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## Value Chain Analysis of the Fruit and Vegetable Market for Smallholder Farmers in Zanzibar

April 2015







# 1. Introduction

**This report provides an analysis and visual summary of the fruit and vegetable value chain in Zanzibar from the perspective of smallholder farmers. It was produced in 2015 using data collected directly from over 200 farmers in Zanzibar as part of the VSO ICS contribution to the VSO Tanzania Livelihood Programme and CASH Project <sup>[1]</sup>**

## Introduction to the CASH Project

The Commercial Agriculture for Smallholder Farmers (CASH) project aims to empower smallholder farmers to participate in the market and transform agriculture from a subsistence activity to a profitable enterprise. The project is supported by Cordaid and Accenture, and is implemented by VSO in collaboration with UWAMWIMA, JUWA, UWZ, KATI.

The project operates in the framework of VSO Tanzania Secure Livelihoods Programme which aims to improve agriculture value chains by ensuring smallholder farmers have access to productive resources (land, microfinance), appropriate technology (irrigation, seeds), good agriculture practices and market linkages.

## CASH Project Objectives

To support smallholder farmers:

- A. Improve productivity and quality through group access to production, extension and training services and reduction of production costs through purchasing larger volumes of materials (including seeds, fertilizers and other equipment).
- B. Improve farmer capacity to participate in higher return markets.
- C. Introduce revolving funds as a means of financing common use services and facilities.

## Objective of this document

The objective of this document is to consolidate and present the key insights about the role and position of farmers in Zanzibar's horticultural value chain in a visual, accessible format in order to help the partner organisations, and other stake holders, understand the challenges that farmers face and suggest a starting point for how these organisations can help. The document directly supports CASH Project Objective B and supports CASH Project Objective A.

## The role of VSO ICS in the production of this document

The document was created, designed and delivered by a group of UK and Tanzanian VSO ICS volunteers in Zanzibar, Tanzania during the period from January 2015 – April 2015. VSO ICS volunteers were responsible for:

- Identifying relevant farmer groups on the island and conducting baseline survey questionnaires
- Coding all responses into a database and performing a statistical analysis of the data, ensuring that units of measurement were converted accurately and that outlier data points were excluded
- Market research to gather the more qualitative elements of this report
- End-to-End production of this final report

The VSO ICS volunteers are grateful for the support and feedback provided by the in-country VSO Long-Term Volunteers which was used to refine this document as it was developed.

## 2. Executive Summary

This report provides an overview of the fruit and vegetable agricultural value chain in Zanzibar from the perspective of smallholder fruit and vegetable farmers. It is based on data collected directly from farmers.

### Report Scope

The term “Value Chain” can be used to describe a large variety of activities across many phases of production. This report focuses primarily on phases in which farmers directly participate (i.e. growing and selling produce) but also includes a high level assessment of final produce selling price at market in order to identify the proportion of the final selling price received by farmers.

### The Fruit and Vegetable Value Chain in Zanzibar

The fruit and vegetable supply chain in Zanzibar is complex with a number of different routes from Farmer to Market. Some farmer organisations have established alternative routes to market for farmers to compete either directly with Traders or Brokers:

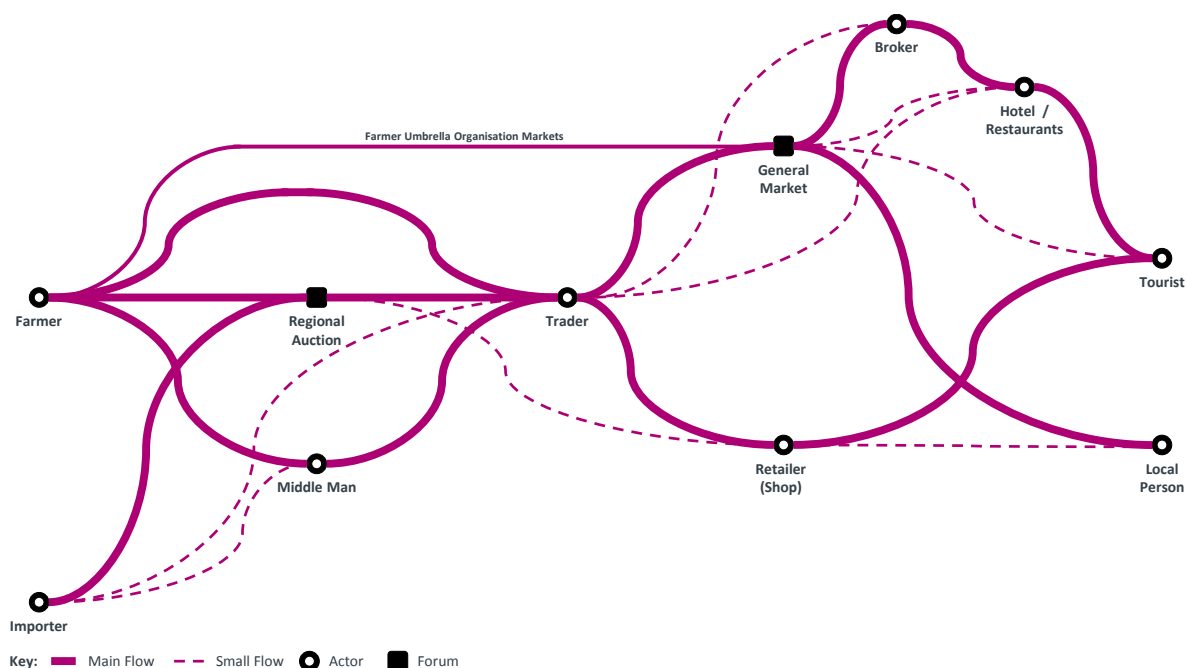


Figure 1: The Fruit and Vegetable Supply Chain in Zanzibar

### Key Value Chain Challenges Facing Farmers in Zanzibar

The analysis contained in this report revealed the following key challenges facing farmers in Zanzibar:

#### 1. Farmers have little or no access to reliable market information

It is difficult for farmers to find out how much their produce was sold on general market to the final customer. Farmers also have poor visibility of overall demand for produce in the final market.

#### 2. Farmers do not use available land optimally

Most farmers in Zanzibar only have small areas of land to cultivate however many do not use best practices to select and space their crops in order to maximize the amount they can grow with their land.



- 3. Farmers do not know how to use the market information they have to maximise their profit**  
Many farmers in Zanzibar do not know how much profit they make for growing different type of crops.
- 4. Farmers lack access to reliable supply of water**  
In rural areas there are very few water points and supply to those that do exist is sometimes not available.
- 5. Farmers do not understand all the costs associated with running the farm**  
Many farmers fail to include farm-wide costs when calculating the cost of producing their crops (E.g. The cost of electricity required to power water pumps).
- 6. Farmers face considerable uncertainty about the price they will receive**  
The range of prices which farmer receive for individual crops can change a lot in an unpredictable way
- 7. Farmers do not have access to a cheap way of transporting large quantities of produce directly to market**  
Most farmers use daladalas to transport their goods which charge a fix amount per bag. Furthermore, many farmers have to take more than one daladala to get to market so incur this cost multiple times.
- 8. Farmers do not understand how to market their produce effectively**  
Very few farmers know how to process and package their produce (E.g. Making jam, juice etc.) which means they are unable to raise the price they can charge above a certain amount.
- 9. Farmers are unable to guarantee to supply to large customers**  
Farmers lack the scale to reliably grow and supply all of the amount and types of food required to fulfil contracts with hotels and restaurants.
- 10. Farmers often do not receive payment for their produce on time**  
Farmers often do not receive payment on the same day they deliver their crops. This makes it difficult for farmers to continue to supply the market as lack money for new seeds and to pay for land preparation means there is a gap in production while they are waiting for their payment.

## Key Recommendations

Whilst debate and discussion is required, the following recommendations provide a suggested starting point for organisations wishing to use the analysis contained within this report to help Zanzibar's smallholder farmers establish sustainable livelihoods:

- A. Accelerate the creation of a mobile platform to deliver market information services to farmers**  
Delivering information to farmer's mobiles that helps them command a fairer price for their goods.
- B. Creation of Policy Advocacy Officers within Farmer Umbrella Organisations**  
Working with the authorities to encourage policy change that benefits farmers by strengthening the position of farmers in the value chain or protecting them from unpredictable fluctuations in price.
- C. Develop the basic business and accounting skills of farmers**  
Training farmers on how to 'farm as a business' by using the available market information to make informed decisions (e.g. crop selection) and maximise their final selling price.
- D. Provide training to farmers on good agricultural practices**  
Teaching farmers about optimal crops spacing and land layout to maximize land productivity.
- E. Making microfinance loans available for irrigation equipment**  
Lending farmers money to buy hose pipe, drip and to dig wells.
- F. Educate farmers in processing and packaging methods**  
Helping farmers get a higher price of their produce by presenting it in a more appealing way to customers.
- G. Farmers must find way to cooperate in order to guarantee supply**  
Encouraging farmers to try different ways to work together to supply large quantity products of produces and sharing the resulting profit (E.g. market committees).
- H. Organise and operate trips for tourist to local farms**  
Creating guided tours / excursions for tourists, potentially in partnership with the hotels, in order to transport the tourists (i.e. the customers) to the farms to try a local meal and see the activities of the farmer rather than the farmer having to bring produce to market for sale.



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### 3. Guide to Diagrams

In order to make the analysis contained within this report as easy to understand as possible, the following diagrams are used throughout this report:

#### Crop Profitability Analysis

These figures show the proportion of the final market selling price that farmers were found to receive and the amount of profit the farmer actually receives after production costs have been paid. The exchange rate as of April 2015 is around TZS2000 to \$1 .

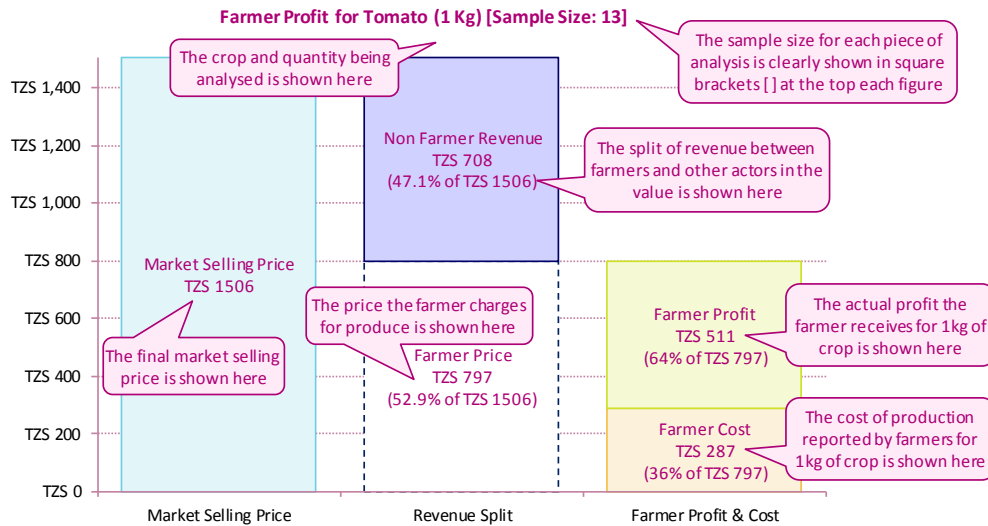


Figure 2: Sample Crop Profitability Figure

#### Price/Cost Range Comparison

These figures show the range (and average) of market prices, farmer prices and costs to produce for each crop. Large overlaps imply risk as this means it is possible to receive a price lower than the price paid:

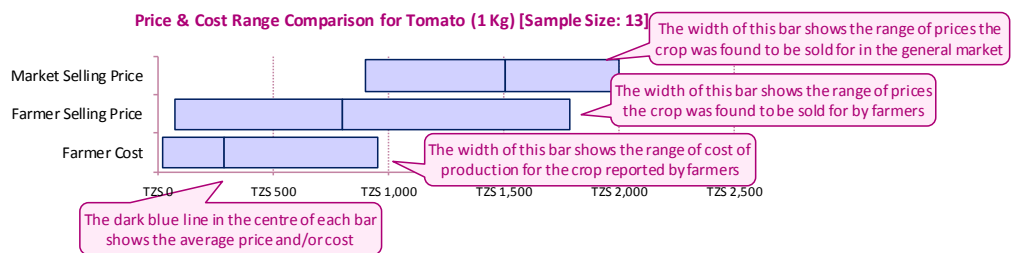


Figure 3: Sample Price / Cost Range Comparison Figure

## 4. What is a Value Chain?

In general, value chains describe the full range of activities required to bring a product or service through all phases from initial producer to final consumer (incl. communication of market information to everybody involved the chain).<sup>[2]</sup>

### 4.1. An Introduction to the Agricultural Value Chain

The agricultural value chain consists of two parts.

