa against farmers mixing with coffee, cocoa, and bananas</b> .....	68
<b>Annex 11: Difference between yield and different farming systems</b> .....	69
<b>Annex 12: Average yield of difference farming systems</b> .....	69
<b>Annex 13: List of respondents (Questionnaires)</b> .....	69
<b>Annex 14: List of the respondents (Focus group discussion)</b> .....	71
<b>Annex 15: List of key informants</b> .....	71
<b>Annex 16: Photos taken during data collection</b> .....	72
<b>Annex 17: Photos taken during an interview with key informants</b> .....	73
<b>Annex 18 : Raw Data</b> .....	74
<b>Annex 19: Raw data (1-26 respondents)</b> .....	75
<b>Annex 20: Raw data (27-40 respondents)</b> .....	77

### List of Figures

Figure 1: Current vanilla chain map Mvomero district (Author, 2022) .....	4
Figure 2: Conceptual framework (Author, 2022).....	7
Figure 3: Top ten (10) countries of vanilla production in the world (FAOSTAT, 2022).....	10
Figure 4: Total volume (tons) of vanilla harvested in Mvomero district (MoAT, 2022) .....	11
Figure 5: Vanilla bean length measurement (Mvomero district, 2020) .....	12
Figure 6: EU-Organic logo (European, 2022) .....	13
Figure 7: Fairtrade Foundation (Fairtrade Foundation, 2022).....	14
Figure 8: Rainforest Alliance logo (Rainforest Alliance, 2022).....	14
Figure 9: Mvomero district map (Mvomero district, 2022).....	15
Figure 10: Research framework (Author, 2022) .....	16
Figure 11: Questionnaire’s respondents (Author, 2022) .....	18
Figure 12: In session focus group discussion with respondents (Author, 2022) .....	19
Figure 13: Interview with ward agricultural officer and chairman of Mhonda Juu Cooperative .....	20
Figure 14: Percentages ranges for both males and females (Author, 2022) .....	23
Figure 15: Age distribution of vanilla smallholder farmers (Author, 2022).....	24
Figure 16: The farmer's educational level (Author, 2022).....	24
Figure 17: Farmers phone ownership (Author, 2022) .....	25
Figure 18: Current vanilla value chain of Mvomero district (Author, 2022).....	26
Figure 19: Sourcing of planting materials (Author, 2022) .....	27
Figure 20: Sample of vanilla beans dried locally by the farmer.....	28
Figure 21: Vanilla beans dried and packaged (Author, 2022).....	29
Figure 22: Exporter (NEI) and Vanilla farmers making organic pesticides (Author, 2022) .....	29
Figure 23: Vanilla chain supporters (Author, 2022).....	30
Figure 24: Production decrease as age increases (author, 2022).....	34
Figure 25: Type of support received (Author, 2022) .....	35
Figure 26: Difference in yield ( Author, 2022) .....	38
Figure 27: Poultry farm ( Author, 2022).....	39
Figure 28: Proposed vanilla value chain (author, 2022) .....	51

## List of Tables

Table 1: Selection criteria for questionnaires respondents.....	16
Table 2: Sampling strategy of wards and respondents.....	17
Table 3: Locations of respondents (Author,2022) .....	19
Table 4: Descriptive statistics (Author, 2022) .....	21
Table 5: Inferential statistics (Author, 2022) .....	21
Table 6: Stakeholder matrix (Author, 2022) .....	32
Table 7: Plan of activities 01 (Author, 2022).....	47
Table 8: Plan of activities 02 (Author, 2022).....	47
Table 9: Plan of the activities 03 (Author, 2022) .....	48
Table 10: Plan of the activities 04 (Author, 2022) .....	48
Table 11: Plan of the activities 05 (Author, 2022) .....	49
Table 12: Plan of the activities 06 (Author, 2022) .....	49
Table 13: Plan of the activities 07 (Author, 2022) .....	50
Table 14: Plan of the activities 08 (Author, 2022) .....	50

## List of Acronyms

ACRONYMS	MEANING
\$	Dollar
€	Euro
AMCOS	Agricultural Marketing Cooperative Society
CBI	The Centre for the Promotion of Imports from developing countries
CM	Centimetre
CRDB	Cooperative and Rural Development Bank
EAMCF	Eastern Arc Mountains Conservation Endowment Fund
EU	European Union
FAO	Food and Agriculture Organisation
FAOSTAT	Food and Agriculture Organisation Corporate Statistical Database
FFS	Farm Field School
FGDs	Focus Group Discussions
GDP	Gross Domestic Product
Ha	Hectare
Kg	Kilogram
LGA	Local government authority
M	Million
MDC	Mvomero District Council
MoAT	Ministry of Agriculture-Tanzania
NEI	Natural Extract Industry
NGO	Non-government organization
NMB	National Microfinance Bank
SPSS	Statistical Package for Social Science
SUA	Sokoine University of Agriculture
TARI	Tanzania Agricultural Research Institute
TBS	Tanzania Bureau of Standard

TMX	Tanzania Mercantile Exchange
WHO	World Health Organisation
WTO	World Trade Organization

## **ABSTRACT**

This research was carried out with the aim to identify ways of Mhonda Juu Agricultural Marketing Cooperative Society to access the export market and to develop interventions. The advised interventions will assist Mhonda Juu Agricultural Marketing Cooperative in improving access to the export market, resulting in increased farmer income, improved livelihoods of vanilla smallholder farmers, and a well-developed and sustainable vanilla value chain in the Mvomero district.

This research was conducted on vanilla smallholder farmers in the Mvomero district. Purposive sampling was used to select a sample of 40 vanilla smallholder farmers from four(4) wards in the study area. Also, focus group discussions (FGDs), and in-depth interviews with key informants were used to collect data.

The study showed that among the 40 vanilla growers production decreased as age increases ( $p=0.005$ ). A T-test showed there were significant differences in yield between farmers mixing vanilla with cocoa (45.2 kg) against farmers mixing vanilla with coffee, cocoa, and bananas (65.3 kg) ( $p= 0.036$ ). The results of questionnaire showed that 57.5% of the farmers practice organic farming and 42.5 % practice agroforestry. The findings from FGD, key informants and questionnaire show that certification is unavailable in the study area.

Vanilla smallholder farmers in Mvomero district are practicing farming systems that meet export market requirements, but the cooperative has yet to gain access to the export market, resulting in farmers' receiving low prices for their vanilla. Unavailability of certification, lack of market information, and lack of post-harvest technology were some of the obstacles mentioned as hindering Mhonda Juu cooperative's access to the export market. However, there is still an opportunity for Mhonda Juu cooperative to access the export market.

To gain access to the export market, Mhonda cooperative should train farmers in post-harvest technology, establish certification, establish a vanilla chart grading system, and finally, the cooperative should join with TMX in order to access the global market.

***Keywords: Vanilla, smallholder farmers, export market, Mhonda Juu AMCOS, value chain, Mvomero.***

## **CHAPTER 1: INTRODUCTION**

### **1.1 Background**

Vanilla is a highly valuable spice globally after saffron. It is a tropical crop that originated in Mexico and is distributed to the world (Ambika and Supriya, 2018). In its green pod, the vanilla crop does not have the aroma that characterises it. After the curative method, this shows up, which can differ based on the climatic conditions of the growing country and region (Baqueiro-Peña, and Guerrero-Beltrán, 2017).

There are two main varieties of vanilla in the world grown on a commercial scale; they include *Vanilla planifolia* and *Vanilla tahitensis* (Chambers et al., 2019). Eighty per cent (80 %) of the vanilla produced globally belongs to the *Vanilla planifolia* variety, and it is habitually known as 'Bourbon' (Bomgardner, 2017). *Vanilla planifolia*, is the main source of natural flavours commonly used in food industries to flavour chocolates, yoghurt, cakes, cosmetics, beverages, ice creams and other sweets (Greule et al., 2015).

According to Resource Trade Earth, (2020), the leading exporter of vanilla worldwide is Madagascar, with a total value of \$565m (63 %) out of \$893m globally. The total quantity of vanilla exported globally in 2020 is 6186 tons (FAOSTAT, 2020). The estimated global demand for vanilla is likely to grow by 6.2 % ranges from 2016 to 2025, and the world market is estimated to reach 724.5 million US dollars in the same year (Grand View Research, 2017).

Furthermore, according to Acumen Research and Consulting (2019), the world market for vanilla pods will be expected to reach \$ 4.3 billion in 2025.

### **1.2 Agriculture Sector Overview in Tanzania**

Currently, the Tanzanian's population has increased from approximately 44 million in 2012 to 59 million in 2021 (Census population projection 2021). The agricultural industry is a crucial source of livelihood for the Tanzanian people. It contributes 28 % of the Gross Domestic Product, offers 95 % of the food, and employs 75 % of the Tanzanian population (Mkonda & He, 2018).

Vanilla smallholder farmers in the Mvomero district face myriads of challenges such as lack of skilled agricultural extension officers with a background in vanilla crop, lack of vanilla smallholder farmers' involvement in the vanilla value chain and lack of knowledge of global standards to meet market requirements for accessing the international markets.

The smallholder farmers own a small size of a farm of less than 4 hectares (Gwambene, 2021). Vanilla is the spice crop that is commonly intercropped with other crops such as bananas and cocoa (Wang et al., 2016). Tanzanian vanilla is primarily sold in global markets; the amount of vanilla produced in Tanzania is relatively small. Exports fluctuate from year to year. For instance, from 2016, 2017, 2019 up to 2020 the export was 28, 520, 600, 137 tons, respectively (FAOSTAT, 2020).

In Tanzania, Agricultural Marketing Cooperative Societies have been introduced to promote the agriculture sector. These cooperatives are dealing with cash crops; the role of agricultural marketing cooperatives is to support the smallholder farmers financially through better access to both local and global markets (Anania and Sambuo, 2017).

The government of Tanzania purposely introduced agricultural cooperatives to reduce poverty among smallholder farmers and create conducive opportunities for rural producers to improve their livelihood (Sumelius et al., 2021).

Vanilla production increased from 229 tons per year 2016 to 1950 tons in 2020. Regions that produce vanilla are Kagera, Kilimanjaro, Mbeya, Arusha, Pemba and Morogoro, mainly Mvomero district. This increase led to Mhonda Juu agricultural marketing cooperative society to be established in Mvomero district and registered in 2016 under cooperative societies act 2015 (Tanzania Ministry of Agriculture, 2020).

Mvomero district is found in the Morogoro region of Tanzania. The district has highly favourable climatic conditions, which is suitable for growing spices such as vanilla crop, which is valuable and is primarily sold in global markets (Mvomero strategic plan, 2017).

A farming system which is practiced in Mvomero district is mixed farming, where the vanilla crop is mixed with other crops like cocoa, bananas, and other supporting trees such as *Jatropha*. The harvest is mainly produced by smallholder farmers who own a farm of less than four hectares with an output in yield/hectare of 1.5 tons (Tanzania Ministry of Agriculture, 2017).

Mhonda Juu Agricultural Marketing Cooperative society sources the green pods vanilla from the smallholder farmers found in Mvomero district, process the green pods (curing) and sell cured pods to Natural Extract Industries Limited in Mvomero district. Mhonda Juu Cooperative is assessed for its performance by the cooperative officers from the district, region, and ministry level (Mvomero district cooperative plan report, 2017).

The roles of cooperative officers are to collaborate with the agricultural officers to train smallholder farmers on Good Agricultural Practices, to monitor the implementation of the cooperative policies to train the cooperative members to be aware of their rights and to give them updates on either new cooperative regulations or new market information (Mvomero district cooperative plan report, 2017).

### **1.3 Opportunities for vanilla in Tanzania**

Tanzania still has the potential to become a major exporter of vanilla around the world, enhance its Gross Domestic Product (GDP), and become more competitive. Researcher investigated five (5) opportunities: farming system, vanilla bean length, certification, market demand, variety, and a suitable environment for growing vanilla.

### **1.4 Problem statement**

The Mhonda Juu Agricultural Marketing Cooperative Society is one of the cooperatives in the Mvomero district that is responsible for selling vanilla products that smallholder farmers produce. Limited access to the export market is the problem the cooperative faces. This leads to vanilla smallholder farmers not benefiting from the premium price of vanilla as the cooperative depends on one market outlet, namely Natural Extract Industries.

The Cooperative is therefore failing to meet among its main objective for fostering competitive market and accessibility to members (Tanzania cooperative societies act, 2013).

Currently, smallholder farmers in Mvomero district almost entirely depend on vanilla production for their livelihoods. The practice has negatively impacted their well-being since the benefits derived from vanilla are low. According to the Mvomero district report for 2020, farmers in Mhonda and Kweuma wards receives 58 euros after selling one kilogram of green cured beans, length 12 cm–20 cm, from Natural Extract Industries Company through Mhonda Juu Cooperative, which is significantly less than the global export market price of 416.69 euros per kilogram of green cured beans (Mvomero district report, 2020).

Therefore, this research aims to identify the factors hindering Mhonda cooperative's access to the export market to recommend to the Mvomero district council the possible ways of improving the accessibility of the export market, which will increase the income of vanilla smallholder farmers.

**Problem owner**

The problem owner is the Mvomero district council. The Mvomero district council key tasks include implementing national agricultural policies, plans, laws, and standards along the value chain of commodities, as well as ensuring that its communities, which are mostly smallholder farmers, are living well.

The chain map shown below shows the problem owner, the Mvomero District Council, and the main buyer, Natural Extract Industries Limited.

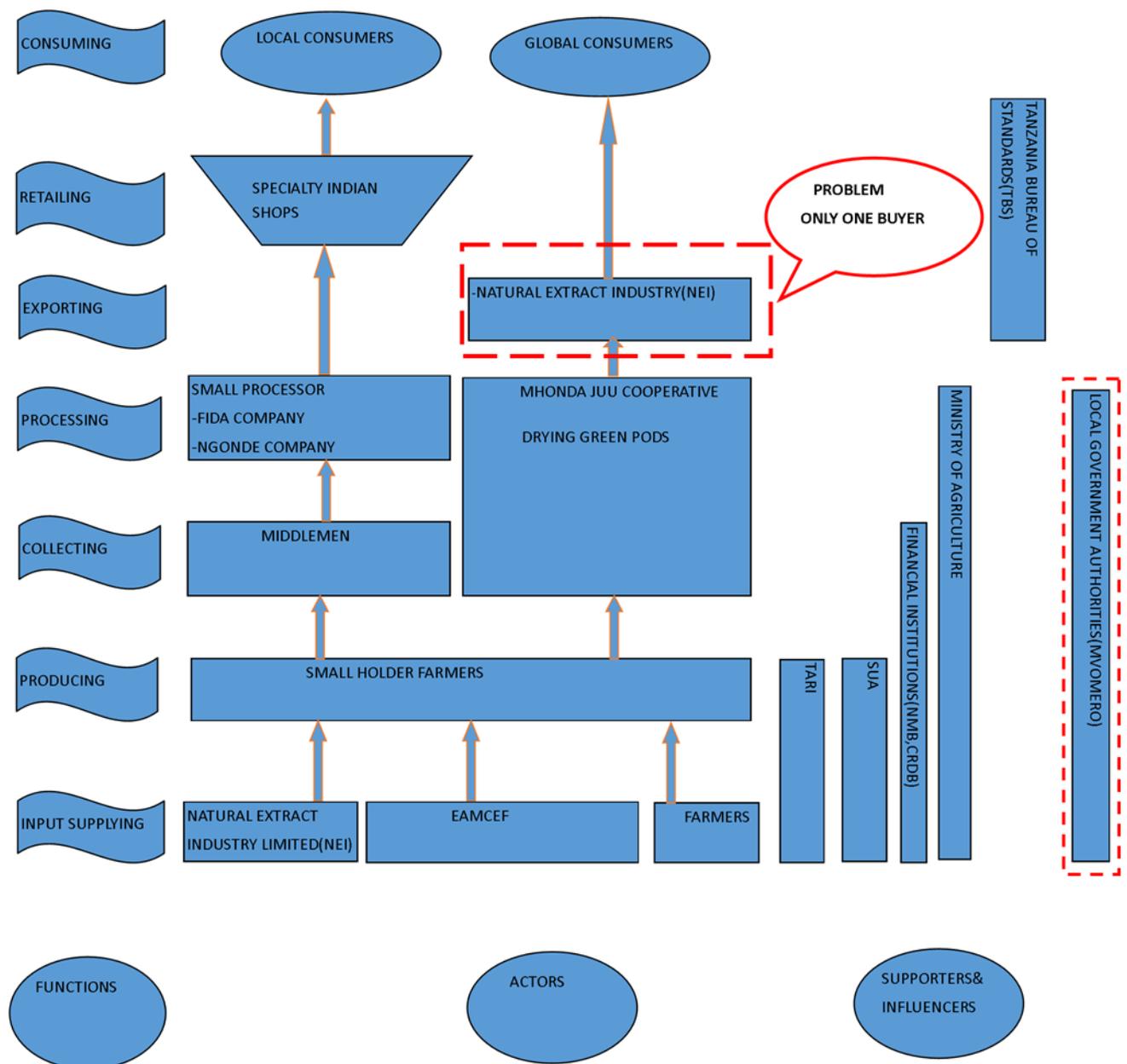


Figure 1: Current vanilla chain map Mvomero district (Author, 2022)

### **1.5 Research Justification**

Despite numerous studies on agricultural marketing cooperative societies in Tanzania, no, or little research has been conducted on the ways of Mhonda Juu Agricultural Marketing Cooperative Society to Access Export Market in Mvomero district council or Tanzania as a whole and Mhonda Juu Agricultural Marketing Cooperative Society in particular. This study aims to identify ways for Mhonda Juu Agricultural Marketing Cooperative Society to access Export Market and to develop interventions that will assist Mhonda Juu Agricultural Marketing Cooperative in improving access to the export market.

Mvomero district was chosen as the research study area because it was the district among nine (Moshi Rural, Siha, Hai, Morogoro Rural, Rungwe, Kyela, Njombe, Bukoba Rural, Mbeya Rural) that had vanilla production potential and was closer to both agricultural university and research institution. Besides, this was the first research done on the vanilla value chain in this area.

The study is useful to the Ministry of Agriculture in Tanzania and the Mvomero district because, through the recommendations and suggestions from the research, there will be an improvement in vanilla production in terms of quality and quantity, as well as market access, which will increase income for the vanilla smallholder farmers and improve their livelihood. Furthermore, it will stimulate community development by creating job opportunities for the youth who are shifted to the Morogoro Municipality to find better jobs. Additionally, it will attract different stakeholders to invest in the sector and enhance good relations between the actors within the chain.

### **1.6 Research objective**

The purpose of this study is to identify the ways of Mhonda Juu Agricultural Marketing Cooperative Society to access export market and to develop interventions that will assist Mhonda Juu Agricultural Marketing Cooperative in improving access to the export market, resulting in increased farmer income, improved livelihoods of vanilla smallholder farmers, and a well-developed and sustainable vanilla value chain in the Mvomero district.

### **1.7 Main and sub-research questions**

#### **1. What is the current vanilla value chain in the Mvomero district?**

##### **Sub research question (s)**

- ❖ What are the stakeholders, their roles, and numbers?
- ❖ What are the chain relations in the vanilla value chain?
- ❖ What are the characteristics of vanilla production?

#### **2. What are the opportunities for Mhonda Juu Agricultural Marketing Cooperative Society to meet export market requirements?**

##### **Sub research question (s)**

- ❖ What are the requirements for meeting vanilla quality and food safety for the export market?
- ❖ To what extent would change in the farming system support farmers to meet export market requirements?

## **CHAPTER 2: LITERATURE REVIEW**

### **2.1 Chapter overview**

This chapter presents a review of relevant theoretical literature. The chapter reviews the concepts of agricultural marketing cooperatives. It also presents factors that hinder agricultural cooperatives' access to export markets, provides the conceptual framework for the research, and provides descriptions of variables.

### **2.2 Agricultural Marketing Cooperative Society**

Smallholder family farming dominates agriculture in developing countries, particularly in Africa, where it contributes significantly to household food consumption and is the foundation of rural women's and men's livelihoods and incomes (Hussein and Suttie, 2016). Smallholder farmers in developing countries are frequently encouraged to form cooperatives, primarily to solve production and marketing constraints that impede their ability to improve their livelihoods (Mojo et al., 2017). Smallholder farmers can gain access to markets that they would not be able to access otherwise through marketing cooperatives (Agbo et al., 2015).

An agricultural marketing cooperative is a business entity owned by farmers that jointly sell their products at competitive prices (Agbo et al., 2015). It serves as pathways to improve market competitiveness and rural household income (Hoken and Su, 2018) assisting farmers in accessing export markets (Tefera et al., 2017); thus, becoming an important component of rural development, agricultural productivity, and anti-poverty guidelines, particularly in Africa and South Asia (Bizikova et al., 2020).

The Tanzania cooperative societies act (2013), stresses that, one of the responsibilities of the Agricultural Marketing Cooperative Societies is to find markets for its members and sell the products to different buyers at a competitive price making marketing services available to its members and other members of the community (Anania & Rwekaza, 2016).

### **2.3 Export marketing**

The planning of marketing strategies for goods that cross a country's international borders is known as export marketing. Exporting has become critical in ensuring a company's existence and gaining a competitive advantage in international markets to sustain the company's current and future success (Sutduean et al., 2019).

### **2.4 Market access**

Market access for goods refers to the terms, tariffs, and non-tariff procedures that members agree upon for the entrance of certain items into their markets (WTO, 2022). Market access is essential for smallholder farmers' improvement because it generates demands and provides compensation prices, resulting in increased smallholder farmers' incomes (Magesa et al., 2014).

### **2.5 Factors hindering agricultural marketing cooperative society from accessing export market**

There are several factors that hinder agricultural marketing cooperatives from accessing the export market. Some of the factors are described in the following text.

The **lack of up-to-date market information** has been cited as a barrier to smallholder farmers to reach the market. For example, smallholder farmers in Western Ethiopia who produce local spices, primarily Korarima, which is commonly used for consumption, potential health benefits, and contributes to smallholder farmers' livelihoods, struggled to sell their product to the appropriate market due to a lack of updated market information, having left them unable to sustain their daily lives (Gebreyesus, 2016).

**Lack of adequate government support**, mainly funding, was highlighted as the factor hindering many cooperatives (Borda & Vicari, 2014), coupled with **lack of availability and accessibility to extension services** (Sebetha, 2021). Furthermore, **lack of warehouse facilities** has been identified as a challenge to large cardamom exports to international markets Attributed by smallholder farmers' low incomes, which prevent them from purchasing warehouse facilities (Acharya et al., 2021).

Another factor that hinders access to the export market is **a decrease in commodity prices**. The sudden and dramatic drop in the price of green vanilla in Madagascar hindered smallholder farmers. In 2019, for example, they were paid ten euros per kilogram (10 €/kg) of green vanilla rather than forty euros per kilogram (40 €/kg) (Hänke, 2020).

## 2.6 Conceptual framework

Conceptual framework is the entire, logical direction and relationships of anything and everything that constitutes the basic thoughts, frameworks, plans, and procedures, and implementation of overall research (Kivunja, 2018). It presents a network of interlinked concepts that together provide a comprehensive understanding of a phenomenon showing how variables relate to each other and depicting the pattern of interaction between different variables. The conceptual framework that is used for this research is as shown in figure below

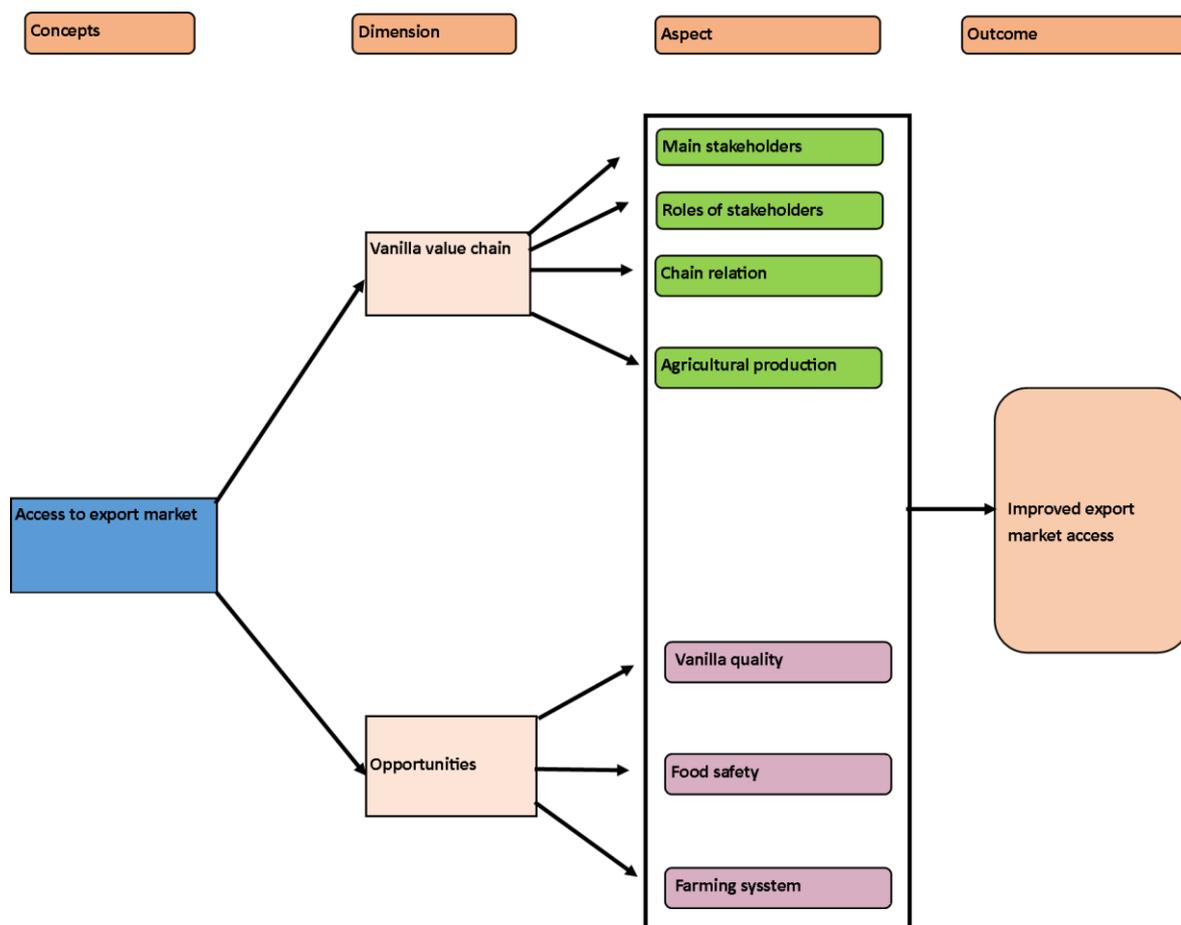


Figure 2: Conceptual framework (Author, 2022)

### **2.6.1 Value chain Map**

The value chain defines the steps that companies take to move a commodity from conception to final consumption, including designing, manufacturing, advertising, and delivery (McGuffog, 2016). The value chain entails the use of different companies' resources and skills to create value for the final customer (Lundy et al., 2014). There is a relationship between the various stakeholders along the chain. These stakeholders are linked by information flows and the knowledge required for the implementation of specific production techniques (Arias et al., 2013).

