

LINKING PASSION FRUIT FARMERS IN MUKONO DISTRICT TO HIGH PRICE MARKET



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in partial fulfilment of the requirements for the degree of MSc in Agricultural Production Chain
Management, Specialisation Horticulture Chains

BY

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Dedication

This work is dedicated to my love Betty Nsubuga, my late father Ernest Kasozi Mwandaza and my late mother Ruth Mpanja Abwoli.

Table of Contents

Acknowledgement.....	i
Dedication.....	ii
Tables.....	v
List of Figures.....	vi
List of abbreviations	vii
ABSTRACT	viii
CHAPTER 1 INTRODUCTION FOR PASSION FRUIT MARKET LINKAGE.....	1
1.1 Background information on Agriculture in Uganda	1
1.2 Contribution of passion fruit to poverty alleviation.....	2
1.3 Passion fruit production in Mukono District	2
1.4 Passion fruit marketing in Mukono	3
1.5 Research problem owner	4
1.6 Research Problem.....	4
1.7 Research objective.....	5
1.7.1 Main research questions	5
1.8 The conceptual framework for passion fruit market linkage	5
1.9 Definition of concepts	6
CHAPTER 2 LITERATURE FOR PASSION FRUIT MARKET LINKAGE.....	7
2.1 Passion fruit varieties required by market	7
2.1.1 Passion fruit market potential.....	7
2.1.2 Passion fruit production quantities and price trends in Mukono	8
2.1.2 Passion fruit value added distribution.....	8
2.2 Value chain concept	9
2.2.1 Value chain analysis.....	9
2.3 Chain Governance.....	10
2.3.1 Chain Upgrading strategies.....	11
2.4 Chain finance	12
2.5 Strengthening Chain relations	12
2.6 Approach for smallholder farmers market linkages	12
2.6.1 Collective action	12
2.6.1.1 Producer organisations and marketing organisations.....	13
2.6.1.2 Types of producer organisations for market linkage.....	13

2.7 Market information to markets.....	14
2.8 Gender aspects.....	14
2.9 Quality standards.....	14
2.9.1 Passion fruit quality attributes	15
2.10 Business arrangements.....	16
2.10.1 Business model canvas	17
2.11 Institutional environment.....	18
CHAPTER 3 METHODOLOGY FOR MUKONO PASSION FRUIT MARKET LINKAGE	19
3.1 The study area	19
3.3 Data collection.....	20
3.3.1 Key informant interviews	20
3.3.1.1 Interview with fruit farmers passion	20
3.3.1.2 Interview with passion fruit traders	21
3.3.1.3 Interview with passion fruit exporters and Supermarkets.....	21
3.3.1.4 Interview with the Mukono District Production Officer.....	22
3.3.1.5 Interview with Micro finance manager	22
3.3.2 Focus group discussions	22
3.3.3 Observation	24
3.3.4 Triangulation.....	24
3.3.5 Desk study.....	24
3.4 Data analysis.....	24
3.5 Research Framework for passion fruit market linkage.....	26
3.6 Limitations to the study.....	26
CHAPTER 4 RESULTS FOR PASSION FRUIT MARKET LINKAGE	27
4.1 Interviews with key stakeholders in passion fruit value chain.....	27
4.1.1 Interview with passion fruit farmers	27
4.1.2 Interview contribution from passion fruit traders	29
4.1.3 Interview response from Supermarkets.....	29
4.1.4 Interview response from Exporters.....	31
4.1.5 Interview with the Mukono District Production Officer.....	32
4.1.6 Response from interview with micro finance manager	33
4.2.1 Koome focus group discussions.....	34
4.2.2 Mukono District Stakeholder Focus Group Discussion.....	35

4.2.2.1 Gender participation	37
4.2.2.2 Passion fruit quality aspects	37
4.2.2.3 Passion fruit investment and revenue.....	37
4.2.2.4 Stakeholders analysis of existing chain	38
4.2.2.5 Business models for produce market linkage.....	40
4.2.2.6 Filling in the preference ranking of crops.....	43
4.2.2.7 Focus group discussion proposals	43
4.2.2.8 Passion fruit chain sustainability	43
4.2.2.9 PESTEC Analysis	44
CHAPTER 5 DISCUSSION FOR PASSION FRUIT MARKET LINKAGE.....	46
5.1 Roles of stakeholders involved in the passion fruit value chain.....	46
5.2 Market information systems in passion fruit value chain	46
5.3 Challenges faced by passion fruit smallholder farmers in market linkage.....	47
5.4 Gender participation in passion fruit value chain	48
5.5 Preferred quality and quantity for passion fruit by high price markets.....	48
5.6 Business arrangement preferred by smallholder passion fruit for market linkages	49
5.7 Form of chain finance to be used by passion fruit farmers to link to high price market.....	51
5.8 What supports and hinders market linkage for smallholder farmers	52
5.9 Study Innovations	52
CHAPTER 6 CONCLUSIONS AND RECOMMENDATION FOR PASSION FRUIT MARKET LINKAGE.....	53
6.1 Conclusions.....	53
6.2 Recommendations.....	54
REFERENCES.....	56
ANNEXES.....	63

Tables

Table 1: Seasonal availability of passion fruit in Uganda	4
Table 2: Passion fruit value added share for actors	8
Table 3: Composition of stakeholder's focus group discussion for data analysis	23
Table 4: Data analysis tools	25
Table 5: Passion fruit gross margin per year/ha.....	38
Table 6: Stakeholders analysis for existing Mukono district passion fruit value chain	39
Table 7: Compiled canvas business model for cooperative - contract farming - trader – buyer	42
Table 8: SWOT analysis for existing passion fruit value chain in Mukono	45

List of Figures

Figure 1: Map of Uganda showing Mukono District the research area	1
Figure 2: Smallholder household family size average daily income	2
Figure 3: Middle man buying passion fruit in Mukono	3
Figure 4: Research conception framework.....	5
Figure 5: Uganda passion fruit production capacity and demand	7
Figure 6: Passion fruit production and farm gate price in Mukono District.....	8
Figure 7: Example of produce value chain in Uganda	10
Figure 8: Passion fruit chain upgrading strategies	11
Figure 9: Currently available finance for farmers.....	12
Figure 10: Results from ITC standards map on recommended private standards.....	15
Figure 11: Canvas business model guide for analysing the selected business model.....	17
Figure 12: Mukono district map showing research area.....	19
Figure 13: Interview process with farmers in Koome.....	20
Figure 14: Researcher discussing with female trader at Ggaba market.....	21
Figure 15: Photos showing target high price market	21
Figure 16: Koome Subcounty focus group discussion in session and participants	22
Figure 17: Mukono District stakeholders' analysis focus group discussion in session and participants.....	23
Figure 18: Researcher observing passion fruit plant and quality attributes	24
Figure 19: Research framework for passion fruit market linkage	26
Figure 20: Researcher interviewing farmers in Koome and Ntenjeru Subcounties	27
Figure 21: Research at supermarkets in Kampala and Mukono.....	30
Figure 22: Produce for export at Mukono growers and packers shed.....	31
Figure 23: Researcher with DPO, Mukono District after the interview.....	32
Figure 24: Interview the manager micro finance at Kisoga.....	33
Figure 25: Researcher facilitating the focus group discussion in Koome Subcounty	34
Figure 26: Researcher facilitate the compilation of chain map with roles of stakeholders and overlays	35
Figure 27: Existing Mukono district passion fruit map with overlays.....	36
Figure 28: Women participation in Mukono passion fruit value chain	37
Figure 29: Researcher showing the selected business model for market linkage	40
Figure 30: Preference ranking of crops in Mukono District	43
Figure 31: ITC Standards map for recommended private standard for passion fruit	49
Figure 32: Proposed Mukono new passion fruit value chain map	51

List of abbreviations

CCP	Critical Control Point
DPO	District Production Officer
EU	European Union
GDP	Gross Domestic Product
FAO	Food and Agriculture Organisation
FGD	Focus Group Discussion
GAP	Good Agricultural Practices
IMF	International Monetary Fund
IIRR	International Institute of Rural Reconstruction
IPM	Integrated Pest Management
ISO	International Organization for Standardization
ITC	International Trade Centre
KIT	Royal Tropical Institute
MAAIF	Ministry of Agriculture Animal Industry and Fisheries
HACCP	Hazard analysis and critical control points
MIS	Market Information Services
MKD	Mukono District
NAADS	National Agricultural Advisory Services
NaCRRRI	National Crops Resources Research Institute
NGO	Non-governmental organisations
SHF	Smallholder farmers
UNBS	Uganda National Bureau of Standards
VEDCO	Volunteer Efforts for Development Concerns
VHL	Van Hall Larenstein University of Applied Sciences
VC	Value chain
UNIDO	United Nations Industrial Development Organization,
USAID	United States Agency for International Development

Currency Exchange rate

1 Euro Equals 4,000 Uganda Shilling

ABSTRACT

This research project for linking passion fruit farmers to high price market gives an overview of the local passion fruit sub-sector performance, structure, relationship that describes how it operates in Mukono District, Uganda. The objective of the study was to analyse the passion fruit chain governance in Mukono District in order to come up with a business model that can be adopted by passion fruit farmers for market linkage to high price market. The research was conducted in Koome and Ntenjeru Sub-counties in Mukono District, Uganda.

The study was applied research following the methodology of a case study with key informants and focus group discussion using checklists. There was stakeholder's focus group discussion for analysing the findings of the key informants, the interviewees were selected purposively, and ethical issues were followed. Various participatory appraisal tools were used in this analysis and including value chain mapping, stakeholder analysis, economic, PESTEC, preference ranking of crops, and SWOT analysis. The aim of the study was to investigate the main factors in passion fruit that could facilitate or hamper market linkage to high price market.

The findings demonstrated that the passion fruit farmers in Mukono had the potential to work with high price market, although they were not organised with weak trade relations, low prices and poor quality passion fruit. Farmers had other challenges like poor physical infrastructure such as poor roads, poor transportation to the markets, poor negotiation skills, and other high transaction costs among others. The target market for high price market were supermarkets and exporters, they were willingness to procure passion fruit from the farmers if they were organised in a cooperative and meeting their required quality standards. The major result of the research was to come out with a tailor made business model 'Cooperative – Contract farming – Trader – Buyer (Supermarket/Exporter) business model.'

Finally, the study recommended interventions to be considered by farmers and Mukono district local government; Farmers should be receptive in joining the selected business model that will facilitate cooperation, improve trade relations, bulk their production and access appropriate market information. Farmers should initiate a saving and credit scheme within the cooperative in order to access affordable chain financing. Farmers through the cooperative system should use collective action in transportation and purchasing of agro-inputs from importing agro dealers.

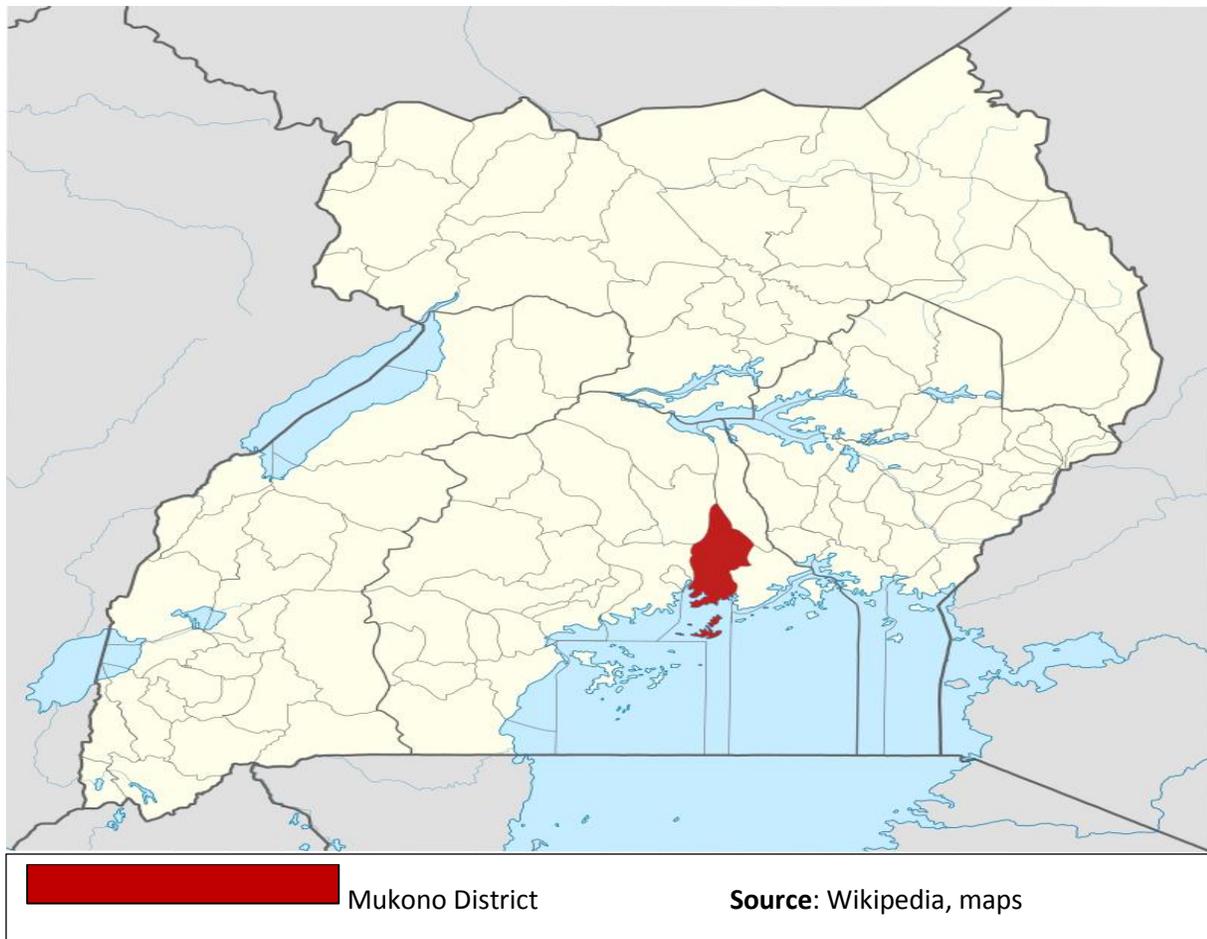
The Local Governments should support and upgrade passion fruit farmer market linkage by adopting the preferred business model, provide business management training to passion fruit farmers in financial management, record keeping and negotiations skills. The local government should work with NGO to establish the cheap storage charcoal coolers to address storage facilities and collaborate with quality standards organisations to get farmers certified; The local government should continue providing farmers with small-scale irrigation systems and collaborate with private standards certification firms to provide good agricultural practices (GAP) training to farmers; Invest in further research for commercial processing of passion fruit into concentrates.

CHAPTER 1 INTRODUCTION FOR PASSION FRUIT MARKET LINKAGE

1.1 Background information on Agriculture in Uganda

Agriculture sector remains important to the Ugandan economy in that it employs approximately 69% of the population and contributes about 26% to the GDP in 2015 (Deloitte, 2016). Uganda is predominantly a rural economy with approximately 88 percent of the population living in rural areas. Some 18 million hectares of land is available for cultivation, less than one third of which is currently under cultivation. This reflects the potential for expansion of the agricultural sector (Sonko, et al., 2005). The sector is the primary source of livelihood for more than 80% of Ugandan rural households who practice subsistence crop and livestock production, with the majority of the industries in the country are agro-based. Agriculture is still rated the largest employer, the majority of women (83 %) derive their livelihood from agriculture as primary producers and contribute 70-75 % of agricultural production this is mostly in the horticulture subsector (IMF, 2010).

Figure 1: Map of Uganda showing Mukono District the research area

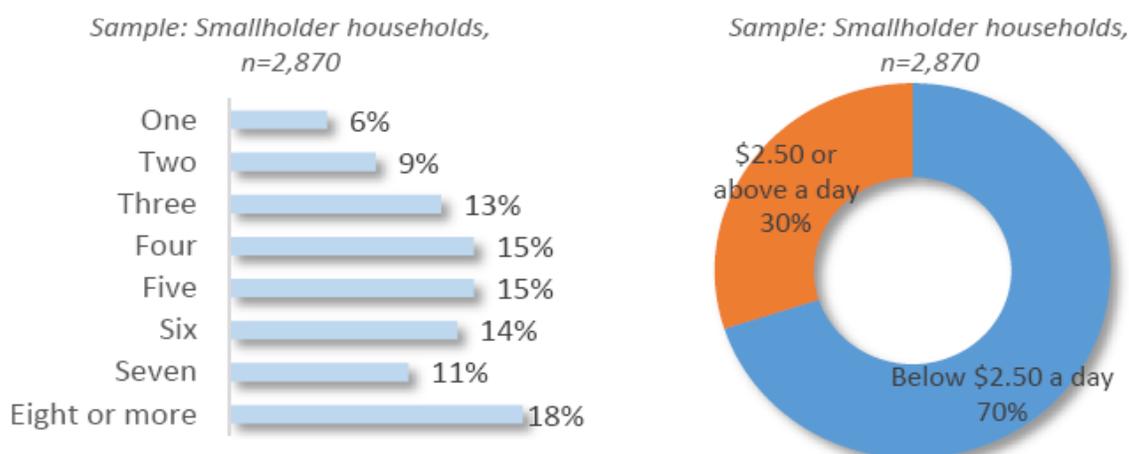


Uganda national strategy for growth and reduction of poverty aims to reduce poverty by transforming the agriculture based economy into a market led, competitive, and semi industrial economy where smallholder farmers dominate the sector (IMF, 2010). The growth of the horticulture sector has great potential to contribute to poverty alleviation in rural areas. The horticulture sector is a key source of income for rural areas, and also in improving the livelihood of farmers in Mukono District, this is reflected in the passion fruit producing areas.

1.2 Contribution of passion fruit to poverty alleviation

The contribution of the passion fruit sub sector to the Uganda's poverty alleviation cannot be under rated, in addition to the contribution to the global sustainable development goal for the year 2030. It is estimated that over 90,000 people are dependent on passion fruit either directly or indirectly, which is an important contribution in a country where 58% of the population between 14 – 64 years are unemployed. It is estimated that the majority of those unemployed are women with 65.2% of the population of 39,660,151 people (Country meters, 2016). It is obvious that the passion fruit production is making a major contribution to Uganda's economic development through foreign exchange earnings, employment opportunities, rural development and food and nutritional security (Sonko, et al., 2005). In Mukono District, passion fruit sub sector employs a number of rural people, especially women led households. It is estimated that more than 6,258 people are involved in passion fruit value chain in Mukono, with an estimated production of 8,150 tons per year with a value of € 4,230,000 (Mukulu, 2016). This income is very important to rural farmers where poverty rate are high, in these rural areas 52% of people live below the poverty line of € 1.15 per day (Aderson, et al., 2016). Figure 2 shows the smallholder family size and daily average income for households in Mukono District.

Figure 2: Smallholder household family size average daily income



Source Aderson, et al., 2016)

According to Ssemwanga (2010) "Horticultural production is one of Uganda's promising agricultural sub-sectors with a growth rate of 20% per year, with passion fruit increasing in popularity". Passion fruit is one of the horticulture crops that can produce all year round. The availability of willing farmers, as well as low and family labour costs for farm operations in the country, serve as a great incentive for the production of the crop.

1.3 Passion fruit production in Mukono District

Passion fruit (*Passiflora edulis*) is a plant that is commercially cultivated for its fruits. Mukono District currently produces the purple granadilla variety and Kawanda hybrid. It is produced for local consumption but has been increasingly exported to the European market in recent years (Kraybill and Kidoido, 2009). Passion fruit is either consumed fresh or used in making juice or blended with other fruits or processed in other forms.

The farming system for the majority of passion growers is mixed farming either between crops and animals or crops with crops. The crop can be intercropped with other perennial crops such as bananas to provide shade and increase profitability. Production is mainly by smallholder farmers who own on less than 2 hectares of land and use traditional production methods working with simple tools like hand hoes and machetes. According to Mukulu (2016) "Mukono has a favourable condition for growing passion fruits such as warm less humid tropical climate with temperatures (18 -30°C) throughout the year, bi-modal rainfall pattern and vast opportunities for irrigation".

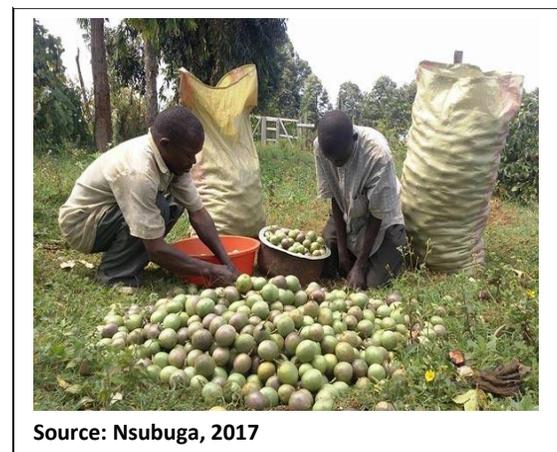
The soils are fertile, well-drained loam soil with high humus content, with soil pH 6.0 - 7.0, the soils have minimum contamination of chemical fertilizers, pesticides and herbicides creating natural quasi-organic conditions in most areas. Much of the production is done by family labour; this translates into a gross output estimated at € 1,542 per hectare per year (Sonko, et al., 2005).