1. The supply chain: links the steps that produce goes through from the farmer to the consumer
2. The demand chain: the flow of market information from consumers back to farmers

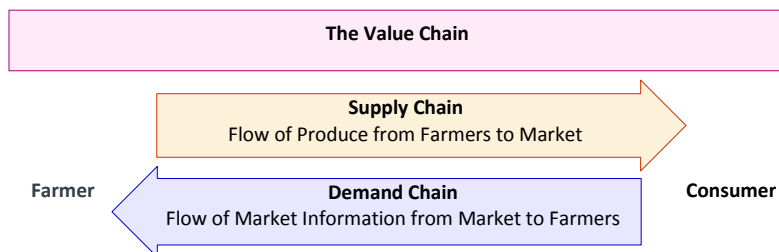


Figure 4: Value Chain Flows

Supply chain activities consist of buying produce (purchasing), changing something about the produce to increase its value (processing e.g. packaging and/or sorting) and transporting it to the location of demand (distribution).

The demand chain consists of activities to stimulate demand for produce (marketing), facilitating transactions to enable people to buy the produce (sales) and providing any 'after-sales' service such as dealing with returns or unsold perishable goods (service):

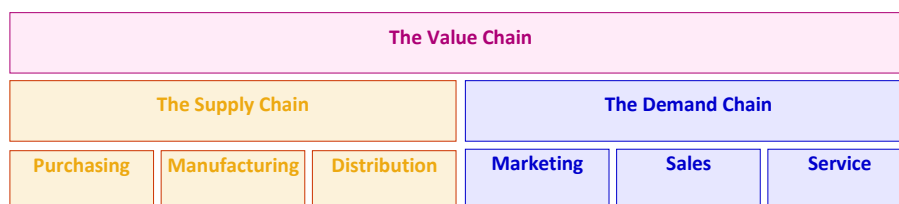


Figure 5: Value Chain Functional Model [3]

Value Chain analysis enables organisations:

- To understand the environment in which they operate
- To have an improved understanding of competitive challenges (such as presence of 'middle men'),
- To identify key relationships
- To gain greater visibility of the risk to which the organisation's operations is exposed

## 4.2. Value Chain Actors

Value Chains typically involve more than one party, working together to satisfy the demands of a particular market. [4] These parties, which may include individuals, companies or producer groups for example are referred to as 'actors' and each has the following characteristics:

- Each actor makes a defined contribution to the value chain (e.g. move produce from A to B)
- Each actor incurs cost in making their contribution to the value chain (e.g. vehicle maintenance)
- Each actor generates profit for itself (or its owner / shareholders)

## 4.3. Value Chain Tiers

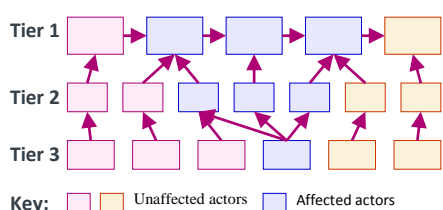


Figure 6: Value Chain Tiers

The supply and demand side of a value chain can be divided into tiers to identify common dependencies that could impact multiple components of the value chain. The first tier represents the flow of goods from actor to actor. The second tier could represent goods, services or other actors that impact this such as transport, the third could represent inputs into those goods and services such as petrol costs.

As the complexity of value chains increases so does the importance of understanding and managing these interdependencies. Given the time constraints associated with this report, analysis will be focussed on Tier 1, but it is acknowledged that important Tier 2 & 3 actors exist across the Agricultural value chain in Zanzibar (e.g. Daladala Services & Petrol Providers).

## 4.4. Value Chain Key Enablers

There are a number of key enabling environments and services that support value chains which must be present in order for the value chain to function efficiently and ensure that all actors benefit. Establishing these key enablers should form a core part of any policy advocacy strategy.

### Business / Economic Environment

Value chains are not independent from the macro-economic environment in which they operate and therefore the value chain can be adversely affected by a poor business environment. For the value chain to function efficiently there must be a strong, stable business environment with attributes such as the following: -

- Peace and public order
- Macro-economic stability
- Controlled predictable inflation levels
- Stable exchange rates for foreign currency
- Predictable taxation that is reinvested in public goods and property rights
- Lack of corruption

### Rural Public Services

In addition to the general business environment the agricultural value chain relies on there being an appropriate level of investment in irrigation, transport infrastructure such as rural roads, utilities such as electricity and water in addition to agricultural research and government extension services.

## 5. The Importance of Understanding the Agricultural Value Chain in Zanzibar

**By understanding the structure of the value chain, and the opportunities and challenges that parties in the chain face, organisations can create informed business plans and strategies to optimally position themselves to support the people that they aim to help.**

### 5.1. Farmer Co-operative Organisations



Some organisations (such as UWAMWIMA, JUWA and other Farmer Umbrella Organisations) work to represent smallholder farmers by promoting locally grown produce and providing services to farmers that create an alternative route to market (e.g. Hosting regular farmer markets in town). By increasing their understanding of the opportunities and challenges facing various actors across the value chain, these organisations can identify the biggest threats to the profit margins of their members across the value chain and ensure they continue to provide the most helpful set of services to their members.

### 5.2. Policy Advocacy



Organisations involved in promoting favourable government policies for smallholder farmers can use the value chain analysis to identify the areas in which changes in government policy can have the greatest impact on the poverty level of farmers. By considering the barriers to the flow of produce to market, demand information to the farmers (producers) and the dynamics of the interaction between actors within the Value Chain, organisations can justify their rationale for promoting policy changes with quantifiable estimated benefits.

### 5.3. Private Sector Investment



Private sector organisations can use the value chain analysis in order to identify opportunities for development of additional profit-making services. For example, there are significant opportunities for mobile phone companies to develop profitable services which facilitate the transmission of market information from central markets to dispersed farmers. By understanding the distribution of profit across the supply chain, these private organisations can design optimal pricing models that maximise profit. For example, the organisation could subsidise users in the least profitable sections of the supply chain by charging a premium to users in the most profitable sections.

## 6. Scope of Analysis

**This report focuses on smallholder fruit and vegetable farmers in Zanzibar, and their position in the agricultural value chain. It is based on data collected directly from farmers and provides a view of the value chain from the farmer's perspective. Specifically, the following aspects of the value chain are considered:**

### 6.1. Industry / Market

This analysis is focused exclusively on the local Fruit and Vegetable Value Chain in Zanzibar.

### 6.2. Produce Type

The following fruit and vegetables were found to be grown in Zanzibar by the smallholder farming communities surveyed as part of the analysis:



Figure 7: Fruit and Vegetable Produce in Zanzibar

In addition to the above mangoes, bananas, spinach and yams were also found to be grown amongst farming communities but these were excluded from the final analysis due to lack of valid data points (see below).

### 6.3. Method of Analysis

During the baseline survey, farmers were asked to give the following information about their crops for Masika and Vuli seasons:

- Quantity Harvested
- Quantity Produced
- Price per Unit

However, as very few farmers were found to keep farm accounting records, the quality of this data varied considerably. In order to improve the accuracy of the analysis, farmer data on individual crops was excluded if any of the above were zero (0) or if the unit of measurement (e.g per bundle) was missing as this is the minimum amount of information required for a meaningful comparison of profit per crop. Additionally data points more than three standard deviations above or below the average value for any of these three metrics were excluded. The resulting sample sizes for each piece of analysis are clearly shown throughout this report.



The majority of farmers provided the above information in varying units per crop (e.g. per bundle, per basket etc.). As such it was necessary to convert each of these units into an equivalent value in Kg in order to allow comparison across units to be performed. The following conversion factors are averages (as the size of bags, buckets, bundles etc. can vary considerably) but were agreed with Omary A Ally (and validated with a number of other stakeholders) as indicated:

Crop	1 Bag	1 Bucket	1 Bunch	1 Bundle	1 Item	Reference
Cassava	42kg					Shella's Discussion with Omary
Cucumber	42kg					Shella's Market Research at UWAMWIMA
Eggplant	50kg	70kg				Shella's Market Research at UWAMWIMA
Okra	18kg					Shella's Market Research at UWAMWIMA
Onion	100kg					Shella's Market Research at UWAMWIMA
Potato	110kg					Shella's Discussion with Omary
Rice	50kg					Shella's Market Research at UWAMWIMA
Sweet Pepper	25kg	30kg				Shella's Market Research at UWAMWIMA
Sweet Potato	100kg		3kg			Shella's Market Research at UWAMWIMA
Tomato	28kg	10kg		15kg		Shella's Market Research at UWAMWIMA
Watermelon					14kg	Shella's Discussion with Omary

**Table 1: Unit To Kg Conversion Factors**

For example, this table shows that 1 Bucket of Eggplant was assumed to weigh approximately 70kg.

#### 6.4. Market Price Information

Price information for the following crops were obtained from a cleansed government report from 2011 during which a number of market traders were surveyed across the year in order to understand the average selling prices of produce in the general market. [5]

However, due to differences in report scope, there were a number of crops encountered as part of the farmer survey, on which this report is based, that were not included in this source report:

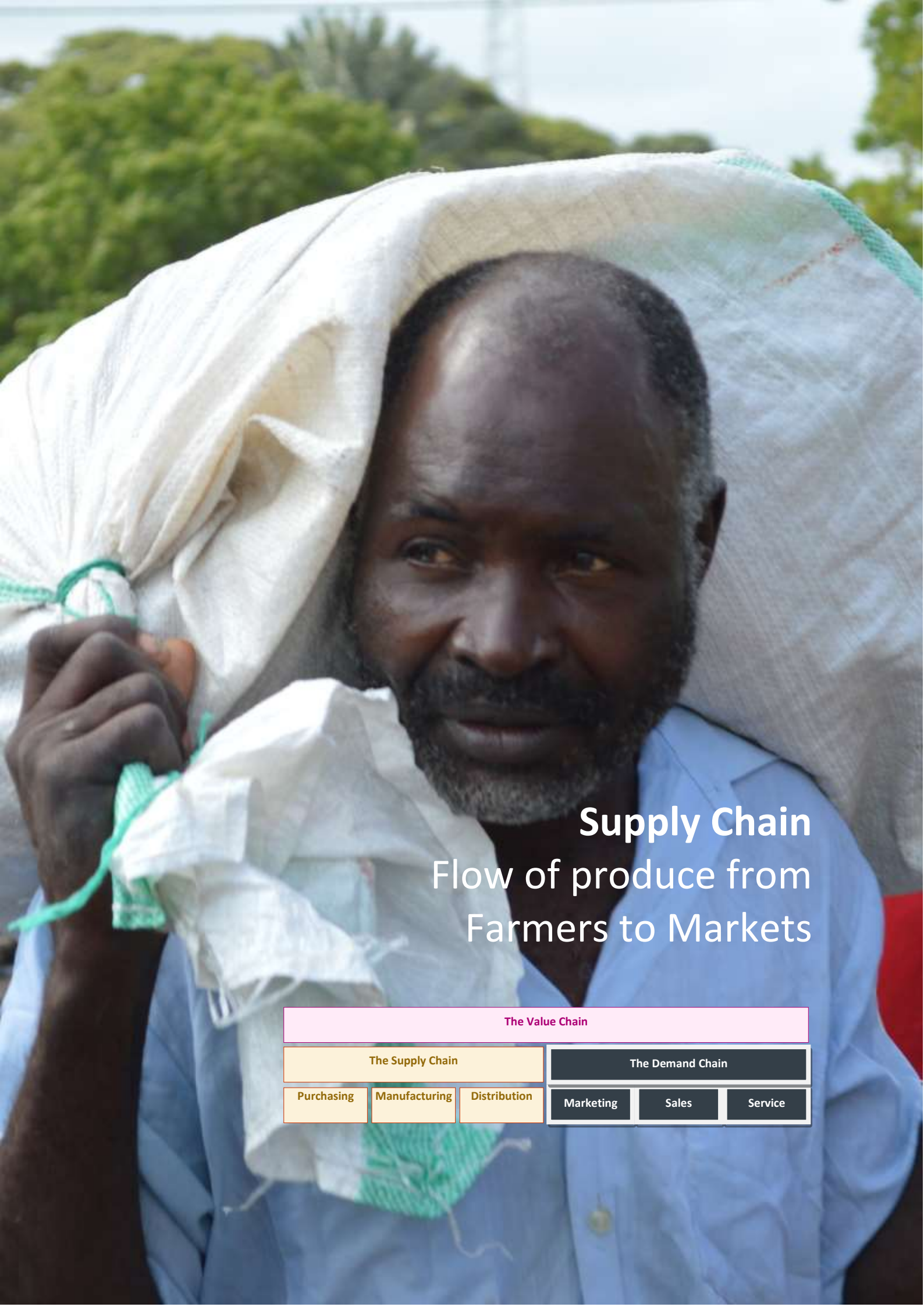
- Potato
- Rice
- Sweet pepper
- Sweet Potato
- Watermelon

For this produce a market selling price was obtained by visiting the market in Stone Town and averaging the price quoted by a number of traders selling this particular produce in February 2015.