Value chain analysis is the act of breaking down a chain into its different components to fully understand its form and performance. The value chain analysis involves determining chain actors at every step and determining their roles and relationships; defining chain governance, to make chain development and strengthening easier (Wondim., 2021).

### **2.6.2 Main Stakeholders (actors, supporters, and influencers) and chain relation**

Stakeholders in the value chain are organizations with a direct interest in an organization's performance in achieving its aims and desired results and ensuring the sustainability of its product, services, and outcomes throughout time (Khudair & Abdalla, 2016). These stakeholders include influencers, supporters, and actors. In this research, stakeholders are all people or organizations that have invested in the Mvomero vanilla value chain.

#### **Actors**

Actors are individuals or organizations that involve in the chain (Lundy et al., 2014). Or actors are individuals who are active in the product's distribution. The value chain includes people involved in acquiring inputs (suppliers), producing products (producers), selling products to collectors or processors, wholesalers, or retailers, and finally, selling products to consumers (Chhetri et al., 2021).

#### **Chain Supporters**

Individuals or organizations are indirectly involved in the value chain (Lundy et al., 2014). The services given by different actors who have no direct interaction with the item but whose contributions add value to it, chain supporters play an indirectly important role in the value chain (Henry et al., 2014). In this research, all individuals or organizations who fit that description will be referred to as supporters. Many organizations in the Mvomero district are involved in some way with the vanilla value chain. Some organizations offer assistance such as vanilla cuttings, training, and advice to vanilla smallholder farmers along the value chain. Furthermore, some non-governmental organizations offer credit to vanilla smallholder farmers.

#### **Influencer**

An influencer is an actor who is not directly involved in the value chain but who may contribute to it creating sustainability (Brettmo and Williamsson, 2020)

#### **Chain relation**

Chain relation is the link between the actors in the chain (KIT and IIRR, 2008). In this study the chain relations that will be identified are vanilla value chain actors, supporters, and influencers.

### **2.6.3 Opportunities of the vanilla**

#### **Farming system**

There are different definitions for a farming system farming systems one definition is that farming systems that can maintain productivity and utility to society continuously. These systems must be

resource-efficient, socially beneficial, financially attractive, and environmentally friendly (Brown et al., 2021). Farming system is a strategic planning approach for achieving economic and long-term production to suit the different needs of farm households while conserving the natural resource and keeping good environmental quality (Meuwissen et al., 2019). Another definition of a farming system is characterized as a set of farm households with broadly similar patterns of resources, livelihoods, consuming, challenges, and opportunity, Typically, these systems have agronomic and market access conditions that are very equivalent (Dixon et al., 2020). For this research the first definition will be used.

### **Type of farming system**

The two main types of farming systems are organic and conventional farming (Therond et al., 2017). Organic farming is seen to be environmentally beneficial and to have less harmful impact on the environment (Persina et al., 2015). **Organic farming** is a method of agriculture that prevents or greatly reduces the use of agrochemicals (Singh, 2021). **Conventional farming** uses of agrochemicals to increase the output of a given crop (Persina et al., 2015).

Organic farming with intercropping produces a high yield (Bedoussac et al., 2015). Intercropping can be made up of two or even more plants, comprising annual crops and perennials. Intercropping is highlighted as an essential agricultural method for improving crop productivity and protection of the environment (Gebru, 2015).

Vanilla is a popular spice (De and Medhi, 2015). Vanilla is a woodland plant that requires a comparable forest environment to grow. Vanilla produces a high yield when intercropped with agroforestry trees such as coffee (Jessy et al., 2017). Also, vanilla produces high yield when intercropped with cacao (Martin et al., 2021).

### **Agroforestry**

Agroforestry is the ecosystem management of natural resources by integrating trees with other crops to generate socio-economic benefits as well as environmental benefits (Jaya et al., 2021). Agroforestry yields are higher than monoculture, and they are uniformly spread throughout the year (Jaya et al., 2021). Contributing positively because one crop's failure can be compensated for by another. Agroforestry does have the ability to transform the world, with the capacity to enhance the conservation of organic farming (Rosati et al., 2021). These benefits make agroforestry an attractive option for smallholder farmers (Jaya et al., 2021). Vanilla is planted in agroforestry systems that are set up in woodlands or on fallow fields (Schwab et al., 2021).

### **Good Agricultural practices**

#### **Training for vanilla vines**

Vanilla plants need a support tree or other structure to grow on (Havkin et al., 2018), or crops such as *Jatropha*, rubber, and clove are also grown to provide support for the vanilla vines (Borbolla et al., 2017). A tree needs to have a strong support system to ensure strong growth, and it needs to get about 50 % of its energy from the sun (Kifelew et al., 2016).

#### **Vanilla pollination**

Vanilla is manually pollinated. The best time to pollinate is morning time. This is the time when the flowers are open (Havkin-Frenkel and Belanger, 2018). Around eight (8) to nine (9) months following pollination, vanilla beans are regarded ripe and suitable for harvesting (Van Dyk et al., 2014).

## Harvesting

The changes in colour of the flower edge of the bean from green to yellow is one of the typical signs of harvesting stage (Van Dyk et al., 2014). The recommended harvesting length for vanilla beans is 10 cm to 25 cm (Adawiyah et al., 2020). The vanilla beans are hand-picked, and farmers have the option of selling them raw or storing them for processing for a few months (Campbell., 2018).

## Vanilla Production

Vanilla is the spice most used after Saffron. It is of Mexico origin (George and Cherian 2017). Two years after planting, vanilla flowers, the ovary swells after manual pollination, producing a long bean that can reach 20 cm in length and ripens in 8–9 months. Beans turn yellow at the end of the flowering period when they are completely ripe. To produce the distinctive vanilla scent and flavor, vanilla beans must be cured (Chambers et al., 2019). Vanilla is an extremely labor-intensive crop, requiring hand pollination, drying, and curing of the beans (Khoiratty et al., 2018).

The ten (10) most vanilla-producing countries in the world, based on data from the Food and Agriculture Organization, show that global vanilla production reaches a total of 7981 tonnes and reaches a total area harvested of 97815 hectares (FAO, 2020). Madagascar is the leading producer, with 2975 tons, and French Polynesia is the last producer, with 25 tons (FAO, 2020). See figure below

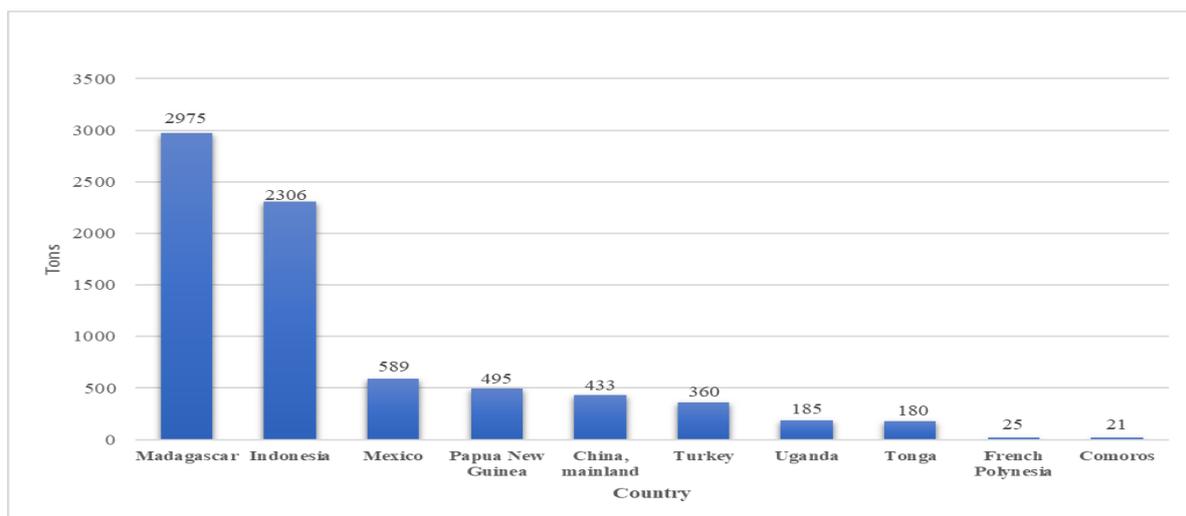


Figure 3: Top ten (10) countries of vanilla production in the world (FAOSTAT, 2022)

## Vanilla production in Tanzania

According to data released by Tanzania's Agriculture Ministry, vanilla production has expanded dramatically within the last four years, increasing from 229.8 tons in 2016 to 1,949 tons in 2020 (Ministry of Agriculture, 2016). Morogoro is a region in Tanzania that is known for its vanilla production. The Morogoro rural and Mvomero districts are the two districts in Morogoro region that produce vanilla (Ministry of Agriculture, 2016).

### Vanilla quantity harvested (2011-2015)

The total volume (tons) of vanilla harvested in Mvomero district as shown below.

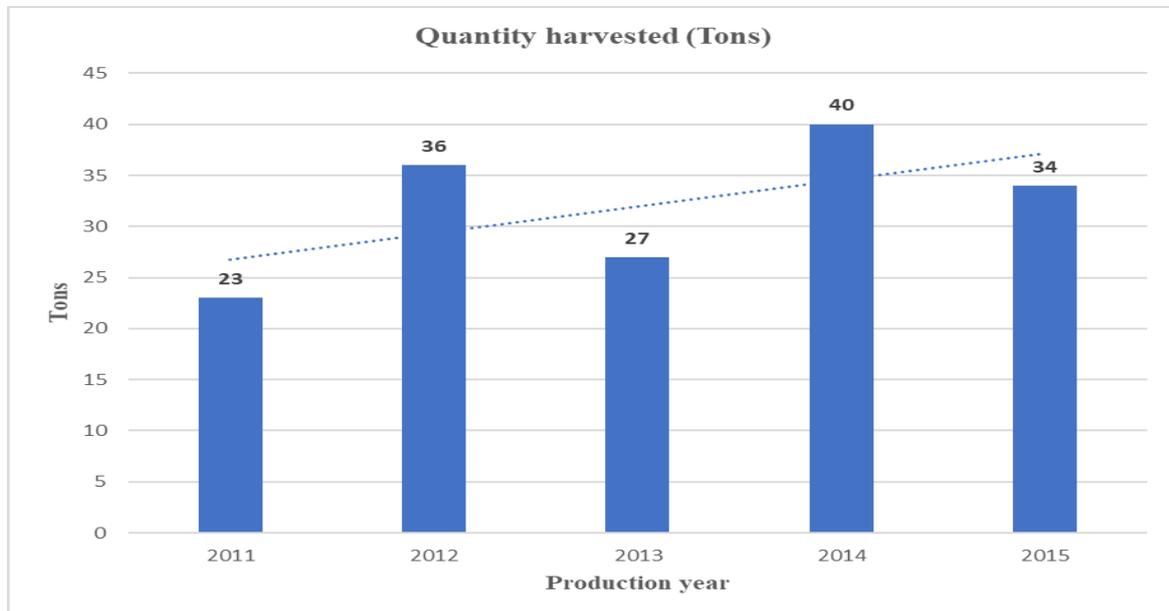


Figure 4: Total volume (tons) of vanilla harvested in Mvomero district (MoAT, 2022)

#### 2.6.4 Export market requirements

The European Union is the main export market destination for most African countries (Bartilol et al., 2019). For all imported commodities, the European Union applies specific requirements, particularly in terms of quality, certification, and food safety (Chammem et al., 2018). The European people's health-conscious lifestyle motivates them to seek out organic ingredients in the food they eat (Purba et al., 2021).

**The export market requirements relevant for this study are discussed below**

##### Product quality

Product quality is defined as the capacity to achieve expectations (Suchánek et al., 2015), or the ability of a product to meet consumer demands or preferences (Amron, 2018). Marketers who may not prioritize the quality of their products risk losing customers who become dissatisfied (Amron, 2017). Consequently, product sales are likely to fall (Amron & Mahmud, 2017).

##### Product quality requirements

**Vanilla bean length** and **moisture content** influence vanilla bean quality. The right vanilla bean length and moisture content are 10 cm–25 cm and 20 %–30 %, respectively (CBI-The Ministry of Foreign Affairs in the Netherlands, 2022). Other product quality requirement for vanilla bean are **appearance**, **colour**, and **flavour and free from defects** (Balasubramaniam et al., 2012).

##### a) Vanilla bean length

Vanilla beans can be found in lengths ranging from 10 cm-25 cm (Adawiyah et al., 2020), the pod length, which ranges between 10 cm and 25 cm in the commercial entity, determines the quality of

vanilla (CBI-The Ministry of Foreign Affairs in the Netherlands, 2022). The size of fresh vanilla beans has a major impact on the flavor and vanillin concentration of dried vanilla beans.

A vanilla bean lengths less than ten (10.0) cm will produce dry vanilla beans that are of poor quality in term of flavor and vanillin concentration (Adawiyah et al., 2022). The vanilla farmer should use a vanilla pod length of more than 10 cm as a physical criterion for harvesting the vanilla bean to generate good, dried vanilla beans qualities (Adawiyah et al., 2022). See the image below, which shows vanilla smallholder farmers in the Mvomero district measuring the vanilla green bean pod length.



Figure 5: Vanilla bean length measurement (Mvomero district, 2020)

#### **b) Moisture content**

The moisture level of Grade A vanilla beans is 20–35 percent, whereas that of Grade B vanilla beans is 15–20 percent. It is preferred if the moisture content is in the range between 20 % and 30 % for grade A (CBI-The Ministry of Foreign Affairs in the Netherlands, 2022).

#### **Food safety**

Food safety usually refers to making sure that food is free of harmful microorganisms or chemical pollutants that can harm people’s health (Bhat & Gómez-López, 2014). Pesticides have become an important part of world agriculture, increasing crop productivity and agricultural production (Carvalho, 2017). Pesticides are highly harmful to people and can cause severe health impacts depending on the amount and method of exposure (WHO, 2022).

Every year, approximately 600 million individuals – about one in every ten individuals around the globe – become unwell after consuming contaminated food, with 420 000 deaths, and losing 33 million years of healthy life (WHO, 2022). Pesticide residue limits in and on food products have been set by the European Union. These levels are designed to protect human health and the environment. Pesticides having higher concentrations than permitted are removed from the European market (CBI-The Ministry of Foreign Affairs in the Netherlands, 2022).

## Certification

A certification is a tool that can give a company an edge over its competitors by increasing the value of its products. The certification may help meet an increasing global demand for healthier, more environmentally sustainable products and it is based on the premise that consumers are more willing to pay a higher price for products that meet certain criteria (Wahyudi et al., 2020). There are certification programs for a wide range of products, including forestry products and crops (Lernoud et al., 2016).

Smallholder farmers must practice a **farming system** that is organic and conventional to comply with the certification (Alotaibi et al., 2021).

The main certification systems are Fairtrade, Organic, Rainforest Alliance (Campbell, 2018; CBI-The Ministry of Foreign Affairs in the Netherlands, 2022).

**Organic certification** is the impact of consumer perception demanding healthy and ecologically friendly products (Wahyudi et al., 2020).

Organic product demand is rising, owing to growing health consciousness among consumers. Organic items are grown and processed to generate finished products that meet organic standards. The existence of an organic label on the packaging allows consumers to recognize that the product is organic (Wahyudi et al., 2021). See the figure of EU organic logo below.



*Figure 6: EU-Organic logo (European, 2022)*

**Fairtrade Certification** is a trade strategy that attempts to promote smallholder farmers' incomes and living conditions by enhancing market access. Reinforcing the companies, offering farmers a reasonable price with a set minimum level, and maintaining trade relations (Wahyudi et al., 2020). Fairtrade certification is a progression which can assist smallholder farmers in developing strategies for direct collaboration with other producer societies (Wahyudi et al., 2020). See the figure of Fairtrade logo below.



Figure 7: Fairtrade Foundation (Fairtrade Foundation, 2022)

**The Rainforest Alliance** is working to make the world a more sustainable place by utilizing social and market power to preserve the environment and enhance the livelihoods of farmers and forest societies (Rainforest Alliance, 2022).

The Rainforest Alliance certification encourages the utilization of fewer agrochemicals such as fertilizers and pesticides, as well as the preservation of natural resources. Producers that are primarily smallholder farmers are recommended to utilize organic replacements as much as possible to limit the overall use of agrochemicals (Rainforest Alliance, 2022). See the figure of Rainforest Alliance logo below.



Figure 8: Rainforest Alliance logo (Rainforest Alliance, 2022)

Tanzania's top export markets for vanilla are the United States, France, and Germany (Farahat et al., 2020). Certification is one of the most widely used certification systems in the European Union (CBI-The Ministry of Foreign Affairs in the Netherlands, 2022).

Certification is a way to ensure the health of commodities and that the environment is being protected. "Sustainable agricultural practices, a diversity of high-quality commodities, more focus on the protection of the environmental, and preserving interests of the consumers" are the goals of the European Union's organic certification (European Union, 2018).

### CHAPTER 3: RESEARCH METHODOLOGY

This chapter outlines the methodology used in this study. Initially, the study area, Mvomero district, is thoroughly described. Second, the research strategy is described. Third, a comprehensive overview of data collection methods is presented. Ultimately, a detail of the data analysis procedure and the results is provided, as well as the ethical issues observed all through the fieldwork.

#### 3.1 Description of the study area

Mvomero district council report, (2014), states that Mvomero district is one of the 7 districts in the Morogoro region. It comprises four divisions: Mlali, Mgeta, Mvomero, and Turiani. These divisions are divided into 30 wards and 130 villages. The study focused on four (4) wards, comprising 12 villages.

The district covers a surface area of 7,325 km<sup>2</sup>. According to Tanzania national census, (2012), The total population in 2012 was 312,109. The population density is 42.6 people/km<sup>2</sup>, 24.4 people/km<sup>2</sup> lower than the national average of 67 people/km<sup>2</sup>. Furthermore, it shows the population comprises 52 % aged less than 19 years and 36 % Under 50 years, people aged 50 and above is 12 %. The percentages of males and females in the district are 49 and 51, respectively

#### Tanzania Map with highlighted study area (Map showing the location of Mvomero District Council)

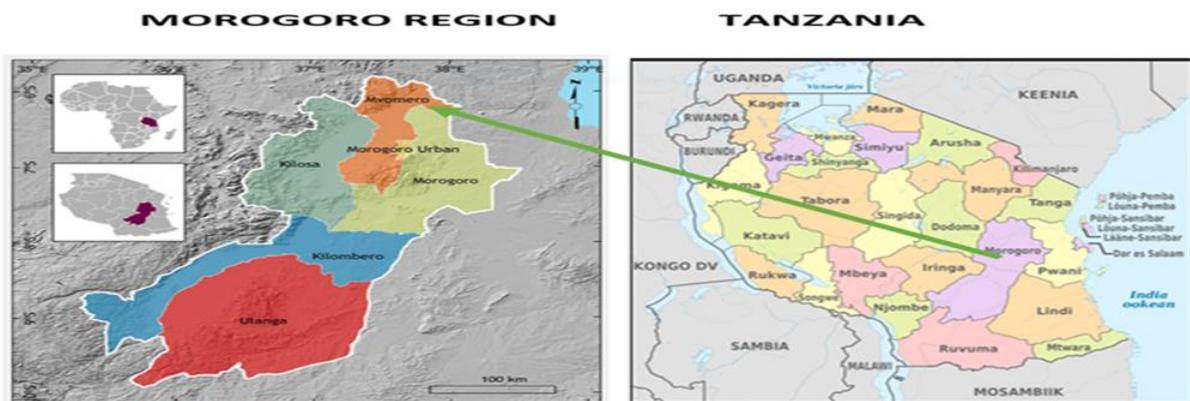


Figure 9: Mvomero district map (Mvomero district, 2022)

Mvomero District Council has a total area of 732,500 hectares, out of which 549,375 hectares (75 %) (Mvomero district, 2017) is suitable for agricultural production. Actual cultivated land is estimated to be 247,219 hectares (45 %) of the land suitable for agricultural production. Uncultivated land is about 302,156, equal to 55 % of the land ideal for agriculture, the main economic activity of the residents, employing roughly 80 % of smallholder farmers. Other economic activities include fishing, livestock keeping, and beekeeping.

According to the Mvomero Mobile Kilimo database (2022), there are about 130,832 registered smallholder farmers (men 85,530 and women 45,302) in Mvomero District. The rainfall varies between 700 mm to 2300 mm and mean temperature is 26°C and the temperature varies from 18°C to 30°C (Mvomero strategic plan, 2017).

#### 3.2 Research strategy

The design allowed for a mixed-method approach to data collection, combining both qualitative and quantitative methods. The mixed methods approach used appropriate strategies and data collection tools to ensure data triangulation and the acquisition of subjective insights from respondents (vanilla smallholder farmers were the study's primary target group) and other key informants. Because the overall goal of the study was inductive in nature, theoretical insights were gathered from the collected data and reflected to the objectives. The qualitative methods and data produced an iterative process

that allowed for the development of a reciprocal relationship between data collected and theoretical insights.

### Research framework

The figure below shows the research roadmap from problem statement to conclusions and recommendations. It displays the steps used to achieve the research objective.

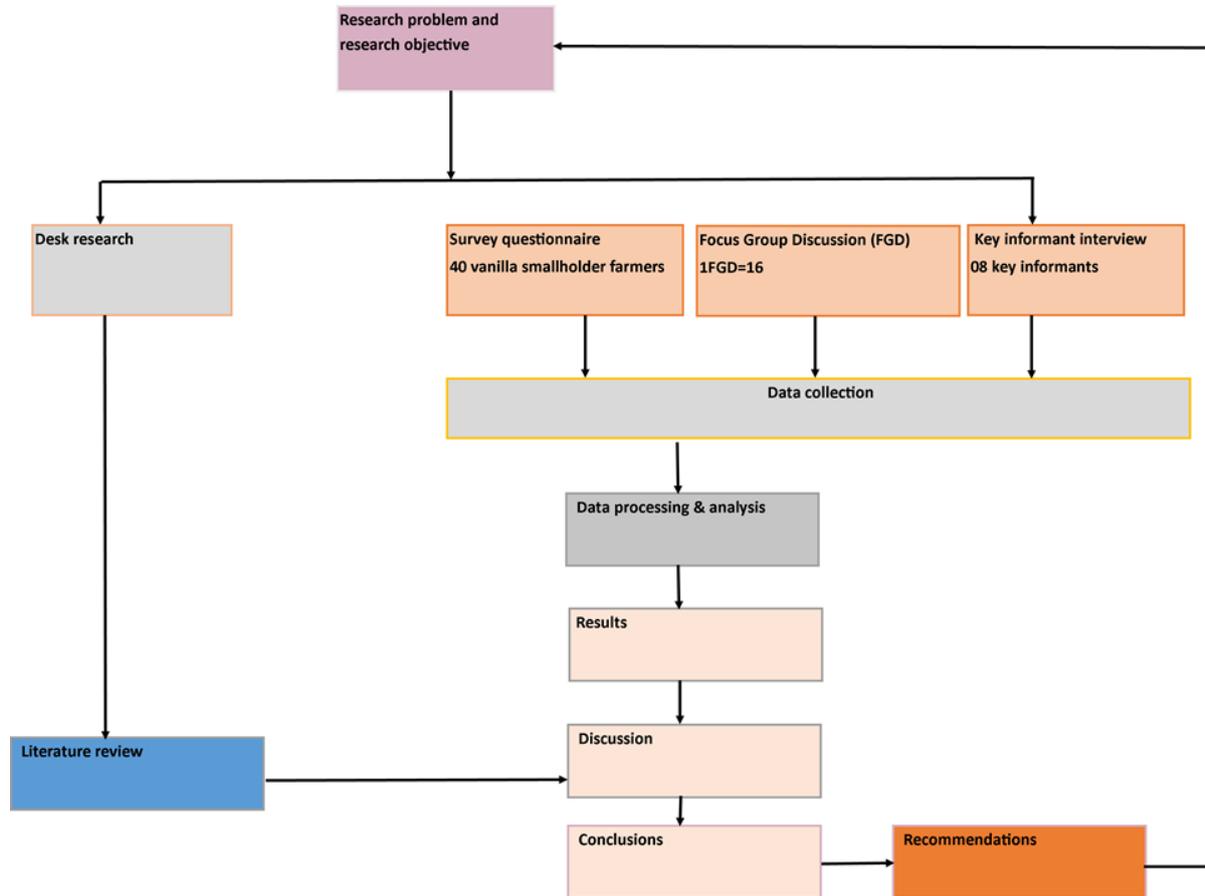


Figure 10: Research framework (Author, 2022)

### 3.3 Sampling procedure

#### Questionnaires

The vanilla farmers were selected with the assistance of the ward field officers. This is due to their frequent contact with vanilla smallholder farmers in the study area. Four (4) vanilla-growing wards were purposively selected based on the criteria listed in **table 1**. A purposive sample of 40 vanilla farmers was selected from a total of 452 vanilla farmers in the study area. This was accomplished by using the lists of vanilla farmers available in each ward. As **table 2** indicates, 10 respondents were selected from each ward to make a total of 40 questionnaire respondents. Additionally, priority was given to the lead farmers and on the basis of the volume of vanilla production.