According to Ssemwanga (2007) “passion fruit is green before maturity and turn to deep purple when ripe and then this the time they fall on the ground for picking and have a storage life of 4-5 weeks under at temperature of 7-10°C”. Local farmer use charcoal coolers, these charcoal cooler uses the principles of evaporative cooling to maintain a cool interior temperature for refrigeration and food preservation at well below 10°C (Shitanda, Oluoch and Pascall, 2011). For the local market, the practice is to pack the fruits in sacks for transportation exposing them to mechanical damage. Most passion fruit post-harvest losses occur through poor storage and transportation along the chain; losses are estimated to be 5% per 100kg.

1.4 Passion fruit marketing in Mukono

Sonko, et al. (2005) observed that “most of the passion fruits grown in Uganda are consumed locally, although some are exported to the neighbouring regional and international markets”. Currently, in Mukono, small holder farmers market their passion fruit to middlemen who purchase through direct negotiation with the local trade either at the farm or at the markets. There are limited standards or weighing facilities to guide the negotiation process. Price is determined by the middlemen from the physical attributes of the product, yield, negotiation skills and experience of the farmer. Traders who buy produce from smallholders at the farm gate tend to offer relatively low producer prices, taking advantage of smallholders’ lack of market information and the high transaction costs they face individually (Fafchamps and Hill, 2008). Figure 3, shows the methods middlemen use in buying passion fruit from farmers, no weighing machine used. While the middlemen were good at paying passion fruit farmers on time, they often offered significantly low prices which de-motivated farmers, leading to a number of youth farmers out of agricultural production (Bategeka, Kiiza and Kasirye, 2013).

Figure 3: Middle man buying passion fruit in Mukono



The major obstacle for smallholder farmers is limited market access, that is why they do not fully participate in the national economy. This situation needs to be improved through combining production and marketing (Magingxa and Kamara, 2003). Market access through linkage will help the smallholder farmers that account for the majority of actors in the sector to increase their incomes, food security and rural employment (Barham and Chitemi, 2009). Individual marketing of small quantities of produce weakens the smallholder farmers’ bargaining positions, increases transaction costs and often exposes them to price exploitation by middle men or traders. Most production systems in Africa, such as passion fruit production in Uganda are done on smallholder level and, hence, farmers acting individually are not able to participate in new markets such as supermarkets and exports where larger quantities and standardization of products are often required (Gyau, et al.2013).

According to Reddy et al. (2009) “Market access is one of the most critical linkages in the farming business for the rural farm households, it is also evident that they are a prerequisite for enhancing agriculture-based economic growth and increasing rural incomes”.

Table 1: Seasonal availability of passion fruit in Uganda

Source	Months											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dev
Mukono												
Masaka												
Mbale												
Kasese												

Adapted: Ssemwanga, 2007 Season for Mukono Season of other major supply

Mukono can produce 2 seasons per year of passion fruit which a competitive advantage to other regions which only have a single season per year. The seasonal availability of passion fruit in Mukono can also be influenced by irrigation to have a supply of the entire all year round supply. Please Table 1 above for production seasons.

Valk and Nyuabuntu, (2005) showed that "the majority of small farmers are not associated with working in groups or collaborative marketing association to facilitate market linkage or marketing process in Uganda". As a result, farmers are basically price-takers, so limited linkages represent a significant impediment to market access, especially for poor passion fruit smallholder farmer in Mukono. This substantially increases transaction costs, post-harvest losses, perpetuates farming as a social rather than business activity and reduces market efficiency which is aggravated by multiple middlemen offering very low prices to these vulnerable farmers. Weak infrastructure such as transportation networks, irrigation systems and storage facilities, limit access to markets, often exacerbate high levels of post-harvest losses and also inhibit efficient distribution of farm inputs to the farmers (FAO, 2016).

1.5 Research problem owner

Mukono District Local Government is the problem owner of the output of this research, it has commissioned and will support this research up to the implementation of the recommendations. This is in line with the mission of the Production and Marketing Department of transforming the subsistence agricultural sector to a commercial and self-sustaining sector through increasing household incomes and improve the well-being of the farmers while contributing to the overall growth of the national economy. The district had prioritised the horticulture sub-sector in its 5-year agricultural sector development strategy in order to achieve its mission, with the aim of generating higher incomes and employment for the rural population. Moreover, passion fruit sub- sector was positioned as a key driver in achieving the 10 per cent annual economic growth rate envisaged for Vision 2020 (Mukulu, 2016). Mukono District Local Government believes that efforts to link smallholder passion fruit farmers to profitable markets will be a crucial part of rural development strategies

1.6 Research Problem

Passion fruit sub- sector has been positioned as a key driver in achieving the 10% annual economic growth rate envisaged for Vision 2020 by Mukono District. It is priority crop under agricultural sector development strategy that aims at improving rural incomes, employment and rural livelihood. Despite passion fruit importance and contribution to the community, there is a problem of the absence of a market linkage business model for passion fruit farmers to high price market that is attributed to limited collective action and inadequate market information which has resulted in low income from prices which are determined by middlemen (Mukulu, 2016).

Therefore this research will come out with a business model that can link smallholder passion fruit farmers in Mukono District to high price market. The findings will be not only useful for smallholder passion fruit farmers in this district but also to other enterprises with similar market linkage problems.

1.7 Research objective

To analyse passion fruit chain governance in Mukono District in order to come up with a business model that can be adopted by passion fruit farmers for market linkage to high price market.

1.7.1 Main research questions

1. What is the current situation of the passion fruit value chain for smallholder farmers in Mukono District?

Sub questions

- What are the roles of stakeholders involved in the passion fruit value chain?
- What are the market information systems used by passion fruit smallholder farmers in Mukono District?
- What are the challenges faced by passion fruit smallholder farmers in market linkage?
- What is the gender participation in passion fruit value chain?

2. Which sustainable business model can be adopted by passion fruit farmers to enable them link to high price market?

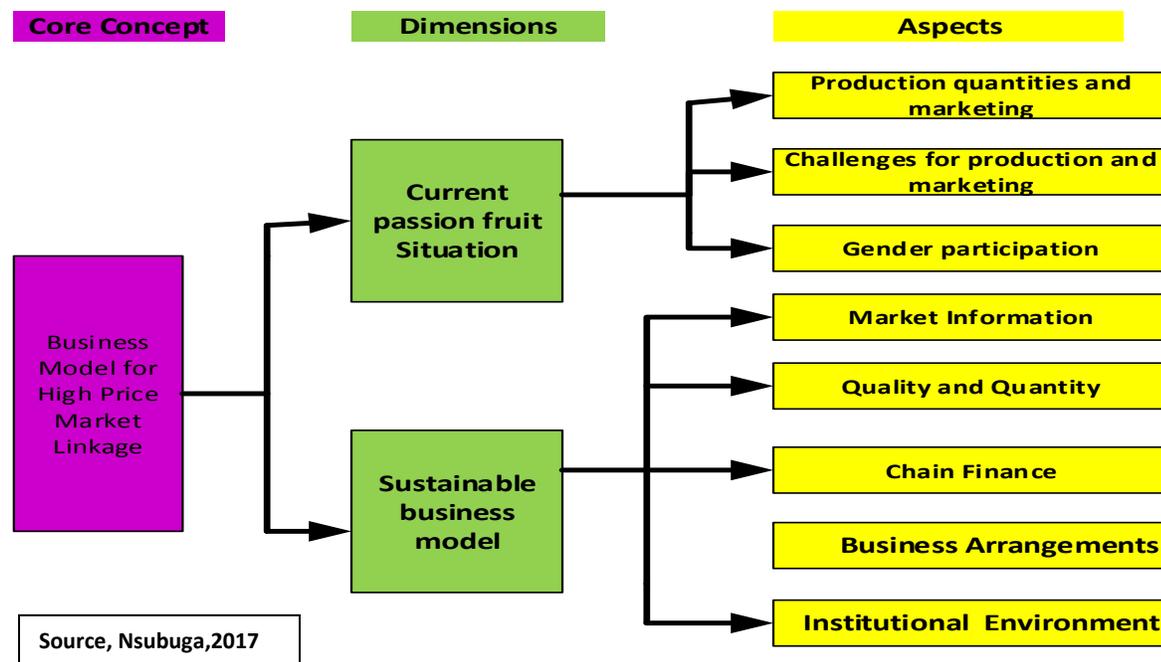
Sub questions

- What are the preferred quality and quantity for passion fruit by high price markets?
- What is the business arrangement preferred by smallholder passion fruit for market linkages?
- Which form of chain finance should be used by passion fruit farmers to link to high price market?
- What supports and hinders market linkage for smallholder farmers?

1.8 The conceptual framework for passion fruit market linkage

Conceptual framework shows the direction of the research variables to understand what is going on in Mukono passion fruit sector and why it is happening like how it is based on the problem statement (McGaghie, *et al.*, 2001). There are 3 dimensions that have been considered in this research for linking passion fruit farmers to high price market which are passion fruit potential, value chain concept and market linkage (See Figure 4). The dimensions were broken down into the different aspect that constituted the basis for research sub questions.

Figure 4: Research conception framework



1.9 Definition of concepts

Bargaining power: Refers to the ability to influence the price or terms of a business operation and can enable producers to negotiate for better prices and terms, such as a long-term supply agreement or access to business services

Business model: Vorley, et al. (2009) defined a business model as the way by which a business creates and captures value within a market network of producers, suppliers and consumers.

Buyer: A person or institution that purchases or intends to purchase passion fruit for use or resale.

Farm gate price: Is the amount of money received by the farmer after selling their produce usually at the farm, this price does not include marketing costs (AICC, 2016).

High price market: Prospective buyers with the same needs who perceive the full value of a product similarly and are willing to pay for high price for the product.

Stakeholders: These are individuals, groups or organisations that are directly or indirectly involved in the passion fruit value chain in Mukono District. They include chain actors, chain supporters and chain influencers.

Market access: Increased opportunity to market outputs regularly at acceptable prices and results in market participation by smallholder farmers.

Market linkages: Is referred as relationships between different actors along the value chain and the way transactions are governed between these actors

Smallholder farmers: These are small scale and subsistence farmers holding land of not more than 2 hectares and poor in other production resources such as inputs and limited technology (Syngenta, 2013)

Tailor made: Something made, adapted, or suited for a particular purpose of organisation or person.

Transaction costs: Costs related to implementation of an investment relating to investment decision, information exchange and transactional risks (EDHEC, 2008)

Value shares: the percentage of the final, retail price that the actor earns.

CHAPTER 2 LITERATURE FOR PASSION FRUIT MARKET LINKAGE

This chapter was to build on literature on passion fruit market situation, approaches for market linkage using a value chain approach, chain governance and institutional environment in order to come up with a business model that can be adopted by small holder passion fruit farmers to link to the high price market such as retail supermarkets and exporters.

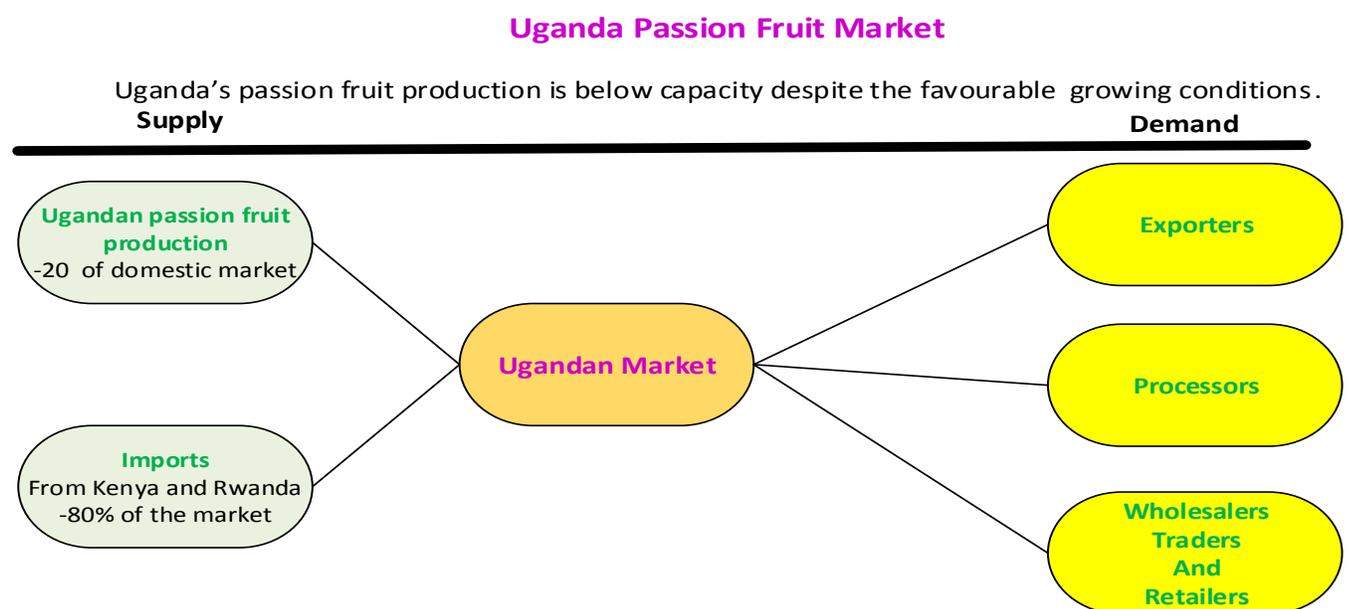
2.1 Passion fruit varieties required by market

The introduction of high yielding, grafted purple passion fruit varieties Kawanda clone 6 and 7 which are tolerant to *Fusarium* wilt offers viable opportunities for growth and expansion, especially in the Southern belt (1,000-1,200M) in the lakeshore districts, Mukono District inclusive. In Mukono currently, two types of passion fruit are produced with clearly differing exterior appearances. The local small purple variety of passion fruit and the hybrid big bright purple passion fruit is the same size as a lemon. Both varieties are richer in aroma and flavour, but the latter has a superior flavour that is well appreciated and valued in the local, regional and European markets (NaCRRI, 2015).

2.1.1 Passion fruit market potential

The demand for passion fruit is growing globally this is evident in Europe where, it has become a major ingredient in tropical juices, yoghurts and desserts. According to Fruittrop (2013), the consumption growth has also been recorded in Europe, where the imports of passion fruit in the EU market reached 7,000 tons in 2013. The Netherlands dominates in imports by country. It can be confirmed that over a ten-year period it imported 60 to 70% of the European tonnages of the produce concerned (Fruittrop, 2013). Uganda has shown solid growth in volumes sold in both the domestic and export markets for fresh fruit with reaching levels of up to 25% per year. However, Uganda can only supply 20 percent of overall national demand; industry sources estimate that passion fruit imports into Uganda during 2015 were approximately 40,000 metric tons worth € 17,120,000 from Kenya and Rwanda out of the annual national demand of about 82,000 tons (Ssemwanga, 2007). Uganda continues to be the single largest export destination for Kenya's fresh passion fruit (USAID, 2012), as portrayed in figure 5 below;

Figure 5: Uganda passion fruit production capacity and demand

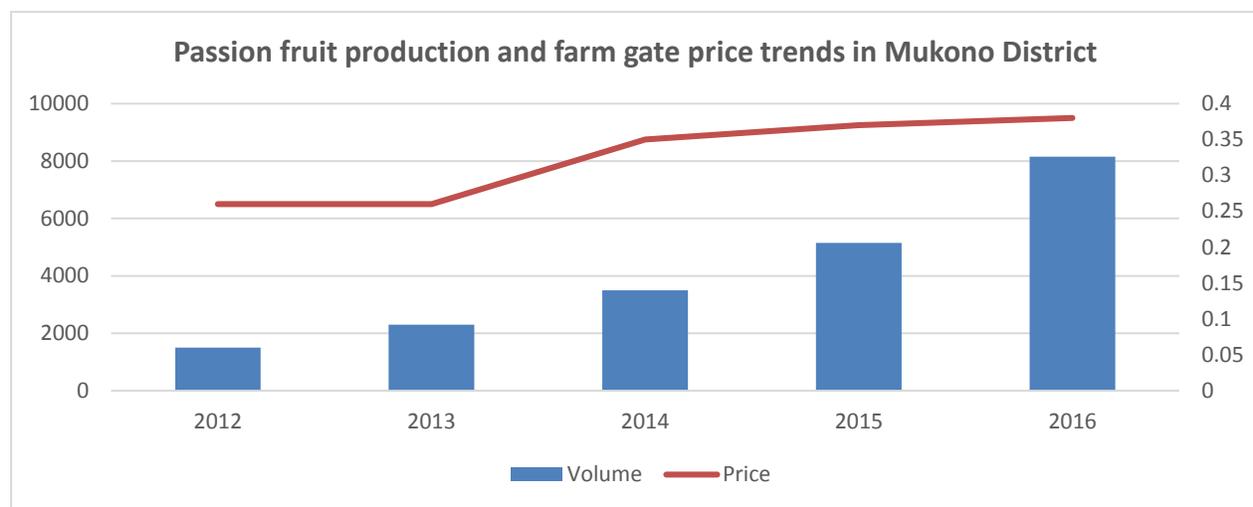


Adapted from KadAfrica, 2015.

2.1.2 Passion fruit production quantities and price trends in Mukono

In the last five years in Mukono District, production has increased from over 3500 tons to 8150 tons; farm gate prices have slightly increased from €0.26 in 2012 to €0.39 in 2016. The production and demand are on the increase; this increase is attributed to both local and export demand. Although the demand is increasing and the prices are increasing in high price market such as supermarkets where the current average shelf price stands at €2.05 per kg. Still, the farmers are getting lower prices of less €0.40 per kg at the farm gate. This could be attributed to the number of intermediaries (Middle men) in the passion fruit marketing. Studies conducted by Omore, et al. (2009) suggests that “when the number of intermediaries increases, the price received by farmers decrease”. The trend for volumes sold and prices for the last five years are in given in Fig 6 below;

Figure 6: Passion fruit production and farm gate price in Mukono District



Source: Nsubuga,2017

2.1.2 Passion fruit value added distribution

The value share distribution for passion fruit indicates that on average farmers receive € 0.38 per kg at farm gate which is 18.53% of the retail price of € 2.05. This is illustrated in Table 2 below. This is based on differences between the price the actor pays for passion fruit and another actor sells.