#### 6.5. Farmers Surveyed

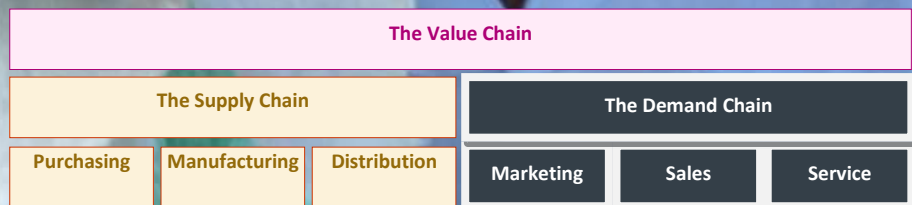
The rest of the analysis in this report is based on a random sample of 200 farmers based primarily in the communities with which VSO ICS had existing relationships (e.g. through Host Home arrangements). Importers were not surveyed but their impact on the value chain was included as these parties are the primary competitors of smallholder fruit and vegetable farmers in Zanzibar. Data collected from these surveys is used to calculate the average cost to produce 1 kg of crop, and the average received farmer selling price of 1 kg of crop throughout this report. The geographical distribution of the farmers surveyed is shown in the following figure:





# Supply Chain

Flow of produce from  
Farmers to Markets



## 7. Fruit and Vegetable Supply Chain Analysis

The fruit and vegetable supply chain in Zanzibar is complex with a number of different routes from farmer to market. Some farmer organisations have established alternative routes to market for farmers to compete either directly with traders or brokers

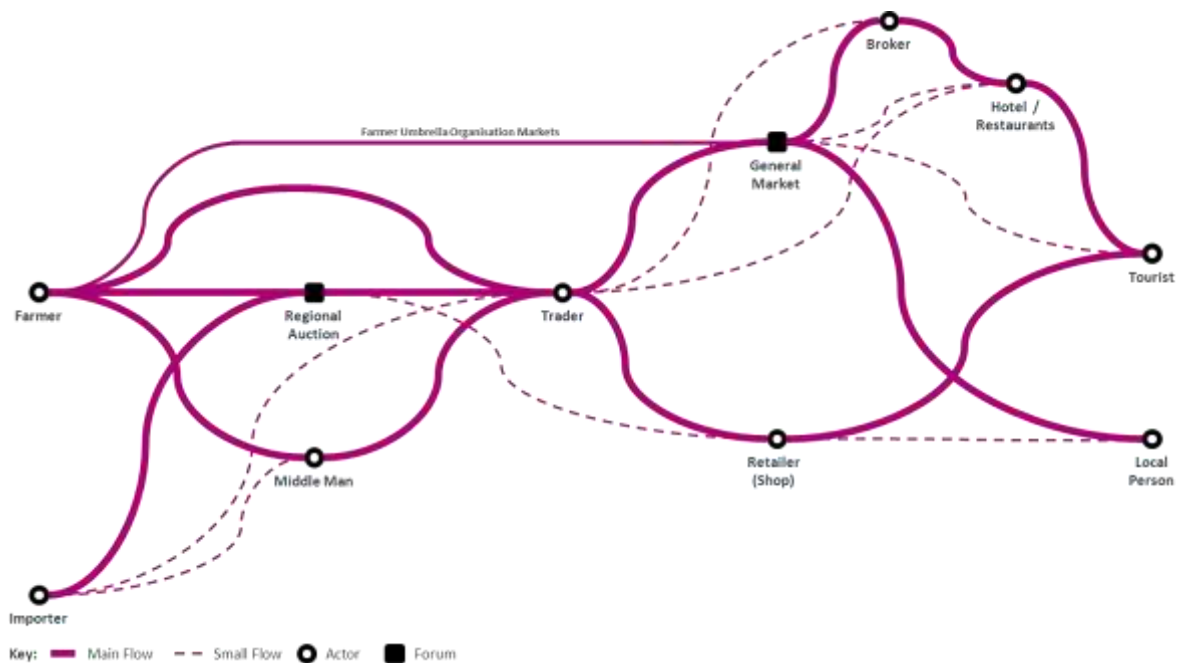


Figure 9: Fruit and Vegetable Supply Chain in Zanzibar

### 7.1. Supply Chain Overview

The fruit and vegetable supply chain in Zanzibar is predominately a 'push' based supply chain. Farmers produce commodities that are 'pushed' into the marketplace via a highly indirect route which involves a large variety of middle men and traders. In these supply chains, producers (farmers) are generally isolated from the majority of end-consumers (customers) and there is little control over input costs or the price received for their goods. [4] This trend appears to be true for the fruit and vegetable supply chain in Zanzibar.

Umbrella Farmer Organisations, such as JUWA and UWAMWIMA, are working to establish alternative routes to market for farmers (as shown by the thin line in the figure above), facilitating direct access to the general market, and potentially establishing direct working relationships between hotels/restaurants and Zanzibar's farmers.

### 7.2. Profitability Analysis

Using the survey data, the following average costs and prices were calculated:

- **Cost to Produce:** The total cost that a farmer has to pay to produce this crop
- **Received Price:** The price that the **farmer** is able to sell his/her crop for at the local market (auction)
- **Final Selling Price:** The price at which the final salesman (usually a trader) is able to sell the crop



The conversions to Kg in the following tables were calculated using the conversion factors listed in section 5.3.

Using this information, the following key metrics were calculated for 1 kg of each crop type as we are interested in the extent to which farmers receive a fair price for their produce and the relative profitability of each crop from the perspective of the farmer:

**1. The Farmer Selling Price as a proportion of Final Selling Price**

This shows the proportion of the final selling price that farmers actually receive. A low value indicates that farmers are in a weak negotiating position as they are only able to charge a fraction of the final value of their goods.

**2. The Farmer’s Profit Margin**

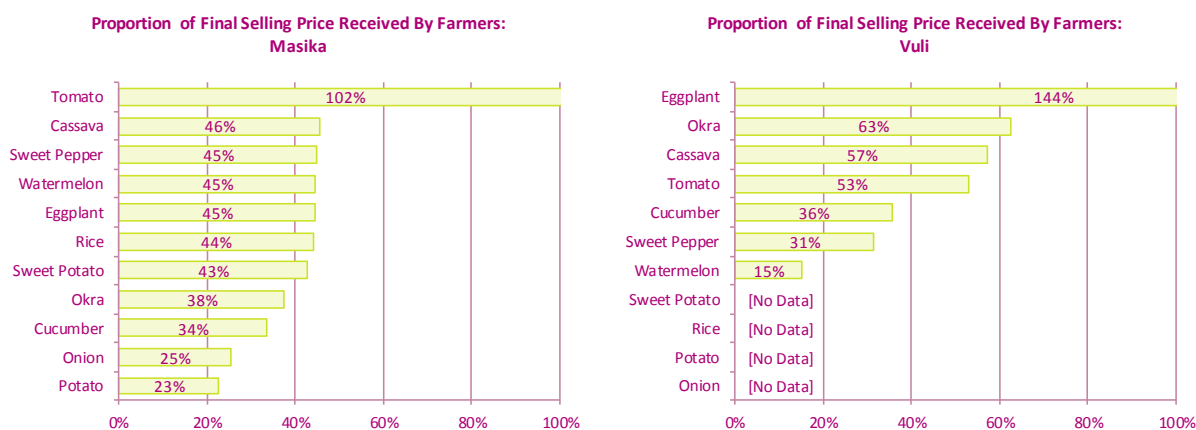
This shows profit as a proportion of the farmer’s received revenue (the received farmer price).

Similarly to the previous metric, a low value means that the costs of production are high relative to the received farmer price. This metric allows comparison of profitability between crops.

In addition to the above, the variance of cost to produce, received farmer price and final selling price in each season was also analysed. The results of this analysis are summarised in the detailed analysis below.

**Summary of Findings – Farmer Selling Price as a proportion of Final Selling Price**

This figure provides a side-by-side comparison of the farmer selling price as a proportion of final selling price for each season:



**Figure 10: Comparison of Proportion of Final Selling Price Received By Farmers**

Proportions greater than 100% imply that, on average, the farmer selling price is higher than the final selling price found in the market. These results are presented here to provide a fair representation of the survey data that is used for this analysis; however this situation clearly needs additional research to understand the underlying drivers. Possible explanations include:

- The existence of fixed price contracts between farmers and other supply chain actors followed by an unanticipated drop in market price
- Crop spoilage due to transportation or time taken to sell by subsequent actors causing spoiled crops to be subsequently sold at a lower price in order to recover some cost

**Summary of Findings – Farmer Profit Margin**

The following figure provides a side-by-side comparison of the farmer’s profit margins for individual crops for each season. Profit margins were found to vary greatly between crops with some crops resulting in high profit margins all year round (e.g. watermelon) and other profit margins for other crops changing significantly between seasons.

Whilst crop profit margin is an important input to decisions about crop selection for farmers, other farm factors (e.g. soil type) and available land for cultivation must also be considered in order to determine optimum crop choice for individual farmers.