CRITERIA	CRITERIA
Farmers	Smallholder farmers
Gender	Both male and female
Age	>25
Size of the farm	< 4 acres

Table 1: Selection criteria for questionnaire respondents

DISTRICT	WARD	NUMBER OF RESPONDENTS	SAMPLING STRATEGY OF RESPONDENTS SELECTION	SAMPLING STRATEGY OF WARDS SELECTION
MVOMERO	MHONDA	10	NON-RANDOM SAMPLING	NON-PROBABILITY (PURPOSIVE)
	KWEUMA	10		
	SUNGAJI	10		
	DIONGOYA	10		
<b>TOTAL</b>	4	40		

Table 2: Sampling strategy of wards and respondents

The following information was collected through questionnaires from the 40 respondents: sourcing of planting materials, source of income, number of hectares (Ha) grown vanilla, time involved in vanilla production, types of vanilla cultivars, mixing vanilla with other crops, crops growing together with vanilla, type of farming system, chemical application during farming, average production of vanilla per season (**Details are in Annex 1**).

### Focus group discussions

Using the list of vanilla farmers found in each ward, two focus groups with a total of eight farmers were held. With the assistance of ward field officers, the farmers of vanilla were selected for the discussion. Farmers were selected based on their amount of production, length of membership in the cooperative, types of farmers, different gender, different age, and different farm size.

### Key Informants Interview

An interview was carried out among selected key informants, including the district agricultural officer, four (4) ward agricultural extension officers, the cooperative officer, the chairman of the Mhonda Juu cooperative, and the exporter(buyer). Separate checklists were developed for the buyer, the chairman of the cooperative, the district agricultural officer, and the district agricultural team(field officers and cooperative officer).

### 3.4 Data collection

Data was collected using a questionnaire (**Annex 1**) with the 40 selected vanilla farmers and a semi-structured interview checklist for the key informants (**Annex 2**) were used to answer each research question.

#### 3.4.1 Primary data

Primary data were collected from field the using appropriate research strategies, including questionnaire, interviews (semi-structure interview) and Focus group discussion. Checklists were used for focus group discussion and semi-structured interviews. Triangulation was used for all three methods: questionnaires, focus group discussion, and key informant interviews to increase confidence in research results.

### Questionnaires

A questionnaire is a set of questions being asked to participants to get quantifiable data information about a specific topic (Roopa & Rani., 2012). Purposive sampling is the intentionally selection of a respondent based on the positive attributes the respondent possesses (Etikan et al., 2016). Forty (40)

vanilla smallholder farmers were selected purposively from the Mvomero district council's four wards, namely Mhonda, Kweuma, Diongoya, and Sungaji. From vanilla smallholder farmers' lists of each ward ten (10) respondents were selected by the researcher based on the criteria.

Ward executive officers contacted selected vanilla smallholder farmers and invite them to the ward office for data collection. The vanilla smallholder farmers were then given a brief introduction to the research topic and its significance to the community's development before filling out the form with the assistance of the researcher and ward agricultural officer.

The following information was collected through questionnaires from the 40 respondents: sourcing of planting materials, source of income, number of hectares (Ha) grown vanilla, time involved in vanilla production, types of vanilla cultivars, mixing vanilla with other crops, crops growing together with vanilla, type of farming system, chemical application during farming, average production of vanilla per season, availability of extension services, and the length of the maturation period, availability of authorized certification standard for the export market, kind of certification, the place they sell their vanilla, number of buyer, market option, type of support received, Access to export market information, the type of information accessed, interaction with other actors and supporters, and the type of relationship exists between vanilla farmers and buyer. **(Details are in Annex 1).**

The researcher's main roles were to introduce the research topic, provide a brief explanation of how to fill out the questionnaire form, take notes, provide questionnaire forms to the respondents, and observe, while the assistant's (Ward agricultural officer) roles were to introduce the researcher to the respondents, take notes, and provide questionnaire forms to the respondents.



Figure 11: Questionnaire's respondents (Author, 2022)

### Focus Group Discussion

Both Quantitative and Qualitative data were collected through Focus Group Discussions. Depending on the purpose of the research, a group interview can have four (4) to twelve (12) respondents (Zina., 2021). In the third week of data collection, a focus group discussion was conducted to obtain

additional information that was not clear after questionnaires and semi structured interviews. Respondents were sampled from the vanilla farmer’s database. These respondents were not included in the questionnaires. The respondents were sampled by purposive sampling. Four (4) respondents were selected from each ward which to make a total of sixteen (16). The respondents were not that participated in the questionnaire.

Two focus group discussions were formed. Each group were consisted of eight (8) respondents. The sample selected was based on six (6) criterion types of farmers, amount of production, length of membership in the cooperative, different gender, different age, and different farm size. Respondents were informed by the ward executive officer through both direct contact and mobile communication to ensure their participation. Before the start of the discussion, the topic and subject matter were introduced and fully described to the respondents.

The discussion was interactive among the respondents. To ensure that all respondents participate fully, open-ended questions and probing questions were used, a list of questions was used as a guide during the discussion. All questions were translated into Swahili. The discussion was monitored by the researcher to ensure that every respondent was fully participating. Data were collected through note taking and audio recording. Below are the tables which show the locations of the respondents.

REGION	DISTRICT	WARD	NUMBER OF RESPONTEENTS
MOROGORO	MVOMERO	MHONDA	4
		KWEUMA	4
		DIONGOYA	4
		SUNGAJI	4
<b>TOTAL</b>		<b>4</b>	<b>16</b>

Table 3: Locations of respondents (Author,2022)



Figure 12: In session focus group discussion with respondents (Author, 2022)

### Key Informants Interview

Semi-structured interviews are a type of qualitative data collection technique that can be used in research investigations (Rahman, 2019). It contains a variety of question kinds some are open-ended

and some closed ended (Laws et al., 2013). Respondents should be capable of providing the researcher with relevant information during data collection, particularly in the initial phases of a study (Zimmerman., 2022). In this study, Key informants were selected based on their expertise and experience.

Data were collected through interviewed specifically semi-structured interviews to get in-depth information about the research topic. Eight (8) key informants were interviewed, including the district agricultural officer, four (4) ward agricultural extension officers, the cooperative officer, the chairman of the Mhonda Juu cooperative, and the exporter (Natural Extract Industry Limited). Face-to-face interviews were used to collect information from each of the key informants.

The information collected from the key informants are: stakeholders and their roles in the vanilla value chain; actors who have more or less power in the vanilla value chain; production volume; expectations of vanilla production in the coming years; number of vanilla smallholder farmers, certification available, type of certification is preferable by the farmers and buyer; type of farming system practiced; training; who is responsible for training farmers about good agricultural practices(GAPs) the criteria guiding farmers to check if the harvested vanilla beans are of good quality, cooperative buying price per kilogram of vanilla beans and the price and product quality and quantity. **(Details are in Annex 2).**



*Figure 13: Interview with ward agricultural officer and chairman of Mhonda Juu Cooperative*

### **3.4.2 Secondary data**

Secondary data were collected from journal articles, journals, Greeni, national reports from internet websites, Mvomero district council reports, Agricultural Routine Data System, a Ministry of Agriculture report, and other related recent publications. Desk research were mainly used in the discussion part to get a broad understanding of the research findings from previous studies.

### **3.5 Data processing and analysis**

The collected data from questionnaires were processed and analysed by using elements of the Statistical Package for Social Science (SPSS Statistics version 27)

## Descriptive statistics

The data obtained from the questionnaires was entered into SPSS Software version 27. Descriptive statistics were used in this statistical analysis. See the table below.

MAIN QUESTION	SUB - QUESTION	DESCRIPTIVE
1. What is the current vanilla value chain in the Mvomero district?	1.What are the stakeholders, their roles, and numbers?	Frequencies, charts
	2. What are the chain relations in the vanilla value chain?	Frequencies
	3. What are the characteristics of vanilla production?	Mean, graph
2.What are the opportunities for Mhonda Juu Agricultural Marketing Cooperative Society to meet export market requirements?	1.What are the requirements for meeting vanilla quality and food safety for the export market?	Mean, charts, Frequencies, graphs
	2. To what extent would change in the farming system support farmers to meet export market requirements?	Frequencies, mean, graph

Table 4: Descriptive statistics (Author, 2022)

## Inferential statistics

The data obtained from the questionnaires was entered into SPSS Software version 27. Inferential statistics were used in this statistical analysis. See the table below

MAIN QUESTION	SUB - QUESTION	TYPE OF TEST
1. What is the current vanilla value chain in the Mvomero district?	3. What are the characteristics of vanilla production?	T- test, One-way Anova (LSD)
2. What are the opportunities for Mhonda Juu Agricultural Marketing Cooperative Society to meet export market requirement?	1. What are the requirements for meeting vanilla quality and food safety for the export market?	T-test

Table 5: Inferential statistics (Author, 2022)

### 3.5.1 Focus group discussion and Interview

Core process means to identify a set of key themes that sum up the significant categories in the data and to examine the relationships between these themes (Laws et al. 2013). The core process was used for both the focus group discussion and the interview of the key informants. The interview and focus group recordings were transcribed in Microsoft Word, then the researcher coded each transcript based on research questions, identified the major themes, and finally checked the themes answered the research questions.

### 3.6 Ethical considerations

The study was carried out in a way that respects the moral principles that made it acceptable. The research entailed interacting with people as they go about their daily lives. Informed consent was used during interviews, questionnaires, and focus group discussions. Permission was asked for any action taken, such as photographing and recording interviews as needed. The research ensured that no

private information was exposed. Any observed situation that is considered immoral in the area was carefully addressed to maintain neutrality.

### **3.7 Limitations of the Research**

The Mvomero district's majority of locations are inaccessible. Obtaining the respondents at the scheduled time was not easy. For instance, it was somewhat difficult to travel from the ward office, which includes the Kweuma ward, up to the nearby village, and some respondents claimed incentives (transport) as a result of the research.

## CHAPTER 4: RESULTS

### 4.1 Chapter Overview

This chapter shows the research findings from the questionnaires, focus group discussions, and semi-structured interviews used to collect data.

### 4.2 Gender, Age and Level of education of questionnaire respondents

#### 4.2.1 Gender

Out from the forty (40) vanilla smallholder farmers who were selected, 53 % of them were male and 47 % were female. The figure below demonstrates the percentage range for both males and females.

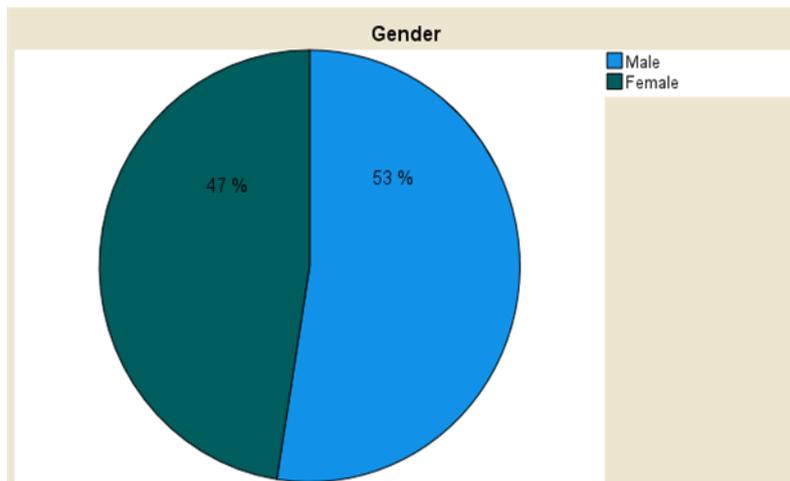


Figure 14: Percentages ranges for both males and females (Author, 2022)

Furthermore, results from key informants (district agricultural officer and cooperative officer) showed that district's vanilla farmers were 57% male and 43% female. Therefore, the percentages of males and females in the sample are almost equal.

#### 4.2.2 Age

Among the smallholder vanilla farmers that answered the questionnaire 37 % were between the ages of 41 and 55, 33% of the farmers were between the ages of 18 and 40, and 30% of the farmers were beyond the age of 56. Ages between 18 and 40 are categorized as youth, ages between 41 and 55 as adults, while ages 56 and older are categorized as aged farmers. Most vanilla smallholder farmers were adults and youth, accounting for 70 percent of the total. Furthermore, the questionnaire results revealed that most vanilla farmers are between the ages of 18 and 55. The figure below shows the age distribution of the vanilla smallholder farmers selected.

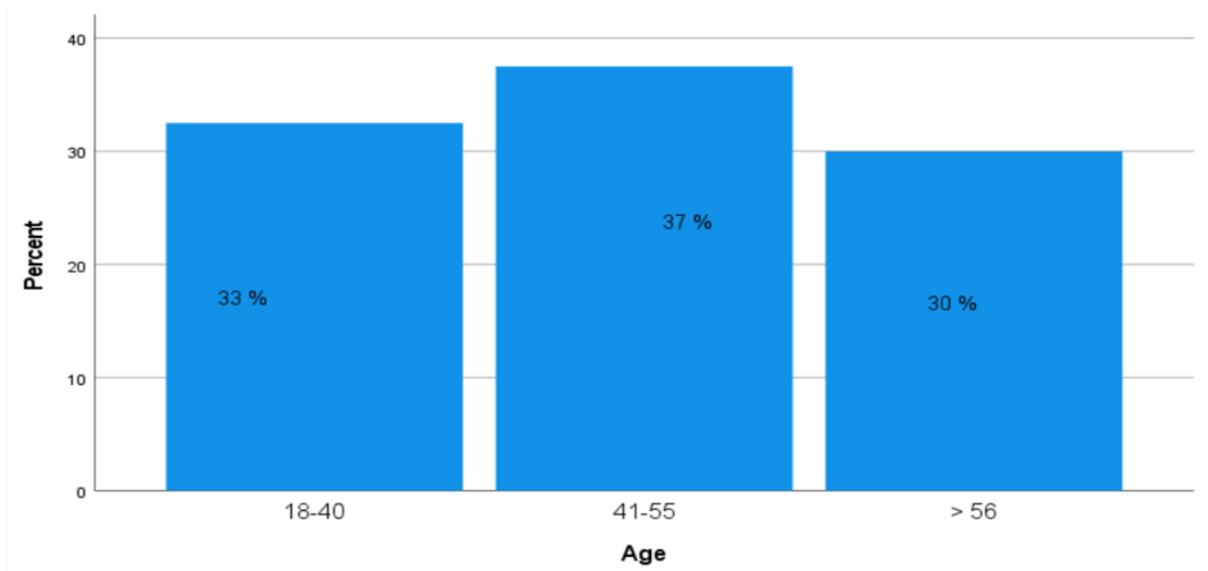


Figure 15: Age distribution of vanilla smallholder farmers (Author, 2022)

Additionally, the findings from key informants (cooperative chairman, district agricultural officer, exporter, and field agricultural officers) showed that the age groups of the 452 vanilla smallholder farmers in the district between the ages of 18 and 55 was 75.32%, while those between the ages of 56 and above were 24.68%.

#### 4.2.3 Level of education

According to the findings, the education level of the respondents fell into three categories: primary level, secondary level, and tertiary level. The finding indicated that 60 % of the respondents were educated at primary level, 38 % were secondary at level and 2 % were at tertiary level. See the figure below

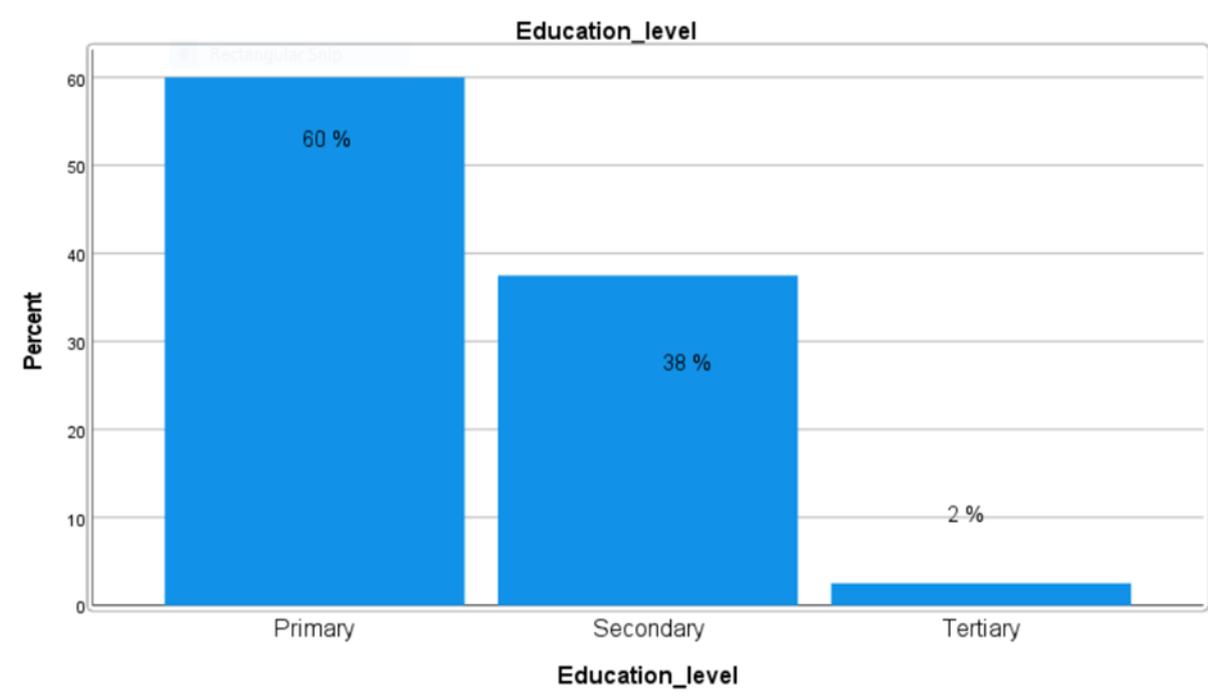


Figure 16: The farmer's educational level (Author, 2022)

#### 4.2.4 Number of farmer's own phone

The results of the questionnaires revealed that 78 percent of the selected smallholder farmers who grow vanilla had phones, whereas 22 percent do not. The figure below shows the farmers phone ownership

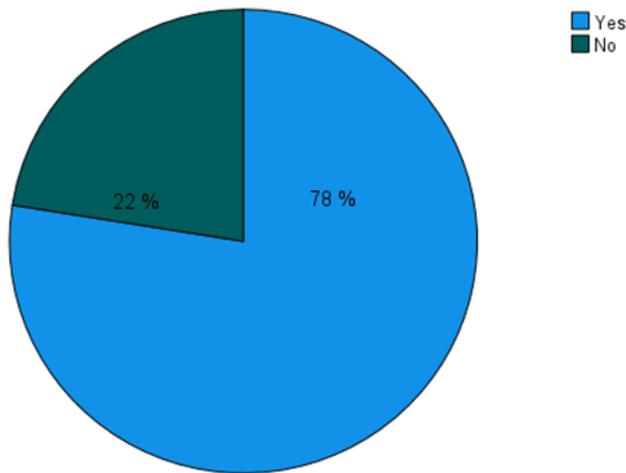


Figure 17: Farmers phone ownership (Author, 2022)

#### 4.3 Number of stakeholders and their roles

##### 4.3.1 Number of actors and their roles in the vanilla value chain

It was identified during face-to-face interviews with key informants and focus group discussions that the vanilla value chain has two (2) channels. The first chain consists of untrustworthy vanilla smallholder farmers from the Mhonda Juu cooperative selling their vanilla green beans directly to middlemen, who then sold them to retailers (specialty shops) in Morogoro town, and finally to consumers. One kilogram of vanilla beans costs approximately 10 euros. Mhonda Juu cooperative sells vanilla green beans to Natural Extract Industries directly, the price of one kilogram of vanilla green beans was 15 euros as shown in **Annex 3**. The figure below represents the current vanilla value chain map in Mvomero district council, along with the number of actors. The main actors in the vanilla value chain are input suppliers, producers, collectors, processors, retailers, and consumers.

### The current vanilla value chain map of Mvomero district council and the number of actors

The majority of vanilla farmers in the Mvomero district are smallholders who sell their vanilla at the collection center, through middlemen, and through a vanilla marketing cooperative (Mhonda cooperative). Middlemen had direct connections to the retailers, while Mhonda cooperative had direct connections to the exporter (NEI) (specialty Indian shops). See the figure below

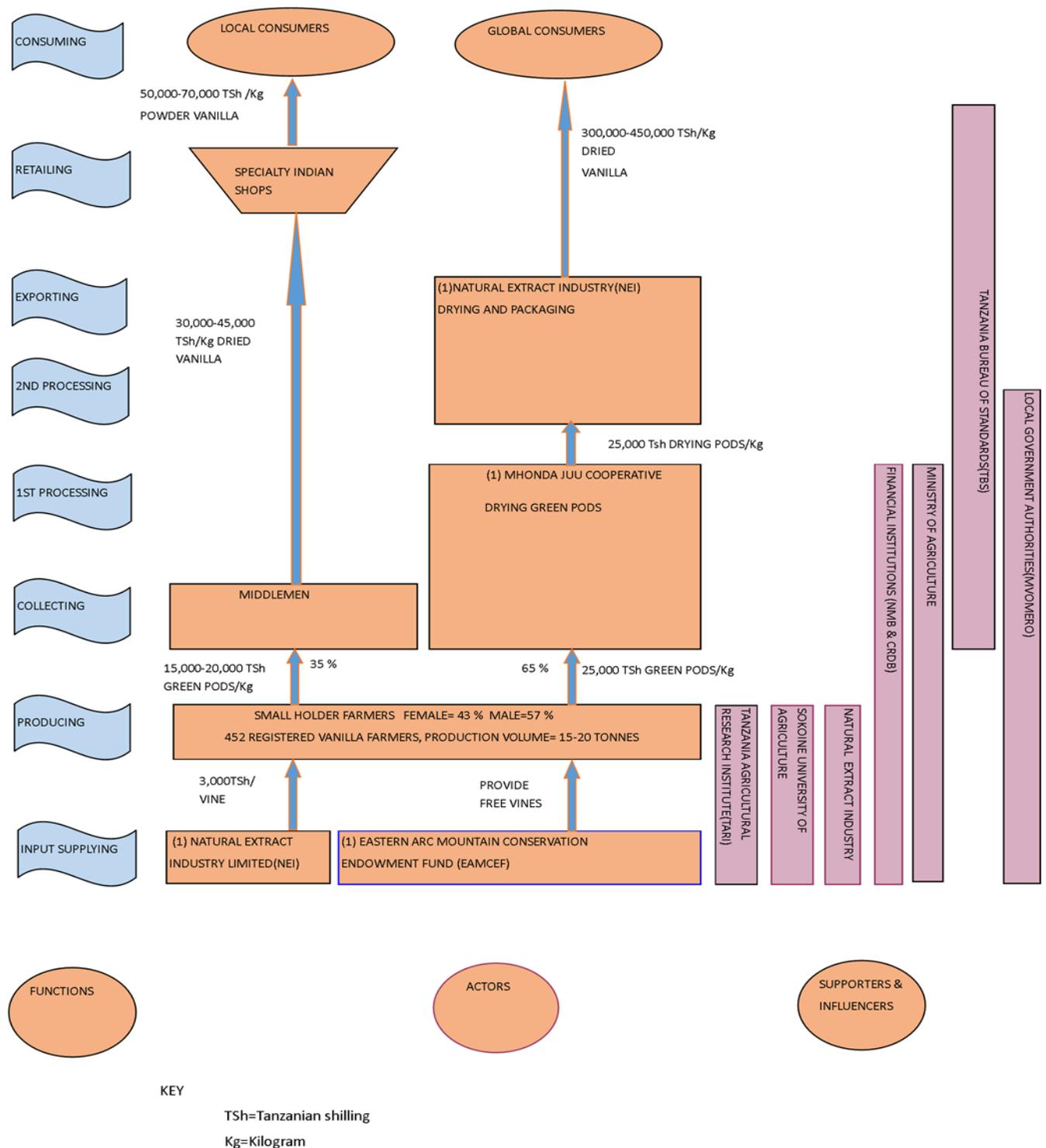


Figure 18: Current vanilla value chain of Mvomero district (Author, 2022)

## Number of vanilla actors and their roles

In this research, seven (7) actors in the vanilla value chain were identified. The actors involved are the Input suppliers, farmers, collectors (middlemen and cooperative), processors, exporters, retailers, and consumers.