Equation: Passion fruit added value = Price received by actor – Price paid by actor

Value share = Added value x 100/Final retail price

Table 2: Passion fruit value added share for actors

Actor	Price received by actor €/kg	Price paid by actor €/kg	Added value/profit	Value Share in percentage
Producer	0.38	-	-	18%
Local trader	0.60	0.38	0.22	11%
Market trader	1.25	0.60	0.65	32%
Retailer	2.05	1.25	0.80	39%

Source: Nsubuga,2017

2.2 Value chain concept

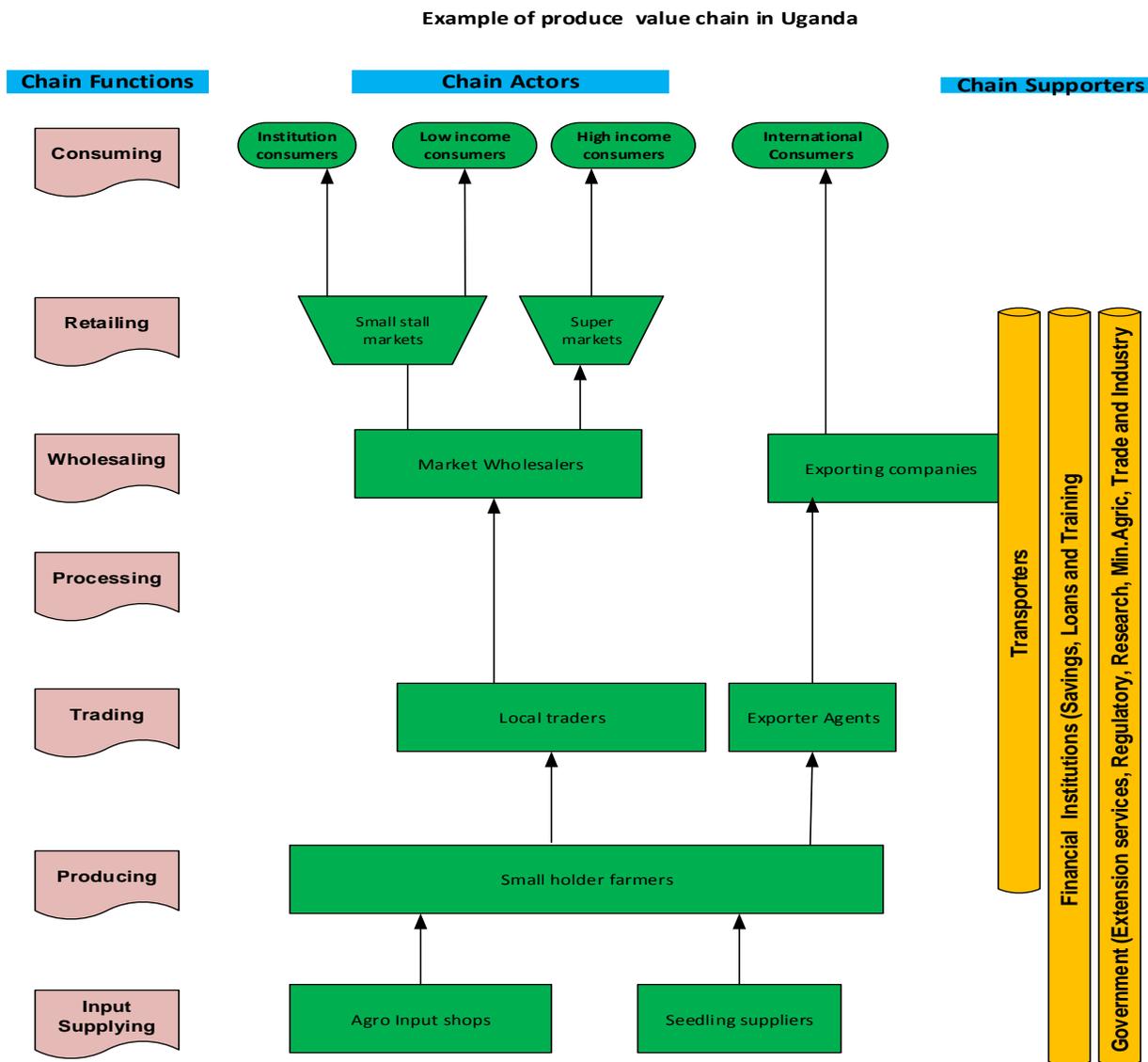
The concept of the value chain is the idea of actors connected along a chain, producing and delivering goods to consumers through a sequence of activities and final disposal after use (Henriksen, et al. 2010). It also encompasses the issues of organising, coordination the strategies and the power relationships between different stakeholders in the chain. Hence, the value chain is associated with the concept of chain governance for better understanding the complex social ties and tradition norms such as power relations, the most vulnerable and natural resources in the value chain (M4P, 2008). A value chain is a connected series of organizations, resources and knowledge streams involved in the creation and delivery of value to the end customer (Sahoo, 2010). According to Lowitt, et al. (2015). “The overall goal of value chain concept is to identify ways to improve the performance of value chain, such that all actors are placed in a better position to fully benefit in available opportunities”. Such collaborative arrangements between various passion fruit value chain actors facilitate for increased efficiency in the chain, because partners can pool their resources, knowledge and capabilities (Kolk, et al., 2008). The use of this approach in this study is to understand opportunities and constraints of key players in the passion fruit value chain of Mukono District. This will help the researcher to come up with farmers’ desired business model to link them to high price market.

2.2.1 Value chain analysis

Value chain analysis is simply a tool that can assist people involved in the chain to understand better the business environment in which they operate in such as weaknesses to be solved and opportunities to increase profits (McGregor and Stice, 2014). According to Roduner (2007) defined “value chain is an analytical and operational model where the product is hardly ever consumed at the place of production before transformed”. The passion fruit value chain in Mukono District qualifies to be a value chain because all the actors such as input suppliers, producers, traders or wholesalers, retailers and consumers with supporters are all mapped (M4P, 2008). This explains that the produced products such as passion fruit are transformed, owned by various actors who take active market positions linked by trade and services until it reaches the final consumer (UNIDO, 2011). Interests of stakeholders in multi-actor collaborations often differ, so business relations in passion fruit value chain should be based on goal alignment (Kolk et al., 2008).

According to Lundy, Sanclemente and Mercado (2008) stated that “Value chain analysis visualize the diverse roles and connections between participating actors in the chain and identify sources of innovation and improvement”. This identifies the roles of stakeholders in passion fruit value chain. Value chain analysis can have lens for gender participation, quality management, sustainability, and revenue with value shares. The goal of value chain analysis can also be to identify how farmers can improve their performance by reducing costs or enhancing the distinctiveness of their products in this case passion fruit (USAID, 2012). Example of produce chain is in figure 7 below.

Figure 7: Example of produce value chain in Uganda



Source: Nsubuga, 2017

2.3 Chain Governance

Governance concept is the dynamic feature of value chains that characterize the relationships or linkages among stakeholders in the chain which encompasses the system of coordination, organization and control that preserves and enhances the generation of value along the chain. This is very important in developing passion fruit value chain (USAID, 2009). Governance implies that interactions between actors in the value chain are organized in a system that allows meeting specific requirements such as quality standards, delivery times or product volumes. Governance analysis defines whether the poor have access to resources or whether there are structural barriers to access the value chain like the small holder passion fruit farmers (M4P, 2008). The means by which market linkages are governed can have a significant impact on the poor's participation in value chains (Ross and West, 2013). Smallholder market linkage is more hinged on the good business model, collective action and coordination all which are in chain governance. It is, therefore, chain governance that forms the core of upgrading the passion fruit smallholder farmers for market linkages.

2.3.1 Chain Upgrading strategies

Upgrading means acquiring the institutional, technological, and market capabilities that allow the smallholder farmers such for passion fruit to capturing more value and improve competitiveness in the value chain (Ponte, 2014). It is taking the new direction towards a passion fruit new marketing, market segment or customer (Mitchell and Coles, 2011). Chain Upgrading which can be vertical or horizontal is not just an opportunity to improve an actor's own position but more importantly a prerequisite to secure position in a chain. For the passion fruit farmers to get linkage with the high price market, they need to upgrade in the chain in order to overcome market linkage barriers. Hawkes and Ruel (2011) proposes "five different types of upgrading strategies for smallholder producers". Smallholder the passion fruit farmers will use four strategies as shown in figure 8 below.

Figure 8: Passion fruit chain upgrading strategies

Mukono District Passion Fruit Value Chain Upgrading Strategies

- **Process upgrading.** The focus will be on reducing waste, which occurs mainly in postharvest losses through efficient delivery to the customer and establishment of local charcoal storage centres.
- **Product upgrading.** New Kawanda hybrid variety which a superior to the local variety will be promoted, and complying with quality standards certification as a value proposition.
- **Volume upgrading.** Passion fruit from smallholder farmers will bulk their quantities into buyer required volumes.
- **Improving value-chain coordination.** Through collective action, scatted farmers will be well coordinated to meet market requirements.

(Adapted: Hawkes and Ruel, 2011)

Vertical integration: According to KIT and IIRR (2008) "vertical integration refers to producers taking up new activities either upstream or downstream the chain for example processing, wholesaling and retailing". It is imperative that passion fruit farmers take up new activities to link to high market. Through the formation of strong vertical linkages, producers can gain access to market demand that can absorb their supply (Ross and West, 2013).The passion fruit chain is a good example of how passion fruit production in Mukono District can become vertically integrated. Asenso-Okyere and Jemaneh (2012) suggests that "vertically and horizontally coordinated value chain can enable poor producers to access appropriate technologies, secure inputs, access markets, and respond to market information".

Horizontal integration- This describes how producers co-operate to attain economies of scale and reduce transaction costs among farmers in chain management, with regards to decisions on sales, product price, quantities and customers (KIT and IIRR, 2008). Horizontal integration also provides uniform quality performance by supporting members through quality programs like Global Gap for passion fruit farmers in Mukono. Famers can also organise themselves into producer organisations to effectively market their products thus achieving a greater share of the final product price (Schalkwyk, et al., 2012). Through cooperation, smallholder passion fruit farmers shall be able to link to a high price market.

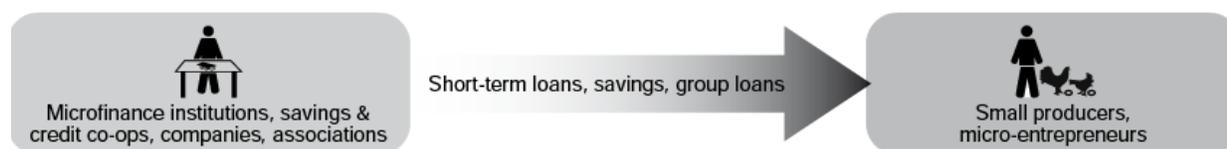
2.4 Chain finance

According to Miller and Jones (2010), value chain finance is the flow of funds to and among the various links within a value chain in order to increase value-chain growth and competitiveness. Limited access to financial services by passion fruit farmers is a major problem for them to take advantage of market-oriented production opportunities like linking to high price markets

For any value chain to develop such as passion fruit, there must be any sort of financing in order that market demands can be met. KIT and IIRR (2010) “states that during the production season, farmers often lack working capital to buy inputs, or to hire workers to plough the land, weed and to harvest the crop”.

Value chain finance is a service based on cooperation in the value chain (KIT and IIRR, 2010). And agricultural finance from outside agent (the microfinance institution) like the situation in Mukono. Miller and Jones (2010) observed that “microfinance institutions do reach some of these low-income households but at a high cost, with short-term loan products that are generally not able to address the full range of agricultural needs”. Farmers in Mukono always have no option but to opt for the offer of high-cost financial services that is available to them to meet market requirements. Miller and Jones (2010) recognized that “increases in finance and investment are needed at all levels of the food chain, with a special interest in increasing the access to finance by those agricultural households and communities who are most vulnerable to food insecurity and poverty”. The farmers currently can only access financial services in a micro finance institution as per figure 9.

Figure 9: Currently available finance for farmers



Source: KIT and IIRR, 2010

2.5 Strengthening Chain relations

According to KIT and IIRR (2008) “strong chain relations are characterised by strong organizations, trust, open and frequent communication and cooperation for mutual growth”. This is an important factor in passion fruit market linkage between the farmers right up to the retailers. On the other hand, weak chain relations are often characterised by farmers and buyers being fragmented, mistrust, fight over prices, few long term relationships, delivery of poor products and services (KIT and IIRR, 2008). Passion fruit farmers need strong relations with other stakeholders such as traders to enhance cooperation in tackling issues of common interest.

2.6 Approach for smallholder farmers market linkages

2.6.1 Collective action

Passion fruit farmers are so scattered in Mukono, and without any coordination in their production and marketing, this calls for collective action in order to benefit the passion fruit business opportunities. According to (Hellin, *et al.*, 2007) “collective action is a voluntary action taken by a group to achieve common interest, it normally exists in the absence of farmer organization”. Sally (2013) states that “in circumstances where there are more vulnerable producer groups such as women, youth and the underprivileged in Africa, collective action offers the advantage of improving their positions”. The majority of passion fruit farmers are classified as vulnerable that need services including the delivery of inputs and training, economies of scale and increased bargaining power. Collective action can be used as a strategy to strengthen linkages and build trust among farmers, traders and the private sector in many food value chain (Facheux *et al.*, 2012). Collective action in the form of producer organisation such as cooperatives and contract farming can enable passion fruit smallholder farmers to deal with the existing market imperfections and work with exporters and supermarkets.

2.6.1.1 Producer organisations and marketing organisations

Participation in a producer organization (PO) is a very strategic element in a farmer's business model for market linkage (Le Courtois, et al., 2011). Bijman and Wollni (2008) stated that "producer organisations are defined as a formal, voluntary membership organisation set up for the economic benefit of agricultural producers by providing services that support the farming activities like making market linkages and product standardisation". The study adopted the definition of PO as an economic structure, in Uganda which are either farmer groups or cooperatives (Onumah, et al. 2007). Organising passion fruit farmers into producer organisation can level the playing field and eliminate scattered production. According to Kawa and Kaitira (2007) "Smallholder farmers in Tanzania operate as individuals, have limited bargaining power, market information, receive low prices, access to financial services, sell out of season at higher prices and their linkages with markets are tenuous". These are the exact challenges facing the smallholder passion fruit farmers in Mukono; they need to be empowered through the formation and strengthening of producer organisation (Kawa and Kaitira, 2007).

2.6.1.2 Types of producer organisations for market linkage

Cooperative

According to ILO (2002) defined a cooperative as "an autonomous association of people united voluntarily to meet their common economic, social and cultural needs and aspirations through jointly-owned and democratically-controlled enterprises". Birthal, et al., (2007) suggested that the "cooperative model is one of the successful models linking farmers to markets". Cooperative are also formed to address smallholder farmers' inability to access high price markets as the case passion fruit farmers. In recent years the government of Uganda has encouraged the development of cooperatives stating, "farmers operate more effectively in the market place if they are organized, and can aggregate demand for inputs and bulk produce for sale" (PMA 2005). Wollni and Zeller (2007) found that "coffee cooperatives in Costa Rica facilitated small-scale growers' participation in speciality markets with higher prices". Cooperatives in Uganda play a major role for smallholder farmers in financial resources mobilization, agro-processing and marketing of agricultural produce that is vital in poverty alleviation (Thangata, 2016).

Contract farming

According to Setboonsarng (2008) "contract farming is defined as an agreement between a farmer and a purchaser established in advance before the product is supplied with a specific quantity, quality and date of delivery of product at the fixed price in advance". In Uganda, contract farming has been found to play an important role in the commercialization of smallholder agriculture through the provision of an assured market, high prices, critical inputs and knowledge of new agricultural technologies for farmers as a driver of a rural development strategy (Elupe and Nalukenge, 2009). It allow supermarkets and exporters to benefit from farmers such for passion fruit's low costs of production while ensuring sufficient supply to make their investment profitable (Tschirley,2007). Vande and Maertens (2014) has shown that "contract-farming leads to higher productivity, higher profits and higher net farm incomes; that it reduces price variability and leads to higher income stability in Benin rice value chain". This could be adopted by smallholder passion fruit farmers to work with high price markets such as Supermarkets and Exporters. Ferris et al. (2014) offered evidence that "incomes for smallholder farmers under contract farming is much higher than for non-contract farmers the case of Senegal".

2.7 Market information to markets

Market information is the service, usually operated by the public sector, which involves the collection of information on prices, quantities and other market requirements from the markets and dissemination of this information regular basis through various media to farmers and other stakeholders (Shepherd, 1997). Rural smallholder farmers in Uganda have little information about market demand and other requirements in order to access the market. In their study, Kürschner, Custodio and Demont (2016) found that “increased transparency and access to timely, accurate and reliable information on prices and demand as well as on weather forecasts will improve decision-making at farm level”. While Khapayi and Celliers (2015) stressed that “poor access to market information make farmers unlikely to participate in marketing because they are not well informed of market prices, products in supply or the products in demand”. According to Svensson and Drott (2010) “smallholder farmers, who are mostly in rural areas, often do not have access to information regarding prices in urban areas; they mostly sell at farm-gate prices to local traders who on their part have access to price and market information prevailing in other markets”. Provision of market information to passion fruit farmers will bridge the gap among chain actors, reduces transaction costs and facilitates efficient negotiations in trading (AICC, 2016). For good market linkage passion fruit farmers should access timely market information from extension workers. Taylor, Zezza and Gurkan (2008) stressed that “new market linkages and better information could enhance agricultural production for a high price and overcome tremendous informational asymmetries that have limited bargaining power with buyers”.

2.8 Gender aspects

Gender is defined as the meaning the society gives to the roles of women and men resulting in certain power relations and dynamics in access and control over resources. Understanding the position of women in passion fruit production and marketing is vital for the inclusive business model and gender equality in resource distribution. Gender equality is the concept that both men and women are free to develop their personal abilities and make choices without the limitations set by stereotypes, rigid gender roles, or prejudices (KIT, Agri-ProFocus and IIRR, 2012). Women’s lack of access to and control over productive resources is mostly limited by the cultural norms and society’s customs (FAO, 2011). It is vital that women participate in levels of the passion fruit chain for the chain to develop efficiently. According to FAO (2016) “Increasing women’s decision-making power, on the other hand, creates immediate economic benefits and promotes long-term sustainability goals”. Women are still not remunerated as per their roles, contribution and participation at household level in passion fruit production (UNIDO, 2011). According to Njuki, et al. (2011) found that “women seem to control more income from crops traditionally used for food such as beans and groundnuts compared with crops such as passion fruit which generate high income”.

2.9 Quality standards

Quality standard is defined as a set of requirements, specifications for ensuring quality, with various guidelines and characteristics of how most products, process or persons are able to meet stated and unstated customer requirements and expectations for stated norm, regulations, and laws (VHL, 2016). Quality standards are paramount in passion fruit market linkage as consumer needs are continuously being influenced by food quality and safety standards to meet or exceed their expectation (Luning and Marcelis, 2009), which can be public or private standards. To ensure the products consumed in Uganda is safe, it must be certified by Uganda National Bureau of Standards the institution mandated to handle public standards. Other markets like export need private standards like Global GAP certification to ensure the product has been produced under strict quality standards and can be traced back to the producers in combination with quality management systems such as HACCP, ISO 22000, and ISO 14001 (Global GAP,2015). Figure 10, shows the map of recommended private standards for EU market requirements for passion fruit from Uganda that should be Global Gap compared to other standards which was automatically generated by the international trade centre (trade map) after information was given for product origin and destination market .

Smallholder passion fruit farmers in Mukono need to comply with all standards requirements if they are to link to high price market. According to Asfaw et al. (2010) “not only do Global Gap certified farmers receive higher incomes, they also enjoy improved bargaining power and more secured relations with their buyer, and keep participating in export markets”.

As stated by Le Courtois, et al. (2011) that “Although GAP certification schemes are voluntary, they are de-facto required to access lucrative markets in most developed countries”. Group certification like for passion fruit farmers allows a reduction of some certification costs because of the generation of economies of scale such as reduced inspection fees (Le Courtois et al., 2011).

Figure 10: Results from ITC standards map on recommended private standards



Source: ITC, 2017

2.9.1 Passion fruit quality attributes

According to East African Standards (2010) “Passion fruit should have three grades for quality management (Grade 1, Grade 2, and Grade 3)”. High price market requires passion fruit separated into 2 different size categories (medium and large), based on fruit diameter. Marketable fruit sizes typically range from 4 to 12 cm long and average diameter for fruit for a medium size is 6.5 cm, and large size, fruit is 8 cm. Fruit marketed domestically should be clean, firm, free from visible signs of disease, mature, uniformly coloured, and free from damage which detracts from the appearance or edibility of the fruit (i.e. bruises, cuts, healed or open cracks, insect damage, sunburn and others). These quality attributes both intrinsic which are inherent to the physical passion fruit and extrinsic which has a direct relationship on influencing consumer acceptance of the fruit as explained by (Luning and Marcelis, 2009). The export market also requires the same quality as supermarkets (USAID, 2012).

2.10 Business arrangements

Smallholder passion fruit farmers in Mukono are faced with challenges of identifying a good market that can offer prices that can help them grow more crops and alleviate poverty. The only way to overcome this situation is to have business arrangements in the form of a sustainable business model. Vorley, et al. (2009) defined a “business model as the way by which a business creates and captures value within a market network of producers, suppliers and consumers”. In order for the passion fruit farmers in Mukono to capture value for their produce they need an inclusive and good business model that organises them and builds relationships with actors to the market. According to Lundy and Jager (2017) “the most appropriate inclusive and good business model should be built on three major principles like inclusive and innovation, fair and transparent to all members of the chain”. According to Lundy et al. (2012) “successful models of trading relationships promote transparent pricing and quality standards that are consistently applied along the chain as in speciality coffee”. The required business model for the passion fruit in Mukono District should have these ingredients for the farmers to successfully participate in high price market.