## Value Chain Analysis of the Fruit and Vegetable Market for Smallholder Farmers in Zanzibar

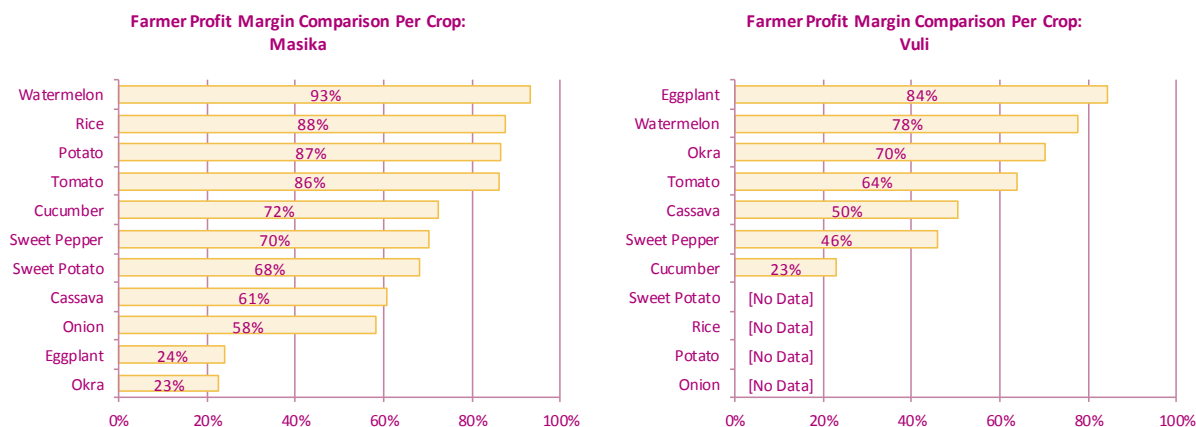



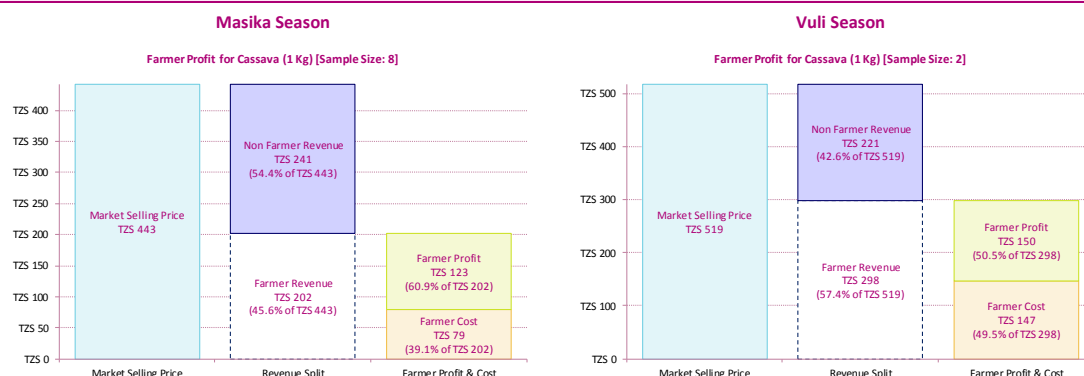
Figure 11: Comparison of Farmer Profit Margin per Crop

### Detailed Crop Analysis

The detailed findings for each crop are shown below:

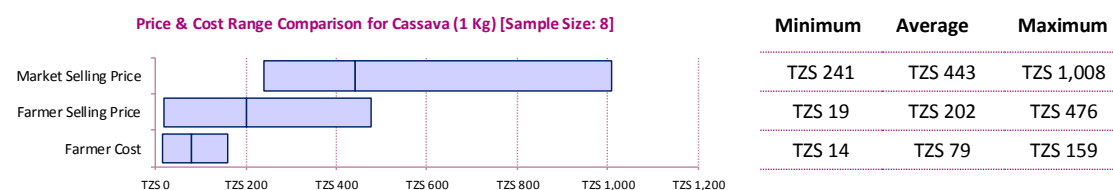
1. Crop Summary: Cassava		Masika	Vuli
	<b>Cassava</b>	Market Selling Price (Per Kg): TZS 443	TZS 519
	<b>Muhogo</b>	Received Farmer Price (Per Kg): TZS 202	TZS 298
		Proportion of final selling Price received by farmer: 45.6%	57.4%
		Farmer Profit Margin: 60.9%	50.5%

#### Proportion of Market Selling Price Received By Farmers and Breakdown of Farmer Profit and Loss



- During the baseline survey, 8 farmers were found to sell Cassava in Masika and only 2 in Vuli
- Farmers receive a higher proportion of the final market selling price in Vuli (57.4%) compared to Masika (45.6%) which, due to a higher market selling price in Vuli, also translates to a higher amount of received revenue in terms of cash
- Despite the higher cost of production in Vuli (TZS 147 compared to TZS 79), farmers receive a higher amount of profit in Vuli per kg as they receive a higher proportion of the higher market selling price in this season

#### Masika Season



#### Vuli Season

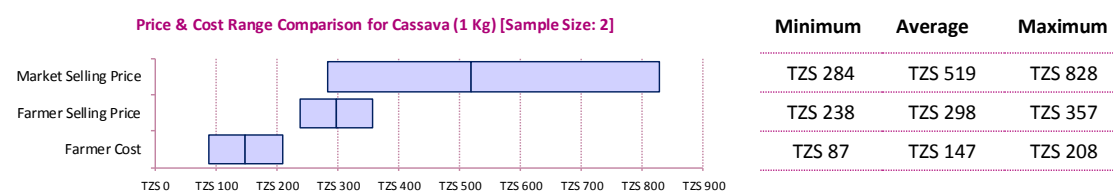


Figure 12: Crop Summary for Cassava

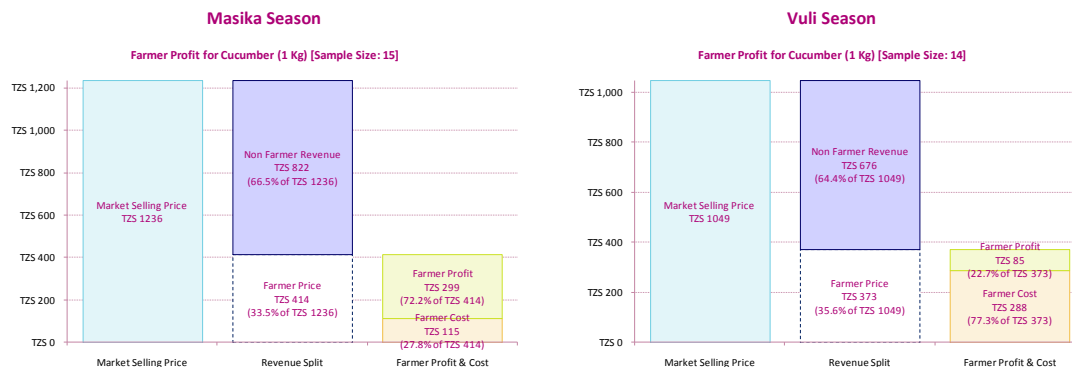
**2. Crop Summary: Cucumber** Masika Vuli



**Cucumber**  
Tango

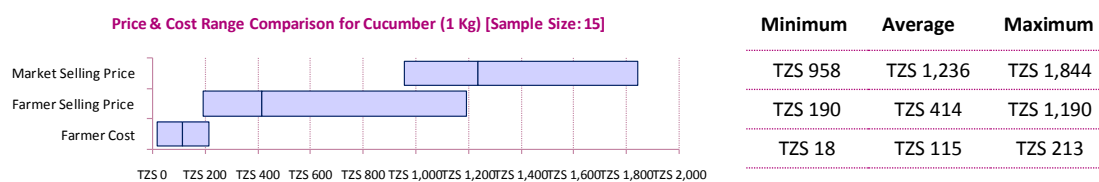
Market Selling Price (Per Kg):	TZS 1,236	TZS 1,049
Received Farmer Price (Per Kg):	TZS 414	TZS 373
Proportion of final selling price received by a farmer:	33.5%	35.6%
Farmer Profit Margin:	72.2%	22.7%

**Proportion of Market Selling Price Received By Farmers and Breakdown of Farmer Profit and Loss**



- During the baseline survey, 15 farmers were found to sell Cucumber in Masika and 14 in Vuli
- Farmers receive a higher proportion of the final market selling price in Vuli (35.6%) compared to Masika (33.5%) which, due to a lower market selling price in Vuli, also translates to a lower amount of received revenue in terms of cash
- Due to the lower cost of production in Masika (TZS 115 compared to TZS 288), farmers receive a higher amount of profit in Masika per kg despite receiving a lower proportion of the final market selling price in this season

**Masika Season**



**Vuli Season**

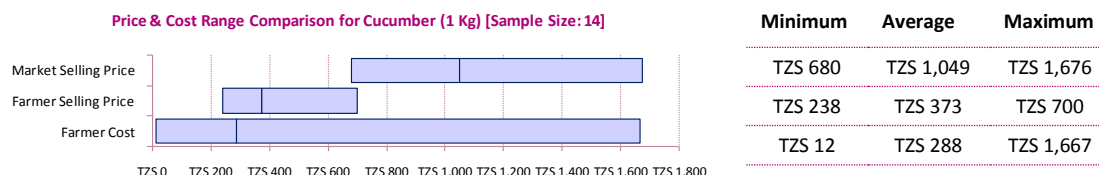


Figure 13: Crop Summary for Cucumber

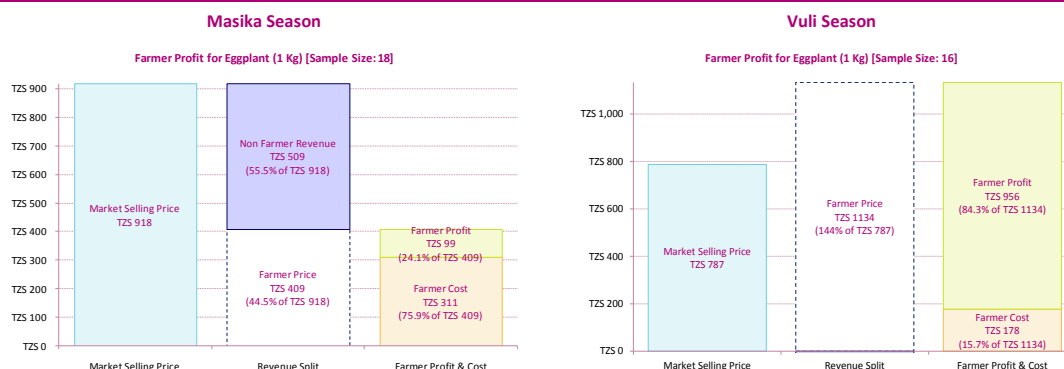
**3. Crop Summary: Eggplant** Masika Vuli



**Eggplant**  
Bilinganya

Market Selling Price (Per kg):	<b>TZS 918</b>	<b>TZS 787</b>
Received Farmer Price (Per Kg):	TZS 409	TZS 1,134
Proportion of final selling Price received by farmer:	44.5%	144%
Farmer Profit Margin:	24.1%	77.4%

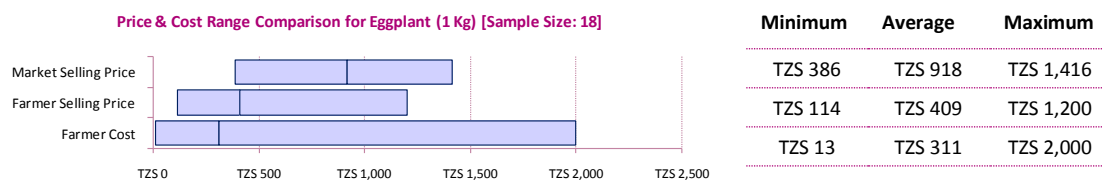
**Proportion of Market Selling Price Received By Farmers and Breakdown of Farmer Profit and Loss**



## Value Chain Analysis of the Fruit and Vegetable Market for Smallholder Farmers in Zanzibar

- During the baseline survey, 18 farmers were found to sell Eggplant in Masika and 16 in Vuli
- Farmers receive a considerably higher proportion of the final market selling price in Vuli (144%) compared to Masika (44.5%) which, despite a lower market selling price, translates to a higher amount of received revenue in terms of cash
- The lower cost of production in Vuli (TZS 178 compared to TZS 311), further increases the actual amount of profit that farmers receive in Vuli per kg