**Input suppliers:** Interview results from key informants (district agricultural officer, field agricultural officers, chairman of the cooperative and exporter) mentioned the two (2) input suppliers which are Natural Extract Industries Limited and Eastern Arc Mountains Conservation Endowment Fund. Furthermore, questionnaire results revealed the same input suppliers mentioned by respondents. According to the findings, of the questionnaire NEI provides planting materials to 63% of vanilla smallholder farmers and EAMCEF provides planting materials to 37%. See the figure below

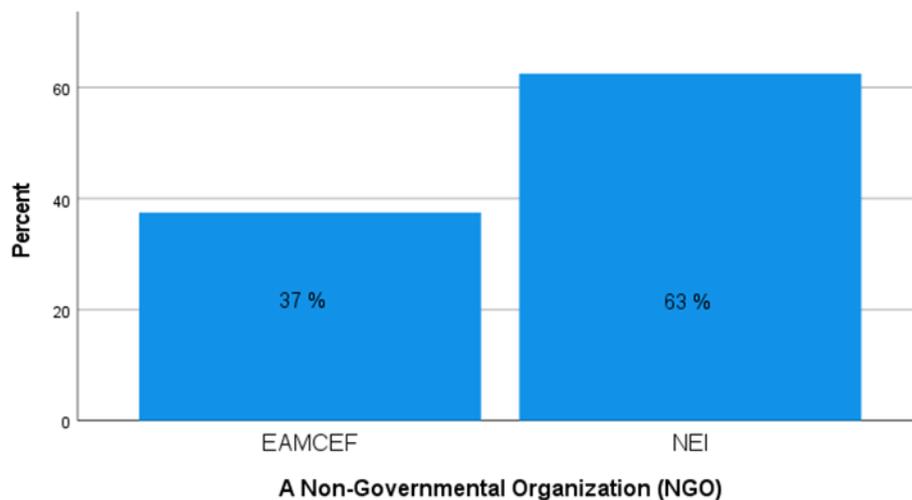


Figure 19: Sourcing of planting materials (Author, 2022)

According to the findings of a focus group discussion, some of the cuttings they received from the Eastern Arc Mountains Conservation Endowment Fund were short in length and of poor quality, resulting in a low yield and taking more than three years to flower. Most cuttings with a length of 3 m or more mature in 2.5 to 3 years and compared to shorter cuttings, they are very easy to control. Vanilla cuttings with longer cuttings trail easily by coiling them along support trees. Furthermore, some respondents suggested that vanilla cuttings with more than 8 internodes are better for planting.

**Producers:** The vanilla smallholder farmers were identified as the producers of vanilla, primarily vanilla planifolia, by the key informants. The primary identified activities are producing and selling vanilla green beans to the Mhonda Juu Cooperative, and farmers are paid through the cooperative. According to the 40 respondents, the average farm size for cultivated vanilla is 2.5 acres. **See Annex 4.**

In addition, the key informant (District agricultural officer and agricultural field officers) mentioned a total of 452 vanilla smallholder farmers. The main vanilla variety cultivated by most farmers in Mvomero district is Vanilla planifolia. According to the findings of a focus group and the findings from key informants (4 agricultural field officers), the price of vanilla beans from farmers to middlemen is between 15,000 and 20,000 Tanzanian shillings.

**Collectors:** Key informant interviews revealed that there are two (2) collectors: one is well-known, the Mhonda Juu Cooperative, and the other collectors are middlemen, who are operating illegally and are not acknowledged by the district council. The Mvomero district is still in the process of enacting legislation to prevent second collectors (middlemen). They intended to notify each ward and village

executive officer of the area growing vanilla to avoid the presence of middlemen who unlawfully collect vanilla green beans from vanilla smallholder farmers.

Furthermore, all key informants interviewed insisted that vanilla smallholder farmers would assist authorities by avoiding the presence of middlemen because they are the ones who suffer the most. They are required to notify the government whenever they notice the presence of middlemen. The presence of two (2) collectors from Mhonda Juu Cooperative and Middlemen was also agreed upon during the focus group discussion. However, farmers advised that it is preferable to have middlemen as well instead of avoiding them, the government should inform them of the vanilla market price. The middlemen can eventually shift and become the major vanilla buyers in the Mvomero district if the government continues to alert the middlemen.

Respondents also stated that when they sold their vanilla green beans to middlemen rather than Mhonda Juu Cooperative, farmers received payment on time. When farmers sell vanilla green beans to the cooperative, it occasionally takes a month for them to get paid. farmers agreed that, compared to the cooperative, farmers received less money when they sold their vanilla green beans to middlemen.

**First processors:** The results from key informants, primarily the chairman of the Mhonda Juu Cooperatives, agreed that they first process the vanilla beans before selling them to the buyer (Natural Extract Industries Limited). Furthermore, the district agricultural officer acknowledged that as well. The difficulty was that most farmers were unfamiliar with drying and other post-harvest handling techniques. District agricultural officer added currently, smallholder vanilla farmers currently only sell the green beans to the cooperative, which processes them initially (locally) before selling them to the buyer. The figure below shows the photo taken during the focus group discussion



*Figure 20: Sample of vanilla beans dried locally by the farmer*

**Second processors:** Natural Extract Industries Limited is the second processor of the vanilla produced by the farmers in all four wards, according to the interviews with all key informants. The primary tasks include packaging the dried vanilla once it has been dried to the recommended moisture content. According to the key informant (exporter), most of the tasks are done in their main collection center which is available in the Moshi region. Below are the figures of the vanilla beans dried and packaged, ready for export.



Figure 21: Vanilla beans dried and packaged (Author, 2022)

**Exporters:** Natural Extract Industries Limited was identified as the only buyer available in Mvomero district council during the key informant interviews. Natural Extract Industries Limited provide vanilla smallholder farmers with training on export market requirements (use of compost manure such as dried cocoa residues, making of organic pesticides). See the figures below



Figure 22: Exporter (NEI) and Vanilla farmers making organic pesticides (Author, 2022)

**Retailers:** All key informants interviewed identified the number of retailers, mainly specialty Indian shops found in Morogoro town, who buy vanilla beans from the middlemen, but the number of the retailers were not known. The district agricultural officer and agricultural field officers mentioned that the price of vanilla from middlemen to retailers ranges between 30,000 and 45,000 Tshs, and the price from retailers to local consumers ranges between 50,000 and 70,000 Tshs.

This price information was obtained by the district when Sustainable Agriculture Tanzania held a stakeholder meeting on January 28, 2022, at Mvomero district hall to discuss the price of quality vanilla beans and good agricultural practices (primarily organically) required to improve vanilla bean quality.

**Consumers:** District agricultural officer and Natural Extract Industries Limited interviews revealed the existence of two types of consumers in the vanilla value chain. The first type of consumer is a high-status local consumer, while the second type of consumer is a global consumer. The global consumers

mentioned are France, Germany, and the United States of America. Natural Extract Industries Limited, the exporter, stated that the cost of a package vanilla of one kilogram can range between 300,000 Tshs and 450,000 Tshs depending on the global market price. The exporter claimed that the COVID 19 pandemic caused a drop in vanilla prices from 2021 to 2022.

#### 4.3.2 Number of supporters and their roles in the vanilla value chain

According to the key informants interviewed, the Tanzania Agricultural Research Institute (TARI), Sokoine University of Agriculture, financial institutions (NMB & CRDB), the Ministry of Agriculture, the Tanzania Bureau of Standards, and local government authority are recognized as supporters in the vanilla value chain in the Mvomero district.

Furthermore, the findings of the questionnaire revealed that vanilla smallholder farmers receive assistance from agricultural NGO (Natural Extract Industries Limited), private company (Cooperative Rural Development Bank), the government, institutions, and others. See the figure below.

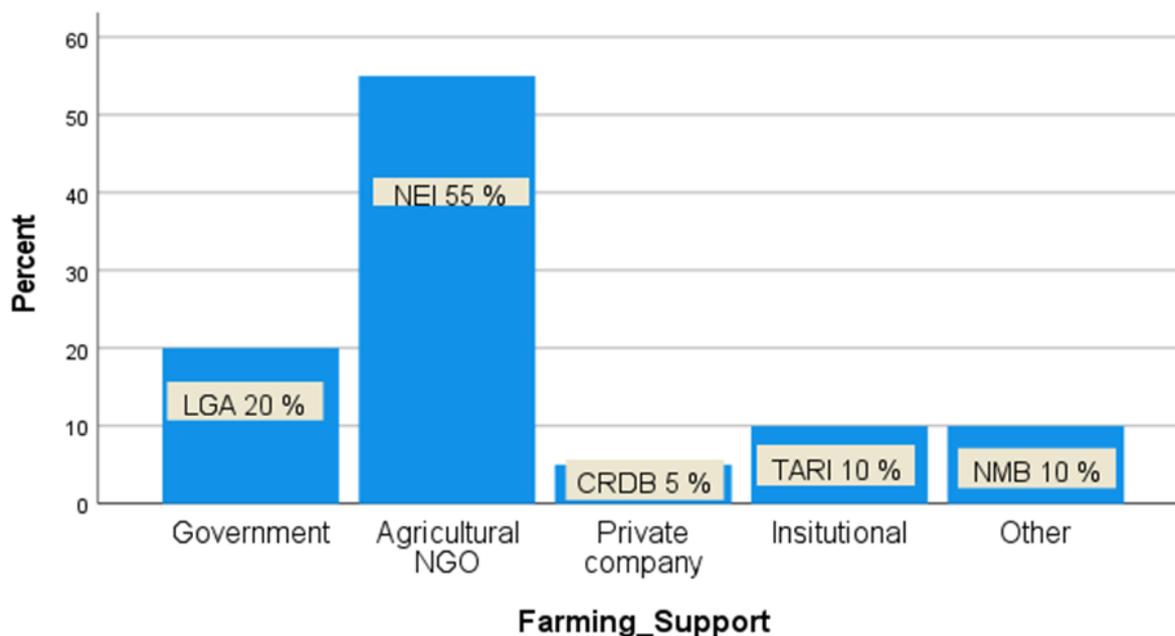


Figure 23: Vanilla chain supporters (Author, 2022)

According to the findings from farmers, it showed that 30 % of farmers received extension services (LGA & TARI), 55 % received training (NEI), and 15 % received financial assistance from NMB and CRDB banks, including loans.

Similarly, the findings from the focus group discussion revealed that the government (SUA, TARI, NMB), non-governmental organizations (NEI, EAMCEF), and private companies (CRDB bank) all provided support.

#### 4.4 Stakeholder matrix

Based on information from questionnaires and key informant interviews, the roles of the stakeholders in the vanilla value chain are summarized in the table below.

Stakeholder	Function in the chain	Roles	Number
<b>Input suppliers</b> ❖ Natural Extract Industries Limited (NGO)	Actor	❖ Providing vanilla cuttings to smallholder vanilla farmers ❖ Provide training	01
❖ Eastern Arc Mountains Conservation Endowment Fund (NGO)	Actor	❖ Provide free vanilla cuttings	01
<b>Producers</b> ❖ Vanilla smallholder farmers	Actor	❖ Producing vanilla green beans and selling them to the exporter.	452
<b>Collectors</b> ❖ Mhonda Cooperative	Actor	❖ Buying vanilla green beans from the farmers and selling them to the exporter ❖ Processing of the vanilla green beans	01
❖ Middlemen	Actor	❖ Buying vanilla green beans from the farmers and selling them to the retailers	unknown
<b>Processors</b> <i>First processor</i> ❖ Mhonda Cooperative	Actor	❖ Process the vanilla beans before selling them to the buyer (NEI)	01
<i>Second processor</i> ❖ Natural Extract Industries Limited	Actor	❖ To dry vanilla beans to the appropriate moisture content and pack them	01
<b>Exporter</b> ❖ Natural Extract Industries Limited	Actor	❖ To export well-dried and packaged vanilla beans to the global market	01
<b>Retailers</b> ❖ Specialty shops	Actor	❖ Buying dried vanilla beans and selling them to local consumers.	Unknown
<b>Consumers:</b> ❖ High status local consumers	Actor		
❖ Global consumer	Actor		3 countries
Tanzania Agricultural Research Institute (TARI)	Supporter	❖ Encouraging smallholder vanilla farmers to use proper agricultural methods to enhance vanilla quality.	01

Financial institutions (NMB & CRDB (private company))	Supporter	❖ Make loans available to both farmers and cooperatives.	02
Sokoine University of Agriculture	Supporter	❖ Provide extension services	01
Ministry of Agriculture	Supporter	❖ Provide extension services	01
Tanzania Bureau of Standards (TBS)	Supporter	❖ Control the product's safety and quality.	01
Local government authority (LGA)	Supporter	❖ Formation of the vanilla farmers' group ❖ Provide extension services and training on good agricultural practices	01
Natural Extract Industries Limited (NEI)	Supporter	❖ Provide extension services	01

Table 6: Stakeholder matrix (Author, 2022)

#### 4.5 Chain relations

According to the findings of focus groups, questionnaires, and interviews with key informants, Natural Extract Industries Limited is the only buyer in the Mvomero district, and the Mhonda Juu Cooperative is the primary cooperative in charge of buying and reselling vanilla green beans to the buyer. Additionally, all respondents listed some of the actors who are a part of the vanilla value chain, such as input suppliers, retailers, exporters, collectors, and consumers. Farmers frequently cited the government during focus group discussions, particularly the department of agriculture, Mhonda Juu Cooperative, and Natural Extract Industries Limited, as the main barrier to the progress of the vanilla value chain in the Mvomero district.

Farmers also mentioned during FGDs that there is no official contract between farmers and buyers (NEI), and farmers added that the government, through the district executive office, should ensure that their communities live a better life. The majority of farmers acknowledged that the actors in the chain have a weak relationship. 2.5 % of the respondent indicated a strong relationship with their buyer; 87.5 % of the respondents indicated a weak relationship with their buyer; 10.0 % of the respondents indicated no relationship with their buyer. See **Annex 5**

Farmers and buyer have a good relationship, according to the district agricultural officer, field officers, and the exporter. "NEI as a company provides extension services and trainings to the group of vanilla smallholder farmers," the district agricultural officer added.

##### 4.5.1 Relationship between farmers

According to the findings of the interviews with ward agricultural officers and to the focus group discussions, the relationship between vanilla farmers remains weak. Some farmers who received training from various agricultural institutions like Sustainable Agricultural Tanzania, Tanzania Agricultural Research Institute, and Natural Extract Industries Limited in good agricultural practices such as vanilla pollination, organic farming, and grading of vanilla beans are unwilling to share with the other farmers, which led to a low vanilla yield. Additionally, farmers who are 56 years of age and older said that younger farmers are unwilling to assist them, particularly with pollination (manual pollination), a tough task requiring expertise and professionalism.

##### 4.5.2 Market information

Results revealed that according to the exporter, farmers had access to market information, essentially the market price of the vanilla beans every harvesting season. These findings contrast sharply with

those of the focus group discussion, which revealed that they had no access to any market information regarding vanilla.

Only a few farmers answered in the questionnaire they had access to market information about vanilla prices. 27.5% of respondents agreed that they obtained market information, primarily the vanilla market price, prior to the harvesting season; these farmers are the ones who frequently received training and attended farmers' days, while 72.5 % responded "No." See **Annex 6**.

During the FGDs, farmers claimed that neither the government nor non-governmental organizations provided them with any market information about vanilla green beans. During the discussions, farmers mentioned that TMX agreed to assist vanilla smallholder farmers in increasing production and earning more cash by assisting them in finding online buyers for their products through the mobile revolution and train farmers about market information. TMX is a platform where buyers and sellers can conduct business while being guaranteed of quality, volume, payment, and shipment. Farmers, exporters, and other market participants can access international and domestic markets through the exchange and can get a reasonable price for purchasing or selling products

## **4.6 Vanilla production**

### **4.6.1 Production volume**

According to the interview with the district agricultural officer, chairman of the cooperative and field agricultural officers, 15 to 20 tonnes of vanilla were produced per year in 2021 and 2022. The district agricultural officer expects that approximately five (5) tonnes more vanilla will be produced in three years. The officer insisted that the district planned to increase training on good agricultural practices and invite other stakeholders, primarily the non-government agricultural sector and other financial institutions, to increase vanilla yield. The officer added the district has already chosen the slogan, which is "*vanilla green gold*."

### **Vanilla production (kilograms) per gender (Male and female)**

The results of the 40 respondents showed that the average vanilla production of the 21 males and 19 females was 56.8 and 57.7 kilograms, respectively. There were no significant differences between the yield of males and females ( $p=0.921$ ). See **Annex 7**

### **Difference in yield (vanilla production) per age group**

#### **Youth farmers vs aged farmers**

The results of the 40 respondents showed that the average vanilla production for those aged 18-40 and those aged over 56 years was 68.1 and 36.2 kilograms, respectively. There were significant differences in production per age group ( $p=0.005$ ) : farmers aged 18-40 yield more than farmers > 56.

#### **Adult farmers vs aged farmers**

The results of the 40 respondents showed that the average vanilla production for those aged 41-55 and those aged over 56 years differed significantly with 64.5 and 36.2 kilograms, respectively ( $p=0.012$ ). Production decreasing as age increases. See the figure below

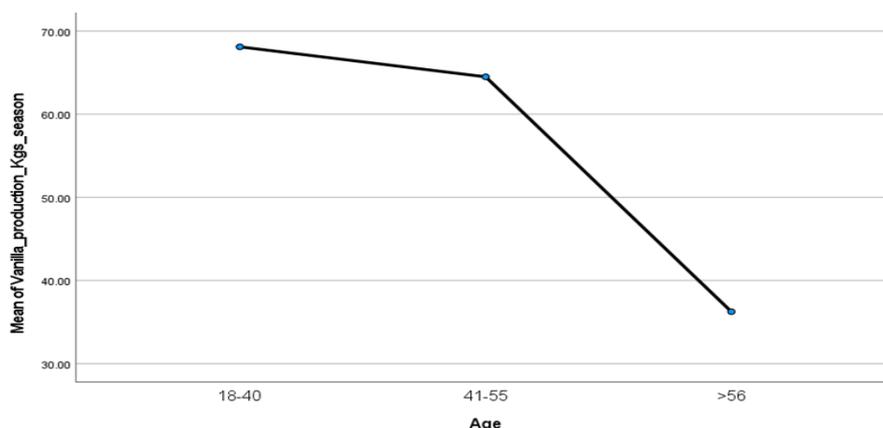


Figure 24: Production decrease as age increases (author, 2022)

The aged group (> 56) has lower production than both youth farmers ( $p=0.005$ ) and the adult group ( $p=0.012$ ). See **Annex 8**

### Youth vs adult farmers

The results of the 40 respondents showed that the average vanilla production for youth (18–40) and adults (41–55) was 68 and 64 kilograms, respectively. According to T-test, the significance value (p value) is 0.756, which indicates that there were no significant differences in yield between those aged 18–40 years (youth) and those aged 41–55 years (adult) in terms of yield.

Furthermore, results from focus group discussions revealed that most aged vanilla farmers claimed that their production was lower than the other groups (adults and youth) due to pollination challenges because vanilla flowers are pollinated by hand.

### Difference in yield per education level

The Mean difference between the vanilla production (yield) and the group (secondary level and primary level) are 74.9 kgs and 46.2 kgs respectively. According to T-test, the significance value ( $p=0.003$ ), which indicates that there were significant differences in yield between education levels (primary and secondary). See **Annex 9**

## 4.6.2 Good agricultural practices

### Post-harvest technology

According to the agricultural district officer, agricultural field officers are available in all wards producing vanilla. He stated that all villages have an equal number of agricultural field officers. Natural Extract Industries Limited stated that it provides group training to vanilla farmers. The Wards agricultural field officers said that they provide farmers with extension services. Respondents in the focus group discussion revealed that they were receiving extension services from both the government and non-government sectors including NEI, but they lacked knowledge of how to add value to the crop. One of the respondents stated that,

***"We are unaware of the significance of adding value to the vanilla crop, which has an impact on our ability to earn extra income".***

In addition, according to the findings, the majority of vanilla smallholder farmers claimed **they were unaware of post-harvest handling**. As a result, they were forced to sell their vanilla green beans to

the buyer immediately after harvesting. They were concerned that the beans would deteriorate, lose quality, and become unmarketable.

### Type of support received

The findings of the questionnaire revealed that 68 % of respondents receive training from NEI, and 20 % of respondents receive extension services from the field agricultural officer and 12 % receive financial from NMB and CRDB banks. See the figure below.

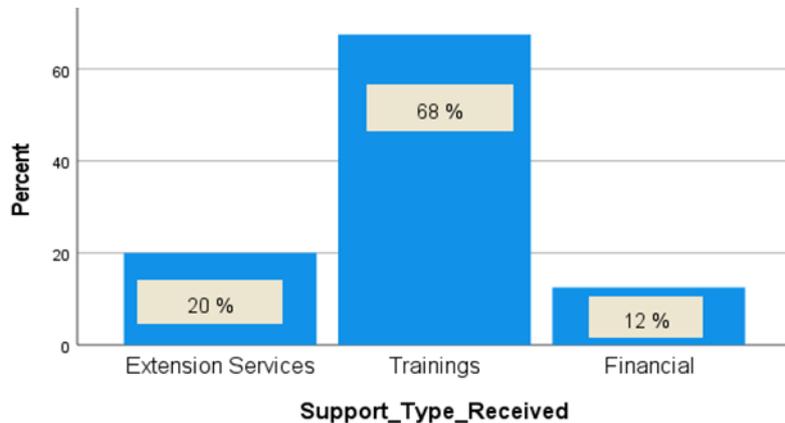


Figure 25: Type of support received (Author, 2022)

According to the district agricultural field officer and field agricultural officers both government and non-government agricultural sectors provide farmers with a variety of forms of assistance, including credits, training, and vanilla cuttings and extension services.

District agricultural officer stated that:

***“Regardless of how effective an extension service is, the district needs pollination groups to increase vanilla production in the study area”.***

District agricultural officer and field officers added that vanilla smallholder farmers receive credit from the mentioned financial institutions (NMB and CRDB). In order to receive loans, they have to show proof of cooperative legislation.

During focus group discussions farmers stated that:

***“Vanilla is a valued crop with increasing global demand. Since the crop is currently the main source of income for the Mvomero district, extension activities should be offered in the form of a home approach, agricultural school, group approach and demonstration plot, which will have a significant impact on agribusiness aspects”.***

Additionally, according to the district agricultural officer and field agricultural officers it was found that EAMCEF and NEI provide vanilla cuttings to the farmers in the study area. The district agricultural officer added that in 2016, the Tanzania Agricultural Research Institute (TARI) provided 100 vanilla cuttings (*Vanilla planifolia*) to the farmers with the intention of establishing a vanilla nursery in Mhonda ward, but unfortunately, the nursery was not established due to the farmers' unwillingness. The absence of other agricultural inputs like organic pesticides was mentioned by the farmers as the main reason.

## **4.7 Vanilla quality, food safety and certification for the export market requirement**

### **4.7.1 Vanilla bean length**

According to the findings of a focus group discussion, both Mhonda Juu cooperative and Natural Extract Industries Limited buy their vanilla beans based on vanilla grade, which is determined by the length of the beans. During FGDs most farmers claimed that they were unfamiliar with the grade A and grade B categories used to grade vanilla beans.

The farmers insisted that neither the government nor the buyer provided them with a chart indicating the specific grade of vanilla bean length required for export markets. The district agricultural officer admitted to receiving the same question when the Eastern **Arc Mountains Conservation Endowment Fund** held a farmers' meeting with vanilla farmers in all four wards to check on the project's progress.

According to the exporter results, NEI as a company always ensures that their farmers produce quality vanilla that is competitive for export markets. The agronomist (NEI) found in the office stated that, in addition to the free training they provide to the farmers, and he specifically mentioned NEI as the company, they provided a free handbook about vanilla production and market requirements for every vanilla farmer.

Out of 40 farmers, 90 % said they were aware of the vanilla bean's length but not the ideal length for the export market and 10 % said they were unaware of it. Furthermore, results from 40 respondents showed that 67.5 % stated a length of 1 to 9 cm as the preferred length for harvesting vanilla green beans, 22.5 % mentioned a length of 10 to 25 cm, and 10 % respondents were unaware. Furthermore, NEI buy vanilla according to the vanilla bean length.