There are three generic business models for market linkage, these include producer driven, buyer driven and intermediary driven (Shepherd, 2007), but it is important to note that each business should have its unique business model in order to succeed. According to FAO (2015) states that “producer-driven models are motivated and owned by small-scale producers based on collective action for increased smallholder farmer participation in markets”. Buyer-driven models involve larger businesses such as supermarkets or exporters organizing farmers such as small holder passion fruit farmers into suppliers, while intermediary models which are commonly led by local NGOs or specialized providers in order to balance the needs of small farmers for improving smallholder market linkages (Vorley, et al. 2009). The following are the business models for market linkage that were presented to the farmers in order to select the best model or compile that suits their business;

- i. **Cooperative to buyer:** This model involves the formation of cooperatives by the smallholder farmers to enable them to access both the input and output markets in a profitable manner. It can be used by farmers to supply directly to the buyer such as supermarkets, on a long-term basis. As stated by Vorley, et al. (2008) “this model has been successful in Carrefour in Indonesia, through which dialogue was established between farmers and buyers to ensure increased quality”.
- ii. **Cooperative-Contract farming to the buyer:** This model involves a cooperative, buyer such as supermarket or exporters’ supports and works with farmers under contracts. Lemeilleur and Tozanli (2006) states that a “similar model has been used in Turkey where farmers’ capacity has been built in a cooperative, support production management and provision of incentives beyond the formal contract to ensure quality consistency supply”.
- iii. **Cooperative – trader – buyer (retailer):** This model involves farmers in cooperative concentrate in production, then work with a trader as the marketer of their produce to link with the buyer in a transparency way. The supply contract is signed between the three parties indicating each actor value share. This model worked well in Mexico, where a supermarket had failed to work directly with farmers until an intermediary was introduced and the transaction costs were reduced (Berdegué et al., 2008b).
- iv. **Cooperative to the consumer:** This business model is gaining popularity in Uganda especially for fresh fruits such as passion fruits, in this model cooperative bulk their produce and transport it to a designated selling point in the urban area and sell directly to the consumers (short chain model). There is an easy information exchanged about the origin, production methods and sustainability of the product, in addition to identity, values and ethics of both the producer and consumer (Foodlinks, 2013).

The above business models were selected among others based on key informants' recommendations in addition to focus group discussion. They recommended only business model built on the cooperative arrangement can organise them for market participation. Business model built on cooperative is in line with Government policy of 2011 on revamping the cooperative to improve smallholder farmer livelihoods. According to Nannyonjo, (2013) "there is increasing participation of government of Uganda in supporting effective development of cooperatives through providing an enabling legislative, political and economic environment".

2.10.1 Business model canvas

The canvas business model used as a strategic management and entrepreneurial tool .It is for in-depth analysis to give a visualization of business description, invention and designs for business models (Osterwalder, 2007). It was used on the selected business model for suitability to the farmer's situation and to understand how the new business model will function, create chain relations, discover opportunities to improve small holder inclusion through the creation and delivering value in the passion fruit value chain. See figure 11 for canvas business model guiding tool.

Figure 11: Canvas business model guide for analysing the selected business model

<p>Key Partners</p> <p>10. Who are your important key partners? 11. Who are your input suppliers? 12. What support do you get from your key partners? 13. What activities do your partners perform?</p>	<p>Key Activities</p> <p>1. What passion fruit production activities do you perform? 2. What marketing and sales activities do you have? 3. What type of transportation used in passion fruit?</p>	<p>Value Proposition</p> <p>21. What makes your passion fruit unique? 22. Which buyer needs are you satisfying? 23. How do buyers access your passion fruit?</p>	<p>Customer Relationships</p> <p>18. Do you have contract with your buyer? 19. Do you get prepayments from your buyer? 20. Do you get help on certification of passion fruit from your buyers?</p>	<p>Customer Segments</p> <p>24. How many kg of passion fruit are you producing? 25. What group of customers are you targeting? 26. Which customer group do you think would be most important</p>
	<p>Key Resources</p> <p>4. What is the average land size of your passion fruit garden? 5. What types of tools do you use in passion fruit production? 6. How many people are needed to manage? 7. How do you finance your business? 8. How do you get your labour? 9. What physical infrastructures do you have? (Storage)</p>		<p>Channels</p> <p>14. Where do you sell your passion fruit? 15. How do you communicate your buyers? 16. How do you reach your buyers? 17. How often do you sell, at what price?</p>	
<p>Cost Structure</p> <p>27. What are the average production costs incurred in passion fruit production? 28. What are the most costly activities in passion fruit production? 29. What is the total investment for a hectare for passion fruit enterprise?</p>		<p>Revenue Streams</p> <p>30. What is the price of passion fruit per kg? 31. What other products apart from passion fruit do farmers sell and at which price? 32. What is the method of payment?</p>		
<p>Environmental issues (Advantages)</p> <p>33. What are the environmental benefits of passion fruit production and marketing?</p>		<p>Environmental issues (Disadvantages)</p> <p>34. What are the environmental degradation of passion fruit production and marketing?</p>		
<p>People Aspects Advantages</p> <p>35. How many people are employed in passion fruit farming? 36. What is the average income for passion fruit farmers</p>		<p>People Aspects Disadvantages</p> <p>37. What are the negative social aspects of passion fruit production and marketing?</p>		

Adapted from Osterwalder, 2006

2.11 Institutional environment

The institutional environment is defined as external business environment that has influence on how business is transacted, includes policy, regulation, economic organisations and socio-cultural like informal norms (VHL, 2016). These institutions can support or hinder the development of passion fruit value chain. Shepherd (2007) stated that “there are many legal issues that governments should address in order to promote agribusiness development more specific to market linkage activities like legislation relating to cooperatives”. Mukono District Local Government is mandated to set or implement socio – economic policies that are aimed to uplift the living standards of the community. Under the national policies for agricultural development include the provision of extension services, market information, cooperative formation and provision of farm inputs to farmers.

These good policies such as infrastructure development could support the development of passion fruit business. However there is always the poor implementation of these policies due to limited funding. Ferris, et al. (2014) found that “Governments need to invest in local infrastructure, strengthen business services and improve farmers’ skills, while extension systems are needed to upgrade production and market performance”. The agricultural sector in Uganda faces a multitude of constraints along the value chain which hinder the ability of farmers to increase production and productivity and access markets for their produce (Masaba, 2014). These challenges can be overturned if government invest in local infrastructure, strengthen business services and improve farmers’ skills, facilitate extension systems to upgrade production and market performance (Ferris et al. (2014).

3.2 Research design and strategy

The research was designed as a case study with the main aim of identifying a business model that can link smallholder passion fruit farmer to high price market. The respondents were purposively selected from Mukono passion fruit value chain. The study followed qualitative and quantitative empirical data with desk study for the literature review. According to Verschuren and Doorewaard (2010) “case studies allow getting full insight into one or several objects or processes that are restricted in time”. It focuses more in-depth than breadth and uses strategic samples for interpreting. Case studies can also be used for deeply investigating dynamic, experiential and complex processes like business-to business marketing, in this case, passion fruit market linkage (Vissak, 2010).

This was done through key informant interviews, focus group discussions and observations grids, using semi structured questions on the checklists and other tools. The checklists were pre-tested before data collection on randomly selected International students at VHL University. Thereafter triangulation was made to verify the information given during interviews. The confidentiality and ethical principles were explained to interviewees.

3.3 Data collection

The data was collected using key informant interviews, focus group discussions and observations. There was face to face interview with key informant interviews, the focus group discussions, observations and triangulation to verify some information took 36 hours of active time providing the most vital information on passion fruit market linkage, data were collected as follows;

3.3.1 Key informant interviews

The research involved personal interviewing of the strategically selected actors and supporters in Mukono passion fruit value chains. Checklists were used to guide the interviewer through the different interviews (see Annex 1-5) on aspects regarding passion fruit market linkage requirements such as production, marketing, quality and challenges. Key informant interviews comprised 14 key informants that included 2 farmers from Koome and 4 Ntenjeru Subcounties, 2 traders in Ggaba market Kampala and Kaame Valley market Mukono, 2 fruit and vegetable exporter in Mukono and Kampala, 2 supermarket managers from Mukono and Kampala, Mukono District Production Officer and Kisoga Micro Finance manager in Mukono, all provided very vital information. Details for the interviews guide are described as below;

3.3.1.1 Interview with fruit farmers passion

Farmers in Koome and Ntenjeru Subcounties were interviewed with guidance of a checklist to obtain information on production area, weekly harvest quantities, buyers, price offered per kg, the extension services received, market information, membership and working with a farmer group, production and marketing challenges, preferred organisation in accessing better markets, sustainability of passion fruit business, pre and post-harvest losses and other comments. Figure 13 showing interviews in the process. More farmers were interviewed in Ntenjeru Subcounty because the planned focus group discussion was skipped.

Figure 13: Interview process with farmers in Koome



Source: Nsubuga,2017

3.3.1.2 Interview with passion fruit traders

Traders a female and male from Ggaba market in Kampala and Kaame Valley markets in Mukono were interviewed with guidance of a checklist to provide information on passion fruit quantities they buy per week from passion fruit farmers, areas they source the fruits, the prices they offer per kg to farmers, preferred business relationship with farmers, their buyers, the price they sell to buyers, the fruit quantity and quality attributes requirements and the challenges and opportunities in the passion fruit trading. Figure 14 showing one of the respondents a female trader at Ggaba market.

Figure 14: Researcher discussing with female trader at Ggaba market



Source: Nsubuga,2017

3.3.1.3 Interview with passion fruit exporters and Supermarkets

Two fruit and vegetable exporters and supermarkets' managers were interviewed one of each from Kampala and another from Mukono, they provided very vital information on how farmers can access their high price markets. The checklists used focused on where they source passion fruit, transport used from source, their required weekly quantity, the price offered per kg, preferred fruit quality attributes, experienced fruit post-harvest losses and how can they be reduced, their business and payment arrangements, proposed strategies for smallholder passion fruit farmers to supply high price market, storage facility for fresh produce and how often they throw away passion fruit because they no longer meet consumer requirement and whom they think controls (Lead firm) the passion fruit business. Figure 15 showing the research target market.

Figure 15: Photos showing target high price market



Source: Nsubuga,2017



3.3.1.4 Interview with the Mukono District Production Officer

The Mukono District Production Officer was interviewed on institution environment that can support or hinder the development of Mukono passion fruit value chain and linkage to high price market. The interview aimed at understanding the services offered by the District to smallholder passion fruit farmers, how often they provide market information and how it reaches farmers, the policies at District and National level that support the passion fruit enterprise development, training and advisory, district efforts to facilitate farmers to access high prices markets, the best way to organise farmers for market linkage, staff with experience in product marketing, plans of the District for sustainability of the passion fruit enterprise and other comments regarding smallholder passion fruit farming in Mukono

3.3.1.5 Interview with Micro finance manager

The Micro finance manager at Kisoga micro finance was interviewed to obtain information on how they can provide chain finance to passion fruit value chain starting with relationships with the farmers, their financial products on offer, type of loans normally give to small holder farmers, type of collateral they require from farmers, if they have gender consideration when giving out loans, their say about working with organised farmers and the requirements for opening up a group account. This was for local chain finance for small holder farmers.

3.3.2 Focus group discussions

Focus group discussion is a good way to gather together people from similar backgrounds or experiences to discuss a specific topic of interest in the development issues of change process with the aim of extracting information (ODI Toolkit, 2009), such as parties in Mukono passion fruit value chain. Two focus group discussions were carried out to validate and complement the information gathered. The first one was in Koome Sub county and comprised of 7 passion fruit farmers that are classified as smallholder farmers who were selected from 7 parishes that produce passion fruit. The aim of this focus group discussion was to generate data for the entire sub county using a checklist that guided the participants in the discussions (See Annex 6). Figure 16 shows the focus group discussion session and participants at Koome Sub-county.

Figure 16: Koome Subcounty focus group discussion in session and participants



Source: Nsubuga,2017

The second focus discussion group for Mukono passion fruit stakeholders comprised of 13 participants including 4 farmers, 2 traders, manager micro finance, a supermarket manager, exporter representative, Mukono NGO forum representative, processor, District commercial officer, and District production office representative. This focus discussion group Borrowed concepts from Link Methodology (2014), of using participatory approach tools for data analysis using value chain mapping, preference ranking of crop and compiling business model canvas(see Annex 7) for the selected business model using a participatory approach. Table 3 indicate the composition of the data analysis focus groups discussion and the figure 17 shows the session and participants.

Table 3: Composition of stakeholder's focus group discussion for data analysis

Participants	Number	Gender	
		Male	Female
Farmers	4	2	2
Traders	2	1	1
Supermarket	1	-	1
Exporter	1	1	-
Micro finance manager	1	1	-
District commercial Officer	1	1	-
District production office representative	1	1	-
NGO Forum	1	-	1
Processor	1	1	-
Total	13	8	5

Source: Nsubuga,2017

Figure 17: Mukono District stakeholders’ analysis focus group discussion in session and participants



Source: Nsubuga,2017

3.3.3 Observation

During the interviews, some observations were done at a number of farms and other stakeholder's work premises. Visiting the interviewees gave the researcher an opportunity to observe their farming practices, harvesting and bulking for the market at farmer level while at the trader, market quality attributes were observed. This observation opportunity facilitated the validation of some of the data given in interviews, and this enhanced the study. Figure 18 show how observation was made.

Figure 18: Researcher observing passion fruit plant and quality attributes



Source: Author

3.3.4 Triangulation

Triangulation refers to the use of multiple methods or data sources in qualitative research to develop a comprehensive understanding of phenomena. There are different methods in triangulation; this research used Investigator triangulation. It was done to examine the consistency of different data sources from within the same method (Mertens and Hesse, 2012). During the research period, triangulation was made between the farmers, traders, District production officer to verify different data on passion fruit prices, fruit quality and the weighing procedure for a sack of passion fruit. District production officer on issues of inadequate availability of extension services for the farmers.

3.3.5 Desk study

The desk study was done for collection of secondary data through, scientific journals, reports, government publication and books. It was used to get in-depth information on passion fruit potential, value chain concept, chain governance, collective action, and approach to marketing linkage and different types of business models in the development of a suitable business model for passion fruit market linkage to high price market.

3.4 Data analysis

Data collected from interviews and focus group discussion was processed into transcripts (see Annexes 8-10 for example transcripts) and analysed qualitatively, some with analysis focus group discussion and presented using value chain map, stakeholders' analysis, PESTEC, canvas business model, SWOT analysis, preference ranking of crops, tables, visual representations and quotes. Key topics relevant to the objectives were analysed by content analysis.

Table 4: Data analysis tools

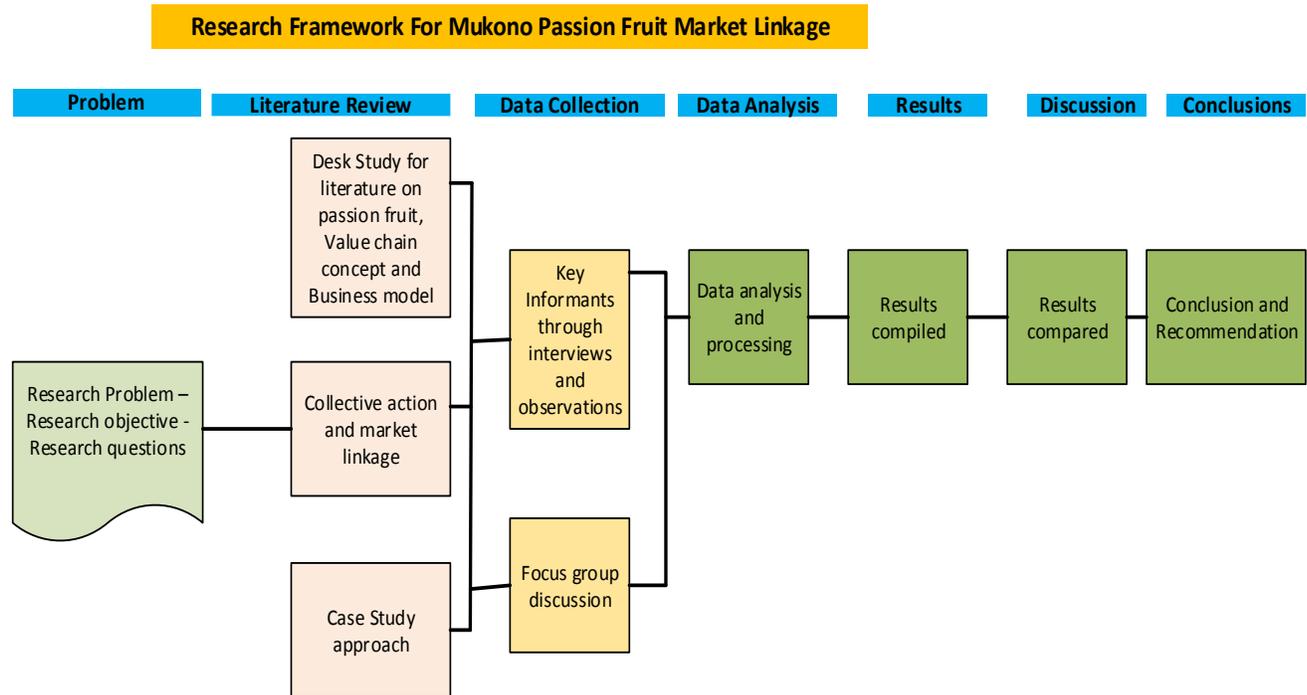
Analysis tool	Type of data analysed
Chain map	<ul style="list-style-type: none">• Map the functions of actors and supporters• Channels and their percentages• Map overlays on gender aspects; prices offered, number of farmers, quantity produced, quality aspects and sustainability
Stakeholders analysis	<ul style="list-style-type: none">• Analyse the role of stakeholders
Canvas business model	<ul style="list-style-type: none">• In-depth analysis of the selected business model• Creation of understanding the business model on how it operates to create and capture value
SWOT analysis	<ul style="list-style-type: none">• Analysed strength, weakness, opportunities and threats in the passion fruit value chain
PESTEC	<ul style="list-style-type: none">• To examine the external factors that can influence passion fruit business
Preference ranking of crops	<ul style="list-style-type: none">• Analysed the importance of passion fruit in producing households.
Tables	<ul style="list-style-type: none">• Arrange data in an understandable way.
Visual analysis	<ul style="list-style-type: none">• Communicate a quantitative message.• Analysed data and evidence.
Quotes	<ul style="list-style-type: none">• Analysed interviewees words

Source: Nsubuga, 2017

3.5 Research Framework for passion fruit market linkage

The research framework for Mukono passion fruit market linkage defines a graphical representation of all the steps that were taken to achieve the research objective. The research framework for passion fruit market linkage in Figure 19, comprises of seven components that were taken which started with a research problem, literature review, data collection, data analysis, results, discussion and finally conclusions and recommendations.

Figure 19: Research framework for passion fruit market linkage



Source: Nsubuga, 2017

3.6 Limitations to the study

During the research period, there were several limitations, one of them was getting latest literature on passion fruit sector in Uganda. There was insufficient information for passion fruit statistics for Uganda. Secondly, the number of participants in Koome Subcounty which is an island in Lake Victoria was less than planned that resulted from limited financial resources, attendance in focus group discussion was reduced from planned 12 participants to 7, as the researcher could not afford € 15 transport refund for each attendee to hire boats from different parishes. Finally, the planned focus group discussion in Ntenjeru Subcounty was skipped due to financial constraints as the required funds could not be raised in time.

CHAPTER 4 RESULTS FOR PASSION FRUIT MARKET LINKAGE

This chapter presents the results of the research study that was gathered from the interviews conducted with passion fruit farmers as well as a group discussion with farmers and other stakeholders in Mukono passion fruit value chain referred as key informants. Case study results take many forms, but none yet follow the routine procedures, the most important aspect is to report your results in an understandable way by the reader (Yin, 2014). Results from key informants obtained using face to face interviews guided by a checklists for in-depth information and observation is presented first, followed by focus group discussions. The results will be lined against the research questions in order to answer the research objectives.

4.1 Interviews with key stakeholders in passion fruit value chain

The results presented here are from data that was collected during interviews and observations with stakeholders in the Mukono passion fruit value chain. The results are organised as follows; farmers (4.1.1), traders (4.1.2), Supermarkets (4.1.3), Exporters (4.1.4), DPO (4.1.5) and Micro finance manager (4.1.6).

4.1.1 Interview with passion fruit farmers

Information obtained from the farmers interviewed who comprised both female and male farmers in Koome, and Ntenjeru Subcounties revealed that all farmers are smallholder with average passion fruit garden of between 1 – 3 acres, with an average production of 100 kg per week. They sell their passion fruit to middlemen at an average price of €0.38 per kg on a weekly basis. Farmers indicated that they receive very limited extension services that focus on passion fruit production and marketing. While on quality, farmers revealed that the market required passion fruit with uniform size, Spotless with Purple in colour, free from insect bites and bruises. Figure 20 below shows the researcher interviewing different farmers in Koome and Ntenjeru Subcounty.

Figure 20: Researcher interviewing farmers in Koome and Ntenjeru Subcounties



Source: Nsubuga,2017

Market information

Farmers revealed that market information such on quantities and prices was offered by traders through mobile phones and rarely on the radio. In Koome one of the female farmer “said that she usually get market information from other farmers in her area”.

Preferred business arrangement

Farmers preferred to work with a cooperative arrangement and selling directly to retailers such as supermarkets, hotels or directly to consumers.

Perceived advantages of working in cooperative

- Support and sharing knowledge from each other in passion fruit farming.
- Builds capacity to produce passion fruit as per required market quantities.
- Getting focused training and advisory services for passion fruit.
- Facilitates lower input costs for passion fruit.
- Reduces transaction costs in passion fruit business.
- Able to bargain and market collectively in passion fruit selling.
- Ability to manage and control quality for passion fruit.
- Help in accessing higher price market for passion fruit.
- Facilitates bulking of passion fruit.
- Facilitates receiving Government support for passion fruit development.