### Masika Season



### Vuli Season

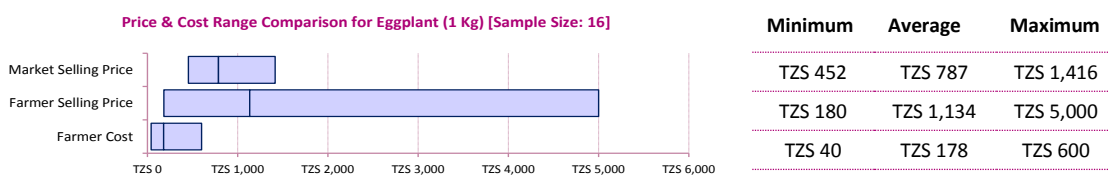


Figure 14: Crop Summary for Eggplant

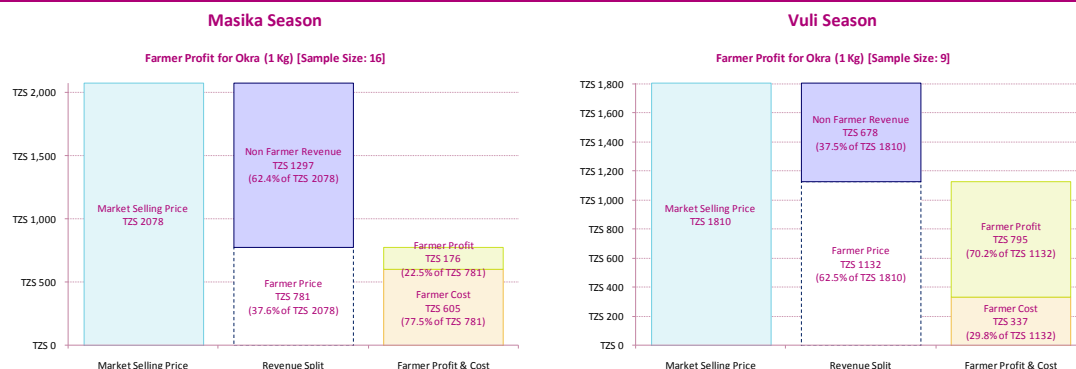
### 4. Crop Summary: Okra



**Okra**  
Bamia

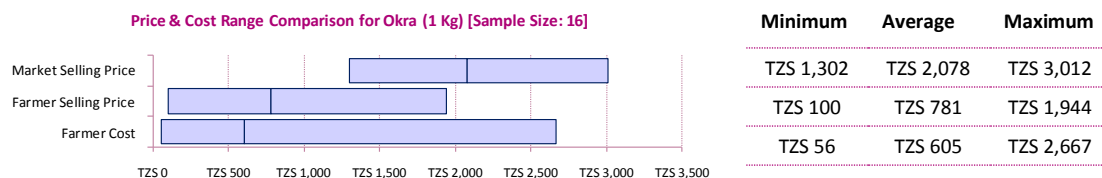
	Masika	Vuli
Market Selling Price (Per Kg):	TZS 2,078	TZS 1,810
Received Farmer Price (Per Kg):	TZS 781	TZS 1,132
Proportion of final selling Price received by farmer:	37.6%	62.5%
Farmer Profit Margin:	22.5%	70.2%

### Proportion of Market Selling Price Received By Farmers and Breakdown of Farmer Profit and Loss



- During the baseline survey, 16 farmers were found to sell Okra in Masika and 9 in Vuli
- Farmers receive a higher proportion of the final market selling price in Vuli (62.5%) compared to Masika (37.6%), which despite a lower market selling price in Vuli, also translates to a higher amount of received revenue in terms of cash
- The lower cost of production in Vuli (TZS 337 compared to TZS 605), further increases the actual amount of profit received by farmers in Vuli per kg

### Masika Season



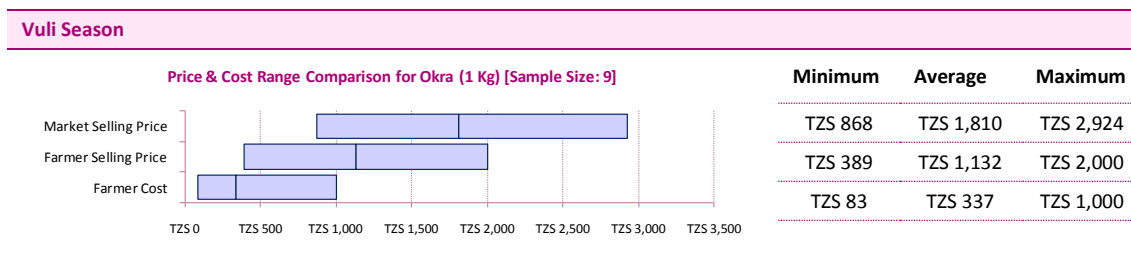

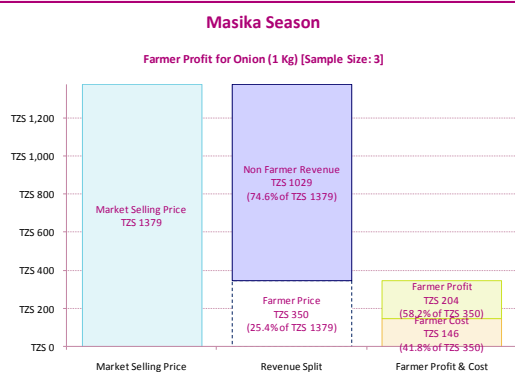


Figure 15: Crop Summary for Okra

5. Crop Summary: Onion		Masika	Vuli
	Market Selling Price (Per Kg):	TZS 1,379	TZS 1,239
	Received Farmer Price (Per Kg):	TZS 350	TZS -
	Proportion of final selling Price received by farmer:	25.4%	-
	Farmer Profit Margin:	58.2%	-

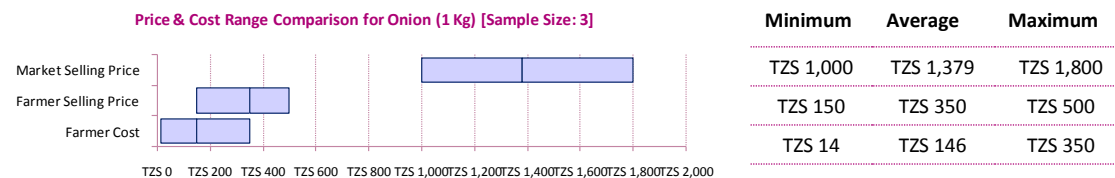
Proportion of Market Selling Price Received By Farmers and Breakdown of Farmer Profit and Loss



None of the farmers surveyed reported selling onion in Vuli

- During the baseline survey, 3 farmers were found to sell Onion in Masika and non in Vuli
- In Masika the proportion of the final market selling price received by the 3 farmers on average was found to be 22.7%. However the small sample size makes this result unreliable.
- The cost of production for the two farmers who reported selling Onion in Masika was low (approximately TZS 146 per Kg).

Masika Season



Vuli Season

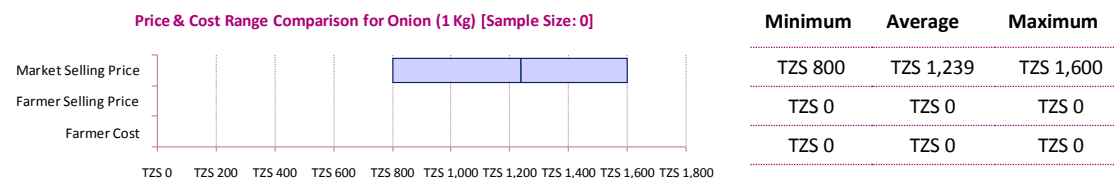



Figure 16: Crop Summary for Onion

6. Crop Summary: Potato		Masika	Vuli
	Market Selling Price (Per Kg):	TZS 1,000	TZS 1,000
	Received Farmer Price (Per Kg):	TZS 227	TZS -
	Proportion of final selling Price received by farmer:	22.7%	-
	Farmer Profit Margin:	86.7%	-

Proportion of Market Selling Price Received By Farmers and Breakdown of Farmer Profit and Loss

## Value Chain Analysis of the Fruit and Vegetable Market for Smallholder Farmers in Zanzibar

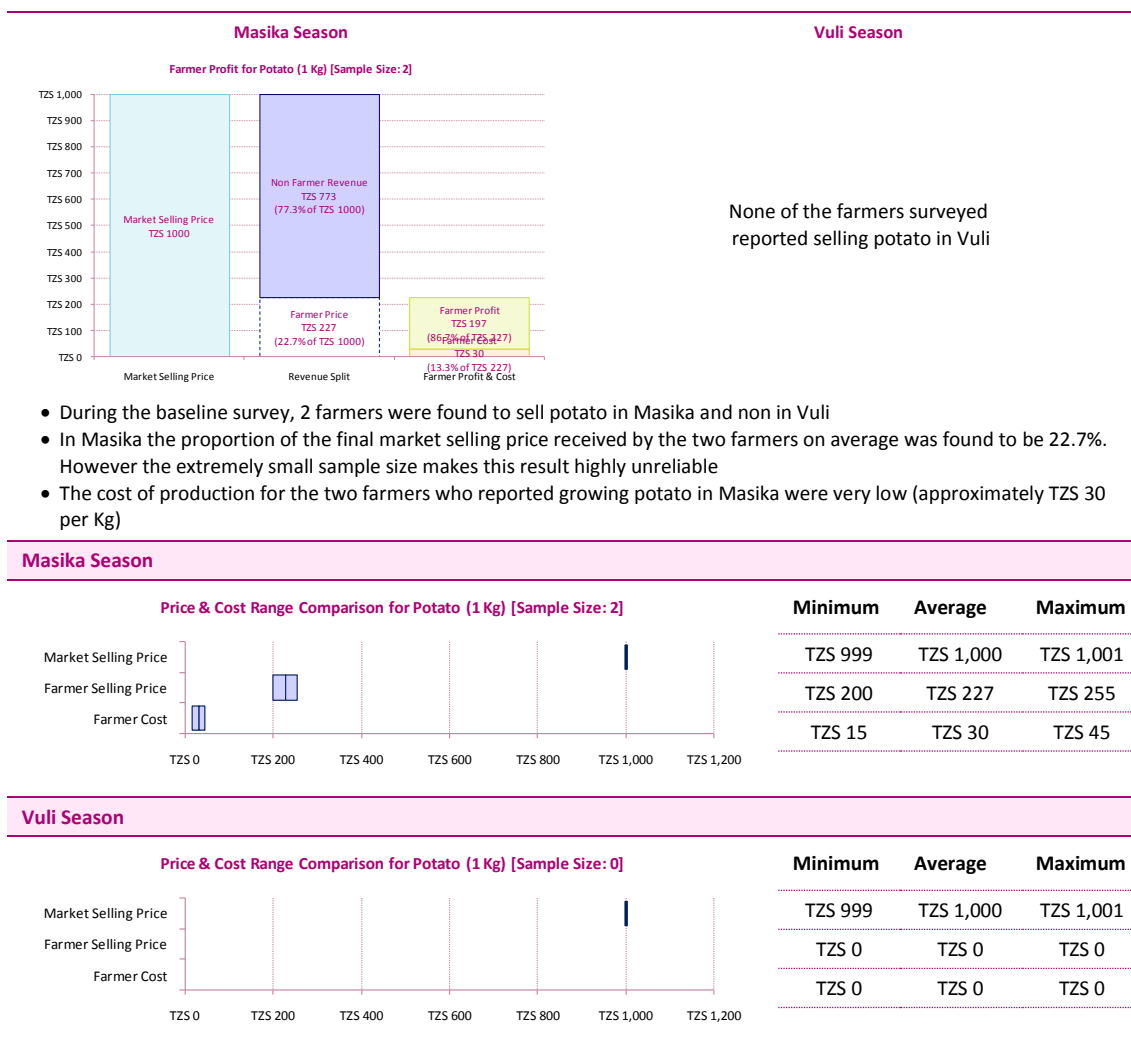
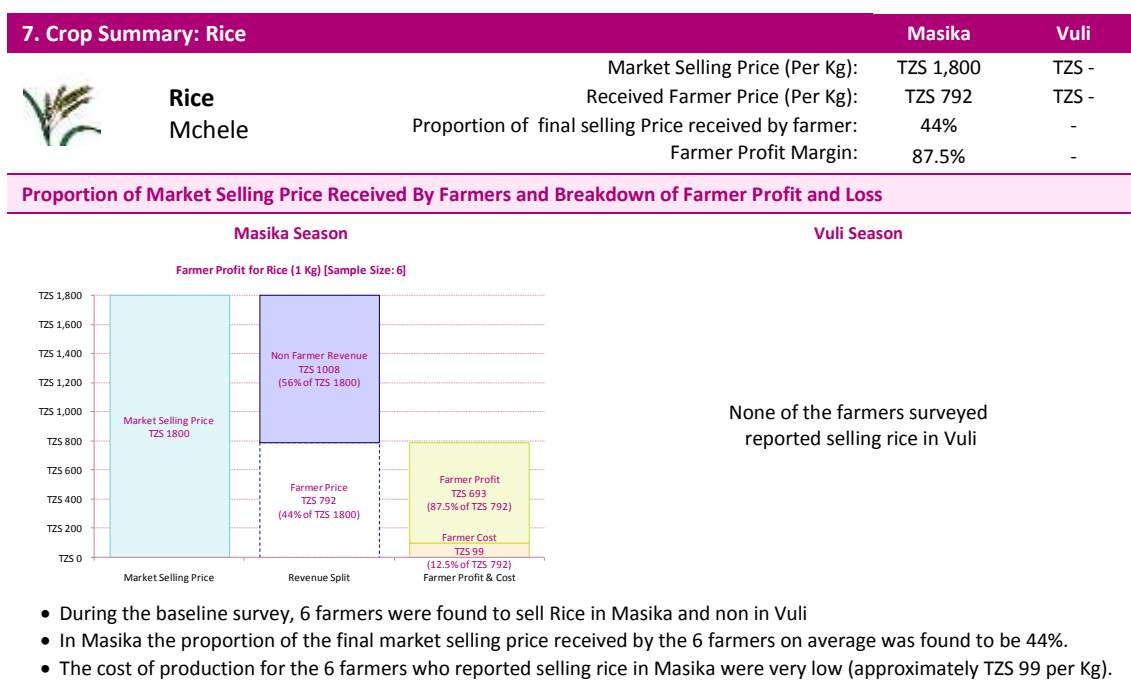