### **4.7.2 Food safety**

According to key informants, the district agricultural field officer and Natural Extract Industries Limited, Tanzania has two authorities that check the quality of the product: the Tanzania Bureau of Standards and the Tanzania Food and Drugs Authority. The district officer stated that it is challenging to assess whether the green beans produced by the farmers are of the high grade required for the export market because these two authorities are not active at the district level. This means that the cooperative does not check food safety. The quality officer from Natural Extract Industries Limited is needed by the district to check food safety.

According to the district agricultural officer, the district has a sufficient number of field agricultural officers who provide farmers with extension services. Also, district agricultural officer stated that:

***“The district practices organic farming, consumers all over the world are becoming more concerned about the environment, so this is a great opportunity for the district”.***

According to the findings of Natural Extract Industries Limited, the TFDA and TBS are both investigating the company (NEI) to check if it meets food safety standards. NEI acknowledged having a quality officer in charge of inspecting the quality of vanilla beans produced in the Mvomero district.

The exporter (NEI) emphasized that NEI's quality officer check all of the export market requirements, such as physical contamination (vanilla beans should be free from residues, physical damage, colour, vanilla bean length) and chemical contamination. The first step in evaluating chemical contamination is to look at the local farming system.

According to the interview results from Mhonda Juu cooperative, the cooperative does not have a quality officer. The cooperative purchases vanilla beans by inspecting the length of the beans as well as other visible parameters including damage. The cooperative is unfamiliar with the post-harvest handling techniques needed for the export market.

The chairman confirmed that the vanilla beans sold to the Natural Extract industry are unlabelled. This makes it difficult for other buyers to recognize the cooperative. Vanilla produced in Mvomero, according to the Natural Extract Industry quality officer, is of high quality when compared to other areas such as rural Morogoro. The chairman added that if the vanilla beans sold to NEI are labelled, it will be much easier to attract other buyers, primarily global buyers.

The findings from the two (2) FGDs showed that farmers were not aware of food safety requirements for the export market, also the same findings were mentioned by the chairman of the cooperative.

#### **4.7.3 Certification**

Results from the exporter, Natural Extract Industries Limited, indicated that the company has authorized certification, basically, organic certification. There was no authorized certification available in the Mvomero district, according to the findings of the district agricultural officer and the chairman of the Mhonda Juu Cooperative. Similarly, the same results come from the 16 respondents from the focus group discussion. 100 % of the farmers said "No authorized certification" is available for the export market. This means that no certified vanilla producer was found in the study area.

Also, according to the district agricultural officer and the cooperative's chairman, certification is unavailable in the study area. As a result, the cooperative was unable to export its products globally. Farmers stated during FGDs that the absence of certification caused them to have low household income due to a lack of access to the export market, but their products are sold through NEI.

### **4.8 Opportunities for cooperative to meet the export market requirements**

#### **4.8.1 Why is there an opportunity?**

##### **Mvomero has suitable environment for growing vanilla**

According to district agricultural officer and exporter, Mvomero district's vanilla-growing wards have a suitable environment for the crop to grow because the area has enough rainfall of 2300 mm, a mean temperature of 26°C, and well-drained soil for the vanilla to grow. The exporter also stated that vanilla produced in the Mvomero district is of higher quality than vanilla produced in other districts such as Malinyi, Lushoto, and Morogoro Rural.

##### **High market demand**

Vanilla is in high demand worldwide, according to the district agricultural officer and exporter. The exporter claimed that although vanilla is a high-value crop, the market can occasionally be unstable. For instance, the global COVID-19 pandemic has significantly disrupted the vanilla market.

##### **Variety**

The results show that all of the vanilla farmers (100 %) identified vanilla planifolia as the only variety grown in the study area. The district agricultural officer, field agricultural officers, exporter, cooperative chairman, and focus group participants also mentioned the same findings.

#### **4.8.2 Researched whether there was a possibility of meeting export market requirements**

##### **Farming system (organic and agro forestry)**

According to the findings from the district agricultural officer, field agricultural officers, the chairman of the Mhonda cooperative, and the focus group discussion, all vanilla smallholder farmers grow their vanilla organically. Furthermore, according to exporter consumers always demand organic vanilla that complies with export market requirements.

The findings also, indicated that all smallholder vanilla farmers mix vanilla with other crops. The primary purpose is to give the crop shade. Out of the 40 responders, 40 % of the respondents mix vanilla with cocoa and 60 % of the respondents mix vanilla with coffee, cocoa, and bananas. Farmers stated during the focus group discussion that:

***“Vanilla grows well when intercropped with other crops, primarily forest trees (Coffee, cocoa and Glyceridia). Its productivity is higher than when grown on its own”.***

**Difference in yield (farmers mixing with cocoa against farmers mixing with coffee, cocoa, and bananas)**

Mean difference in vanilla production between groups of farmers are 45.2 kgs and 65.3 kgs respectively. See the figure below, which shows the difference.

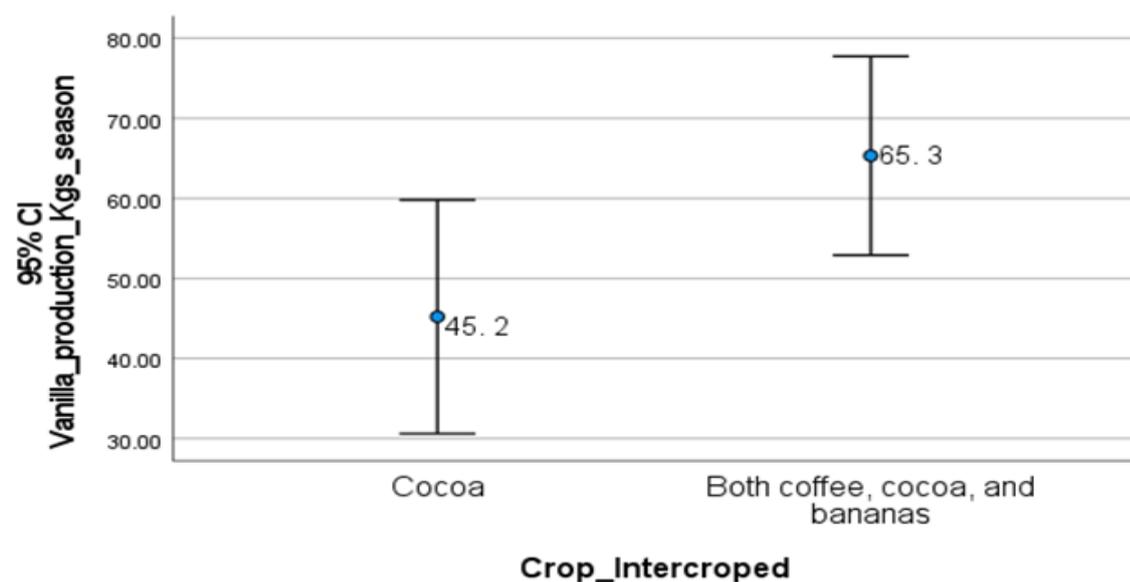


Figure 26: Difference in yield ( Author, 2022)

There was difference in yield between farmers mixing with cocoa against farmers mixing with coffee, cocoa, and bananas (p= 0.036). **See Annex 10**

**Type of farming**

According to the results of the 40 respondents, two types of farming are practiced in the Mvomero district: **organic farming** and **agro-forestry**. The results show 57.5% of the farmers practice organic farming and 42.5 % practice agroforestry. Also, according to all key informants’ farmers in the Mvomero district practice organic farming and agroforestry farming. The result showed there was no significant difference between yield and different farming systems (p=0.560). **See Annex 11**

**Average yield of different farming systems (organic and agro-forestry)**

The result of the mean difference between the vanilla production (yield) and the group (farmers practiced organic and agro forestry farming systems) are 54.9 and 60.6 kgs respectively. **See Annex 12**

## Production volume

The district agricultural officer, the cooperative's chairman, the exporter, and the field agricultural officers all reported that the volume of vanilla produced between 2021 and 2022 was between 15 and 20 tonnes. Therefore, based on the results, there is enough production to export.

## 4.9 Other opportunities

### 4.9.1 Source of income

The findings from the 40 respondents and FGDs mentioned vanilla farming as the main source of income. One of the farmers during focus group discussion stated that

***"My life has been transformed by the vanilla crop. With the money I received from selling the vanilla, I was able to construct a house, send my kids to school, and start a poultry farm".***



Figure 27: Poultry farm ( Author, 2022)

Furthermore, farmers claimed that the income they receive from the sale of cocoa and coffee beans enables them to buy agricultural inputs, manage to repay their debt, and sustain their way of life.

### 4.9.2 Forest conservation

According to the district agricultural officer and field agricultural officers' vanilla requires the support of forestry trees, including cocoa, in order to grow, so forestry trees are well preserved in the study area. The support trees provide the main shade for the vanilla crop.

## 5.0 District agricultural officer and field officers advised on how to access export markets

The district agricultural officer advised that farmers should use their mobile phones to sign up for the online marketing platform in order to find buyers. The district agricultural officer and the field officers suggested inviting various stakeholders to learn more about the export market from their experiences and viewpoints.

## **CHAPTER 5: DISCUSSION**

This chapter's goal is to discuss the research findings and compare the findings with the previous research.

### **5.1 Vanilla value chain**

The vanilla Value Chain was explored based on actors' number, supporters and their roles, Chain relations and characteristics of the agricultural production.

#### **5.1.1 Number of farmers**

According to key informant (agricultural district officer) data, there are 452 vanilla smallholder farmers in total, with an average farm size of 2.5 acres (1 ha). However, there is a potential for increase in number as there are 452 farmers. The researcher believes this number of farmers could likely cause an increase in vanilla production in the future if enough agricultural technologies, training, good prices, and market information about vanilla would be provided to the farmers. The study by Antitampering et al. (2021) conducted in Madagascar showed that an increase in the number of vanilla farmers led to an increase in production.

The researcher thinks, the number of stakeholders involved with the vanilla is insufficient and some of the stakeholders are not fulfilling their responsibilities. For instance, besides the number of farmers (452), and global consumers channels (3), the number of other stakeholders (actors and supporters) in the chain is 10. Additionally, exporter (NEI) could provide farmers with market information in order to strengthen the vanilla value chain in the study area. For the chain's sustainability, researcher expects the presence of other actors, including importers and wholesalers, to make the vanilla chain in the study area sustainable. The chain's various stakeholders are what make it sustainable (Friedman and Ormiston, 2022).

#### **5.1.2 Market Information**

Findings revealed that many vanilla smallholder farmers claimed they did not receive market information about vanilla prices from their buyers and that buyers always benefited more than farmers who are primarily producers. This finding is in line with Gyau et al. (2014), who noted that smallholder farmers, who are primarily located in rural areas, frequently lack access to price information due to a lack of information flow in rural areas; they typically sell at farm-gate prices to buyers who, in turn, have access to price and market information existing in other markets.

Additionally, according to the findings, TMX agreed to assist vanilla smallholder farmers in marketing their products and earning more cash by assisting them in finding online buyers for their products through the mobile technology and training farmers about market information. According to the findings, 2% of respondents have tertiary level education, while 98 percent have primary and secondary level education. This could be the reason they are having difficulty finding a specific buyer for their product (vanilla), as the majority of farmers have a low education level and little market knowledge. Mobile technology means Information accessibility through the use of mobile devices and internet services (Krell et al., 2021).

Joining the TMX Online Trading Platform could help the cooperative to sell their products at the best prices to specific buyers worldwide. The TMX will link the cooperative with the buyer according to the market standards. TMX assures that buyers receive control of the marketed product with assurances of volume and quality and that payments to sellers are made on time. Additionally, TMX provides free services to cooperatives; no contracts are formed, helping to ensure equal and fair markets.

### **5.1.3 Relationships between actors and supporters in the vanilla value chain**

The lack of collaboration between farmers, collectors, processors, and exporters was mentioned by the majority of vanilla smallholder farmers (87.5%). This could probably be caused by the lack of stakeholder meetings in the study area, which likely led to the slow progression of the vanilla subsector. The findings from the district agricultural officer, field officers, and buyers showed a good relationship between buyer and farmers. To strengthen relationships between vanilla actors in the value chain, Mvomero district could perhaps hold quarterly stakeholder meetings. The district will then identify and solve the most common problems that the actors face.

### **5.1.4 Characteristics of vanilla production**

#### **Production**

The findings revealed that production decreased as age of farmers increased. Due to less knowledge, and activeness, the elderly group experienced some difficulties during pollination. The majority of the elderly claimed a loss of production due to ineffective pollination because if pollination is unfruitful, the blossom drops off in just 24 hours, while if pollination is fruitful, the blossom remains attached to the plant.

Those aged 18–55 years were identified as the most active group for pollination according to the findings, pollination takes approximately three hours and is effective in the early morning hours, demanding quick speed and knowledge about pollination. A farm field school could help to bridge the knowledge gap. Because four (4) wards produce vanilla, four (4) pollination groups, each with 20-30 members, are needed for farmer field school training. In order to obtain funding for the formation of the groups through farm field school (FFS), To ensure the sustainability of FFS, the Mvomero district could also invite various stakeholders. it would be advisable to make use of training rotation (rotation of farmers) to disseminate knowledge among farmers to maintain sustainability.

The Mvomero district's production of vanilla will rise to more than the volume of 5 tonnes mentioned by the agricultural district officer during the interview. As a result, the Mhonda Juu cooperative and the Mvomero district as a whole will meet the required production volume for export markets.

#### **Extension services**

According to the findings, vanilla smallholder farmers in the Mvomero district received extension services and training. The availability of extension services could cause an increase in vanilla production in the study area, hence meeting production volume requirements for the export. However, researcher believe that field officers in the study area lack sufficient information about vanilla quality according to the findings, the majority of farmers are unaware of vanilla bean length as one of the requirements for export markets. This implies that the information is also unavailable to the field officers.

#### **Post-harvest technology**

According to the findings, the majority of vanilla smallholder farmers claimed they were unaware of post-harvest handling. This could be the reason of selling green vanilla beans at low price to the buyer Furthermore, this could be why vanilla produced in the Mvomero district is not packaged and labelled for easy traceability and identification by buyers.

## **5.2 Opportunities for Mhonda Juu Agricultural Marketing Cooperative Society to meet export market requirements**

Mvomero has a suitable environment for growing vanilla. This could contribute to an increase in vanilla production, which might have a positive impact on crop yield changes in the study area and meet the needs of the export market.

According to the findings, all of the vanilla farmers (100%) said that the only variety grown in the study area was vanilla planifolia. The vanilla produced in the Mvomero district is likely to pique the interest of the majority of buyers due to its aroma and flavor. Literature confirms the main vanilla variety produced in the majority of producing countries, including Madagascar, is called Vanilla planifolia, and it is preferred by buyers in the USA, Japan, and Europe (Campbell, 2018).

High market demand might possibly result in the assurance of the vanilla market globally. This argument has been raised in other study (Borbolla-Pérez et al., 2017), where it is assumed that high market demand ensures the market of vanilla produced by farmers.

### **5.2.1 Better meeting requirements for vanilla quality and food safety for the export market**

#### **Vanilla bean length**

The findings revealed that while farmers of questionnaires were aware of the vanilla bean length, only 22.5 % of the respondents were aware of the vanilla bean length required for the export markets. To notify vanilla smallholder farmers of the grade needed for the export market, a table displaying specific length and grade requirements (vanilla bean chart grading system) based on the export market requirements would be useful to introduce. This result is consistent with Ranadive's observation (2014) that Indian vanilla farmers used a vanilla grade system to determine whether the harvested vanilla green beans met the requirements of the export market.

#### **Food safety**

The findings revealed that two government regulatory bodies, including TBS and TFDA, are involved in evaluating the quality of products in Tanzania but are not carrying out their duties at the Mvomero district level, specifically for the Mhonda Cooperative. According to the findings, the vanilla cooperative assesses the quality of vanilla beans by measuring their length and other visible parameters. This suggests that the producers are unaware of the other food safety regulations. This could be due to inadequate training of the farmers (members of the cooperative) by these two government regulatory bodies (TBS and TFDA) at the district level, as well as a lack of stakeholder meetings.

All respondents (farmers, FGD and the key informants) revealed that no certification was available in the Mvomero district.

### **5.2.2 Change in the farming system would support farmers to meet export market requirements.**

#### **Farming system**

According to the findings, two (2) farming systems, namely organic and agro-forestry farming systems, are practiced in the study area. According to the Tanzanian Ministry of Agriculture report (2019), the major vanilla buyers are European countries (Germany and France) and the United States of America (U.S.A). The European Union is interested in organic certification, while the United States is interested in the Rainforest Alliance. Having these two types of certifications will draw attention to all of the buyers.

### **5.2.3 Change to mixing with more crops would support farmers to meet export market requirements**

According to the findings, there was a significant difference in yield ( $p = 0.036$ ) between the group of farmers mixing vanilla with cocoa and the farmers mixing vanilla with cocoa, coffee, and bananas. The reason for this difference could be that cocoa, coffee, and bananas provide enough shade for the vanilla to grow, or upon decomposition of leaves and branches, add soil organic matter, which is more crucial for the plant to grow. Through extension services, the Mvomero district should advise vanilla farmers to grow those trees. The findings show that there is an increase in vanilla production when vanilla is mixed with vanilla cocoa, coffee, and bananas (65.3 kg) compared with vanilla mixed with cocoa (45.2 kg). Therefore, an increase in quantity would allow the cooperative to meet export market requirements.

### **5.3 Chosen research design and methodology**

The research was conducted in Tanzania's Mvomero district. The purpose of this research is to determine how Mhonda Juu Agricultural Marketing Cooperative Society can gain access to the export market. The Mvomero district, which is located in Tanzania's Morogoro region, was selected as the study's intended location. Mhonda, Kweuma, Sungaji, and Diongoya were the four (4) vanilla-producing wards involved. The study area has remained unchanged during the research.

Purposive sampling was carried out to choose samples (respondents) in the study area. Initially, researcher thought that using purpose sampling would give relevant information. Questionnaires, semi-structured interviews, and FGD were used to collect data (qualitative and quantitative data).

The design allowed for a mixed-method approach to data collection, combining both qualitative and quantitative methods. Before data collection, the researcher introduced the research topic and the impact of the research on the community to the respondents with the assistance of the ward field officer. Two focus groups were formed, each with eight (8) respondents, eight key informants were interviewed and 40 vanilla farmers were questionnaire. The researcher was satisfied with the findings and the results were reliable because the researcher was able to triangulate information.

Additionally, the challenge encountered during data collection was the absence of the eight lead farmers who participated in Farmer's Days (Nane Nane). The researcher had hoped to know and understand more about vanilla and its market in the study area from these farmers.

Purposive sampling, in the researcher's opinion, was not well worked out in both the questionnaire and FGD to obtain valid and reliable data; instead, random sampling could be used because different smallholder vanilla farmers might have an equal chance of being selected to take part in the discussion and offer various perspectives on the vanilla industry, essentially ways to access the export market.

Researcher able to analyse information collected well, using appropriate methods including core process for qualitative data and SPSS for quantitative data. Researcher believes the analysis gives good (valid and reliable) information because the information is in line with other literature.

### **5.4 Sustainability (3P)**

The value chain's sustainability can be expressed along three aspects: (Planet, Profit, People) (Gebre & Eweg, 2016).

#### **5.4.1 Planet**

The study area included two farming systems: organic and agro-forestry farming systems. There were no chemicals used in the production process. Additionally, Vanilla requires the support of forestry

trees, including cocoa, to grow, so forestry trees are well preserved in the study area, resulting in a management system of the surrounding system which supports preserving biodiversity and the sustainability of the ecological system.

#### **5.4.2 Profit**

The findings show that the exporter's income to farmers along the vanilla value chain is inefficient. The buyer (NEI) earned a higher profit. This suggests that farmers have less control over the market price of vanilla. The Mvomero district's farmers had limited access to a substitute market for their supply of vanilla.

#### **5.4.3 People**

Youth are involved in the production of vanilla, so it created job opportunities for the youth in the study area. Furthermore, at the farm level, there is gender equality in vanilla production; both women and men work in vanilla production. Vanilla production employs both men and women.

#### **5.5 Limitation**

Due to the short period of time the researcher was unable to assess other vanilla bean qualities like vanillin content, colour, and moisture content which are critical for the export market. The colour of vanilla beans can be a reputable indicator of a product's quality and it has a significant impact on both the use and perspective of customers. The moisture content of vanilla beans determines the grade, which includes Grade A, Grade B, and Grade C and a vanilla bean's flavor intensity and quality can be accurately predicted by looking at its vanillin content. All of these parameters require more time and money to test in the laboratory

## **CHAPTER 6: CONCLUSIONS AND INTERVENTIONS**

### **6.1 CONCLUSIONS**

This study was carried out to identify ways of Mhonda Juu Agricultural Marketing Cooperative Society to access export market. The following are the research questions' conclusions:

#### **6.1.1 Current value chain**

Several stakeholders' roles and numbers were identified in the vanilla value chain in the Mvomero district. For instance, 452 vanilla smallholder farmers whose main activities are the production of vanilla and selling green beans to the Mhonda cooperative were identified (by the key informants). Also, other stakeholders, including input suppliers (2), collectors, processors (2), exporter (1), retailers and consumers, and their roles were identified by the key informants, and vanilla farmers.

#### **Chain relations**

The study revealed that there is a weak relationship between the buyer and the farmers, as well as between the government and the farmers. This results in a lack of information flow among vanilla value chain actors. Also, it was noticed that there is a good relationship between buyer and farmers.

#### **Insufficient market information**

It was discovered that, vanilla smallholder farmers in the study area reported receiving no market information about vanilla prices or other market requirements. Also, according to the findings, the Tanzania Mercantile Exchange agreed to assist vanilla smallholder farmers to find online buyers for their products via the mobile technology( and to train farmers on market information.

#### **Vanilla production**

##### **Production volume**

According to the findings, the production volume of vanilla in the study area increased year over year. Currently, the production volume of the district mentioned by the district agricultural officer is 15-20 tonnes. The district agricultural officer stated during interviews that production will increase by about 5 tonnes over the next three years. Buyers regularly look at production volume as an additional requirement. As a result, an increase in production in the study area will certainly be more attractive to buyers.

##### **Good agricultural practices**

Farmers in the study area have access to extension services from both government and non-government organizations.

##### **Post-harvest technology**

It was observed that, the majority of vanilla smallholder farmers claimed they were unaware of post-harvest handling. Knowledge of post-harvest technology should be disseminated to farmers in order for the cooperative to comply with export market requirements. The district could invite an experienced expert to train farmers on post-harvest technology.

### **6.1.2 Opportunities for Mhonda Juu Agricultural Marketing Cooperative Society to meet export market requirements**

#### **Using right vanilla bean length**

The findings show that the cooperative in the study area sell it green beans to the buyer by comply the recommended vanilla bean length (10cm- 25cm). This is an opportunity for Mhonda Juu Agricultural Marketing Cooperative Society to export vanilla produced by its members.

#### **Food safety**

The study found that vanilla smallholder farmers used organic farming and agro-forestry farming systems. Because most consumers nowadays are interested in organic products and are concerned about products that may have an impact on the environment, this is an opportunity for the cooperative to export its vanilla globally when certified.

Consumers all over the world are becoming more worried about the environment. They are attentive to details regarding products, methods, and brand names that may have an environmental effect. Environmental problems are regarded to have a more significant effect on the health of consumers. Consumers who are aware of environmental deterioration actions are more likely to purchase organic produce (Gundala and Singh, 2021).

#### **Starting use of certification**

In the Mvomero district, there is no certification available. According to the findings, 100% of respondents were unaware of certification. Due to unavailability of certification, the cooperative is unable to access the export market for its vanilla. This is an opportunity for the cooperative to establish certifications in order to export vanilla around the world.

### **Change in the farming system would support farmers to meet export market requirements**

#### **Farming system**

The results show that there are two different farming systems in the study area: an organic farming system and an agro-forestry farming system. The Mhonda Juu cooperative would have the option to choose a certification type in accordance with the farming systems present in the research area.

A study carried out in Madagascar, revealed that the majority of Malagasy vanilla farmers used organic and agroforestry systems. The Vanilla Farmers' Association selected the Organic and Rainforest Alliance certifications. According to the Farmers' Association, the certifications (organic and rainforest alliance) would be advantageous to their farm and family (Campbell, 2018).