Challenges faced in production and marketing, the farmers outlined;

Production challenges

- Limited access to financial services for investing in passion fruit production.
- Poor extension services to facilitate passion fruit production.
- Poor quality planting materials such as seedlings for passion fruit.
- Pests and diseases such as collar rot disease in passion fruit.
- Expensive agrochemicals for passion fruit.
- Scattered passion fruit production and low production volumes.
- Changing weather (Longer dry spells) that affect passion fruit.
- Thieves who steal the passion fruits.
- Non-existing of irrigation system to provide water in dry season to passion fruit.
- The high rate of rural – urban migration leading to reduced labour force in passion fruit.

Marketing challenges

- Limited marketing information to access passion fruit better markets
- Poor negotiation skills to be able to sell at good price for passion fruit
- Poor storage facilities for keeping harvested passion fruit
- Unfair sorting and grading of passion fruits by traders resulting in lower prices
- High transport costs for farmers to purchase inputs such as seedlings and agrochemicals
- Price fluctuations for passion fruit
- Competition from substitute products such as oranges
- Seasonality of passion fruit for low prices in rain seasons

Postharvest losses and how they can be reduced they revealed that;

Because of unavailable storage facilities, sun scorching, long dry spell, pests and diseases and poor transport system were the leading causes of post-harvest losses. The Farmers proposed that these could be reduced through provision of proper passion fruit production advisory, the establishment of the joint storage system and the establishment of the appropriate irrigation system.

Farmers' other comments

- There is a need for collective action led by a cooperative
- Promotion of the high breed passion fruit variety to benefit from the rising demand regionally and internationally.
- Government in the form of providing clean planting materials
- Specialized transport crates should be introduced

4.1.2 Interview contribution from passion fruit traders

The traders among the prominent ones in respective markets were interviewed, they were male working in Kaame valley market and female working in Ggaba market. They provided information as follows; they both source their passion fruit from about 82 farmers from Masaka, Buikwe and Mukono districts and 6 middle men sourcing in Kenya and Rwanda. Global Gap certification was required by exporters, quality attributes they preferred medium to large size, shiny skin with purple colour, free from pests and disease damage, purple in colour and free from visible pesticide residues.

Quantities and price

Handles between 9,000 -10,000 kg per week of passion fruit.

Purchase price € 0.38/kg for farmers and paid € 0.60/kg to local traders (middlemen).

Selling price € 1.20 – 1.30/kg depending on quality and quantity are sold to supermarkets, juice makers, exporters and other institutions.

Preferred business arrangement with farmers

- To work in a collective arrangement such as for passion fruit cooperative.
- To be the marketing agent for passion fruit farmers.

Challenges

- Poor infrastructure such storage facilities for passion fruit
- Small quantities of passion fruit supplied by farmers
- Limited access to financial services due to high requirements by financial institutions.

Opportunities

- Steady increase in passion fruit demand by customers means good income
- Increase in production of the passion fruit at local level
- Government promoting passion fruit for household income

4.1.3 Interview response from Supermarkets

The managers for Capital shoppers' supermarkets in Kampala and City shoppers' supermarkets in Mukono town were interviewed, they indicated that they source passion fruit from traders who possibly get them from outside Uganda or locally from Kasese, Masaka and Mukono districts. They revealed of not having passion fruit post-harvest losses because all that they stock is bought and the remaining few are used to make Juice sold in their stores.

Quantities and price

Handles between 3,000 - 3650 kg per week depending on season

Purchase price € 1.25 – 1.35/kg depending on seasonality

Selling price € 2.0 – 2.10 per kg

Preferred quality attributes

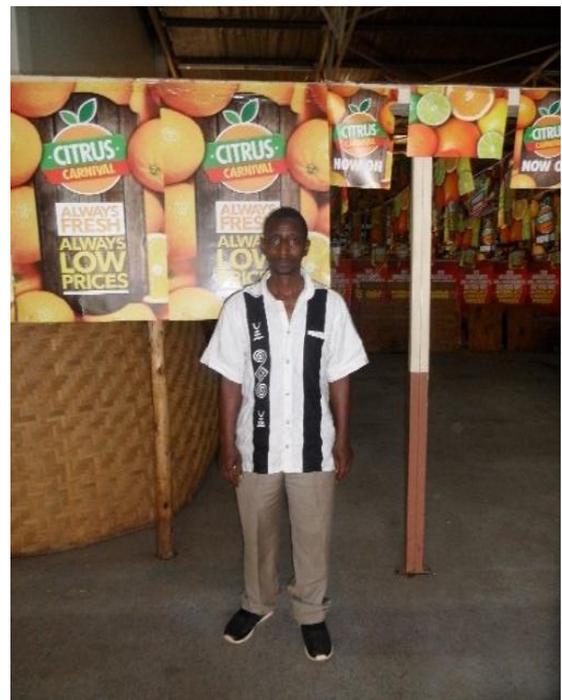
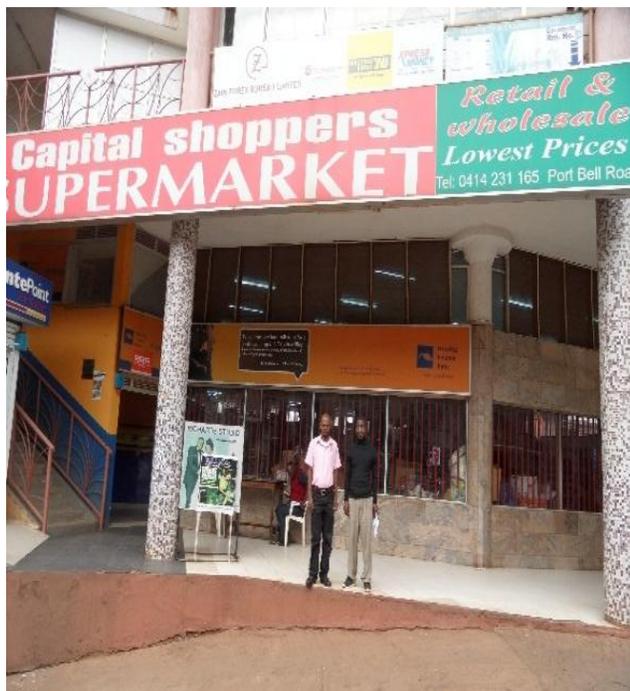
Uniform size, spot less, purple in colour, free from pests and diseases, free from scratches and sun scotch and clean fruits of passion fruit.

Preferred business arrangement with farmers

- Prefer to work with organised farmers in the form of producer organisation for meeting their customer requirements in terms of quantity, quality and price.
- Suggested that farmers be organised, then contract farming would be a possibility to work with them directly.
- Payment of suppliers is on weekly basis by cash or through their bank accounts according to supplier requirements
- Prefer continuous supply of passion fruit all the year round.

Both supermarkets did not have cold storage facilities but were planning to establish as their share increase in fresh produce, while they both indicated the supermarket controls the business in terms of the price offered, quality requirements and time to supply. Figure 21 showing the researcher at different supermarkets in Kampala and Mukono.

Figure 21: Research at supermarkets in Kampala and Mukono.



Source: Nsubuga, 2017

4.1.4 Interview response from Exporters

Two export managers were interviewed, both were male from ICEMARK – AFRICA LTD based in Kamwokya Kampala and Mukono growers and packers based in Mukono, they both export to EU market. They source passion fruit from traders from Masaka, Mukono, Kasese and Rwanda. Figure 22 showing one of exporting companies preparing for export products in the shed.

Required quantities

2,000 – 2,500 kg per week depending on export orders for passion fruit.

Purchase price range from € 1.20 – 1.35/kg according to grade of passion fruit.

Preferred quality

Passion fruit quality for export should be Global Gap certified, purple in colour, grade 1 and 11, uniform size (medium and large), clean fruits, spot less free from the appearance of pests and disease with acceptable pesticide residue content on passion fruit.

Preferred business arrangements

- Work with registered entities such as passion fruit cooperative in order to be able to bulk their scattered produce and to meet our stringent quality requirements.
- Operate on signed contract to ensure quality and quantity
- Farmers must be Global Gap certified as a requirement for international buyers.
- Continuous passion fruit supply throughout the year
- Advance our suppliers with money to deliver the required quantities
- Payment by cash or cheque after 7-10 days after delivery of produce
- Give certificate of good quality product that guarantees the supplier continued supply quarterly.
- Provide reference letters to our supplier as guarantors to the financial institutions.

Both exporters were of the view that in export business, the trader controls the supply chain but the export companies were the lead firm.

Figure 22: Produce for export at Mukono growers and packers shed



Source: Nsubuga,2017

4.1.5 Interview with the Mukono District Production Officer

The DPO Mukono District was interviewed on institution environment in Mukono passion fruit value chain. The results showed that Mukono district promotes and support sustainable and market oriented agricultural production, food security and household incomes to all farmers, through the provision of extension services to passion fruit farmers like technical advice, market information and other services as per farmers' requirements and some inputs such as seedlings. Efforts to facilitate farmers to access market is still very limited due to limited availability of technological like internet and infrastructure. Figure 23 researcher with DPO, Mukono district after the interview.

Figure 23: Researcher with DPO, Mukono District after the interview



Source: Nsubuga,2017

Supporting National and District policies

- Mukono District Local Government under the production department work in line with national agriculture policy that aims to make investments that will increase agricultural incomes, reduce poverty, improved household food, create employment and stimulate overall economic growth this supports passion fruit development.
- Through Infrastructural development policy, many roads are being improved to facilitate easy marketing by farmers such as passion fruit farmers.
- Passion fruit is the district 5-year strategic plan as a priority crop for promotion to increase rural income, so the district will continuously support farmers with technical advice, market linkage, and linkage to research centres for new varieties and using IPM on pests and diseases.
- Under the National Cooperative Policy, is implemented by the District Commercial officer in the process of registering a district cooperative society for passion fruit growers to be able to benefit from a number of opportunities that passion fruit can offer.

Hindrance market linkage for smallholder passion fruit farmers at District or National Level

- Poor infrastructure especially rural roads and unavailable cold chain facility at all level
- Nonexistence of specialized person with value chain development to develop value chains in the district.
- Limited usage of market information technology by our extension staff such internet
- Small quantities of passion fruit produced Mukono in comparison to market requirements.
- Poor implementation of passion fruit quality standards by Uganda National Bureau of Standards
- Nonexistence of market linkage approach for passion fruit farmers

Organising farmers for market linkage

The appropriate organising of smallholder farmers is a cooperative arrangement for market linkage. It is in line with the national cooperative policy passed in 2011.

Sustainability of the passion fruit enterprise by district

- There are plans for training farmers in producing passion fruit without degrading the environment while attracting high prices. This will be achieved through promoting private standards like organic farming and promoting small-scale processing of passion fruit to increase rural employment.
- Besides, Government will continue providing farm inputs such as seedlings, small scale irrigation systems to organised farmers.

Market information

The district provides market information on price and quality to farmers but occasionally to passion fruit farmers through extension staff. After the interview, the researcher and DPO had a photo, figure 23.

4.1.6 Response from interview with micro finance manager

Micro finance manager a male was interviewed on the services that can be offered by the institution to smallholder passion fruit farmers in the provision of chain financing for market linkage to its members. He revealed that a number of farmers in the area were already their customers. The majority of farmers prefer long term for buying farm inputs. While a few number of farmers take short term loans during harvesting time for different agriculture products. Figure 24 showing the researcher interviewing the micro finance manager.

Figure 24: Interview the manager micro finance at Kisoga



Source: Nsubuga,2017

Financial products offered

- Emergency loans for customers who have immediate needs.
- Short term loans for customers that have a business or have an activity of fewer than 6 months at 25% interest rate per year.
- Long term loan for customers that have business or activity of more than 6 months at 22% interest rate per year.

Type of collateral required to borrow

- Security required; livestock such as cow, proof of land plot ownership and customer track record.
- Group guarantee for few organised group among our customers is also accepted.

Requirements for opening up a group account

- Group constitution or articles of association
- Group resolution for opening up of account which indicates the signatories.
- Recommendation letter from local council
- 3 passport photo from each signatory
- Opening balance of € 7

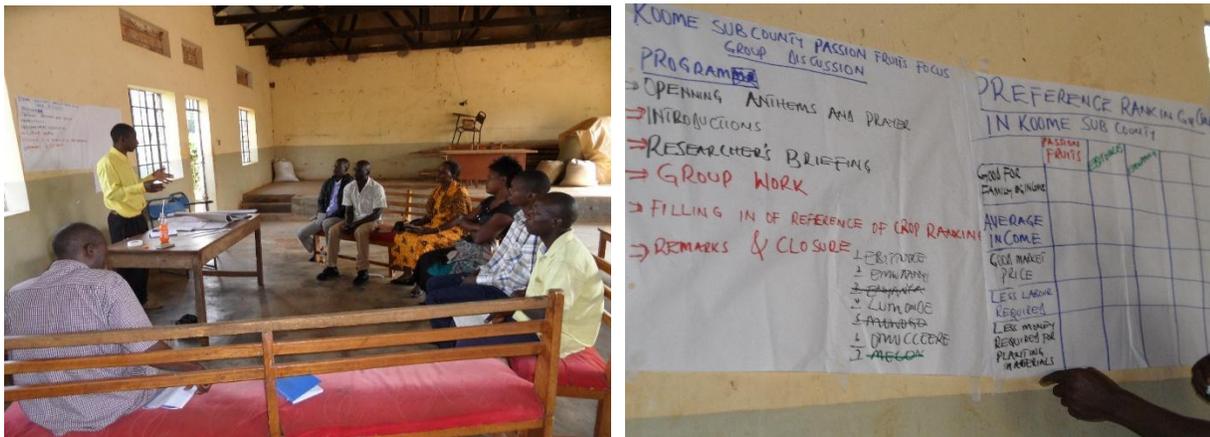
4.2 Interviews results from focus group discussions in passion fruit value chain

The results presented here are from the two focus group discussions that for data collection and verification from farmers of Koome Sub-county and for analysis with stakeholders in the Mukono passion fruit value chain using applied research tools. The results are organised as follows; Koome FGD (4.2.1) and District Stakeholders FGD (4.2.2).

4.2.1 Koome focus group discussions

This focus group was to upgrade, summarise and verify information provided by key informant farmers. Results indicated that information given by farmer key informants was comprehensive especially on issues such as; the production and marketing challenges with sustainability issues. Figure 25 showing the researcher facilitating the focus group discussion. Results indicated that passion fruit was ranked as the best crop receiving the highest marks as preferred crop for house hold income, supplemented information;

Figure 25: Researcher facilitating the focus group discussion in Koome Subcounty



Source: Nsubuga, 2017

Average quantity, price and number of farmers

- 70 kg per week of passion fruit per farmer.
- Price offered € 0.36 -38 /kg by local traders (Middlemen)
- The number is estimated to be 780 farmers producing passion fruit.

Major season for passion fruit and Market information

- There are 2 Seasons, that is February to May first Season. September to November second season.
- Market information received on mobile phones for passion fruit.
- Market information is provided by different traders for passion fruit.

Postharvest losses and how to be reduced

- Postharvest losses are mainly due to pests and diseases, unavailability of storage facilities and poor transport methods.
- Provision of proper extension services especially on the use of IPM, the introduction of special boats for transport, Gov't help in establishing collection centres for passion fruit with the cold charcoal facility.

Gender Aspects

Men do the heavy work such as making bush clearing, trellis for passion fruit and spraying while women do light work like weeding and pruning and harvesting. In marketing, both men and women are involved, but when money comes, men have the upper hand in decision making on spending the money.

Preferred business arrangement

- Cooperative and market directly to retailers or consumers.
- Contract farming to produce for sure market and stable price.

Importance of passion fruit production

- Passion fruit was ranked with coffee, upland rice, sweet potato and banana. Passion fruit received the highest marks as a preferred crop for house hold income.

4.2.2 Mukono District Stakeholder Focus Group Discussion

The analysis focus group discussion with stakeholders was participatory in selecting their preferred business model, compiling the passion fruit chain and business model canvas, filling preference ranking of the crop, question and answer session and discussing the way forward. The following were the results;

i. Chain mapping for Mukono passion fruit value chain

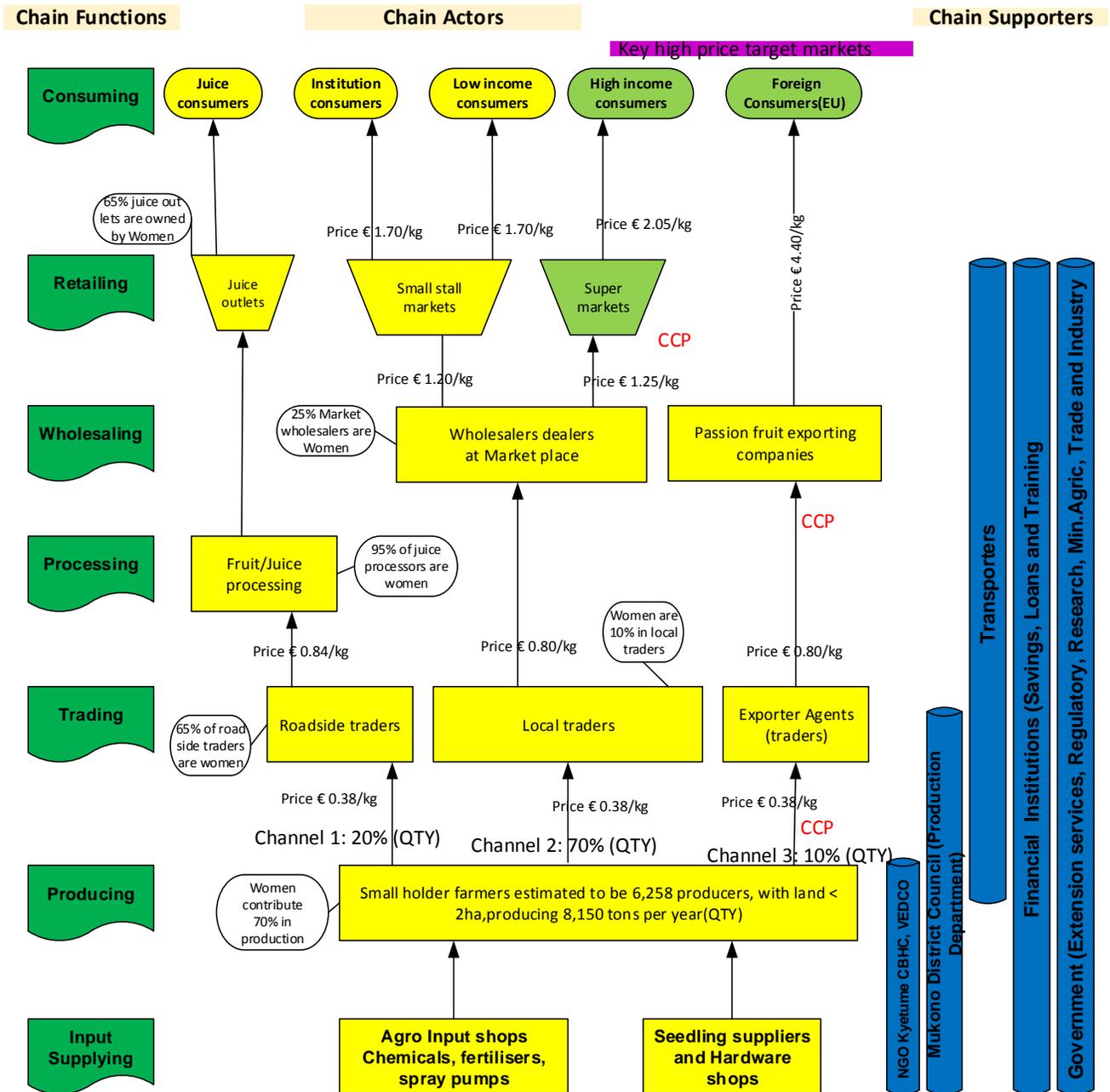
During the chain mapping session, focus group discussion interviewees mapped the passion fruit value chain with overlays for gender participation, quality management with critical control points (CCP), passion fruit quantities to different channels and discussed the passion fruit gross margin. Participants provided information on roles of stakeholders (see figure 26). This information was arranged into the existing passion fruit value chain map for Mukono District shown in figure 27 and stakeholder analysis table 6 below.