Figure 17: Crop Summary for Potato





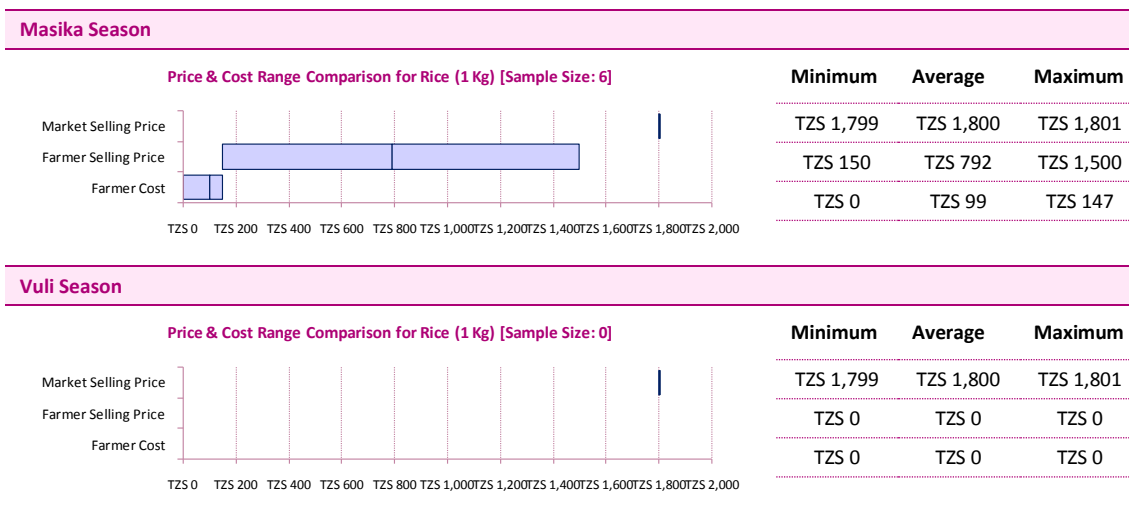

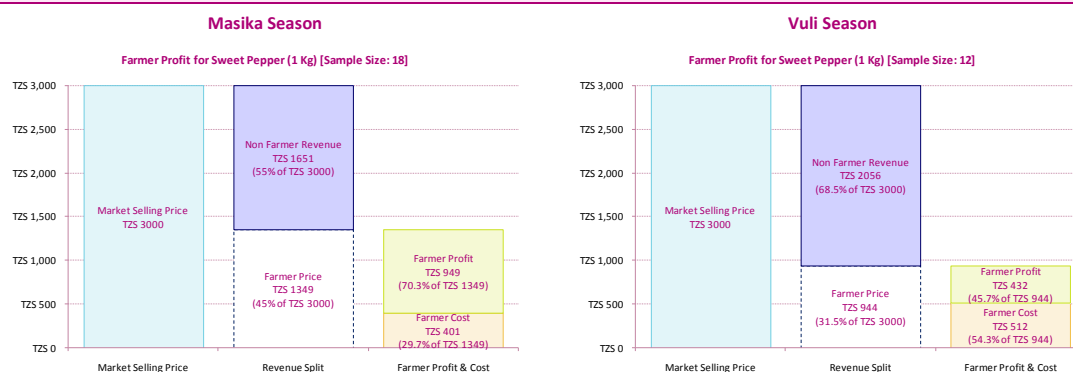


Figure 18: Crop Summary for Rice

		Masika	Vuli
	<b>Sweet Pepper</b>		
	Pilipili hoho		
	Market Selling Price (Per Kg):	TZS 3,000	TZS 3,000
	Received Farmer Price (Per Kg):	TZS 1,349	TZS 944
Proportion of final selling Price received by farmer:		45%	31.5%
Farmer Profit Margin:		70.3%	45.7%

**Proportion of Market Selling Price Received by Farmers and Breakdown of Farmer Profit and Loss**



- During the baseline survey, 18 farmers were found to sell Sweet Pepper in Masika and 12 in Vuli
- Farmers receive a higher proportion of the final market selling price in Masika (45% compared to Vuli (31.5%), which also translates to a higher amount of received revenue in terms of cash
- The lower cost of production in Masika (TZS 401 compared to TZS 512), further increases the actual amount of profit received by farmers in Masika per kg.

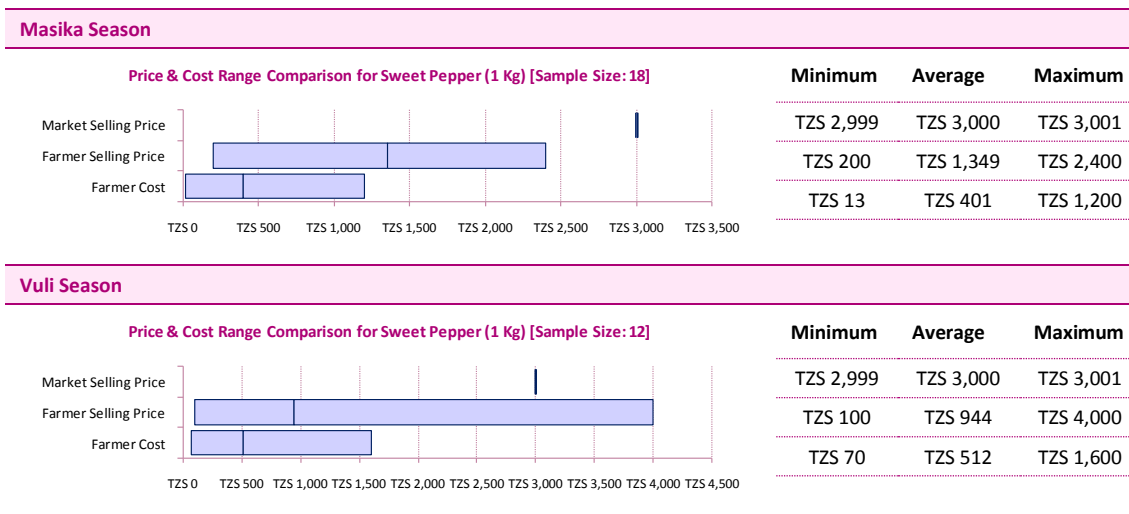


Figure 19: Crop Summary for Sweet Pepper

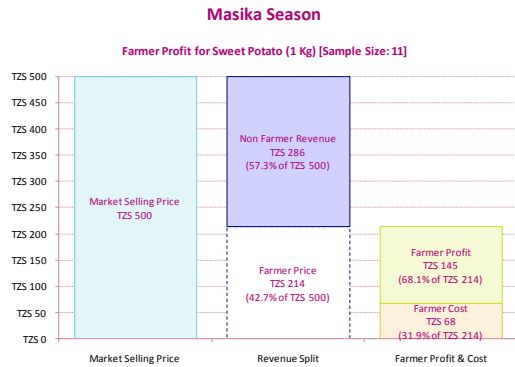
**9. Crop Summary: Sweet Potato** **Masika** **Vuli**



**Sweet Potato**  
Kiazi kitamu

Market Selling Price (Per Kg):	TZS 500	TZS -
Received Farmer Price (Per Kg):	TZS 214	TZS -
Proportion of final selling Price received by farmer:	42.7%	-
Farmer Profit Margin:	68.1%	-

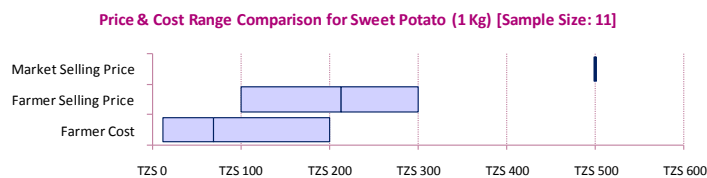
**Proportion of Market Selling Price Received By Farmers and Breakdown of Farmer Profit and Loss**



None of the farmers surveyed reported selling Sweet Potato in Vuli

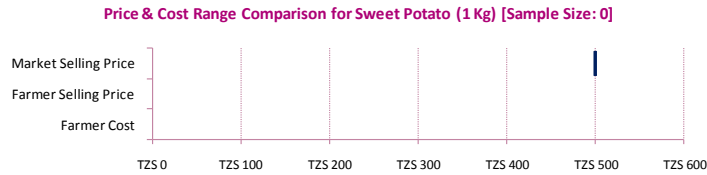
- During the baseline survey, 11 farmers were found selling Sweet potato in Masika and non in Vuli
- In Masika the proportion of the final market selling price received by the 11 farmers on average was found to be 42.7%.
- The average cost of production for the 11 farmers who reported selling Sweet Potato in Masika was TZS 214.

**Masika Season**



Minimum	Average	Maximum
TZS 499	TZS 500	TZS 501
TZS 100	TZS 214	TZS 300
TZS 12	TZS 68	TZS 200

**Vuli Season**



Minimum	Average	Maximum
TZS 499	TZS 500	TZS 501
TZS 0	TZS 0	TZS 0
TZS 0	TZS 0	TZS 0

Figure 20: Crop Summary for Sweet Potato

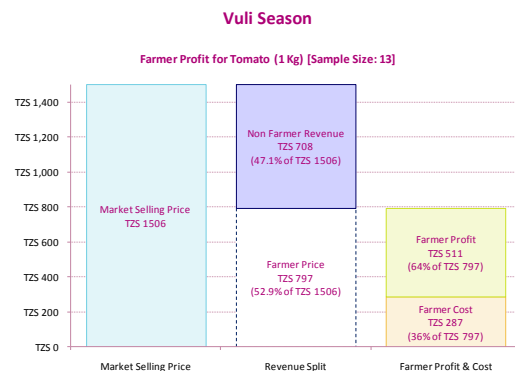
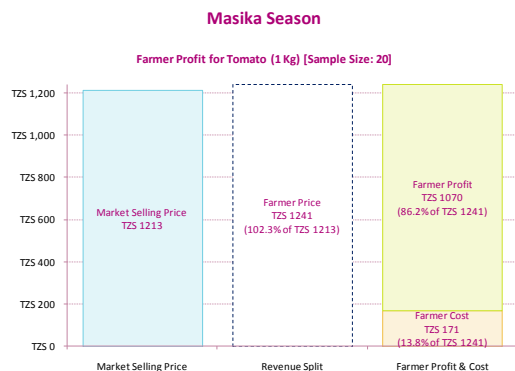
**10. Crop Summary: Tomato** **Masika** **Vuli**



**Tomato**  
Nyanya

Market Selling Price (Per Kg):	TZS 1,213	TZS 1,506
Received Farmer Price (Per Kg):	TZS 1,241	TZS 797
Proportion of final selling Price received by farmer:	102%	52.9%
Farmer Profit Margin:	85.9%	64.0%

**Proportion of Market Selling Price Received By Farmers and Breakdown of Farmer Profit and Loss**



## Value Chain Analysis of the Fruit and Vegetable Market for Smallholder Farmers in Zanzibar

- During the baseline survey, 20 farmers were found to sell Tomato in Masika and 13 in Vuli
- A very wide range of farmer selling prices was found to exist during the survey. Consequently, the average farmer selling price was found to be slightly above the average market selling price suggesting that farmers do better on average than other value chain actors. This is unlikely as it suggests that other supply chain actors make a loss when selling tomatoes.
- On average the cost of production in Masika was found to be lower than in Vuli (TZS 171 compared to TZS 287).