## 6.2 INTERVENTIONS

### 6.2.1 To link Mhonda Juu cooperative with the Tanzania Mercantile Exchange Online Trading Platform

Findings revealed that the majority of farmers have a low education level (60 % of the vanilla farmers have primary level) and thus little market knowledge. Therefore, the cooperative is advised to join the Tanzania Mercantile Exchange (TMX) Online Trading Platform in order to sell their products at the best prices to specific buyers worldwide. See the figure below for the plan of the activities

Activities	Responsible Institutions	Output	Outcomes	Time frame
To link the Mhonda Juu cooperative with the Tanzania Mercantile Exchange Online Trading Platform	Mvomero district Council (Cooperative office)	The registration is issued to the cooperative by the Tanzania Mercantile Exchange	Accessibility to vanilla buyers worldwide	End of July-2023

Table 7: Plan of activities 01 (Author, 2022)

### 6.2.2 To assist vanilla smallholder farmers to use their phones to find market information

Findings revealed that many vanilla smallholder farmers claimed they did not receive market information about vanilla prices from the buyer. The government is departments in the study area are suggested assist vanilla smallholder farmers to use their phones to access market information. See the figure below

Activities	Responsible Institutions	Output	Outcomes	Time frame
To assist vanilla smallholder farmers to use their phones to access market information by July 2023.	1.Department of agriculture 2.Department of business 3.Department of information technology departments	100% of vanilla farmers are well trained on how to use their mobile phones to access market information	100% of vanilla farmers trained are able to use their mobile phones to access market information to meet export market requirements	July 2023

Table 8: Plan of activities 02 (Author, 2022)

### 6.2.3 Interactions between actors in the value chain

The findings show that there is a weak relationship between chain actors in the vanilla value chain. The district is recommended to hold quarterly stakeholders' meetings to strengthen the relationships between vanilla actors in the value chain. See the figure below for the plan of the activities

Activities	Responsible Institutions	Output	Outcomes	Time frame
Conducting stakeholder meeting in the vanilla value chain in Mvomero district	Mvomero district Council	A quarterly meeting with different vanilla stakeholders is held	Goodwill and active participation among the various stakeholders	End of April 2023

Table 9: Plan of the activities 03 (Author, 2022)

### 6.2.4 Train farmers on post-harvest technology

The majority of vanilla smallholder farmers claimed they were unaware of post-harvest handling. Therefore, to educate and train farmers on post-harvest technology, the district is advised to invite experts from Natural Extract Industries. See the figure below

Activities	Responsible Institutions	Output	Outcomes	Time frame
Training farmers on post-harvest technology	1.Mvomero district Council 2.Natural Extract Industries' Trainer	452 vanilla smallholder farmers were trained about post-harvest technology according to export market requirements	1. 80% of farmers adopt post-harvest technology 2. 60% of farmers meet the requirements for the market	May 2023

Table 10: Plan of the activities 04 (Author, 2022)

### 6.2.5 Establishment of a vanilla bean chart grading system

The majority of the vanilla smallholder farmers (62.5 %) in the study area are unaware of the vanilla bean length for the export market. It is necessary to establish a vanilla bean chart grading system with specific length and grade requirements based on the export market. See the figure below.

Activities	Responsible Institutions	Output	Outcomes	Time frame
Establishment of a vanilla bean chart grading system	1. District agricultural office, 2. Mhonda cooperative	452 vanilla smallholder farmers are aware of the vanilla bean length and grade	100 % of vanilla smallholder farmers are aware of the vanilla bean length for the export market and meet the requirement for the export market	December 2022

Table 11: Plan of the activities 05 (Author, 2022)

### 6.2.6 Establishment of four (4) tree nurseries

According to the findings, vanilla smallholder farmers who mixed their crop with more than one crop, such as cocoa, bananas, or coffee, harvested a higher yield (65.3 kgs) than those who mixed with only one crop (45.2 kgs). Therefore, in order to produce more vanilla yield in the study area and meet market demand, one tree nursery should be introduced in each ward. See the figure below

Activities	Responsible Institutions	Output	Outcomes	Time frame
Establishment of four (4) tree nurseries. Each ward one nursery	District agricultural officer, Field agricultural officers	Establishment of 4 tree nurseries	40 % of farmers growing seedlings  60 % of vanilla farmers grow cocoa and coffee in their farms	April 2023

Table 12: Plan of the activities 06 (Author, 2022)

### 6.2.7 Formation of 4 vanilla pollination farm field school group

The majority of the elderly claimed a loss of production due to ineffective pollination, the findings revealed that production decreased as age of farmers increased. Due to knowledge, and activeness, the elderly group experienced some difficulties during pollination. In order to obtain funding for the formation of the 4 vanilla pollination farm field school group, the district is advised to invite various stakeholders like NMB, CRDB, Equity, and Barclays banks to ensure the sustainability of FFS. There will be a training rotation to disseminate knowledge among farmers to maintain sustainability. See the figure below

Activities	Responsible Institutions	Output	Outcomes	Time frame
Formation of 4 vanilla pollination farm field school group	Community development department	Formation of 4 vanilla pollination farm field school groups and registered	Increasing vanilla production by 5 tonnes	End of January 2023

Table 13: Plan of the activities 07 (Author, 2022)

### 6.2.8 Establishment of certifications

The findings show that no certification is available in the Mvomero district. The establishment of certification (organic and rainforest alliance) in the study is therefore necessary for the cooperative to meet the requirements of the export market. See the figure below

Activities	Responsible Institutions	Output	Outcomes	Time frame
Establishment of certifications	1. District agricultural office 2. QA Technic International Certification	452 vanilla smallholder farmers are trained and certified	100 % of smallholder farmers through cooperative export vanilla globally (meet the requirements for export market)	End of March 2023

Table 14: Plan of the activities 08 (Author, 2022)

## The proposed vanilla value chain map in the Mvomero district

A large percentage of the vanilla growers in the Mvomero district will sell their beans to the cooperative right there at the collection center. Vanilla will be sold locally and internationally by the cooperative. Less than 10 cm long vanilla beans are sold locally, and vanilla beans between 10 cm and 25 cm long (the recommended length for the export market) are sold worldwide. See the figure below

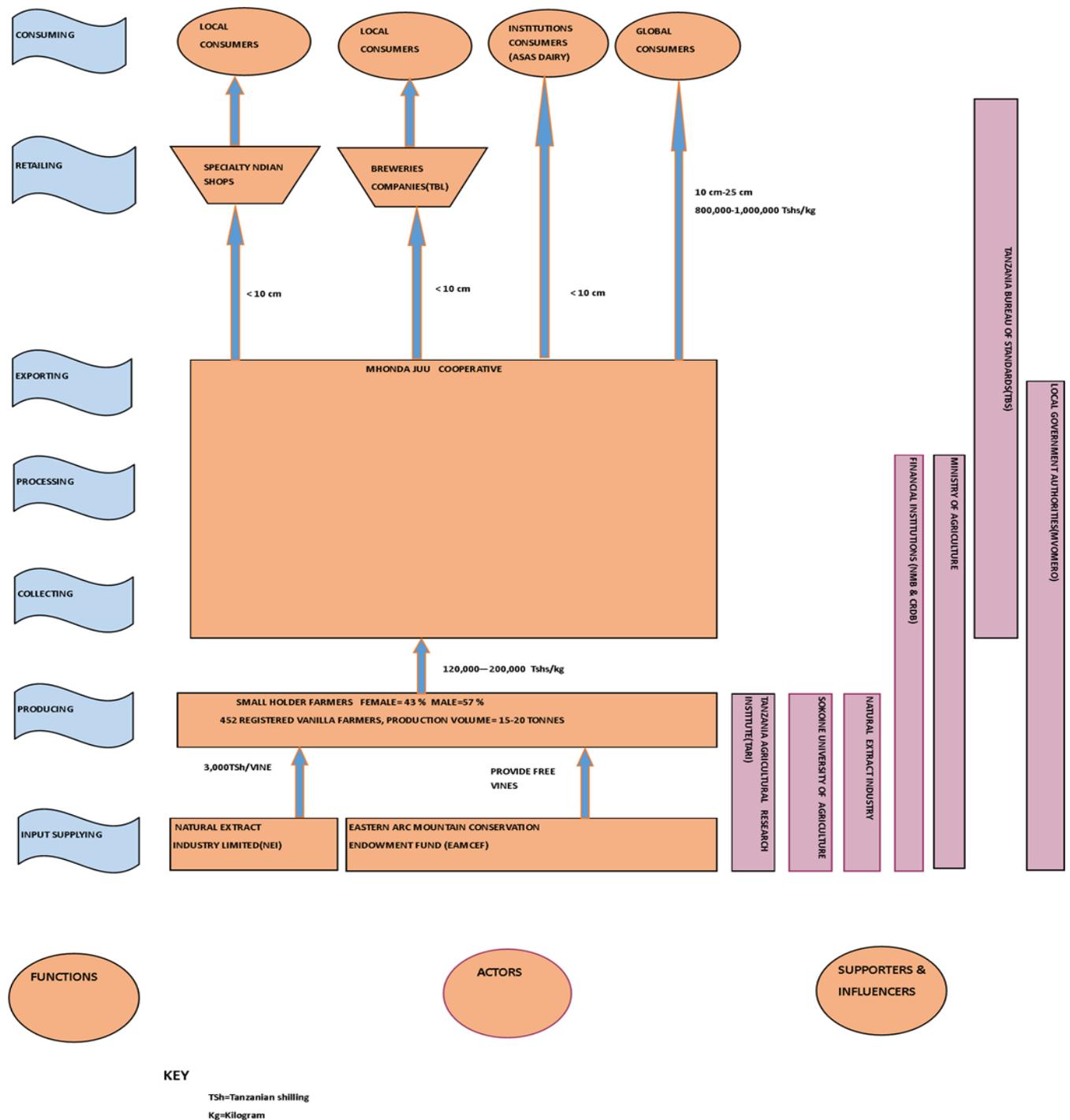


Figure 28: Proposed vanilla value chain (author, 2022)

**Recommendations in relation to further studies**

It is advised that additional research into the relationship between parameters (vanillin content, colour, and moisture content) and the quality of the vanilla bean for the export market be conducted in the Mvomero district involving more participants in the vanilla value chain, including Sokoine University of Agriculture and Tanzania Agricultural Research Institute.

## REFERENCES

- Acharya, S., Sharma, S.R., Upreti, B.R. and Matthys, M.L., (2021). Why Nepal's main agricultural export product, large cardamom, does not reach the world market. *SN Business & Economics*, 1(1), pp.1-21.
- Acumen Research and Consulting (2019). *Vanilla Beans and Extract Market by 2025*.
- Adawiyah, D.R., Reri, P.Y.D. and Lioe, H.N., (2020). The Effect of Bean Size and Curing Process on Aroma Profile and Vanillin/Glucovanillin Content of Indonesian Cured Vanilla Beans. *alcohol*, 100, p.10.
- Agbo, M., Rousselière, D. and Salanié, J., (2015). Agricultural marketing cooperatives with direct selling: A cooperative–non-cooperative game. *Journal of Economic Behavior & Organization*, 109, pp.56-71.
- Alotaibi, B.A., Yoder, E., Brennan, M.A. and Kassem, H.S., (2021). Perception of organic farmers towards organic agriculture and role of extension. *Saudi Journal of Biological Sciences*, 28(5), pp.2980-2986.
- Ambika, N.K. and Supriya, P., (2018). Detection of vanilla species by employing an image processing approach. *Procedia computer science*, 143, pp.474-480.
- Amron, A. & Mahmud, M. (2017). "Developing Marketing Strategy in Property Insurance Business", *International Business Management*, Vol.11 No.1, pp.177-182.
- Amron, A. (2017). "Marketing Challenge of Import Insurance Product in Indonesia", *Advance Science Letters*, Vol. 3 No. 8, 7243-7245.
- Amron, A., (2018). The influence of brand image, brand trust, product quality, and price on the consumer's buying decision of MPV cars. *European Scientific Journal*, ESJ, 14(13), p.228.
- Anania, P. and Rwekaza, G.C., (2016). The determinants of success in agricultural marketing cooperatives in Tanzania: the experience from mweka sungu, mruwia and uru north njari agricultural marketing co-operatives in Moshi district. *European Journal of Research in Social Sciences*, 4(3).
- Anania, P. and Sambuo, D.B., (2017). *The Co-Operative Enterprise and Youths Employment Creation: Prospects and Challenges, (Reflections from Tanzanian Agricultural Sector)*. *Noble International Journal of Business and Management Research*, 1(2), pp.55-67.
- Antitampering, J.N., Hänke, H. and Schlecht, E., (2021). Food security and food quality among vanilla farmers in Madagascar: The role of contract farming and livestock keeping. *Food Security*, 13(4), pp.981-1012.
- Arias, P., Hallam, D., Krivonos, E. and Morrison, J., (2013). *Smallholder integration in changing food markets*. Food and Agriculture Organization of the United Nations, Rome.
- Balasubramaniam Krishnan, K., Freie, N., Hochkammer, H., Lee, J., Mersch, S., Morgan, S., Pepoy, M., Quamilla, O., Schneider, E., Shimoide, M. and Stolpmann, J.P., (2012). *The Market for Vanilla in Germany and the United States*.
- Baqueiro-Peña, I. and Guerrero-Beltrán, J.Á., (2017). Vanilla (*Vanilla planifolia* Andr.), its residues and other industrial by-products for recovering high value flavor molecules: A review. *Journal of applied research on medicinal and aromatic plants*, 6, pp.1-9.

- Bartilol, M.K., Keror, S.J. and Yego, H.K., (2019). Kenya's Export of Cut Flowers to the European Union: A Constant Market Share Analysis. *International Journal of Research and Innovation in Social Science (IJRISS)*, (3 (4)).
- Bedoussac, L., Journet, E.P., Hauggaard-Nielsen, H., Naudin, C., Corre-Hellou, G., Jensen, E.S., Prieur, L. and Justes, E., (2015). Ecological principles underlying the increase of productivity achieved by cereal-grain legume intercrops in organic farming. A review. *Agronomy for sustainable development*, 35(3), pp.911-935.
- Bhat, R. and Gómez-López, V.M. eds., (2014). *Practical food safety: Contemporary issues and future directions*. John Wiley & Sons.
- Bizikova, L., Nkonya, E., Minah, M., Hanisch, M., Turaga, R.M.R., Speranza, C.I., Karthikeyan, M., Tang, L., Ghezzi-Kopel, K., Kelly, J. and Celestin, A.C., (2020). A scoping review of the contributions of farmers' organizations to smallholder agriculture. *Nature Food*, 1(10), pp.620-630.
- Bomgardner, M. (2017). The problem with vanilla | September 12, 2016, Issue - Vol. 94.
- Borbolla-Pérez, V., Iglesias-Andreu, L.G., Luna-Rodríguez, M. and Octavio-Aguilar, P., (2017). Perceptions regarding the challenges and constraints faced by smallholder farmers of vanilla in Mexico. *Environment, Development and Sustainability*, 19(6), pp.2421-2441.
- Borda-Rodriguez, A. and Vicari, S., (2014). Rural co-operative resilience: The case of Malawi. *Journal of Co-operative Organization and Management*, 2(1), pp.43-52.
- Brettmo, A. and Williamsson, J., (2020). The Role of 'Influencers' as Drivers of a More Sustainable Urban Freight Sector. *Sustainability*, 12(7), p.2850.
- Brown, K., Schirmer, J. and Upton, P., (2021). Regenerative farming and human wellbeing: Are subjective wellbeing measures useful indicators for sustainable farming systems? *Environmental and Sustainability Indicators*, 11, p.100132.
- Campbell, M., (2018). *Ethically Sourced Vanilla: Certifications in the production of vanilla in the SAVA Region of Madagascar*.
- Carvalho, F.P., (2017). Pesticides, environment, and food safety. *Food and energy security*, 6(2), pp.48-60.
- CBI-The Ministry of Foreign Affairs in the Netherlands, (2022). Available at: <https://www.cbi.eu/market-information/spices-herbs/vanilla#> Accessed 13/05/2022.
- Census population projection, (2021). Available at: <https://www.nbs.go.tz/index.php/en/> Accessed 27/02/2022.
- Chambers, A.H., Moon, P., Edmond, V. and Bassil, E., (2019). Vanilla Cultivation in Southern Florida: HS1348, 11/2019. EDIS, 2019(6), pp.7-7.
- Chammem, N., Issaoui, M., De Almeida, A.I.D. and Delgado, A.M., (2018). Food crises and food safety incidents in European Union, United States, and Maghreb Area: current risk communication strategies and new approaches. *Journal of AOAC International*, 101(4), pp.923-938.

- Chhetri, A., Panth, B. P., Poudel, D., Gauli, B., & Bhattarai, D. (2021). Value Chain Analysis of Tomato in Palpa District of Nepal. *Socio Economy and Policy Studies*, 1(2), 44–51. <https://doi.org/10.26480/seps.02.2021.44.51> .
- De, L.C. and Medhi, R.P., (2015). Orchid-A diversified component of farming systems for profitability and livelihood security of small and marginal farmers. *J Glob Biosci*, 4(2), pp.1393-1406.
- Dixon, J., Garrity, D., Boffa, J.M., Williams, T.O., Amede, T., Auricht, C., Lott, R. and Mburathi, G., (2020). *Farming Systems and Food Security in Africa*.
- Eagly, A.H. and Carli, L.L., (2018). Women and the labyrinth of leadership. In *Contemporary issues in leadership* (pp. 147-162). Routledge.
- Eric, O.O., Prince, A.A. and Elfreda, A.N.A., (2014). Effects of education on the agricultural productivity of farmers in the Offinso Municipality. *Int. J. Dev. Res*, 4(9), pp.1951-1960.
- Etikan, I., Musa, S.A. and Alkassim, R.S., (2016). Comparison of convenience sampling and purposive sampling. *American journal of theoretical and applied statistics*, 5(1), pp.1-4.
- European Union, (2018) Available at: [https://ec.europa.eu/info/index\\_en](https://ec.europa.eu/info/index_en) Accessed 12/05/2022
- FAOSTAT, (2020). Available at :<https://www.fao.org/faostat/en/#data/TCL> Accessed 27/02/2022.
- Farahat, M., Saner, R., Chiarato, L. and Yiu, L., (2020). *Agricultural Commodities of Ethiopia, Madagascar, and Tanzania*.
- Farrington, J. and Lewis, D.J., (2014). *Non-governmental organizations and the state in Asia: Rethinking roles in sustainable agricultural development*. Routledge.
- Friedman, N. and Ormiston, J., (2022). Blockchain as a sustainability-oriented innovation? Opportunities for and resistance to Blockchain technology as a driver of sustainability in global food supply chains. *Technological Forecasting and Social Change*, 175, p.121403.
- Garcia, J.M. and Teixeira, P., (2017). Organic versus conventional food: A comparison regarding food safety. *Food Reviews International*, 33(4), pp.424-446.
- Gebre, G.G. and Rik, E., (2016). Sustainability assessment of a banana value chain: The case of Arba Minch, Ethiopia. *Journal of Agribusiness*, 34(2), p.2016.
- Gebreyesus, F., (2016). Determination of important factors affecting production and marketing of korarima (*Aframomum Corrorima* (braun) PCM Jansen) in Western Ethiopia. *International Journal of Engineering Development and Research* (www. ijedr. org), 4(2).
- Gebru, H., (2015). A review on the comparative advantages of intercropping to mono-cropping system. *Journal of Biology, Agriculture and Healthcare*, 5(9), pp.1-13.
- George M, Cherian E (2017) Emergent global marketing challenges for Kerala cardamom producers visà-vis the role of the Spices Board of India. *Int J Community Dev Manag Stud* 1:39–61.
- Grand View Research, (2017) *Vanillin Market Size, Share & Trends Analysis Report By End-use (Food & Beverage, Fragrance, Pharmaceutical), By Region (North America, Europe, Asia Pacific, Central & South America, MEA), And Segment Forecasts, 2018–2025* Retrieved from <https://www.grandviewresearch.com/industry-analysis/vanillin-market/>. Accessed 27/02/2022.

- Grisoni, M. and Nany, F., (2021). The beautiful hills: half a century of vanilla (*Vanilla planifolia* Jacks. ex Andrews) breeding in Madagascar. *Genetic Resources and Crop Evolution*, 68(5), pp.1691-1708.
- Gundala, R.R. and Singh, A., (2021). What motivates consumers to buy organic foods? Results of an empirical study in the United States. *PLoS one*, 16(9), p.e0257288.
- Gwambene, B., (2021). The sway of land available for farming activities and diversification among smallholder farmers in Rungwe district, Tanzania. Issue 36 | *Chemical & Engineering News*. [online] *Cen.acs.org*. Available at: <http://cen.acs.org/articles/94/i36/problem-vanilla.html>. Accessed 27/02/2022.
- Gyau, A., Franzel, S., Chiatoh, M., Nimino, G. and Owusu, K., (2014). Collective action to improve market access for smallholder producers of agroforestry products: key lessons learned with insights from Cameroon's experience. *Current Opinion in Environmental Sustainability*, 6, pp.68-72.
- Hänke, H., Barkmann, J., Blum, L., Franke, Y., Martin, D.A., Niens, J., Osen, K., Uruena, V., Witherspoon, S.A. and Wurz, A., (2018). Socio-economic, land use and value chain perspectives on vanilla farming in the SAVA Region (north-eastern Madagascar): The Diversity Turn Baseline Study (DTBS) (No. 1806). *Diskussionsbeitrag*.
- Hänke, H., Living Income Reference Price for Vanilla from Madagascar, a (2020) update.
- Havkin-Frenkel, D. and Belanger, F.C. eds., (2018). *Handbook of vanilla science and technology*. John Wiley & Sons.
- Henry, J., Bennie, G., and Gerhard, R. (2014). Conceptual framework for value chain analysis for poverty alleviation among smallholder farmers. *Agrekon: Agricultural Economics Research, Policy and Practice in Southern Africa*. 53(1), 1 – 25.
- Hussein, K. and Suttie, D., (2016). IFAD RESEARCH SERIES 5-Rural-urban linkages and food systems in sub-Saharan Africa: the rural dimension. *IFAD Research series*.
- Jaya, A., Antang, E.U., Djaya, A.A. and Gunawan, H., (2021), March. Agroforestry farming system as peatland restoration efforts in Central Kalimantan, Indonesia. In *IOP Conference Series: Earth and Environmental Science* (Vol. 694, No. 1, p. 012016). IOP Publishing.
- Jaya, A., Antang, E.U., Djaya, A.A. and Gunawan, H., (2021), March. Agroforestry farming system as peatland restoration efforts in Central Kalimantan, Indonesia. In *IOP Conference Series: Earth and Environmental Science* (Vol. 694, No. 1, p. 012016). IOP Publishing.
- Jessy, M.D., Joseph, P. and George, S., (2017). Possibilities of diverse rubber-based agroforestry systems for smallholdings in India. *Agroforestry Systems*, 91(3), pp.515-526.
- Jessy, M.D., Joseph, P. and George, S., (2017). Possibilities of diverse rubber-based agroforestry systems for smallholdings in India. *Agroforestry Systems*, 91(3), pp.515-526.
- Jiménez-Carvelo, A.M., Tonolini, M., McAleer, O., Cuadros-Rodríguez, L., Granato, D. and Koidis, A., (2021). Multivariate approach for the authentication of vanilla using infrared and Raman spectroscopy. *Food Research International*, 141, p.110196.
- Kamya, I.R., (2015). Development Aid, Agricultural Value Chains and Farmers' Benefits: The Case of Vanilla Growers in Kasese, Uganda. *Eastern Africa Social Science Research Review*, 31(1), pp.1-20.

- Kephe, P.N., Ayisi, K.K. and Petja, B.M., (2020). A decision support system for institutional support to farmers in the face of climate change challenges in Limpopo province. *Heliyon*, 6(11), p.e04989.
- Khojratty, S., Kodja, H. and Verpoorte, R., (2018). Vanilla flavor production methods: a review. *Industrial Crops and Products*, 125, pp.433-442.
- Khudair, S.A.B. and Abdalla, A.K., (2016). Value chain, stakeholders' analysis, and technology: A holistic and integrated approach for determining the cumulative added value of education. *International Journal of Educational Administration and Policy Studies*, 8(7), pp.85-96.
- Kifelew, H., Hailemichael, G., Mulatu, Z., Bekelle, D., Getu, A., Mitiku, H. and Tefera, T., (2016). Result of Vanilla (*Vanilla Planifolia*) Adaptation Study in Ethiopia. *International Journal of Research Studies in Agricultural Sciences*, 2(5), pp.35-38.
- Kivunja, C., (2018). Distinguishing between theory, theoretical framework, and conceptual framework: A systematic review of lessons from the field. *International Journal of Higher Education*, 7(6), pp.44-53.
- Krell, N.T., Giroux, S.A., Guido, Z., Hannah, C., Lopus, S.E., Caylor, K.K. and Evans, T.P., (2021). Smallholder farmers' use of mobile phone services in central Kenya. *Climate and Development*, 13(3), pp.215-227.
- Krumbiegel, K., Maertens, M. and Wollni, M., (2018). The role of fairtrade certification for wages and job satisfaction of plantation workers. *World Development*, 102, pp.195-212.
- Laws, S. et al. (2013) *Research for Development*. 2nd edn. SAGE Publications. Available at: <https://www.perlego.com/book/1431431/research-for-development-pdf> (Accessed: 09 September 2022).
- Laws, S., Harper, C., Jones, N. and Marcus, R., (2013). *Research for development: A practical guide*. Sage.
- LEEMANS, K., (2016). Exploring the role of a technical support agency in horticulture: case study of the Centre Technique Horticole de Tamatave (Madagascar).
- Lernoud, J., Potts, J., Sampson, G., Voora, V., Willer, H. and Wozniak, J., (2016). The state of sustainable markets-statistics and emerging trends 2015.
- Leyva, V.E., Lopez, J.M., Zevallos-Ventura, A., Cabrera, R., Cañari-Chumpitaz, C., Toubiana, D. and Maruenda, H., (2021). NMR-based leaf metabolic profiling of *V. planifolia* and three endemic Vanilla species from the Peruvian Amazon. *Food Chemistry*, 358, p.129365.
- Loki, O., Aliber, M. and Sikwela, M.M., (2021). Assessment of socio-economic characteristics that determine farmers' access to agricultural extension services in Eastern Cape, South Africa. *South African Journal of Agricultural Extension*, 49(1), pp.198-209.
- Lundy, M., Amrein, A., Hurtado Bermúdez, J.J., Becx, G., Zamierowski, N., Rodríguez, F. and Mosquera Echeverry, E.E., (2014). *LINK methodology: a participatory guide to business models that link smallholders to markets*. Version 2.0.