Figure 26: Researcher facilitate the compilation of chain map with roles of stakeholders and overlays



Source: Nsubuga, 2017

Figure 27: Existing Mukono district passion fruit map with overlays



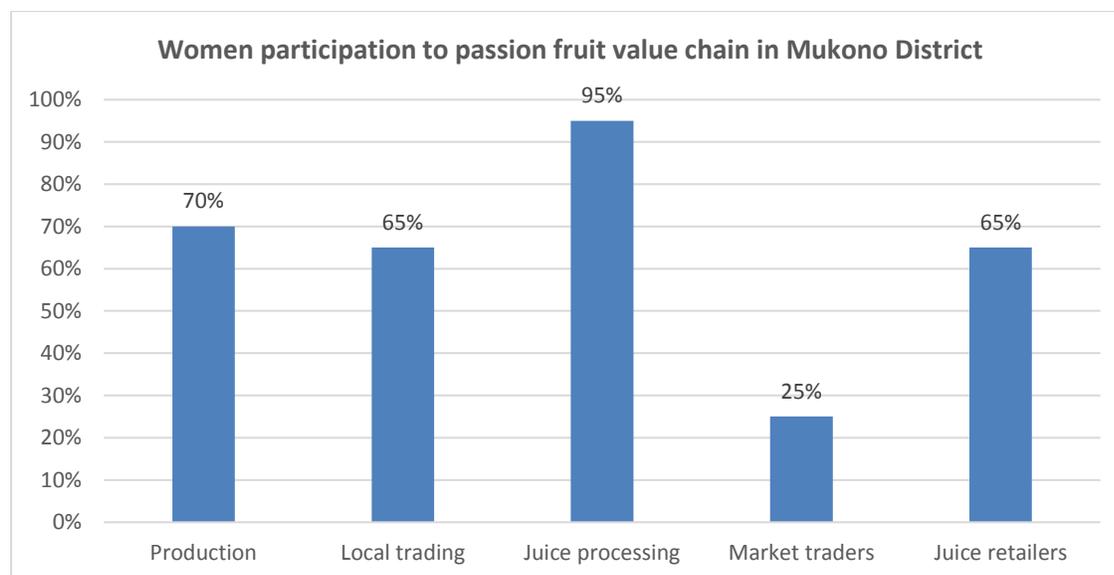
Source: Nsubuga, 2017

Qualitative overlays;

4.2.2.1 Gender participation

Interviewees observed that gender participation was fair in passion fruit value chain, men taking most of the heavy work, while women contribute on light work such as weeding, pruning, fruit picking and sorting. Women were more dominant in the processing channel in the existing chain. Regarding income from passion fruit selling, men were the majority decision makers. Women participation is summarized in figure 28 below.

Figure 28: Women participation in Mukono passion fruit value chain



Source: Nsubuga, 2017

4.2.2.2 Passion fruit quality aspects

The participants informed the researcher that Global GAP certification was a prerequisite for accessing export markets and some super markets. Quality attributes required are a uniform size, mature, firm, spot less, purple in colour, free from pests and diseases, free from scratches and sun scotch and clean fruit. Grading must be (Grade 1, Grade 2, and Grade 3). Exporters and Super markets require only grade 1 and 2 with fruit sizes typically range from 4 to 12 cm long for local variety. The high price market channel had a number of quality critical control points (CCP) to ensure customer satisfaction.

Quantitative overlays

4.2.2.3 Passion fruit investment and revenue

The participants discussed the investment costs and gross margin for passion fruit at farmer level for one hectare of land in Mukono District. The information was calculated into gross margin per 12 months as indicated in Table 5 below;

Table 5: Passion fruit gross margin per year/ha

Gross-output	Quantity	Price in /Euro	Total Euro
Income passion fruit	5,400kg	0.38 /kg	€ 2,052.00
Variable Costs			
Family labour	100 days for 2 persons	Per day €1.50	€ 300.00
Seedlings	540	€0.50	€ 270.00
Manure (3 ton truck)	2 trips	€ 20.00	€ 40.00
Fertilisers(NPK)	100kg	€ 0.75	€ 75.00
Wires for trellis	3 Rolls	€ 37.50	€ 112.50
Poles	840	€ 0.50	€ 420.00
Agro pesticides	4 litres	€ 5.00	€ 20.00
Fungicides	5kg	€ 3.75	€ 18.75
Transportation			€ 100
Total cost			€ 1,355.50
Gross output - Variable Costs = Gross Margin			€ 696.50

Source: Nsubuga, 2017

4.2.2.4 Stakeholders analysis of existing chain

During the chain mapping session, focus group discussion interviewees mapped the existing passion fruit value chain and provided information on roles of stakeholders as shown in table 6 below;

Table 6: Stakeholders analysis for existing Mukono district passion fruit value chain

Functions	Actors	Roles
Input Supplying	Nursery bed operators	<ul style="list-style-type: none"> Supply grafted and non-grafted seedlings. Provide manures for sale
	Agro Input suppliers	<ul style="list-style-type: none"> Provide farmers with necessary farming inputs, e.g. pesticides, fertilisers and farm equipment.
	Hard-wares shops	<ul style="list-style-type: none"> Provide advisory services on inputs supplied Provide inputs for trellising
Producing	Passion fruit farmer	<ul style="list-style-type: none"> About 8,300 farmers Manage the gardens, harvest and sort the fruits Produce and sell the fruit
Trading	Local traders	<ul style="list-style-type: none"> Buys passion fruit from farmers at farm gate Provide information on market requirements such as quantities.
	Roadside traders	<ul style="list-style-type: none"> Transport the fruit to the market
	Market traders	<ul style="list-style-type: none"> Monitor the quality of the fruits Market the fruits to different levels customers.
Processing	Juice makers	<ul style="list-style-type: none"> Make fresh passion fruit juice Market fresh juice to consumers.
Exporting	Exporters	<ul style="list-style-type: none"> Determine required fruit quality Buy fruits from farmers and traders Sorts, grades, exports the fruit. Export fruits to regional and international markets
Retailing	Supermarkets, small grocers, urban market stalls	<ul style="list-style-type: none"> Buy and stock the fruit in reasonable quantities. Determine the required fruit quality Sell the fruit to consumers
Consuming	Individuals consumers	<ul style="list-style-type: none"> Buy the fruit through different market channels. Consume passion fruit products.
Supporters		
Mukono District Local Government (production department)	Extension staff, Commercial officer	<ul style="list-style-type: none"> Work on infrastructure like roads Provide seedlings Provide extension and advisory services such agronomic practices. Provide production and market information.
Non-Governmental Organizations	Kyetume CBHC	<ul style="list-style-type: none"> Provide support in group formation, input supply and advisory to passion fruit farmers
	VEDCO	
Financial Institutions	Banks, Micro finance associations	<ul style="list-style-type: none"> They provide loans or micro-credit to farmers, traders and retailers.
Transporters	Boats, trucks, motorcycles and lorries	<ul style="list-style-type: none"> Provide transport for the fruit from the producers to market, exporters and different selling outlets

Source: Nsubuga, 2017

4.2.2.5 Business models for produce market linkage

The major results for the stakeholder focus group discussion were to come out with the farmers preferred business model that will be adopted for high price market linkage; **'Cooperative – Contract farming – Trader – Buyer (Supermarket/Exporter) business model'**. The outcome was a tailor made from a combination of the 4 business models that the researcher had presented to FGD. The presented business models were Cooperative to Retailer, Cooperative-Contract farming to Buyer, Cooperative – Trader – Buyer and Cooperative to the consumer. From these, a new business model was compiled. (See figure 29 below).

Figure 29: Researcher showing the selected business model for market linkage



Source: Nsubuga, 2017

The interviewees came out with this new business model with a view that farmers should mobilise under a cooperative and concentrate on production of the required quantity and quality for the market under contract farming from the buyer. The trader will become the marketing agent to negotiate business dealings with buyer including prices on behalf of the cooperative, organise transport, delivery of the fruits to the buyer (This arrangement shall be organised under formed committee comprising of selected farmers, traders and district commercial officer). Under this business model, transparency, trust and trade relations will be the foundations; it was indicated that each actor in this chain must know the price offered by the buyer, so the price is shared at 50% to the farmer, 25% to cooperative and 25% to the trader. This model, the participants, observed that it could result in farmers getting high prices for their passion fruit.

After, focus group discussion compiled this new business model for linking to high price market, the business model was analysed by the interviewees using the canvas business model.

i. Compiling Business Model Canvas for Cooperative - Contract farming – Trader – buyer business model

The stakeholder in participatory approach compiled the business model canvas a hands on the tool in order to understand the dynamics of passion fruit business using the preferred business model looking at its internal and external factors including sustainability. The stakeholder revealed that the value proposition for Mukono passion fruit value chain was the ability to produce two major seasons in a year that is February to May first Season and September to November second season as a competitive advantage against other producing areas of Uganda.

Table 7: Compiled canvas business model for cooperative - contract farming - trader – buyer

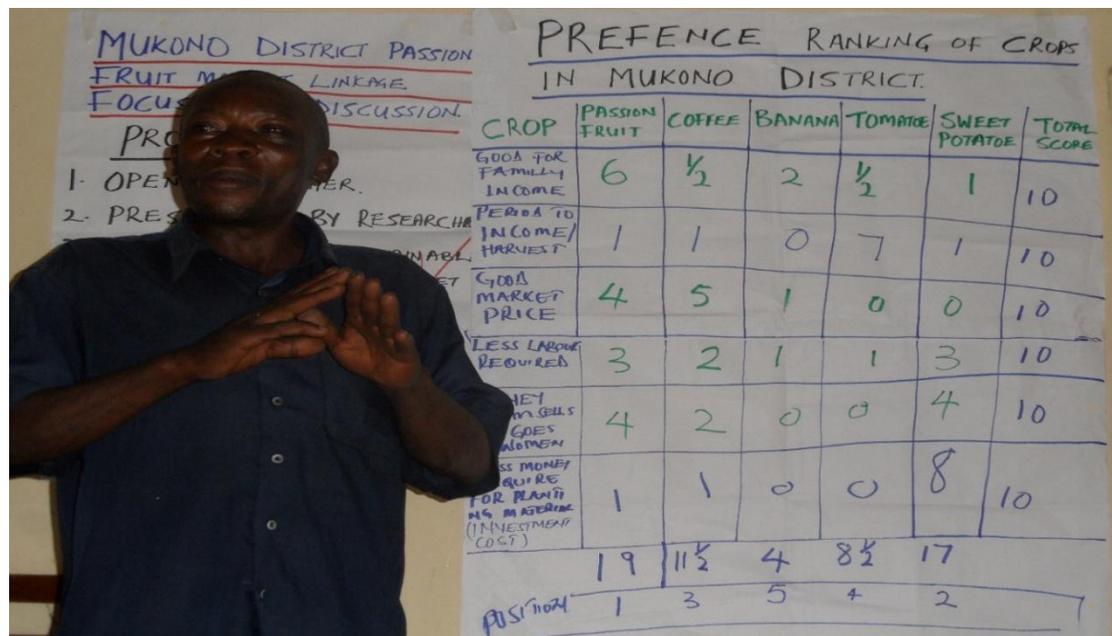
<p>Key Partners</p> <ul style="list-style-type: none"> • Micro finance institution, Mukono District Local Government, Non-Governmental Organisations (NGOs), Wealth Creation Production. • Agro- chemicals and fertilisers, seedlings, forestry farmers. • Financial services, extension services and passion fruit inputs. • Savings and credit, farmer training and advisory, seedlings and fertilisers. 	<p>Key Activities</p> <ul style="list-style-type: none"> • Farmers plant, produce and manage passion fruit • Farmers engage in local marketing of their fruit • Farmers only use public transport to transport their passion fruit to market. 	<p>Value Proposition</p> <ul style="list-style-type: none"> • Two peak seasons of passion fruit. And small supply over other periods throughout the year. • Efficient delivery of fruits to the buyer. • Using a cooperative approach. 	<p>Customer Relationships</p> <ul style="list-style-type: none"> • Using Contracting farming • Able to get weekly payment • Farmers will get quality certification support. 	<p>Customer Segments</p> <ul style="list-style-type: none"> • Supermarkets/Exporters targeting 4 tons per week • Produced quality targets both middle and high-class customers. • Both the middle and high-class customer
	<p>Key Resources</p> <ul style="list-style-type: none"> • Land of between 1-3 acres • Using rudimentary tools • Between 2 – 3 persons working on the farm. • Investment finance required € 1300 per acre. • Mostly family labour • None 		<p>Channels</p> <ul style="list-style-type: none"> • Selling through supermarkets and exporters • Communication by phone and the internet • Transport used will be organised by the trader. • Passion will be sold weekly at € 1.40 per kg 	
<p>Cost Structure</p> <ul style="list-style-type: none"> • It requires total investment of € 1335 for an acre • The most costly activities in passion fruit production is trellis wire and poles. 		<p>Revenue Streams</p> <ul style="list-style-type: none"> • Sales of passion fruit at a price of € 1.40 per kg • Farmers get other income from selling coffee, banana, tomato and sweet potato • Payments are made by cash and cheque 		
<p>People Aspects</p> <ul style="list-style-type: none"> • About 9,820 farmers will be directly employed in the passion fruit value chain management. • Assured weekly income by actors • Improved Local government revenue 		<p>Negative People Aspects</p> <ul style="list-style-type: none"> • Health risks from exposure to pesticides • Increase in marriage break ups 		
<p>Environmental Aspects</p> <ul style="list-style-type: none"> • Passion fruit provides green cover, • Provide alternative source income to those who would have degraded • Source of food for wildlife like monkeys 		<p>Negative Environmental Aspects</p> <ul style="list-style-type: none"> • It promotes tree cutting, • It causes soil and water pollution from pest and fungicides. 		

Adapted from Osterwalder, 2006

4.2.2.6 Filling in the preference ranking of crops

Passion fruit emerged as the best-ranked crop among the mostly grown crops for income at households in Mukono District from the discussion by the FGD participants as presented by participants, meaning that passion fruit is a priority crop and cash crop. See figure 30 below;

Figure 30: Preference ranking of crops in Mukono District



Source: Nsubuga, 2017

4.2.2.7 Focus group discussion proposals

During the stakeholders focus group discussion session on the way forward, the interviewees provided information for existing passion fruit value chain that resulted in compilation of chain sustainability aspects, PESTEC, SWOT analysis representing the strengths and weaknesses for internal factors whilst the opportunities and threats as external factors. The interviewees compiled a proposed new chain map reflecting the adopted business model for market linkage to high price market. (Please see SWOT table 8; proposed new chain map refer to (figure 32 in the discussion chapter).

4.2.2.8 Passion fruit chain sustainability

Profit: Farmers revealed that passion fruits provide weekly income, return on investment are high within 6 months compared to traditional crops like coffee and have created rural employment.

Planet: Provides green cover, employs people who would have to degrade the environment for survival like charcoal burning, the source of food for wildlife. But production promotes tree cutting for poles, leads to soil and water pollution from spraying chemicals.

People's aspects: Use of family labour, students able to meet school dues from household income and reduces criminality in the area and improves children nutrition. There is still a possibility of health risks from spraying the chemicals.

4.2.2.9 PESTEC Analysis

Political: Uganda is a politically stable country with clear policies to support passion fruit value chain development such as national agriculture policy, cooperative policy, and gender policy. These policies in the provision of inputs and extension services to passion fruit farmers like technical advice.

However, there is still poor infrastructure, weak standards implementation, corruption and bureaucracy can negatively affect passion fruit value chain development.

Economic factors: There are policies instituting business development services like national investment authority, cooperative policy and export promotion board to promote farmer cooperation. Passion fruit creates rural employment currently 8,300 people of which 6,258 are farmers; it offers quick returns 1st harvest after 3 months from planting, income well above the national per capita income. However, there is limited access to financial services to most stakeholder, and when they access it, the financial institution has a very high lending interest rate of 26% per annum that can hinder passion fruit value chain development. Limited use of formal contracts between stakeholders retard chain relations and coordination

Social factors: In Uganda, Mukono in particular, has community development department to support farmers socially. Women are accorded equal rights through gender policy, family labour is mostly used in production, and these factors promote passion value chain development. But still the poverty level is still high, the prevalence of HIV/AIDS is on the increase again, high rural- urban migration and low adoption of new technologies such as high breed big purple passion fruit.

Technical factors: There are good information and communication infrastructure such as mobile phones, research centres for appropriate technological development such as high breed varieties for passion fruit for market linkage. However, there is limited research linkage with farmers, insufficient post-harvest handling (cold storage facilities) and loss due to poor transport methods, poor quality inputs, use of rudimentary tools such hand hoes by farmers and limited or non-existent irrigation.

Environmental: In Uganda, is covered with significant natural resources including forests and an abundance of lakes wetlands and rivers. These resources are managed by National Environment Authority established by law. There are fertile soils and good weather for passion fruit production. However, there is an increase in pests and diseases, pollution of soil and water from agro chemicals, long dry spells as a result of climate, rampant tree cutting for poles these are major concerns.

Cultural factors: Uganda, in particular Mukono district is family-oriented, have multi languages, English is the official language, and the majority of people are Christians. There is a belief that growing passionfruit is associated with luck, a good indicator of the success of the passion fruit value chain development. However, the culture of men handling the household income may negatively impact the sustainable development of passion fruit value chain development.

Table 8: SWOT analysis for existing passion fruit value chain in Mukono

Strength	Weakness
<ul style="list-style-type: none"> • Ideal climate suitable for passion fruit production, in Lake Victoria basin • Farmers currently grow the purple passion fruit which is popular in the market • Farmers have some knowledge on production and management of the fruit • Offers quick returns (1st harvest after 3 months from planting) • Availability of family labour for production. 	<ul style="list-style-type: none"> • Limited availability of extension services • Limited access to market information • Low cooperation among farmers • Poor infrastructure such storage facilities • Limited access to financial services • Low prices for passion fruit • Scattered production leading to poor marketing • Low volumes of the fruit produced • Poor transport method • Limited commercial processing for passion fruit • Poor quality fruit supplied to the market
Opportunities	Threats
<ul style="list-style-type: none"> • The District is promoting passion fruit through the distribution of improved planting material. • Growing demand for passion fruit for emerging local and international markets. • Stable Macroeconomic Environment: This offers opportunities for investment in the sector • Improving infrastructures, such as roads, storage and transportation. • Establishment of fruit value chain are areas for potential investment 	<ul style="list-style-type: none"> • Poor implementation of government policies. • Micro climate encourages pests and disease to proliferate. • Expensive agro inputs, such as agrochemicals • Changing weather (Longer dry spells) • Thieves who steal the fruits • High transport costs • Competition from substitute products such as oranges • Price fluctuations • The high rate of rural – urban migration.

Source: Nsubuga, 2017

CHAPTER 5 DISCUSSION FOR PASSION FRUIT MARKET LINKAGE

This chapter presents the discussions of the results from interviews with key informants and focus group discussions various stakeholders in the passion fruit value chain. Results are compared with information reviewed in the literature in order to justify, present similarities or differences.

5.1 Roles of stakeholders involved in the passion fruit value chain

During the district analysis focus group discussion, participants provided information on roles of stakeholders' involved in Mukono passion fruit value chain, refer to stakeholder's analysis in table 4 above. These stakeholders are very vital in playing different activities in the chain so that the passion fruit could reach the consumer. This is in line with M4P (2008) findings that "the value chain describes all the activities that are required in bringing the products or services to the final consumers". The roles of stakeholders in this value chain composed of input supplying, passion fruit producing, trading, processing, exporting, retailing and consuming known as actors who transform and own the product until it reaches the end user, like passion fruit from seedling to fruits used at different stages. This is in line with UNIDO (2011) who observed that "the produced products are transformed, owned by various actors who take active market positions linked by trade and services until it reaches the final consumer".

Among the stakeholders were also chain supporter including Mukono District Local Government, non-governmental organizations, financial institutions and transporters. These organisations provide information and business support services for the efficient operation of the passion fruit value chain. This was supported by Sahoo (2010) stating that "in a value chain there are connected series of organizations, resources and knowledge streams involved in the creation and delivery of value to the end customer". These stakeholders and their roles are very vital in facilitating passion fruit smallholder farmers' market linkage. Such collaborative arrangements between various passion fruit value chain actors facilitate for increased efficiency in the chain, because partners can pool their resources, knowledge and capabilities (Kolk, et al., 2008). Although, interests of stakeholders in multi-actor collaborations often differ, so business relations in passion fruit value chain should be based on goal alignment (Kolk, et al., 2008). However, the selected business model will change the roles of some actors to become more efficient in terms of resources and capabilities.

5.2 Market information systems in passion fruit value chain

The key informant farmers and focus group discussion revealed that market information was an important component in market participation, this information provides required quantities and prices offered by traders in order to make informed marketing decisions. Although they mainly obtained market information using mobile phones and rarely on the radio, they only obtained information from traders without other reliable sources of the market. In their findings Khapayi and Celliers (2015) noted that "poor access to market information make farmers unlikely to participate in marketing because they are not well informed of informed of market prices, products in supply or the products in demand". This contributes to farmers getting lower prices of €0.38 compared to over €2.00 at retail price for passion fruit as they are not able to negotiate from a well-informed decision. According to AICC (2016) "access to market information empowers farmers and aids in decision making, especially in rural areas". Poor market information situation from traders can be attributed to weak extension services and poor trade relations, but this situation can change if farmers build strong relation with different stakeholders in the chain such as Mukono District production extension services for better market information. According to KIT and IIRR (2008) suggested that "strong chain relations are characterised by strong organizations, trust, open and frequent communication and cooperation for mutual growth".