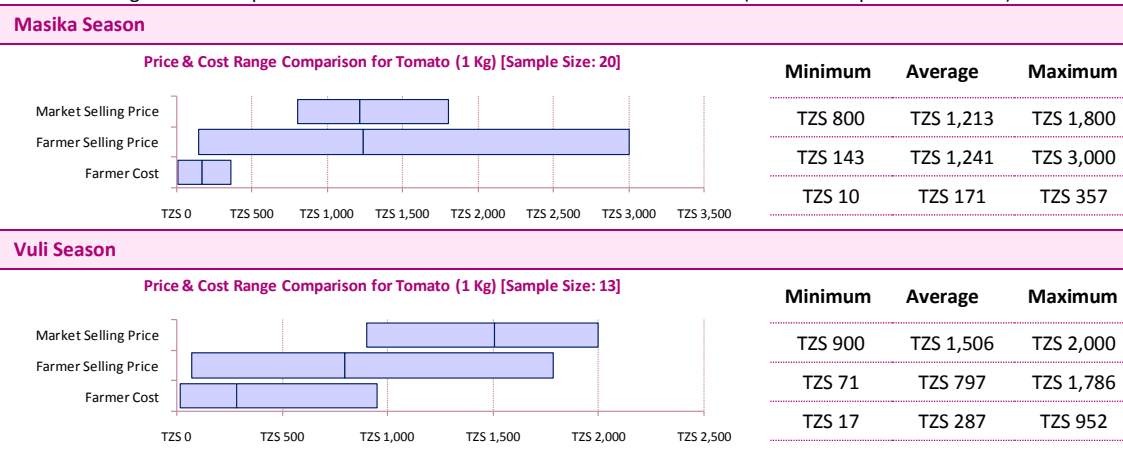

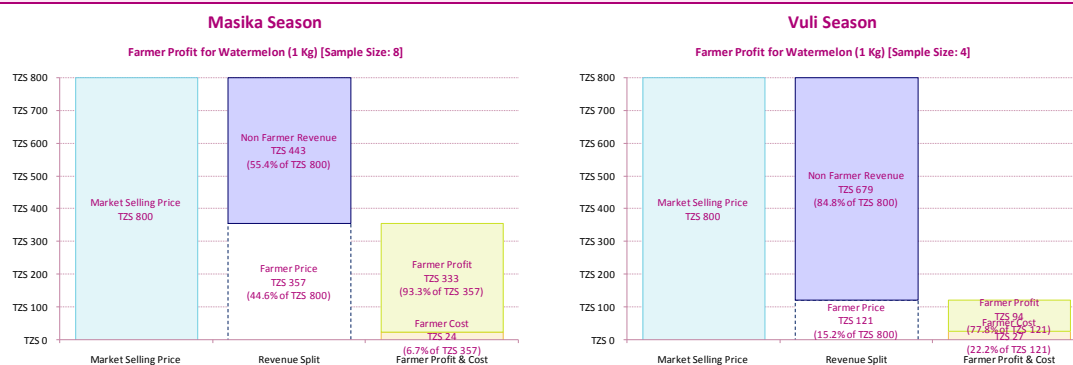


Figure 21: Crop Summary for Tomato

		Masika	Vuli
	<b>Watermelon</b>		
	Tikitimaji		
	Market Selling Price (Per Kg):	TZS 800	TZS 800
	Received Farmer Price (Per Kg):	TZS 357	TZS 121
Proportion of final selling Price received by farmer:		44.6%	15.2%
Farmer Profit Margin:		93.3%	77.8%

### Proportion of Market Selling Price Received by Farmers and Breakdown of Farmer Profit and Loss



- During the baseline survey, 8 farmers were found to sell Watermelon in Masika and 4 in Vuli
- Farmers receive a higher proportion of the final market selling price in Masika (44.6%) compared to Vuli (15.2%) which also translates to a higher amount of received revenue in terms of cash
- As the cost of production does not change significantly between Masika and Vuli (TZS 24 compared to TZS 27), receiving a higher proportion of the final market selling price also means farmers receive a higher amount of profit in Masika per kg

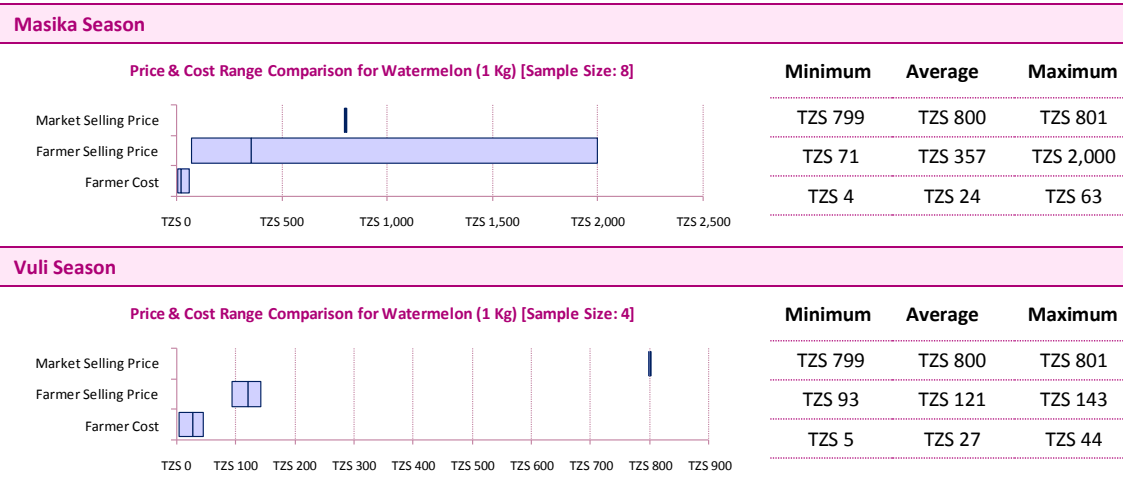


Figure 22: Crop Summary for Watermelon

### 7.3. Crop Price Variability

One of the primary difficulties that farmers in Zanzibar face is unpredictable variability in the received price for their produce. The following diagrams show the extent to which prices for individual crops were found to fluctuate across the year:

#### Received Farmer Price Variability

The following diagram shows the variation of received farmer price for each crop, relative to the average price, expressed in TSH. The bar is centred on the normalised average (0) and extends to the right by the difference between the highest price observed and the average price. Similarly, it extends to the left by the difference between the average and the lowest price observed.

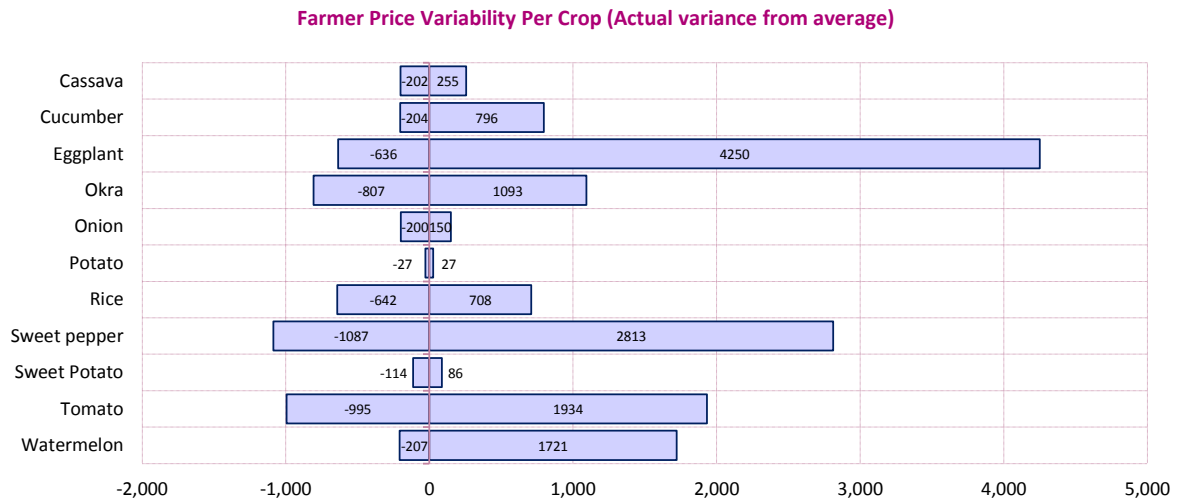


Figure 23: Summary of Observed Farmer Price Variability per Crop

However, whilst this figure shows that Eggplant has the largest variation in price in monetary terms by Kg, it does not imply that Eggplant has biggest variation of price relative to its average price. For example, if a crop sells for 100TSH on average with prices ranging from 95TSH to 105TSH (Variance: 10TSH) then, in relative terms, the price only varies by  $\pm 5\%$ . However if a crop sells for 10TSH on average with prices ranging from 5TSH to 15TSH (Variance: 10TSH) then, in relative terms the price varies by  $\pm 50\%$ . The following figure shows Farmer Price Variability expressed as a percentage variation of average price:

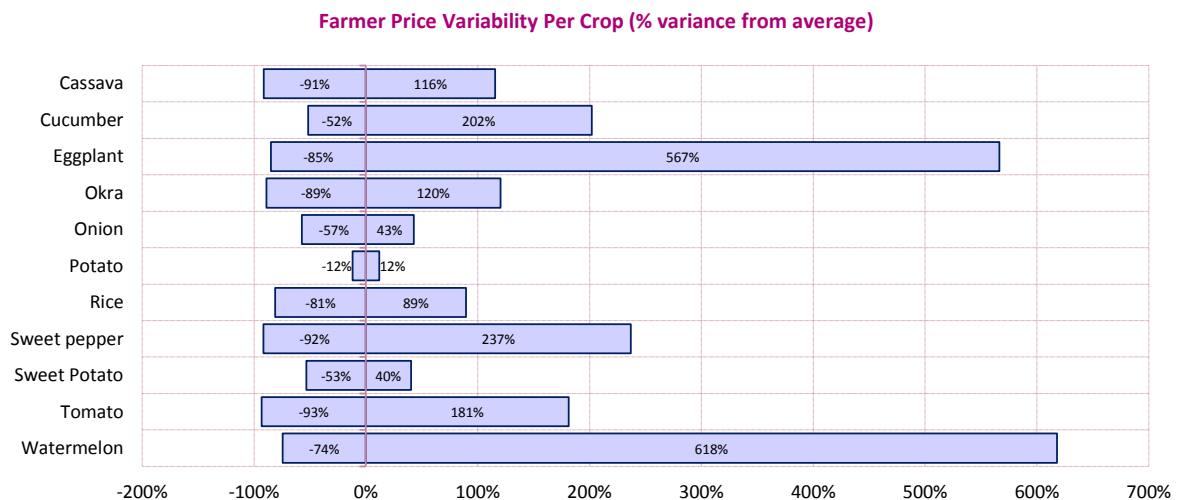


Figure 24: Summary of Observed Farmer Price Variability per Crop (as a % of average crop price)

Comparing the previous two figures we can see that whilst the amount of money that farmers receive for 1kg of Eggplant varies considerably more than Watermelon, the price received for Watermelon is almost as unstable, with the highest selling price being many times greater than the average price at some points.

**Received Farmer Price Sensitivity to Market Price**

To understand the extent to which received farmer price changes in response to changes in the final market selling price, the correlation between the range of price variations was calculated. In the graph below, crops in the bottom right hand corner are relatively insensitive to price variations (meaning that the farmer’s received price doesn’t change much even if the final market price changes a lot) and crops in the upper left hand corner are highly sensitive to price variations (they change a lot for a small change in final market price):

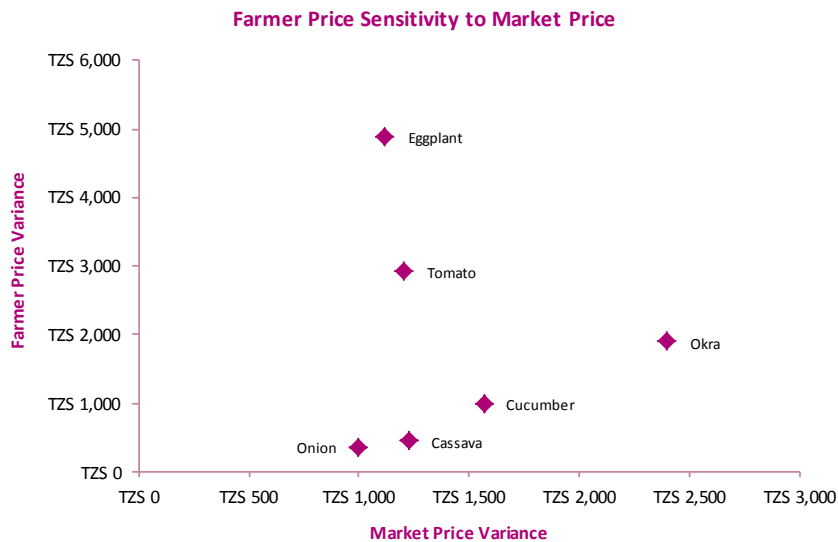


Figure 25: Received Farmer Price Sensitivity to Market Price

This graph shows that there appears to be very little correlation between these two prices in general, with sensitivity varying widely between different crop types. Of the six crops for which sensitivity could be calculated given the available data, Eggplant was found to be the most sensitive a small change in Market Price resulting in a large change in received farmer price.