Lwelamira, J., Safari, J. and Wambura, P., (2015). Grapevine farming and its contribution to household income and welfare among smallholder farmers in Dodoma urban district, Tanzania. *American Journal of Agriculture and Forestry*, 3(3), pp.73-79.

Ma, W. and Abdulai, A., (2016). Does cooperative membership improve household welfare? Evidence from apple farmers in China. *Food Policy*, 58, pp.94-102.

Magesa, M.M., Michael, K. and Ko, J., (2014). Access to agricultural market information by rural farmers in Tanzania.

Martin, D.A., Wurz, A., Osen, K., Grass, I., Hölscher, D., Rabemanantsoa, T., Tschardt, T. and Kreft, H., (2021). Shade-tree rehabilitation in vanilla agroforests is yield neutral and may translate into landscape-scale canopy cover gains. *Ecosystems*, 24(5), pp.1253-1267.

McGuffog, T., (2016). Building effective value chains: value and its management. Kogan Page Publishers.

Meuwissen, M.P., Feindt, P.H., Spiegel, A., Termeer, C.J., Mathijs, E., de Mey, Y., Finger, R., Balmann, A., Wauters, E., Urquhart, J. and Vigani, M., (2019). A framework to assess the resilience of farming systems. *Agricultural Systems*, 176, p.102656.

MINH, V.T., MIZUNO, K., FUNAKAWA, S., SHINJO, H., TANAKA, U. and Van AN, L., (2015). Introduction of vanilla to mountainous villages of central Vietnam. *Tropical Agriculture and Development*, 59(4), pp.199-206.

Ministry of Agriculture, (2016), Available at: <https://www.kilimo.go.tz/> Accessed 29/02/2022

Ministry of Agriculture, (2017), Available at: <https://www.kilimo.go.tz/> Accessed 29/02/2022

Ministry of Agriculture, (2020), Available at: <https://www.kilimo.go.tz/> Accessed 29/02/2022

Mkonda, M.Y., He, X. and Festin, E.S., (2018). Comparing smallholder farmers' perception of climate change with meteorological data: experience from seven agroecological zones of Tanzania. *Weather, Climate, and Society*, 10(3), pp.435-452.

Mojo, D., Fischer, C. and Degefa, T., (2017). The determinants and economic impacts of membership in coffee farmer cooperatives: recent evidence from rural Ethiopia. *Journal of Rural Studies*, 50, pp.84-94.

Mvomero district cooperative plan (2017). Available at: <http://mvomerodc.go.tz> Accessed 27/03/2022

Mvomero District Council; August (2014). Available at: <https://mvomerodc.go.tz/> Accessed 07/03/2022

Mvomero district investment profile, (2017). Available at: <http://mvomerodc.go.tz> Accessed 27/03/2022.

Mvomero district report, (2020). Available at: <http://mvomerodc.go.tz> Accessed 28/04/2022

Mvomero strategic plan, (2017). Available at: <http://mvomerodc.go.tz> Accessed 28/03/2022

- Neimark, B., Osterhoudt, S., Alter, H. and Gradinar, A., (2019). A new sustainability model for measuring changes in power and access in global commodity chains: through a smallholder lens. *Palgrave Communications*, 5(1), pp.1-11.
- Pershina, E., Valkonen, J., Kurki, P., Ivanova, E., Chirak, E., Korvigo, I., Provorov, N. and Andronov, E., (2015). Comparative analysis of prokaryotic communities associated with organic and conventional farming systems. *PLoS One*, 10(12), p.e0145072.
- Purba, H.J., Yusufi, E.S. and Hestina, J., (2021). Performane and Competitiveness of Indonesian Nutmeg in Export Market. In *E3S Web of Conferences* (Vol. 232, p. 02018). EDP Sciences.
- Rahman, K.U., Thaleth, M.K.B., Kutty, G.M. and Subramanian, R., (2019). Pilot scale cultivation and production of *Vanilla planifolia* in the United Arab Emirates. *Bulgarian Journal of Agricultural Science*, 25(6), pp.1143-1150.
- Rahman, M.M., (2019). *Semi-Structured Interview: A Critical Analysis*. University of Bath, July, pp.4-6.
- Rainforest Alliance, (2022). Available at <https://www.rainforest-alliance.org/> Accessed 29/05/2022
- Ranadive, A.S. ed., (2018). Quality control of vanilla beans and extracts. *Handbook of vanilla science and technology*, pp.237-260.
- Resource trade. Earth 2020 data. Available at: <https://resourcetrade.earth/> Accessed 27/02/2022
- Roopa, S. and Rani, M.S., (2012). Questionnaire designing for a survey. *Journal of Indian Orthodontic Society*, 46(4\_suppl1), pp.273-277.
- Rosati, A., Borek, R. and Canali, S., (2021). Agroforestry and organic agriculture. *Agroforestry Systems*, 95(5), pp.805-821.
- Royal Tropical Institute (KIT) and International Institute of Rural Construction (IIRR). (2008). *Trading up: Building cooperation between farmers and traders in Africa*. Royal Tropical Institute, Amsterdam; and International Institute of Rural Reconstruction, Nairobi.
- Schwab, D., Wurz, A., Grass, I., Rakotomalala, A.A., Osen, K., Soazafy, M.R., Martin, D.A. and Tschardtke, T., (2021). Decreasing predation rates and shifting predator compositions along a land-use gradient in Madagascar's vanilla landscapes. *Journal of Applied Ecology*, 58(2), pp.360-371.
- Sebetha, P., (2021). *Assessment of factors hindering marketing among smallholder vegetable cooperative farmers in Polokwane Municipality, Limpopo Province, South Africa* (Doctoral dissertation).
- Seufert, V., Ramankutty, N. and Mayerhofer, T., (2017). What is this thing called organic? –How organic farming is codified in regulations. *Food Policy*, 68, pp.10-20.
- Singh, M., (2021). Organic farming for sustainable agriculture. *Indian Journal of Organic Farming*, 1(1), pp.1-8.
- Suchánek, P., Richter, J. and Králová, M., (2015). Customer satisfaction, product quality and performance of companies. *Review of economic perspectives*, 14(4), pp.329-344.
- Sumelius, J., Bäckman, S.T. and Bee, F., (2021). Agricultural cooperatives and their role in poverty reduction in Tanzania. In *Cooperatives in the Global Economy* (pp. 59-85). Lexington Books.

Sutdualan, J., Harakan, A. and Jermsittiparsert, K., (2019). Exploring the nexus between supply chain integration, export marketing strategies practices and export performance: a case of Indonesian firms. *Humanities & Social Sciences Reviews*, 7(3), pp.711-719.

Tanzania cooperative societies act, (2013). Available at: <https://www.ushirika.go.tz/> Accessed 12.03.2022.

Tanzania national census, (2012). Available at: <https://www.nbs.go.tz/index.php/en/> Accessed 07/03/2022

Tefera, D.A., Bijman, J. and Slingerland, M.A., (2017). Agricultural co-operatives in Ethiopia: evolution, functions and impact. *Journal of International Development*, 29(4), pp.431-453.

Therond, O., Duru, M., Roger-Estrade, J. and Richard, G., (2017). A new analytical framework of farming system and agriculture model diversities. A review. *Agronomy for sustainable development*, 37(3), pp.1-24.

Trade Map, (2021). Available at: [https://www.trademap.org/Product\\_SelCountry\\_TS.aspx](https://www.trademap.org/Product_SelCountry_TS.aspx) Accessed 14/05/2022.

Van Dyk, S., Holford, P., Subedi, P., Walsh, K., Williams, M. and McGlasson, W.B., (2014). Determining the harvest maturity of vanilla beans. *Scientia Horticulturae*, 168, pp.249-257.

Wahyudi, A., Sujianto, S. and Kurniasari, I., (2021), November. Strategy for developing Indonesian vanilla products to improve the added value. In *IOP Conference Series: Earth and Environmental Science* (Vol. 892, No. 1, p. 012042). IOP Publishing.

Wahyudi, A., Wulandari, S., Aunillah, A. and Alouw, J.C., (2020). Sustainability certification as a pillar to promote Indonesian coffee competitiveness. In *IOP Conference Series: Earth and Environmental Science* (Vol. 418, No. 1, p. 012009). IOP Publishing.

Watteyn, C., Dejonghe, O., Van Hoyweghen, K., Bolanos, J.B.A., Karremans, A.P., Vranken, L., Reubens, B., Muys, B. and Maertens, M., (2022). Exploring farmer preferences towards innovations in the vanilla supply chain. *Journal of Cleaner Production*, 330, p.129831.

Wondim, D., (2021). Value chain analysis of vegetables (onion, tomato, potato) in Ethiopia: A review. *International Journal of Agricultural Science and Food Technology*, 7(1), pp.108-113.

World Health Organization, (2022). Available at: <https://www.who.int/> Accessed 15/05/2022

World Trade Organization, (2022). Available at <https://www.wto.org/index.htm> Accessed 02/05/2022

Zimmerman, A.S., (2022). The Teaching of the Philosophical Concepts Underlying Hermeneutical Phenomenology: Five Curriculum Design Possibilities. In *Methodological Innovations in Research and Academic Writing* (pp. 82-100). IGI Global.

Zina, O., (2021). *The essential guide to doing your research project*, Sage, pp 252.

**APPENDICES**

**Annex 1: Questionnaire for vanilla smallholder farmers in Mvomero District**

District.....

Questionnaire Number: .....

Ward.....

Name of the respondent: .....

**SECTION 1: BACKGROUND INFORMATION**

1. Name of the farmer? .....

2. Mobile number.....

3. Sex of the respondent: Male  Female

4. Age of the respondent: .....

5. What is your education level: Primary  Secondary  Tertiary   
None

6. What is your main source of income?

(a) Farming  (b) formal employment  (c) Other (specify) .....

7. Do you own a phone? (a)Yes  (b)No

If your answer in question 7 was Yes, please answer question 8,

8. which type of phone?

(a) Smart phone  (b) Simple phone

**SECTION 2: VANILLA PRODUCTION**

9. How many hectares (Ha) do you grow vanilla?.....

10. For how long you have been involved in vanilla production?.....

11. What kinds of vanilla cultivars do you have in your farm?

(a) Vanilla Planifolia

(b) Vanilla Tahitensis

(c) Others (specify)

(d) Don't know

12. Where do you get your planting materials?

(a) Non-Government organization

(b) Fellow farmers

(c) Own farm

(d) Other (specify) .....

If you responded to agricultural NGOs, please include names.

Agricultural NGOs .....

13. Do you grow vanilla with other type of crop?

(a) Yes  (b) No

If your answer in question 13 was Yes, please answer question 14,

14. What other crop do you grow together with vanilla?

(a) Coffee

(b) Cocoa

(c) Bananas

(d) Both coffee, cocoa, and bananas

(e) Jatropha

(f) Other (specify)

15. What kind of farming system do you do?

(a) Organic farming system

(b) Conventional farming

(c) Mixed farming

(d) Agro forestry farming system

16. What is the average production of vanilla per season?.....

17. Do you apply any chemicals during farming?

(a) Yes  (b) No  (c) Not sure

If your answer in question 17 was Yes, please answer question 18

18. Which types of chemicals do you apply during farming?

- (a) Organic pesticides
- (b) Inorganic/Industrial pesticides
- (c) Not sure

19. Do you receive any extension services?

- (a) Yes
- (b) No

**SECTION 3: EXPORT REQUIREMENT**

20. Do you know the length of the matured vanilla green beans preferable for harvesting?

- (a) Yes
- (b) No
- (c) Not sure

21. Which vanilla green beans length is preferable for harvesting?.....

22. Do you have any authorized certification standard for the export market?

- (a) Yes
- (b) No
- (c) Not sure

If your answer in question 22 was Yes, please answer question 23

23. What kind of certification?

- (a) Organic certification
- (b) Fairtrade certification
- (c) Rainforest Alliance certification
- (d) Other, specify .....

**SECTION 4: BUYERS**

(24) Who do you usually sell your green vanilla bean to?

- (a) Middlemen
- (b) Wholesaler
- (c) Retailer
- (d) Other(specify) .....

(25) Do you usually sell to the same buyer?

- (a) Yes
- (b) No

If your answer in question 24 was Yes, please answer question 25

(26) Why do you sell to this buyer?

(a) Better price

(b) No alternative buyer

**SECTION 4: SUPPORTER**

(27) Where do you receive support for your farming activities?

(a) Government

(b) Agricultural NGOs

(c) Private company

(d) Institutional

(e) Other(specify).....

If you responded to agricultural NGOs and private companies, institutional please include names.

Agricultural NGOs .....

Private company .....

Institutional.....

(28) What type of support do you receive?

(a) Extension services

(b) Training

(c) vanilla cuttings

(d) financial

(e) Other(specify).....

(29) Do you have access to export market information?

(a) Yes

(b) No

If your answer in question 28 was Yes, please answer questions 29 and 30

(30) To what type of information do you have access? (Tick all that apply)

(a) Export market requirements

(b) Market volume demand

(c) Market price

(d) Other(specify).....

(31) How frequently do you interact with actors and supporters?

(a) monthly

(b) quarterly

(c) twice a year

(d) annual

(c) None of the above

(32) What type of relationship exists between you and your buyer?

(a) Strong relationship  (b) weak relationship  (c) None

## Annex 2. Interview checklist for the key-informants

**(District agricultural officer, four (4) ward agricultural extension officers and district cooperative officers)**

1. Who are the key stakeholders and their roles in vanilla value chain in Mvomero?
2. Which actor has more power in the vanilla value chain?
3. Which actor has low power in the vanilla value chain?
4. What is the production volume?
5. What do you expect vanilla production in the coming years?
6. What is the number of vanilla smallholder farmers in Mvomero?
7. What certification is available in the Mvomero district?
8. What is the type of certification preferable by the farmers and buyer?
9. What type of farming system is practiced in Mvomero district? (Organic, conventional, mixed farming, agroforestry)
10. Is there any training or information on vanilla quality and food safety provided to the farmers? If yes how often? And by who?
11. Who is responsible to train farmers about good agricultural practices in general?
12. How often is the information about vanilla export market requirements provided to the farmers?
13. Who is responsible for making sure vanilla export requirements are well provided to the farmers?
14. Is there any criteria's guiding farmers to check if the harvested vanilla beans are of good quality?
15. Who is or are the buyers of vanilla?
16. Where do the cooperative sell vanilla product?
17. What is the cooperative buying price per kilogram of vanilla beans?
18. What suggestions would you recommend improving the vanilla export market?

**Mhonda juu cooperative (Chairman of the cooperative)**

- 1.What are roles of the cooperative in the vanilla value chain?
- 2.Where do you source vanilla green beans?
- 3.What is the production volume?
- 4.What is the number of vanilla smallholder farmers?
- 5.What type of farming system is practiced by farmers?
6. What is the cooperative buying price per kilogram of vanilla beans?
- 7.What is the quality of vanilla bean needed by buyers?
- 8.What are the available market channels?
- 9.Who are your buyers?
- 10.Do you have a contract with your buyer? How often?
- 11.Do you often sell to the same buyer?
- 12.What are the reasons for selling vanilla products to the same buyer?
13. Are you aware of any alternative markets?
14. Do you have access to information about the export market? (Price and product quality and quantity)
15. Where do you get the information about export market?

**Buyer (Exporter)**

- 1.Description of your company and the role in vanilla value chain?
- 2.Where do you buy vanilla green beans?
- 3.Do you have a contract with the supplier?
- 4.Where do you sell your product?
- 5.How much do you pay farmers for one kg of vanilla green?
- 6.How much quantity do you collect per season?
- 7.How do you know the vanilla green beans you buy have the good quality you need?
- 8.Do you have any authorized certification standard for the export market?
- 9.What are the requirements of the export market?
10. Do you have any plans to make sure vanilla farmers produce the good quality you need?
- 11.Have you ever experienced supply shortages? How often? if yes, how much quantity?
12. Do you always meet your demand?

Annex 3: Receipt of the green bean's vanilla per kg

**No 20854** RISITI YA MALIPO KWA MKULIMA NEI LTD  
S.L.P 7628 MOSHI - TANZANIA

Tarehe 01/06/22  
Jina la Mkulima (la Kwanza) Samuel (La, Mwisho) Safah  
Kitambulisho ID No 138735 Simu No 0673747362  
Kijiji Lywemba Kata Mhondo  
Wilaya Mromero Mkoa Manzano  
Sababu ya Malipo Vanilla pods  
Organic  Non - organic  Conversion   
Kiasi cha Pesa KILICHOLIPWA Tshs 259,250/- Uzito Kgs 10.37kg  
Malipo yanafanyika baada ya kukata Malipo yoyote ya Awali aliyopewa Mkulima na NEI  
Ambayo ni Tshs \_\_\_\_\_  
Kwa sababu ifuatayo  
MKULIMA MHAMASISHAJI / VEO/WC  
Jina \_\_\_\_\_  
Sahihi \_\_\_\_\_  
NEI LTD REPRESENTATIVE  
SONGO  
Sahihi \_\_\_\_\_  
MKULIMA  
Samuel  
Jina \_\_\_\_\_  
Sahihi \_\_\_\_\_

Annex 4 : Mean

Vanilla Acres

N	Valid	40
	Missing	0
Mean		2.4865

Annex 5: Relationship

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strong	1	2.5	2.5	2.5
	Weak	35	87.5	87.5	90.0
	None	4	10.0	10.0	100.0
Total		40	100.0	100.0	

Annex 6: Accessed market information

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	11	27.5	27.5	27.5
	No	29	72.5	72.5	100.0
Total		40	100.0	100.0	

### Annex 7: Vanilla production (kilograms) per gender

		Levene's Test for Equality of Variances				t-test for Equality of Means				
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Vanilla_production_Kgs_season	Equal variances assumed	.009	.925	-.099	38	.921	-.95614	9.61354	-20.41773	18.50544
	Equal variances not assumed			-.100	37.720	.921	-.95614	9.60532	-20.40582	18.49354

### Annex 8 : Difference in yield (vanilla production) per age groups

#### Multiple Comparisons

Dependent Variable: Vanilla\_production\_Kgs\_season

LSD

(I) Age	(J) Age	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
18-40	41-55	3.60714	10.27852	.728	-17.2191	24.4334
	>56	31.85714*	10.69823	.005	10.1805	53.5338
41-55	18-40	-3.60714	10.27852	.728	-24.4334	17.2191
	>56	28.25000*	10.69823	.012	6.5733	49.9267
>56	18-40	-31.85714*	10.69823	.005	-53.5338	-10.1805
	41-55	-28.25000*	10.69823	.012	-49.9267	-6.5733

\*. The mean difference is significant at the 0.05 level.

### Annex 9: Difference in yield per education level

		Levene's Test for Equality of Variances				t-test for Equality of Means				
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Vanilla_production_Kgs_season	Equal variances assumed	.522	.474	-3.200	37	.003	-28.67917	8.96358	-46.84110	-10.51724
	Equal variances not assumed			-3.240	31.078	.003	-28.67917	8.85214	-46.73139	-10.62694

### Annex 10 : Difference in yield between farmers mixing with cocoa against farmers mixing with coffee, cocoa, and bananas

		Levene's Test for Equality of Variances				t-test for Equality of Means				
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Vanilla_production_Kgs_season	Equal variances assumed	.027	.870	-2.177	38	.036	-20.11458	9.24164	-38.82331	-1.40586
	Equal variances not assumed			-2.209	33.879	.034	-20.11458	9.10716	-38.62500	-1.60417

## Annex 11: Difference between yield and different farming systems

		Independent Samples Test					t-test for Equality of Means		95% Confidence Interval of the Difference	
		Levene's Test for Equality of Variances					Mean Difference	Std. Error Difference	Lower	Upper
		F	Sig.	t	df	Sig. (2-tailed)				
Vanilla_production_Kgs_season	Equal variances assumed	.170	.682	-.588	38	.560	-5.68926	9.66870	-25.26252	13.88400
	Equal variances not assumed			-.585	33.872	.562	-5.68926	9.72525	-25.45610	14.07758

## Annex 12: Average yield of difference farming systems

		Group Statistics				
		Farming_system	N	Mean	Std. Deviation	Std. Error Mean
Vanilla_production_Kgs_season	Organic Farming		23	54.8696	29.74025	6.20127
	Agro forestry		17	60.5588	30.88885	7.49165

## Annex 13: List of respondents (Questionnaires)

S/N	FARMER'S NAME	GENDER	DISTRICT	WARD
1	ANNA EMANUEL MAHABARI	FEMALE	MVOMERO DC	MHONDA
2	FELIX PETER	MALE	MVOMERO DC	MHONDA
3	ANTHON MAFUME	MALE	MVOMERO DC	MHONDA
4	AGNES SEVERIN	FEMALE	MVOMERO DC	MHONDA
5	YEREMIAS ISAAC KIPEYU	MALE	MVOMERO DC	MHONDA
6	ETIEN ISAACK	MALE	MVOMERO DC	MHONDA
7	STEVEN JOHN MAGWIZA	MALE	MVOMERO DC	MHONDA
8	ANTONIA JOHN	FEMALE	MVOMERO DC	MHONDA
9	ALOYCE JOHN MTIRI	MALE	MVOMERO DC	MHONDA
10	ERNESTA HILALY	FEMALE	MVOMERO DC	MHONDA
11	DISMUS ISMAIL MTACHI	MALE	MVOMERO DC	KWEUMA
12	HENRY HAMZA MATAGE	MALE	MVOMERO DC	KWEUMA
13	ALPHONCE PETRO KILAZA	MALE	MVOMERO DC	KWEUMA
14	BERNADETHA JOHN MNGOYA	FEMALE	MVOMERO DC	KWEUMA
15	GODFREY MSUYA	MALE	MVOMERO DC	KWEUMA
16	JONAS ANACRETI	MALE	MVOMERO DC	KWEUMA
17	ESTA KILIAN MUYA	FEMALE	MVOMERO DC	KWEUMA
18	EMANUEL CHARLES MNZAVA	MALE	MVOMERO DC	KWEUMA
19	CHARLES KIBINDA	MALE	MVOMERO DC	KWEUMA

20	ROSEMARY MATELU	FEMALE	MVOMERO DC	KWEUMA
21	MWANAI ATHUMANI KIPANGA	FEMALE	MVOMERO DC	KWEUMA
22	MWAJUMA MOHAMED MLOEZI	FEMALE	MVOMERO DC	SUNGAJI
23	SAILA AMRANI HASSANI	FEMALE	MVOMERO DC	SUNGAJI
24	YOSIA SEMBULI ZAKALIA	MALE	MVOMERO DC	SUNGAJI
25	LEVINA JOHN JONAS	FEMALE	MVOMERO DC	SUNGAJI
26	DICKSON DAUD MAINDE	MALE	MVOMERO DC	SUNGAJI
27	AGNES NICOLAUS LUGOLE	FEMALE	MVOMERO DC	SUNGAJI
28	ALEX MICHAEL MCHANJA	MALE	MVOMERO DC	SUNGAJI
29	JACKLINE JOHN KIHWELO	FEMALE	MVOMERO DC	SUNGAJI
30	CHRISTIAN THOMAS KIMATA	MALE	MVOMERO DC	SUNGAJI
31	GERVAS PATRICK DINDILI	MALE	MVOMERO DC	SUNGAJI
32	GETRUDA JOSEPH CHAMBO	FEMALE	MVOMERO DC	DIONGOYA
33	BEATRICE EMANUEL KAWAKA	FEMALE	MVOMERO DC	DIONGOYA
34	HAPPINESS AVELIN PETER	FEMALE	MVOMERO DC	DIONGOYA
35	RAHIM RASHID ABDALA	MALE	MVOMERO DC	DIONGOYA
36	MICHAEL KAZIMOTO	MALE	MVOMERO DC	DIONGOYA
37	VERONICA EMANUEL MNYANI	FEMALE	MVOMERO DC	DIONGOYA
38	RAJABU JUMA BAKARI	MALE	MVOMERO DC	DIONGOYA
39	HUSNA MUSLIM DARWESH	FEMALE	MVOMERO DC	DIONGOYA
40	RUKIA ALLY NASSORO	FEMALE	MVOMERO DC	DIONGOYA

**Annex 14: List of the respondents (Focus group discussion)**

S/N	NAME	SEX
1	ANTONY JOSEPH CHACHALA	MALE
2	NOEL JOHN AZARIA	MALE
3	MWAJUMA MOHAMEDI MLOEZI	FEMALE
4	SAILA AMRANI HASSANI	FEMALE
5	SALIM BAKARI MGANDILA	MALE
6	COLETHA MAKUNDI	FEMALE
7	DICKSON DAUD MAINDE	MALE
8	LEVINA JOHN JONAS	FEMALE
9	NOEL DAMIAN PETER	MALE
10	STELA LAULENT IZIDOLI	FEMALE
11	YUSTA PETER COSMAS	FEMALE
12	YUSUFU NASORO MTAMBWE	MALE
13	ISAYA SAMWELI MUSA	MALE
14	CHARLES NGOWI	MALE
15	YUSUPH ATHUMAN HUSEN	MALE
16	RAPHAEL ALBANO	MALE