The importance of market information in passion fruit market linkage was supported by Taylor, Zezza and Gurkan (2008) who stated that “new market linkages and better information could enhance agricultural production for a high price and overcome tremendous informational asymmetries that limits bargaining power with buyers such as the passion fruit farmers in Mukono District”. The selected business model that shall use improved chain relations and contractual arrangement for better transparency for market information flow using a centralized market information centre at the district.

5.3 Challenges faced by passion fruit smallholder farmers in market linkage

From the results, smallholder passion fruit farmers had a number of challenges confronting them which were categorised as production and marketing challenges.

Production challenges

The farmers reported challenges of poor planting materials (seedlings) which most of is carrying viral disease, limited availability of support poles for trellis that are obtained through tree cutting; regular incidences of pests and diseases but with expensive agrochemicals, the most proliferation is the collar rot disease; scattered production and low production volumes, changing weather (long dry spells) leading to poor transport and irrigation systems, thieves who steal the fruits and the high rate of rural – urban migration especially the youth leading to reduced labour force in the area.

Marketing challenges

The results indicated that farmers were faced with limited market information without knowledge on market demand and other requirements for passion fruit in order to access the market, poor negotiation skills was because they operate individually that made them over reliant on traders and became prices takers; Unfair sorting and grading of passion fruits by traders resulting in lower prices; high transport cost and poor transport system to take passion fruit to the market to get better price market, an example are farmers in Koome islands who have to hire boats to travel to the mainland for inputs; Limited access to financial services rendering them unable to invest in passion fruit production; Poor storage facilities where passion fruit is stored inside the living rooms of households or in outside kitchen which leads to compromising fruit quality; Price fluctuations, traders always offer prices of their preference and cause artificial price fluctuation to farmers. There was also challenges of competition from substitute products such as oranges and seasonality like low prices in rainy seasons.

The production and marketing challenges identified by passion fruit farmers are generic to smallholder farmers in developing countries and are comparable to the situation in other production areas. In Africa because of weak infrastructure such as transportation networks, irrigation systems and storage facilities, limit access to markets, often exacerbate high levels of post-harvest losses and also inhibit efficient distribution of farm inputs such planting materials to the farmers (FAO, 2016). In addition, passion fruit farmers’ challenges were similar to those in Tanzania, as Kawa and Kaitira (2007) have both shown that “smallholder farmers in Tanzania operate as individuals, have limited bargaining power, market information, receive low prices, access to financial services, sell out of season at higher prices and their linkages with markets are tenuous”. Such challenges facing the passion fruit farmers in Mukono can be alleviated through the formation and strengthening of producer organisation (Kawa and Kaitira, 2007). This calls for the selected business model that will be instrumental in address the challenges within passion fruit value chain.

5.4 Gender participation in passion fruit value chain

From the focus group discussion, results indicated that gender participation was fair in passion fruit value chain, men taking most of the heavy work, while women contribute on light work such as weeding, pruning, fruit picking and sorting. Income from sales of passion fruit was more controlled by men, while women were more involved in juice processing and retailing this comparable with a study on control income by Njuki, et al. (2011) that found “in Uganda women seem to control more income from crops traditionally used for food such as beans and groundnuts compared with crops such as passion fruit which generate high income.

Nevertheless, in Mukono passion fruit value chain, women play a visibly very important role in the upgrading strategies of this chain since they are playing the leading role in this value chain especially in processing. This is supported by FAO (2016) showing that “Increasing women’s decision-making power, on the other hand, creates immediate economic benefits and promotes long-term sustainability goals”. The roles in the chain from production, processing to retailing is a good sign of vertical integration for women. This concurs with KIT and IIRR (2008) that “vertical integration refers to producers taking up new activities either upstream or downstream the chain for example processing, wholesaling and retailing”. The women in this chain have taken up the roles that are more likely to improve the chain and their self-esteem in deciding on the income received from their time and effort. It is imperative that women participation will take a central role in the selected business model that will link passion fruit farmers to high price to market.

5.5 Preferred quality and quantity for passion fruit by high price markets

Quality

Based on interviews with key informants more especially farmers, traders and the targeted market the supermarkets and exporters. Results indicated farmers were more aware of the required quality attributes for the market in order to receive better prices, but did not mention other quality standards such as Global Gap. Probably a factor for farmers not linking directly to high price market. This is similar to observation made by Le Courtois, et al. (2011) that “Although GAP certification schemes are voluntary, they are de-facto required to access lucrative markets in most developed countries”. The traders were aware of both the public and private standards in order to work with exporting companies. The supermarkets and exporters preferred, purple in colour, grade 1 and 11, uniform size (medium and large), clean fruits, spot less free from appearance of pests and disease with acceptable pesticide residue content, this was also reported by USAID (2012) that stated “export market also requires the same quality as supermarkets”. Passion fruit quality determines the prices the farmers receive from the produce, used to strengthen the relationship between the farmers and high price markets. These quality attributes both intrinsic which are inherent to the physical passion fruit and extrinsic which has a direct relationship on influencing consumer acceptance of the fruit (Luning and Marcelis, 2009).

From the results, it was revealed by exporters that to access export markets; it is a requirement for the passion fruit to be Global Gap certified, this is supported by ITC (2017) standard map for that confirmed that passion fruit from Uganda require Global Gap private standards to access EU markets in comparison with other required standards because it addresses a number of issues like ethical, social, environmental, traceability and quality which are of concern to EU buyers as shown in figure 31. This was in agreement with Asfaw, et al. (2010) findings that “not only do Global Gap certified farmers receive higher incomes, they also enjoy improved bargaining power and more secured relations with their buyer, and keep participating in export markets”. The selected business model will devise ways to certify passion fruit farmers as a group to reduce costs, as stated by Le Courtois, et al. (2011) that “Group certification allows a reduction of some certification costs because of the generation of economies of scale such as reduced inspection fees”.

Figure 31: ITC Standards map for recommended private standard for passion fruit



Source: ITC, 2017

Quantity

From the results of key informants especially the targeted market, the preferred required passion quantity were varying between the exporters and supermarkets. Exporters required 2,000 – 2,500 kg per week depending on export orders. While, the supermarkets preferred between 3,000 - 3650 kg per week depending on the season. These quantities are very appropriate to facilitate smallholder farmers’ linking to high price market using the selected business model. Linking to high price market will accelerate poverty alleviation in rural farmers, this view was supported by Aderson et al (2016) that “income is very important to rural farmers where poverty rate are high”. In these rural areas of Mukono 52% of people live below poverty line of € 1.15 per day.

5.6 Business arrangement preferred by smallholder passion fruit for market linkages

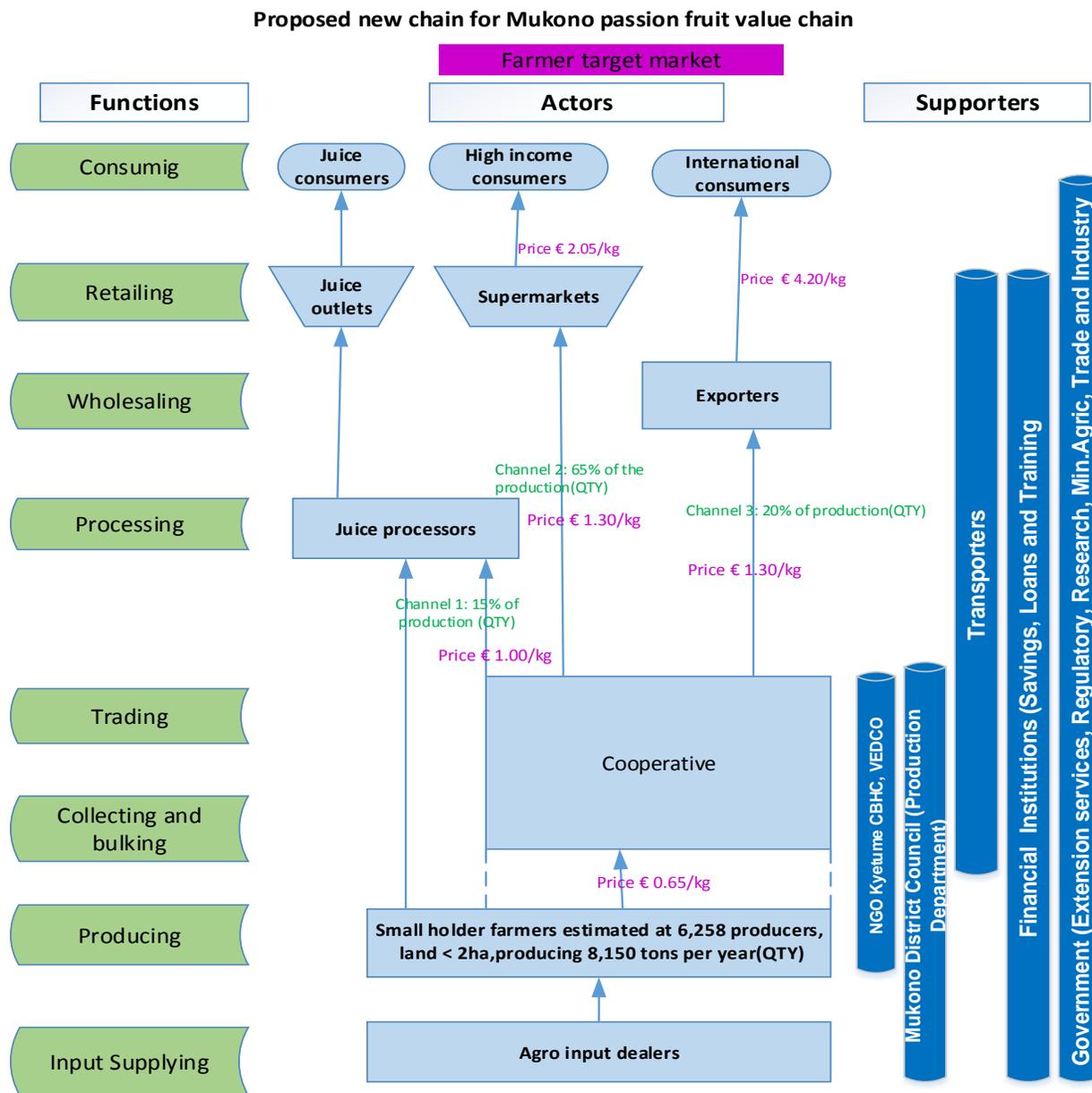
Based on interviews with key informants and focus group discussions, the results revealed that passion fruit farmers preferred to work within a cooperative arrangement and to sell directly to retailers such as supermarkets, exporters or directly to consumers. The passion fruit farmer’s target market for the higher price were supermarkets and exporters that could take reasonable passion fruit quantities. Small holder famer’s willingness to cooperate was contrary to the findings of Valk and Nyuabuntu (2005) that “the majority of small farmers are not associated with working in groups or collaborative marketing association to facilitate market linkage or marketing process in Uganda”. These passion fruit farmers were more than willing to cooperate to meet the requirements of high price market.

The supermarkets preferred to work with passion fruit farmers who are able to meet the following criteria; farmers organised in producer organisation, coordinated to be able to meet their customer requirements like quantity, quality and price, and able to honour contract farming that can benefit both parties. While the exporters preferred the same business arrangements with supermarket. But exporters emphasised that farmers must be Global Gap certified as a requirement for international buyers. Passion fruit farmers were only likely to achieve standards through collective action, that facilitate strategies to strengthen linkages and build trust among farmers, traders and the private sector in food value chain (Facheux, et al., 2012). In supporting the preferred cooperative approach by the stakeholders, BIRTHAL, et al., (2007) “suggested that the cooperative model is one of the successful models linking farmers to markets”.

From the overall results for preferred business arrangements of cooperative and contract farming linking to buyers, Mukono district passion fruit stakeholders, results indicate that a business model which comprised a **‘cooperative combined with contract farming with a trader in order to link to high price market’** was compiled. The components of this business model were supported by different researchers as such Wollni and Zeller (2007) found that “coffee cooperatives in Costa Rica facilitated small-scale growers’ participation in speciality markets with higher prices”. While contract farming is known to facilitate high income, was supported by Vande and Maertens (2014) both shown “that contract-farming leads to higher productivity, higher profits and higher net farm incomes; that it reduces price variability and leads to higher income stability in Benin rice value chain”. The results further indicated that the selected business model for passion fruit farmers for market linkage will have an operational committee that will comprise of selected farmers and traders to monitor product quality, negotiate price and continuously look for alternative high price markets with similarities to other market linkage case studies such as Burkina mango growers (KIT and IIRR. 2008). This will build strong chain trade relations and transparency with farmers - trader and buyers. Lundy, et al. (2012) has found that “successful models of trading relationships promote transparent pricing and quality standards that are consistently applied along the chain as in speciality coffee”. These are pillars of the selected business model for the passion fruit farmers in Mukono District to successfully participate in high price market.

This selected business model is inevitably going to change the existing Mukono passion fruit value chain into the proposed new chain. The new chain will reduce the number of intermediaries such as export agents, local and market traders between the high price markets. But some few selected traders will be retained within the cooperative and contract farming framework in a transparent way. Under the new chain, there will be increase in the money received by the passion fruit smallholder farmers from € 0.38 to € 0.65 per kg. This is based on price share of 50% to the farmer, 25% to cooperative and 25% to the trader, at the average income of € 1.30 per kg the cooperative price. Finally, the new chain shall increase the quantities going to supermarket channel to 65%, export channel 20% and reduce quantities of processing channel to 15%. This was portrayed in the proposed new chain, figure 32.

Figure 32: Proposed Mukono new passion fruit value chain map



Source: Nsubuga, 2017

5.7 Form of chain finance to be used by passion fruit farmers to link to high price market

Results from the key informants, the passion fruit farmers and the traders revealed that they had a big challenge in accessing any form of financing to invest in passion fruit business. This was also the found by KIT and IIRR (2010) showing that “during the production season, farmers often lack working capital to buy inputs, or to hire workers to plough the land, weed and to harvest the crop”. The actors in the value chain such as passion fruit farmers are mostly poor with a great need to access the required financial resources to be successful in their marketing. This is in agreement with Miller and Jones (2010) finding that “increased finance and investment are needed at all levels of the food chain, with a special interest in increasing the access to finance by those agricultural households and communities who are most vulnerable to food insecurity and poverty”.

While the key informant the manager Kisoga micro finance revealed that their financial institution was more than willing to work with the proposed passion fruit cooperative. The institution has both long and short term financing, but the interest rate is high at an average of 22% per annum. This view of high interest rate has been supported by Miller and Jones (2010) observed that “microfinance institutions do reach some of these low-income households but at a high cost, with short-term loan products that are generally not able to address the full range of agricultural needs”.

5.8 What supports and hinders market linkage for smallholder farmers

Results from Mukono district production officer revealed that Mukono District Local Government under the production department work in line with national agriculture policy that aims to make investments that will increase agricultural incomes, reduce poverty, improved household food and create employment. This supports passion fruit development through infrastructural development policy, roads improvement to facilitate easy marketing by farmers such as passion fruit farmers. Under the National Cooperative Policy, the District Commercial officer in the process of registering a district cooperative society for passion fruit growers to be able to benefit from a number of opportunities that passion fruit can offer. His submission was in line with the findings of Shepherd (2007) stating that “there are many legal issues that governments should address in order to promote agribusiness development more specific to market linkage activities is the need to clarify legislation relating to farmer groups and cooperatives”.

While on what could hinder market linkage for smallholder passion fruit farmers at district or national level, the DPO stressed on issues such as poor infrastructure especially rural roads and non-existence of cold chain facilities; non-existence of specialized person with value chain development to develop value chains in the district; non-existence of market linkage approach for passion fruit farmers; limited usage of market information technology by our extension staff such internet, that hinders them to access latest information. The hindrance could reduce as stated by Shepherd (2007) “where extension services do function, field-level officers can play an important role in promoting linkages between farmers and traders or agribusinesses”. Other hindrances are small quantities of passion fruit produced Mukono in comparison to market requirements this affects market linkage; Poor implementation of passion fruit quality standards by Uganda National Bureau of Standard.

For the efficient operation of Mukono passion fruit value chain, both national and local governments need to invest in improving the extension services and infrastructure such as transport system among others. This concurs with Ferris, et al. (2014) findings that “Governments need to invest in local infrastructure, strengthen business services and improve farmers’ skills, while extension systems are needed to upgrade production and market performance”. The agricultural sector in Uganda faces a multitude of constraints along the value chain which hinder the ability of farmers to increase production and productivity and access markets for their produce (Masaba, 2014). The selected business model is like to strengthen relations with Mukono district local government for better service delivery.

5.9 Study Innovations

Jose (2014) defined innovation as “applying ideas, knowledge or practices that are new to a particular context with the purpose of creating positive change that will provide a way to meet needs, take on challenges or seize opportunities”. This new business model is the first of its kind to Mukono passion fruit farmers is an institutional innovation that will organise the passion fruit value chain and create relations to make the chain more interactive and competitive. During the study, it was discovered that farmers had their innovation in dealing with the rampant collar rot disease using smearing cow dung mixed with fungicides and it is very effective.

CHAPTER 6 CONCLUSIONS AND RECOMMENDATION FOR PASSION FRUIT MARKET LINKAGE

This chapter draws conclusions based on research results from desk research literature, key informants and focus group discussions in passion fruit value chain. Conclusions linked on research questions on what is the current situation of the passion fruit value chain and which sustainable business model can be adopted by passion fruit farmers to enable them link to high price market? Value chain oriented recommendations to improve the competitiveness of passion fruit farmers in the chain and customize market linkage to high price market were formulated.

6.1 Conclusions

From the research, 'One of the most important aspects of the research was the selection of a tailor made Cooperative – Contract farming – Trader – Buyer sustainable business model to be adopted by passion fruit farmers to enable them link to high price market'. The successful functioning of this business model is hinged on upgrading the roles of the current stakeholders in Mukono district passion fruit value chain, strengthening chain relations in a transparency way and support from Mukono District Local Government.

Roles of stakeholders involved in the passion fruit value chain

There are a number of stakeholders in Mukono passion fruit value chain including actors and supporters with different roles that contribute to the delivery of passion fruit from production to consumers. The selected new business model will reduce the intermediaries to improve the efficiency of the value chain.

Market information systems in passion fruit value chain

There is limited market information flow within the chain that contributed to asymmetry of information from the farmers to end market, vital information was only available to those actors that might have opportunistic behaviour such traders to take advantage on farmers. This was attributed to poor cooperation among the farmers, weak trade relations and weak extension services. However market information was an important component in market participation, this information provides helps farmers to make informed marketing decisions. The selected business model will improve farmer cooperation, trade relation and extension service delivery.

Challenges faced by passion fruit smallholder farmers

There are a number of challenges for the smallholder passion fruit farmers which were categorised as production and marketing challenges. These identified production and marketing by passion fruit farmers are generic to smallholder farmers in Uganda. These challenges can be alleviated by the selected business model to facilitate farmers tap into the huge market opportunities for passion fruit in Mukono district and Uganda, given the increasing demand for passion fruit in supermarkets and exports markets.

Gender participation in passion fruit value chain

There was women domination in passion fruit value chain participation. Both male and female participated almost equally in production of passion fruit, men doing the heavy work like spraying while women took the lighter work like weeding and pruning. But when it came to local trading, processing and retailing passion fruit with its products like juice, women participated by about 70% in the chain, becoming dominant against men. The selected business model is likely to improve further on women participation in the chain.

Preferred quality and quantity for passion fruit by high price market

The preferred quality attributes for passion fruit for the target market should be purple in colour, grade 1 and 11, uniform size (medium and large), clean fruits, spot less free from appearance of pests and disease with acceptable pesticide residue content. Exporter preferred passion fruit certified by Global Gap private standard. Passion fruit quantity preferred by exporters was 2,000 – 2,500 kg per week depending on export orders. While, the supermarkets preferred between 3,000 - 3650 kg per week depending on the season. This translated to about 6,150 kg per week, which the farmers can supply. The selected business model will enhance farmer's capacity to meet both quality standards and quantity for the target market.

Business arrangement preferred by smallholder passion fruit farmers

The preferred business arrangement by the farmers is accessing the high price market was 'cooperative - contract farming - trader – buyer business model'. This business model has the potential to improve farmer management skills, enhance extension services, upgrade farmers financial and business skills in order to gain from economies of scale through demand driven marketing to high price market.

Form of chain finance to be used by passion fruit farmers

There is a big challenge in accessing any form of financing to invest in passion fruit business. Farmers' need affordable financing compared to the available source that very high interest rate of 22% per annum. Farmers have no option since banks do not entertain agriculture financing due risk involved, but to use micro finance institution. The selected business model will devise ways of creating chain finance.

Supporting and hindering for passion fruit farmers market linkage

The institutional environment is generally favourable in terms of good policies and strategies that promote agriculture development with liberalized market. There is improvement in infrastructural development such as road upgrading to facilitate easy transportation to market. However, there were still major hindering factors related to poor infrastructure, limited availability of professional personnel in value chain development, poor implementation of quality standards and limited availability of financial resources.

Methodology

The methodology applied in the passion fruit market linkage to high price markets was very effective in probing key informants in order to provide information that resulted into compiling a tailor made business model. Participatory approach during the focus group discussion and used appraisal tools generated a lot enthusiasm among the participants. Farmers revealed their innovation in dealing with collar rot disease using smearing cow dung mixed with fungicides and it is very effective.

6.2 Recommendations

The following recommendations are feasible that will have to be considered by farmers and Mukono District Local Government as interventions to operationalize the selected business model. The role to be played by researcher in order to enable linkage to high price market is included.

To the farmers

- Farmers should form an interim committee to register farmers in to a cooperative and they should be receptive in joining the selected business model that will facilitate cooperation, improved trade relations and access appropriate market information.

- Farmers should initiate a saving and credit scheme within the cooperative in order to access affordable chain financing. The scheme can loan members at 10% interest rate per annum and give savers 6% interest on their savings.
- Farmers through the cooperative system should use collective action in transportation and purchasing of agro-inputs from importing agro dealers.

To Mukono District

- Local Governments should provide support and assign the district commercial officer to operationalize the farmer's preferred business model for market linkage to high price market through registering their cooperative.
- The district local government under the production department should emphasize provision of market information and business management skills' training to passion fruit farmers to improve farmers' competitiveness in participating in the passion fruit value chain.
- District local government should collaborate with NGOs to construct cheap storage charcoal coolers to address passion fruit storage facilities.
- The district should collaborate with private certification firms to provide Good agricultural practices (GAP) training to passion fruit farmers to enhance quality standards and acquisition of Global Gap certification.
- The district through the commercial officer should work closely with the farmers' cooperative in implementing, and enforcement of contractual arrangements between them and the buyers.
- The district should fund more research in the feasibility of commercial processing of passion fruit into concentrates that have high demand locally and internationally.

Role of researcher

I'm an Agricultural Officer mandated to train and impart skills to the farmers on modern, productive and sustainable agriculture practices and marketing in Mukono District Local Government.

As a trained professional chain facilitator and leader in value chain management, I will provide capacity building training to other extension staff and policy makers in value chain concept in order to identify opportunities and bottlenecks in the passion fruit sector. I will participate in managing projects, initiate innovative chain processes as I did on passion fruit value chain, effectively communicate with policy makers and academicians on value chain developments. This will have a focus on supporting the selected passion fruit business model and promote inclusive passion fruit value chain in Mukono. This will give me an opportunity to influence change within my mandate.

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ANNEXES

ANNEX 1: FARMER'S CHECKLIST INTERVIEW QUESTIONS

Checklist of interview with questions for Farmers

Name:.....**Date:**.....

Location:.....**Sex:**.....

1. What is the size of your passion fruit garden?
2. What is your average weekly harvest in quantity per week?
3. Who buys your passion fruit?
4. How much is offered for your passion fruit per Kg?
5. What type of trainings do you get from the extension workers?
6. Do you get any market information before you sell your passion fruit and how?
7. Have you ever been a member of producer group?
8. What are the advantages and disadvantage of producing in the farmer group?
9. What kind of farmer organisation would you prefer to use to access better markets?
10. What is your preferred organisation to access high price market?
11. What are the challenges do think are faced by smallholder farmers in production and marketing of passion fruit?
12. What strategies should be in place to sustainably maximize passion fruit production and improve marketing on your farm?
13. What are the passion fruit pre and postharvest losses do you experience and how can they be reduced?
14. Any other comments?

ANNEX 2: TRADER'S CHECKLIST INTERVIEW QUESTIONS

Checklist of interview with questions for Traders

Name:.....**Date:**.....

Location:.....**Sex:**.....

1. How many farmers supply you with passion fruit?
2. What are the passion fruit quantities do you buy per week from passion fruit farmers?
3. Where do you source your passion fruit?
4. What is the price you offer to farmers per Kg of passion fruit? Why
5. What business relationship would you prefer with passion fruit farmers?
6. What are your buyers of your passion fruit?
7. How much price do you sell the passion fruit per Kg?
8. What quantities does your buyers require per week?
9. What quantities does your buyers require per week? Are you able to supply them?
10. What are the challenges and opportunities in the passion fruit trading?

ANNEX 3: EXPORTER AND SUPERMARKET CHECKLIST INTERVIEW QUESTIONS

Checklist of interview with questions for Supermarket and Exporters

Name:.....**Date:**.....

Location:.....**Sex:**.....

1. Where do you source your passionfruit?
2. What means of transport do you use to transport your passion fruit from the supply source?
3. What volumes of passionfruit do you purchase per week?
4. What is the price do you offer to your passion fruit supplier per Kg?
5. What is your preferred quality attributes for passion fruit?
6. What are the passion fruit postharvest losses do you experience and how can they be reduced?
7. What business arrangements do you have in terms of advancing finance to you suppliers?
8. What are your payment arrangements with your suppliers?
9. What strategies do you propose to help smallholder passion fruit farmers to supply you?
10. Do you have storage for fresh produce and how often do you throw away passion fruit because it is no longer meet customer requirements?
11. Who do you think controls (Lead firm) the passion fruit business?

ANNEX 4: DISTRICT PRODUCTION OFFICER CHECKLIST INTERVIEW QUESTIONS

Checklist of interview with questions for District Production Officer

Name:.....**Date:**.....

Location:.....**Sex:**.....

1. What services do the District offer to smallholder passionfruit farmers?
2. How often do you provide market information and how does it reach the farmers?
3. What are the policies at District and National level in place to support the passion fruit enterprise to develop?
4. Which trainings are offered to passion fruit farmers and type of market information?
5. What are your efforts facilitating farmers to access high prices for passion fruit?
6. What might hinder market linkage for smallholder passionfruit farmers at District or National Level?
7. What would be the best way to organise farmers for market linkage?
8. How many staff does the department have with experience in product marketing?
9. What plans do the District have for the sustainability of the passion fruit enterprise?
10. Any other comments regarding smallholder passion fruit farming in Mukono?

ANNEX 5: MICRO FINANCE MANAGER CHECKLIST INTERVIEW QUESTIONS

Checklist of interview with questions for Manager Microfinance

Name:.....**Date:**.....

Location:.....**Sex:**.....

1. What type of relationships do you have with farmers
2. What type of financial products do offer at this institution?
3. What type of loans do you normally give to small holder farmers
4. What type of collateral do you require from farmers? Do you have group guarantee system?
5. Do you consider gender balance when giving out loans?
6. What can you say about working with organised farmers?
7. What are the requirements for opening up a group account?

ANNEX 6: KOOME FOCUS DISCUSSION GROUP CHECKLIST INTERVIEW QUESTIONS

Farmer Focus Discussion Group Checklist interview questions

1. What is the average passion fruit garden size in the Subcounty?
2. What is the quantity of passion fruit produced by each farmer every week? By how many farmers?
3. Who buys your passion fruit and how often? And the price offered per Kg?
4. What is the processing you go through when selling passion fruit?
5. What is the seasonality of passion fruit in this area?
6. What kind of support do you get from the District?
7. How do you get market information, what information do you normally get?
8. Do you think passion fruit production is good for the environment, why?
9. How do men and women share responsibilities in passion fruit production and marketing?
10. What are the passion fruit postharvest losses do you experience and how can they be reduced?
11. How would you like to access high price market?
12. What are the challenges do think are faced by smallholder farmers in production and marketing of passion fruit?
13. How important is passion fruit production to your household? Use preference ranking of crops for the group. Sustainability issues?

ANNEX 7: MUKONO DISTRICT PASSION FRUIT STAKEHOLDER FOCUS DISCUSSION GROUP ANALYSIS CHECK LIST

Mukono District Focus Discussion Group Analysis Meeting

Stage 1 Stakeholder analysis, Chain mapping with overlays

List the key stakeholders and their roles

- Passion fruit value chain mapping with overlays on gender, gross margin, quality and quantity

Stage 2 Presentation of different business models

- Presentation of different business models
- Discussion and selection of suitable business model for market linkage

Stage 3 Analysis of selected business model using canvas business model

KEY ACTIVITIES

1. What passion fruit production activities do you perform?
2. What marketing and sales activities do you have?
3. What type of transportation used in passion fruit?

KEY RESOURCES

4. What is the average land size of your passion fruit garden?
5. What types of tools do you use in passion fruit production?
6. How many people are needed to manage?
7. How do you finance your business?
8. How do you get your labour?
9. What physical infrastructures do you have? (Storage)

KEY PARTNERS

10. Who are your important key partners?
11. Who are your input suppliers?
12. What support do you get from your key partners?
13. What activities do your partners perform?

CHANNELS

14. Where do you sell your passion fruit?
15. How do you communicate your buyers?
16. How do you reach your buyers?
17. How often do you sell, at what price?

CUSTOMER RELATIONSHIPS

18. Do you have a contract with your buyer?
19. Do you get pre payments from your buyer?
20. Do you get help on Certification of passion fruit from your buyers?

VALUE PROPOSITION

21. What makes your passion fruit unique?
22. Which buyer needs are you satisfying?
23. How do buyers access your passion fruit?

CUSTOMER SEGMENTS

24. How many kgs of passion fruit are you producing?
25. What group of customers are you targeting?
26. Which customer group do you think would be most important?

COST STRUCTURE

27. What are the average production costs incurred in passion fruit production?
28. What are the most costly activities in passion fruit production?
29. What is the total investment for a hectare for passion fruit enterprise?

REVENUE STREAMS

30. What is the price of passion fruit per kg?
31. What other products apart from passion fruit do farmers sell and at which price?
32. What is the method of payment?

MARKET INFORMATION

33. Which key market information do you get from partners
34. How do you get the market information?

GENDER

35. Who is mainly responsible for the project- ownership
36. How are the roles mainly divided
37. Who is mainly responsible for the production and marketing activities
38. Do men and women have equal access to capital and resources like livestock inputs

MARKETING CHALLENGES

39. What marketing linkage arrangement would you prefer to access profitable markets?
40. What are the major challenges in passion fruit marketing to profitable market segments such as Exporters and retail supermarkets?

FINANCE

- 41 Where do you get financing when you need money for production?
- 42 Do you get credit from input suppliers or buyers? What are the terms?
- 43 Do you get production financing from your buyers? What are the terms?
- 44 Do you have a need for additional financing at the moment? If so, what would it be used for?

GENDER

- 45 . How many women are in passion fruit production and marketing?
46. What are women roles and responsibilities in passion fruit value chain?

SUSTAINABILITY

47. How many people are in the passion fruit value chain in Mukono?
48. How are farmers benefiting from producing passion fruit?
49. What are the environmental advantages and disadvantages in producing and marketing passion fruit?
50. What are the passion fruit investment and profitability?

The Canvas Business Model to be filled in by focus group discussion for analyzing the selected business model

Key Partners	Key Activities	Value Proposition	Customer Relationships	Customer Segments
	Key Resources		Channels	
Cost Structure		Revenue Streams		
Environmental Advantages		Environmental Disadvantages		
People Aspects Advantages		People Aspects Disadvantages		

Stage 4: Filling in the preference ranking of crops tool

Stage 5: Question and Answer Session

Stage 6: Way forward and closure

ANNEX 8: TRANSCRIPT FOR FARMER PREPARED FROM INTERVIEW QUESTIONS

Farmer Name: Annet Gigwe

Sex: Female

12/07/2017

Location: Bugazzi village, Bugombe Parish, Koome Sub-county.

s/n	Checklist question	Answers
1	What is the size of your passion fruit garden?	➤ 3.5 Acres
2	What is your average weekly harvest in quantity per week?	➤ 870 kg
3	Who buys your passion fruit and how often?	➤ Traders (Middlemen), they buy weekly.
4	What is the price offered per Kg of passion fruit?	➤ € 0.38/kg
5	What type of training or advisory do you get from the extension workers?	➤ Received limited training or advisory on passion fruit from extension workers. So this is urgently needed.
6	How do you get market information before you sell your passion fruit, what information do you normally get?	<ul style="list-style-type: none"> ➤ Through mobile phones and rarely on radio ➤ Information received comprise; prices offered by different traders.
7	Have you ever been a member of producer group? Which type?	➤ Yes, NAADS group.
8	What are the advantages and disadvantage of producing in the farmer group?	<p>Advantages of working in farmer groups</p> <ul style="list-style-type: none"> ➤ Attracts training and advisory ➤ Facilitates bulking of produce ➤ Facilitates receiving Govt support <p>Disadvantages of working in farmer groups</p> <ul style="list-style-type: none"> ➤ Limited women in leadership positions in the group ➤ Majority of members are not active in group development ➤ Poor record keeping within the group
9	What kind of farmer organisation would you prefer to use to access better markets?	➤ Cooperative marketing association to work on marketing issues.
10	What is your preferred organisation to access high price market?	➤ Cooperative to retailer or Exporter

11	What are the challenges do you think are faced by smallholder farmers in production and marketing of passion fruit?	<p>Production challenges</p> <ul style="list-style-type: none"> ➤ Poor quality seedling ➤ Pests and diseases ➤ Poor quality chemicals ➤ Expensive agro inputs ➤ Long dry spell ➤ Quality management ➤ Thieves <p>Marketing challenges</p> <ul style="list-style-type: none"> ➤ Limited marketing information ➤ Price determined by traders ➤ Unavailability of storage facilities at farm level ➤ Inappropriate transport methods to market ➤ Competition from substitute produce e.g. oranges ➤ Low prices in rain seasons
12	What strategies should be in place to sustainably maximize passion fruit production and improve marketing on your farm?	<p>Environmental Advantages</p> <ul style="list-style-type: none"> ➤ Provides green cover ➤ Employs people who would degrade the environment for survival <p>Environmental Disadvantages</p> <ul style="list-style-type: none"> ➤ Tree cutting ➤ Soil and water pollution <p>People Aspects</p> <ul style="list-style-type: none"> ➤ Creates rural employment ➤ Provides sure household income ➤ Reduces criminality in the area <p>Improve marketing on farm</p> <ul style="list-style-type: none"> ➤ Through collective action ➤ Timely market information ➤ Proper quality management
13	What causes passion fruit pre and post-harvest losses and how can they be reduced?	<p>Pre-harvesting losses</p> <ul style="list-style-type: none"> ➤ Pests and diseases ➤ Thieves ➤ Poor quality chemicals <p>Postharvest losses</p> <ul style="list-style-type: none"> ➤ Unavailable storage facilities ➤ Poor system i.e. using passenger boats ➤ Sun scorching ➤ Long dry spell ➤ Throwing the under quality fruits <p>How can losses be reduced</p> <ul style="list-style-type: none"> ➤ Provision of proper passion fruit production advisory ➤ Establishment of joint storage system ➤ Establishment of appropriate irrigation system ➤ Government testing on agrochemical efficacy.

ANNEX 9: TRANSCRIPT FOR DPO PREPARED FROM INTERVIEW QUESTIONS

Mukono District Production Officer: Dr. Fred Mukulu

20/07/2017

Location: Mukono District Headquarters

Sex: Male

s/n	Checklist question	Answers
1	What services do the District offer to smallholder passionfruit farmers?	<p>We promote and support sustainable and market oriented agricultural production, food security and household incomes to all farmers.</p> <ul style="list-style-type: none"> ➤ We provide extension services to passion fruit farmers like technical advice. ➤ We provide some inputs such as seedlings
2	How often do you provide market information and how does it reach the farmers?	<ul style="list-style-type: none"> ➤ Not often, we provide market information occasionally to passion fruit farmers. ➤ The market information is only through extension staff.
3	What are the policies at District and National level in place to support the passion fruit enterprise to develop?	<ul style="list-style-type: none"> ➤ Mukono District Production in line with national level follows the national agriculture policy that aims to make investments that will increase agricultural incomes, reduce poverty, improved household food, create employment and stimulate overall economic growth this supports passion fruit development.
4	Which trainings are offered to passion fruit farmers and type of market information?	<ul style="list-style-type: none"> ➤ We offer agronomic training ➤ We provide market information on price and quality for passion fruit
5	What are your efforts in facilitating farmers to access high prices for passion fruit?	<ul style="list-style-type: none"> ➤ It is still very limited because of specialized of the limited availability of technical personnel and infrastructure. ➤ We have plans to establish a cooperative society for passion fruit farmers to facilitate access to all better markets.
6	What might hinder market linkage for smallholder passionfruit farmers at District or National Level?	<ul style="list-style-type: none"> ➤ Limited availability of specialized person with knowledge and experience in market linkage procedures. ➤ Poor flow of market information at all levels. ➤ Small quantities of passion fruit produced Mukono in comparison to market requirements. ➤ Poor quality fruits produced by farmers. ➤ Nonexistence of cold chain facility at all level. ➤ Limited usage of market information technology by our extension staff.

7	What would be the best way to organise farmers for market linkage?	➤ Definitely, the farmers should be organised in a cooperative arrangement for market linkage.
8	How many staff does the department have with experience in product marketing?	➤ All our staff have some experience in product marketing, but we do not have a specialized personnel in the marketing of passion fruit.
9	What plans do the District have for the sustainability of the passion fruit enterprise?	➤ We have a plan of training farmers in producing passion fruit without degrading the environment while attracting high prices. This will be achieved through promoting organic farming and promoting small-scale processing of passion fruit to increase rural employment.
10	Any other comments regarding smallholder passion fruit farming in Mukono?	➤ The district is committed to promoting passion fruit production, processing and marketing as a way to reduce imports of passion fruit from neighbouring countries. This will increase income for rural farmers and consequently alleviate poverty.

ANNEX 10: TRANSCRIPT FOR DPO PREPARED FROM INTERVIEW QUESTIONS

Exporter Name: ICEMARK – AFRICA LTD

26/07/2017

Manager name: James Mukisa

Location: Kamwokya, Kampala

s/n	Checklist question	Answers
1	Where do you source your passionfruit? Who are your suppliers?	<ul style="list-style-type: none"> ➤ From traders from Mukono, Masaka and Kasese.
2	What means of transport do you use to transport your passion fruit from the supply source? Does it have any effect	<ul style="list-style-type: none"> ➤ It is transported by our suppliers in the cartoons we gave them to maintain high quality.
3	What quantities of passionfruit do you purchase and export per week?	<ul style="list-style-type: none"> ➤ Between 2,000 – 2,500kg per week, according to our export orders
4	What is the price do you offer to your passion fruit supplier per Kg?	<ul style="list-style-type: none"> ➤ € 1.35/kg
5	What is your preferred quality requirements and attributes for passion fruit?	<p>It is a requirement in export to have Global Gap certification</p> <p>Required Quality</p> <ul style="list-style-type: none"> ➤ Purple in colour ➤ Uniform size (medium and large) ➤ Clean fruits ➤ Spot less ➤ Free from appearance of pests and disease
6	What are the passion fruit postharvest losses do you experience and how can they be reduced?	<ul style="list-style-type: none"> ➤ We have not experienced passion fruit postharvest losses
7	What business arrangements do you prefer with your suppliers?	<ul style="list-style-type: none"> ➤ Work with registered entities such as passion fruit cooperative in order to be able to bulk their scattered produce and to meet our stringent quality requirements. ➤ Operate on signed contract to ensure quality and quantity ➤ Farmers must be Global Gap certified as a requirement for international buyers. ➤ Continuous passion fruit supply throughout the year ➤ Advance our suppliers with money to deliver the required quantities

		<ul style="list-style-type: none"> ➤ Give certificate of good quality product that guarantees the supplier continued supply quarterly.
8	What are your preferred payment arrangements with your suppliers?	<ul style="list-style-type: none"> ➤ We would like to pay by cheque 10 days after delivery of delivered produce.
9	What strategies do you propose to help smallholder passion fruit farmers to supply you?	<ul style="list-style-type: none"> ➤ I propose the smallholder farmers to use collective action as a strategy to work with us in order to be able to bulk their scattered produce and to meet our stringent quality requirements. ➤ Farmers should work with a trusted agent with experience in marketing, so they concentrate on producing good quality passion fruit. ➤ I also to work with Government institutions like NAADS in order to secure support like seedlings, fertilisers and others. ➤ It is also important that farmers also produce the high breed passion fruit which is gaining popularity in the market.
10	Do you have storage for fresh produce and how often do you throw away passion fruit because it is no longer meet customer requirements?	<ul style="list-style-type: none"> ➤ Our cold facility is under construction, but we do not throw passion fruit because the quantities below our quality requirements is sold to the juice markers.
11	Who do you think controls (Lead firm) the passion fruit business?	<ul style="list-style-type: none"> ➤ In export business, the exporter controls or is the lead firm.