**Annex 15: List of key informants**

S/N	POSITION	INSTITUTION
1	DISTRICT AGRICULTURE OFFICER(DAICO)	MOMERO DISTRICT
2	AGRICULTURAL OFFICERS (4)	MVOMERO DISTRICT
3	CHAIRMAN OF MHONDA COOPERATIVE	MHONDA COOPERATIVE
4	EXPORTER	NATURAL EXTRACT INDUSTRIES LIMITED
5	COOPERATIVE OFFICER	MVOMERO DISTRICT

Annex 16: Photos taken during data collection





**Annex 17: Photos taken during an interview with key informants**



## Annex 18 : Raw Data

KANUTI TEMPLATE.sav.NEW.sav [DataSet1] - IBM SPSS Statistics Data Editor

File Edit View Data Transform Analyze Graphs Utilities Extensions Window Help

	Name	Type	Width	Decimals	Label	Values	Missing	Columns	Align	Measure	Role
1	ID	String	8	0		None	None	8	Left	Nominal	Input
2	Gender	Numeric	8	2		{1.00, Male}...	None	8	Right	Nominal	Input
3	Age	Numeric	8	2		{1.00, 18-40}...	None	8	Right	Ordinal	Input
4	Education_I...	Numeric	8	2		{1.00, Prima...	None	10	Right	Nominal	Input
5	Income_sou...	Numeric	8	2		{1.00, Farmi...	None	11	Right	Nominal	Input
6	Other_inco...	String	16	0		None	None	14	Left	Nominal	Input
7	Phone_own...	Numeric	8	2		{1.00, Yes}...	None	11	Right	Nominal	Input
8	Phone_type	Numeric	8	2		{1.00, Smar...	None	8	Right	Nominal	Input
9	Vanilla_Acres	Numeric	8	2		None	None	10	Right	Scale	Input
10	Cultivation_...	Numeric	8	2		None	None	8	Right	Scale	Input
11	Vanilla_Cult...	Numeric	8	2		{1.00, Vanill...	None	10	Right	Nominal	Input
12	Other_Vanill...	String	16	0		None	None	14	Left	Nominal	Input
13	Vanilla_See...	Numeric	8	2		{1.00, NGO'...	None	15	Right	Nominal	Input
14	NGO_Name	String	16	0		None	None	8	Left	Nominal	Input
15	Other_source	String	16	0		None	None	8	Left	Nominal	Input
16	Vanilla_Inter...	Numeric	8	2		{1.00, Yes}...	None	10	Right	Nominal	Input
17	Crop_Intercr...	Numeric	8	2		{1.00, Coffe...	None	11	Right	Nominal	Input
18	Other_Crop...	String	16	0		None	None	15	Left	Nominal	Input
19	Farming_sy...	Numeric	8	2		{1.00, Orga...	None	10	Right	Nominal	Input
20	Vanilla_prod...	Numeric	8	2		None	None	20	Right	Scale	Input
21	Chemicals_...	Numeric	8	2		{1.00, Yes}...	None	14	Right	Nominal	Input
22	Chemicals_...	Numeric	8	2		{1.00, Orga...	None	11	Right	Nominal	Input
23	Extension_...	Numeric	8	2		{1.00, Yes}...	None	13	Right	Nominal	Input
24	Vanilla_bea...	Numeric	8	2		{1.00, Yes}...	None	18	Right	Nominal	Input
25	Preferable_...	String	16	0		{1, 1-9 cm}...	None	15	Left	Ordinal	Input
26	Authorised_...	Numeric	8	2		{1.00, Yes}...	None	15	Right	Nominal	Input
27	Certificatio...	Numeric	8	2		{1.00, Orga...	None	11	Right	Nominal	Input
28	Other_certif...	String	16	0		None	None	16	Left	Nominal	Input
29	Vanilla Buy...	Numeric	8	2		{1.00, Middl...	None	11	Right	Nominal	Input

Data View Variable View

KANUTI TEMPLATE.sav.NEW.sav [DataSet1] - IBM SPSS Statistics Data Editor

File Edit View Data Transform Analyze Graphs Utilities Extensions Window Help

	Name	Type	Width	Decimals	Label	Values	Missing	Columns	Align	Measure	Role
30	Other_Vanill...	String	16	0		None	None	13	Left	Nominal	Input
31	Always_On...	Numeric	8	2		{1.00, Yes}...	None	12	Right	Nominal	Input
32	Why_One_...	Numeric	8	2		{1.00, Bette...	None	11	Right	Nominal	Input
33	Farming_Su...	Numeric	8	2		{1.00, Gover...	None	11	Right	Nominal	Input
34	Agricultural...	String	16	0		None	None	12	Left	Nominal	Input
35	Private_Co...	String	16	0		None	None	11	Left	Nominal	Input
36	Institutional	String	16	0		None	None	8	Left	Nominal	Input
37	Other_Specifi	String	16	0		None	None	11	Left	Nominal	Input
38	Support_Ty...	Numeric	8	2		{1.00, Exten...	None	15	Right	Nominal	Input
39	Other_Supp...	String	8	0		None	None	9	Left	Nominal	Input
40	Market_Acc...	Numeric	8	2		{1.00, Yes}...	None	10	Right	Nominal	Input
41	Market_Infor...	Numeric	8	2		{1.00, Expor...	None	19	Right	Nominal	Input
42	Other_Mark...	String	16	0		None	None	23	Left	Nominal	Input
43	Actors_Inter...	Numeric	8	2		{1.00, Mont...	None	19	Right	Nominal	Input
44	Farmer_Buy...	Numeric	8	2		{1.00, Stron...	None	17	Right	Nominal	Input
45											
46											
47											
48											
49											
50											
51											
52											
53											
54											
55											
56											
57											
58											

Data View Variable View

## Annex 19: Raw data (1-26 respondents)

KANUTI TEMPLATE.sav:NEW.sav [DataSet1] - IBM SPSS Statistics Data Editor

File Edit View Data Transform Analyze Graphs Utilities Extensions Window Help

53 : Other\_Market\_Inf... Visible: 44 of 44 Variables

ID	Gender	Age	Education Level	Income Source	Other Income Source	Phone Ownership	Phone Type	Vanilla Acres	Cultivation Duration	Vanilla Cultivars	Other Vanilla Cultivars	Vanilla Seeding Source	NGO Name
1	Male	41-55	Primary	Farming		Yes	Simple Ph...	2.50	5.00	Vanilla Planifolia		NGO's NEI	
2	Female	41-55	Primary	Farming		Yes	Smart Phone	3.00	6.00	Vanilla Planifolia		NGO's NEI	
3	Male	>56	Primary	Farming		Yes	Simple Ph...	2.00	6.00	Vanilla Planifolia		NGO's NEI	
4	Female	41-55	Primary	Farming		Yes	Simple Ph...	2.50	6.00	Vanilla Planifolia		NGO's NEI	
5	Female	41-55	Primary	Farming		Yes	Smart Phone	3.00	5.00	Vanilla Planifolia		NGO's NEI	
6	Male	18-40	Primary	Farming		Yes	Smart Phone	3.00	6.00	Vanilla Planifolia		NGO's NEI	
7	Male	>56	Primary	Farming		Yes	Simple Ph...	3.50	6.00	Vanilla Planifolia		NGO's NEI	
8	Male	>56	Primary	Farming		Yes	Simple Ph...	2.00	7.00	Vanilla Planifolia		NGO's NEI	
9	Female	41-55	Secondary	Farming		Yes	Smart Phone	2.00	5.00	Vanilla Planifolia		NGO's NEI	
10	Male	18-40	Secondary	Farming		Yes	Smart Phone	3.00	5.00	Vanilla Planifolia		NGO's NEI	
11	Male	18-40	Secondary	Farming		Yes	Smart Phone	2.00	5.00	Vanilla Planifolia		NGO's NEI	
12	Female	41-55	Secondary	Farming		Yes	Smart Phone	2.00	6.00	Vanilla Planifolia		NGO's NEI	
13	Male	18-40	Secondary	Farming		Yes	Smart Phone	4.00	5.00	Vanilla Planifolia		NGO's NEI	
14	Female	18-40	Secondary	Farming		No		3.00	6.00	Vanilla Planifolia		NGO's NEI	
15	Male	>56	Primary	Farming		Yes	Simple Ph...	4.00	6.00	Vanilla Planifolia		NGO's NEI	
16	Male	18-40	Secondary	Farming		Yes	Smart Phone	4.00	5.00	Vanilla Planifolia		NGO's NEI	
17	Female	18-40	Secondary	Farming		Yes	Simple Ph...	3.00	5.00	Vanilla Planifolia		NGO's NEI	
18	Male	41-55	Primary	Farming		Yes	Simple Ph...	3.50	6.00	Vanilla Planifolia		NGO's NEI	
19	Male	41-55	Primary	Farming		Yes	Simple Ph...	4.00	6.00	Vanilla Planifolia		NGO's NEI	
20	Male	18-40	Secondary	Farming		Yes	Smart Phone	3.00	5.00	Vanilla Planifolia		NGO's NEI	
21	Male	>56	Tertiary	Farming		Yes	Simple Ph...	3.50	7.00	Vanilla Planifolia		NGO's NEI	
22	Female	>56	Primary	Farming		No		3.00	6.00	Vanilla Planifolia		NGO's NEI	
23	Female	18-40	Secondary	Farming		Yes	Smart Phone	2.00	5.00	Vanilla Planifolia		NGO's NEI	
24	Female	41-55	Secondary	Farming		Yes	Simple Ph...	3.00	6.00	Vanilla Planifolia		NGO's NEI	
25	Female	41-55	Secondary	Farming		Yes	Simple Ph...	2.00	6.00	Vanilla Planifolia		NGO's NEI	
26	Male	>56	Primary	Farming		Yes	Simple Ph...	2.50	6.00	Vanilla Planifolia		NGO's EAMCEF	

Data View Variable View

KANUTI TEMPLATE.sav:NEW.sav [DataSet1] - IBM SPSS Statistics Data Editor

File Edit View Data Transform Analyze Graphs Utilities Extensions Window Help

Visible: 44 of 44 Variables

NGO Name	Other Source	Vanilla Inter crop	Crop Inter crop	Other_Crop Inter crop	Farming System	Vanilla production_Kgs_season	Chemicals Application	Chemicals Type	Extension Services	Vanilla bean length Harvest	Preference
1	NEI		Yes Both coffee, co...		Organic Farmi...	100.00	No		Yes	Yes 1-9 cm	
2	NEI		Yes Both coffee, co...		Organic Farmi...	120.00	No		Yes	Yes 1-9 cm	
3	NEI		Yes Both coffee, co...		Agro forestry	25.00	No		Yes	Yes 1-9 cm	
4	NEI		Yes Cocoa		Agro forestry	30.00	No		Yes	Yes 10-25 cm	
5	NEI		Yes Both coffee, co...		Agro forestry	90.00	No		Yes	Yes 10-25 cm	
6	NEI		Yes Both coffee, co...		Agro forestry	85.00	No		Yes	Yes 10-25 cm	
7	NEI		Yes Both coffee, co...		Agro forestry	60.00	No		Yes	Yes 10-25 cm	
8	NEI		Yes Both coffee, co...		Organic Farmi...	30.00	No		Yes	Yes 1-9 cm	
9	NEI		Yes Cocoa		Organic Farmi...	110.00	No		Yes	Yes 10-25 cm	
10	NEI		Yes Both coffee, co...		Agro forestry	150.00	No		Yes	Yes 1-9 cm	
11	NEI		Yes Cocoa		Agro forestry	80.00	No		Yes	Yes 1-9 cm	
12	NEI		Yes Both coffee, co...		Agro forestry	70.00	No		Yes	Yes 10-25 cm	
13	NEI		Yes Both coffee, co...		Organic Farmi...	80.00	No		Yes	Yes 10-25 cm	
14	NEI		Yes Cocoa		Organic Farmi...	60.00	No		Yes	Yes 1-9 cm	
15	NEI		Yes Both coffee, co...		Agro forestry	40.00	No		Yes	No	
16	NEI		Yes Both coffee, co...		Organic Farmi...	50.00	No		Yes	Yes 10-25 cm	
17	NEI		Yes Cocoa		Organic Farmi...	87.00	No		Yes	Yes 10-25 cm	
18	NEI		Yes Both coffee, co...		Agro forestry	53.00	No		Yes	Yes 1-9 cm	
19	NEI		Yes Both coffee, co...		Organic Farmi...	32.00	No		Yes	Yes 1-9 cm	
20	NEI		Yes Both coffee, co...		Organic Farmi...	45.00	No		Yes	Yes 1-9 cm	
21	NEI		Yes Cocoa		Agro forestry	60.00	No		Yes	Yes 1-9 cm	
22	NEI		Yes Cocoa		Organic Farmi...	25.00	No		Yes	Yes 1-9 cm	
23	NEI		Yes Both coffee, co...		Organic Farmi...	54.50	No		Yes	Yes 1-9 cm	
24	NEI		Yes Both coffee, co...		Organic Farmi...	76.00	No		Yes	Yes 1-9 cm	
25	NEI		Yes Both coffee, co...		Organic Farmi...	67.50	No		Yes	Yes 1-9 cm	
26	EAMCEF		Yes Both coffee, co...		Organic Farmi...	70.00	No		Yes	Yes 1-9 cm	

Data View Variable View

KANUTI TEMPLATE.sav.NEW.sav [DataSet1] - IBM SPSS Statistics Data Editor

File Edit View Data Transform Analyze Graphs Utilities Extensions Window Help

53 : Other\_Market\_Inf... Visible: 44 of 44 Va

	Authorised_certificate	Certification_type	Other_certificate_type	Vanilla_Buyers	Other_Vanilla_Buyers	Always_One_Buyer	Why_One_Buyer	Farming_Support	Agricultural_NGO	Private_Company	Institutional	Other_Specify
1	No	.	.	Other NEI		Yes	No alternative b...	Government LGA				
2	No	.	.	Other NEI		Yes	No alternative b...	Government LGA				
3	No	.	.	Other NEI		Yes	No alternative b...	Government LGA				
4	No	.	.	Other NEI		Yes	No alternative b...	Government LGA				
5	No	.	.	Other NEI		Yes	No alternative b...	Government LGA				
6	No	.	.	Other NEI		Yes	No alternative b...	Government LGA				
7	No	.	.	Other NEI		Yes	No alternative b...	Government LGA				
8	No	.	.	Other NEI		Yes	No alternative b...	Government LGA				
9	No	.	.	Other NEI		Yes	No alternative b...	Agricultural NGO NEI				
10	No	.	.	Other NEI		Yes	No alternative b...	Agricultural NGO NEI				
11	No	.	.	Other NEI		Yes	No alternative b...	Agricultural NGO NEI				
12	No	.	.	Other NEI		Yes	No alternative b...	Agricultural NGO NEI				
13	No	.	.	Other NEI		Yes	No alternative b...	Agricultural NGO NEI				
14	No	.	.	Other NEI		Yes	No alternative b...	Agricultural NGO NEI				
15	No	.	.	Other NEI		Yes	No alternative b...	Agricultural NGO NEI				
16	No	.	.	Other NEI		Yes	No alternative b...	Agricultural NGO NEI				
17	No	.	.	Other NEI		Yes	No alternative b...	Agricultural NGO NEI				
18	No	.	.	Other NEI		Yes	No alternative b...	Agricultural NGO NEI				
19	No	.	.	Other NEI		Yes	No alternative b...	Agricultural NGO NEI				
20	No	.	.	Other NEI		Yes	No alternative b...	Agricultural NGO NEI				
21	No	.	.	Other NEI		Yes	No alternative b...	Agricultural NGO NEI				
22	No	.	.	Other NEI		Yes	No alternative b...	Agricultural NGO NEI				
23	No	.	.	Other NEI		Yes	No alternative b...	Agricultural NGO NEI				
24	No	.	.	Other NEI		Yes	No alternative b...	Agricultural NGO NEI				
25	No	.	.	Other NEI		Yes	No alternative b...	Agricultural NGO NEI				
26	No	.	.	Other NEI		Yes	No alternative b...	Agricultural NGO NEI				

Data View Variable View

KANUTI TEMPLATE.sav.NEW.sav [DataSet1] - IBM SPSS Statistics Data Editor

File Edit View Data Transform Analyze Graphs Utilities Extensions Window Help

53 : Other\_Market\_Inf... Visible: 44 of 44

	Private_Company	Institutional	Other_Specify	Support_Type_Received	Other_Support	Market_Access	Market_Information_Accessed	Other_Market_Information_Accessed	Actors_Interaction_Frequency	Farmer_Buyer_Relationship
1				Extension Services		Yes	Market Price		Annually	None
2				Extension Services		Yes	Market Price		Annually	Weak
3				Extension Services		Yes	Market Price		Annually	Weak
4				Extension Services		Yes	Market Price		Annually	None
5				Extension Services		Yes	Market Price		Annually	Weak
6				Extension Services		Yes	Market Price		Annually	Weak
7				Extension Services		Yes	Market Price		Annually	Weak
8				Extension Services		Yes			Annually	None
9				Trainings		No			Annually	Weak
10				Trainings		Yes	Market Price		Annually	Weak
11				Trainings		Yes	Market Price		Annually	Weak
12				Trainings		Yes	Market Price		Annually	Weak
13				Trainings		No			Annually	Weak
14				Trainings		No			Annually	Weak
15				Trainings		No			Annually	Weak
16				Trainings		No			Annually	Weak
17				Trainings		No			Annually	Weak
18				Trainings		No			Annually	Weak
19				Trainings		No			Annually	Weak
20				Trainings		No			Annually	None
21				Trainings		No			Annually	Weak
22				Trainings		No			Annually	Weak
23				Trainings		No			Annually	Weak
24				Trainings		No			Annually	Weak
25				Trainings		No			Annually	Weak
26				Trainings		No			Annually	Weak
27				Financial		No			Annually	Weak

Data View Variable View

## Annex 20: Raw data (27-40 respondents)

KANUTI TEMPLATE.sav:NEW.sav [DataSet1] - IBM SPSS Statistics Data Editor

File Edit View Data Transform Analyze Graphs Utilities Extensions Window Help

Visible: 44 of 44 Variables

ID	Gender	Age	Education_level	Income_source	Other_income_source	Phone_ownership	Phone_type	Vanilla_Acres	Cultivation_duration	Vanilla_Cultivars	Other_Vanilla_cultivars	Vanilla_Seeding_source	NGO_Name
27	Female	18-40	Primary	Farming		Yes	Simple Ph...	2.00	6.00	Vanilla Planifolia			NGO's EAMCEF
28	Female	>56	Primary	Farming		No	.	1.50	7.00	Vanilla Planifolia			NGO's EAMCEF
29	Male	41-55	Primary	Farming		No	.	1.00	6.00	Vanilla Planifolia			NGO's EAMCEF
30	Male	>56	Primary	Farming		Yes	Simple Ph...	2.00	6.00	Vanilla Planifolia			NGO's EAMCEF
31	Female	41-55	Primary	Farming		No	.	2.00	6.00	Vanilla Planifolia			NGO's EAMCEF
32	Male	>56	Primary	Farming		Yes	Simple Ph...	2.00	6.00	Vanilla Planifolia			NGO's EAMCEF
33	Female	18-40	Primary	Farming		Yes	Simple Ph...	2.00	6.00	Vanilla Planifolia			NGO's EAMCEF
34	Male	18-40	Secondary	Farming		No	.	3.00	5.00	Vanilla Planifolia			NGO's EAMCEF
35	Female	18-40	Secondary	Farming		Yes	Smart Phone	3.00	5.00	Vanilla Planifolia			NGO's EAMCEF
36	Female	>56	Primary	Farming		No	.	2.00	6.00	Vanilla Planifolia			NGO's EAMCEF
37	Male	18-40	Primary	Farming		Yes	Simple Ph...	2.50	6.00	Vanilla Planifolia			NGO's EAMCEF
38	Male	41-55	Primary	Farming		Yes	Simple Ph...	2.00	6.00	Vanilla Planifolia			NGO's EAMCEF
39	Female	41-55	Secondary	Farming		No	.	2.00	6.00	Vanilla Planifolia			NGO's EAMCEF
40	Female	>56	Primary	Farming		No	.	1.50	7.00	Vanilla Planifolia			NGO's EAMCEF
41													
42													
43													
44													
45													
46													
47													
48													
49													
50													
51													
52													

Data View Variable View

KANUTI TEMPLATE.sav:NEW.sav [DataSet1] - IBM SPSS Statistics Data Editor

File Edit View Data Transform Analyze Graphs Utilities Extensions Window Help

Visible: 44 of 44 Variables

Other_source	Vanilla_Intercrop	Crop_Intercropped	Other_Crop_Intercropped	Farming_system	Vanilla_production_Kgs_season	Chemicals_Application	Chemicals_type	Extension_Services	Vanilla_bean_length_harvest	Preferable_harvest_length
	Yes	Cocoa		Agro forestry	55.00	No	.	Yes	Yes 1-9 cm	
	Yes	Cocoa		Organic Farmi...	20.00	No	.	Yes	Yes 1-9 cm	
	Yes	Both coffee, co...		Organic Farmi...	45.00	No	.	Yes	Yes 1-9 cm	
	Yes	Cocoa		Organic Farmi...	30.00	No	.	Yes	Yes 1-9 cm	
	Yes	Cocoa		Organic Farmi...	25.00	No	.	Yes	Yes 1-9 cm	
	Yes	Cocoa		Agro forestry	30.00	No	.	Yes	Yes 1-9 cm	
	Yes	Cocoa		Agro forestry	40.00	No	.	Yes	No	
	Yes	Both coffee, co...		Agro forestry	70.00	No	.	Yes	Yes 1-9 cm	
	Yes	Both coffee, co...		Agro forestry	65.00	No	.	Yes	Yes 1-9 cm	
	Yes	Cocoa		Organic Farmi...	24.50	No	.	Yes	Yes 1-9 cm	
	Yes	Both coffee, co...		Organic Farmi...	32.00	No	.	Yes	Yes 1-9 cm	
	Yes	Cocoa		Agro forestry	26.50	No	.	Yes	Yes 1-9 cm	
	Yes	Both coffee, co...		Organic Farmi...	58.00	No	.	Yes	No	
	Yes	Cocoa		Organic Farmi...	20.50	No	.	Yes	No	
41										
42										
43										
44										
45										
46										
47										
48										
49										
50										
51										
52										

Data View Variable View

IBM SPSS Statistics Data Editor - KANUTI TEMPLATE.sav.NEW.sav [DataSet1]

Visible: 44 of 44 Variables

	Authorised_certificate	Certification_type	Other_certification_type	Vanilla_Buyers	Other_Vanilla_Buyers	Always_One_Buyer	Why_One_Buyer	Farming_Support	Agricultural_NGO	Private_Company	Institutional	Other_Specify
27	No	.	.	Other NEI		Yes	No alternative b...	Other NMB				
28	No	.	.	Other NEI		Yes	No alternative b...	Other NMB				
29	No	.	.	Other NEI		Yes	No alternative b...	Private company CRDB				
30	No	.	.	Other NEI		Yes	No alternative b...	Private company CRDB				
31	No	.	.	Other NEI		Yes	No alternative b...	Agricultural NGO NEI				
32	No	.	.	Other NEI		Yes	No alternative b...	Other NMB				
33	No	.	.	Other NEI		Yes	No alternative b...	Agricultural NGO NEI				
34	No	.	.	Other NEI		Yes	No alternative b...	Other NMB				
35	No	.	.	Other NEI		Yes	No alternative b...	Agricultural NGO NEI				
36	No	.	.	Other NEI		Yes	No alternative b...	Institutional TARI				
37	No	.	.	Other NEI		Yes	No alternative b...	Agricultural NGO NEI				
38	No	.	.	Other NEI		Yes	No alternative b...	Institutional TARI				
39	No	.	.	Other NEI		Yes	No alternative b...	Institutional TARI				
40	No	.	.	Other NEI		Yes	No alternative b...	Institutional TARI				
41												
42												
43												
44												
45												
46												
47												
48												
49												
50												
51												
52												

Data View Variable View

IBM SPSS Statistics Data Editor - KANUTI TEMPLATE.sav.NEW.sav [DataSet1]

Visible: 44 of 44 Variables

	Private_Company	Institutional	Other_Specify	Support_Type_Received	Other_Support	Market_Access	Market_Information_Accessed	Other_Market_Information_Accessed	Actors_Interaction_Frequency	Farmer_Buyer_Relationship
27				Financial		No	.	.	Annually	Weak
28				Financial		No	.	.	Annually	Weak
29				Financial		No	.	.	Annually	Weak
30				Financial		No	.	.	Annually	Weak
31				Trainings		No	.	.	Annually	Weak
32				Trainings		No	.	.	Annually	Weak
33				Trainings		No	.	.	Annually	Weak
34				Financial		No	.	.	Annually	Strong
35				Trainings		No	.	.	Annually	Weak
36				Trainings		No	.	.	Annually	Weak
37				Trainings		No	.	.	Annually	Weak
38				Trainings		No	.	.	Annually	Weak
39				Trainings		No	.	.	Annually	Weak
40				Trainings		No	.	.	Annually	Weak
41										
42										
43										
44										
45										
46										
47										
48										
49										
50										
51										
52										

Data View Variable View