Conversely, Onion and Cassava were found to be relatively insensitive with large changes in market prices having only a small effect on received farmer price. This is likely to be a result of the imbalance in bargaining power between farmers and other supply chain actors who, in general, have better access to market information than farmers and can therefore can ensure the received farmer price remains low even when the final market selling price increases.

**7.4. Market Channel Comparison**

To understand the effect of different routes to market on received farmer price, a comparison between the two major supply chain routes was performed:

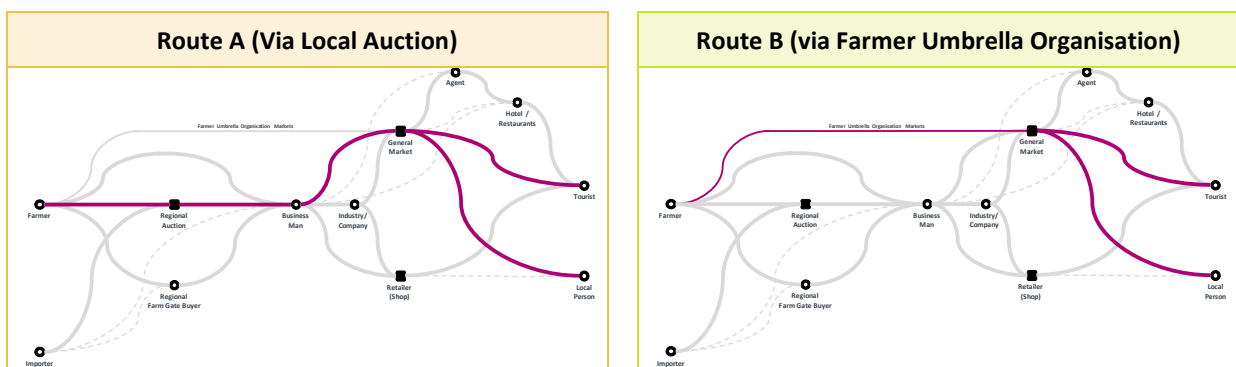
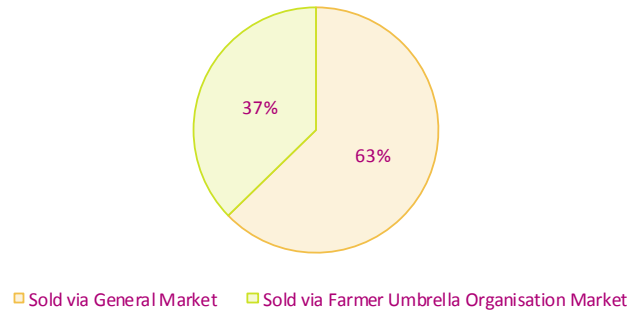


Figure 26: Visual Representation of Supply Chain Routes Analysed

During data collection, farmers were asked whether they sold produce at farmers markets organised by Farmer Umbrella Organisations in addition to local regional auctions. Using this information, the quantity of crops sold and the average farmer price per crop for each route was calculated. The overall proportion of produce found to flow down each route is shown in the following figure:

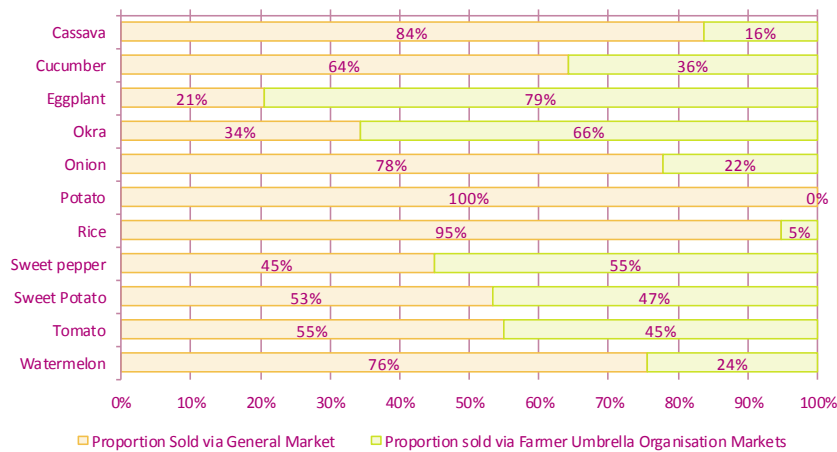
**Proportion of Overall Crop Quantity per Market Channel (Kg)**



**Figure 27: Proportion of Crop Quantity per Market Channel**

A detailed breakdown of this flow revealed significant variation of market channel preference per crop:

**Proportion of Each Crop Sold per Channel**

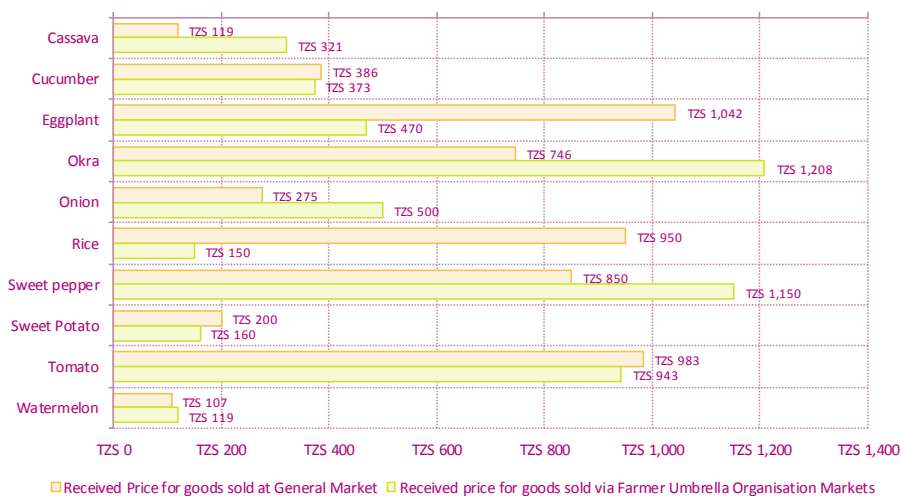


**Figure 28: Detailed Breakdown of Crop Quantity per Market Channel**

**Comparison of Average Crop Price per Market Channel**

Finally, the average selling price of each crop per Market Channel was calculated across the year:

**Crop Average Selling Price Comparison across the Year**



**Figure 29: Comparison of Average Crop Selling Price per Channel**



In general, this analysis suggests that selling crops via Farmer Umbrella Organisation Markets enables farmers to receive a higher average price for their produce than otherwise which is as expected as the market channel eliminates a number of other actors (e.g. Middle Men and Traders etc.). However, the increase in average selling price for most crops appears to be relatively small, suggesting that something is preventing farmers using this route obtaining the same market selling prices as the established traders and middle men.

### 7.5. Role of Importers in the Supply Chain

Importers source produce from abroad and arrange for it to be transported to Zanzibar for sale. In Zanzibar the majority of importers are small businesses (rather than large enterprises) involving one party in Zanzibar sending Market Information about predicted demand in Zanzibar to a contact on the Mainland (or other foreign location) who then sources and ships the produce to Zanzibar. The Zanzibar party receives these goods at the port and transports them to local market auctions for sale:

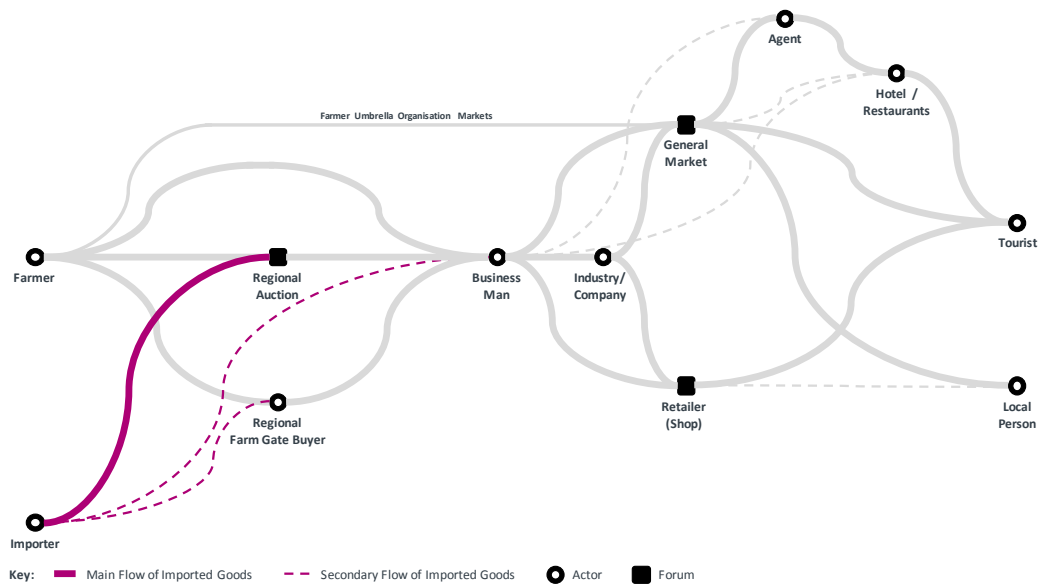


Figure 30: Entry of Importers to the Fruit & Vegetable Value Supply Chain in Zanzibar

Consequently, importers tend to compete directly with farmers at each location that farmers typically interface with the wider supply chain. This is significant, as produce must be aggregated and packaged for shipping, importers also perform a number of wholesaler services which allow them to benefit from economies of scale. This means the importer is in a very strong competitive position relative to the farmers enabling them to undercut the farmer price and reduce the profit potential of the farmer.

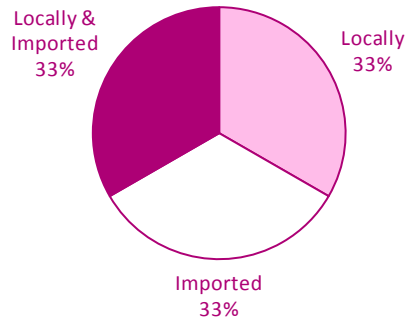
### 7.6. Direct Supply to Hotel / Restaurants

The majority of farmers in Zanzibar are smallholders so do not have the capacity to meet agreements for hotels and restaurants as they require a large quantity of high quality produce regularly. This is a problem as the farmers are dictated by seasons to grow specific crops and they have a small area to cultivate. Farmer Umbrella Organisations work to create network of farmers that together have greater capacity and so are more likely to be able to meet these demands.

In order for these associations to work there are various factors that are critical for their success. For example, the farmer has to trust that the association will provide them with a competitive price compared to the price that suppliers would offer them, and they need to make sure they are reliable in paying on time. If trust is lost between the association and farmers, it will have a negative effect on any agreements the farmers associations have and their ability to fulfil them as the farmers will return to other methods in getting their produce to market. This failure to fulfil agreements will in turn damage the reputation of the association within the tourism industry, preventing future business within this sector.

To get an overview of where the tourism industry in Stone Town buy their fruit and vegetable produce, 10 hotels and restaurants (chosen at random in Stone Town) were informally surveyed to find out where they source their supply:

**Where Stone Town's Hotels Source Food [Sample Size: 10]**



**Figure 31: How Stone Town's Hotels Source Produce**

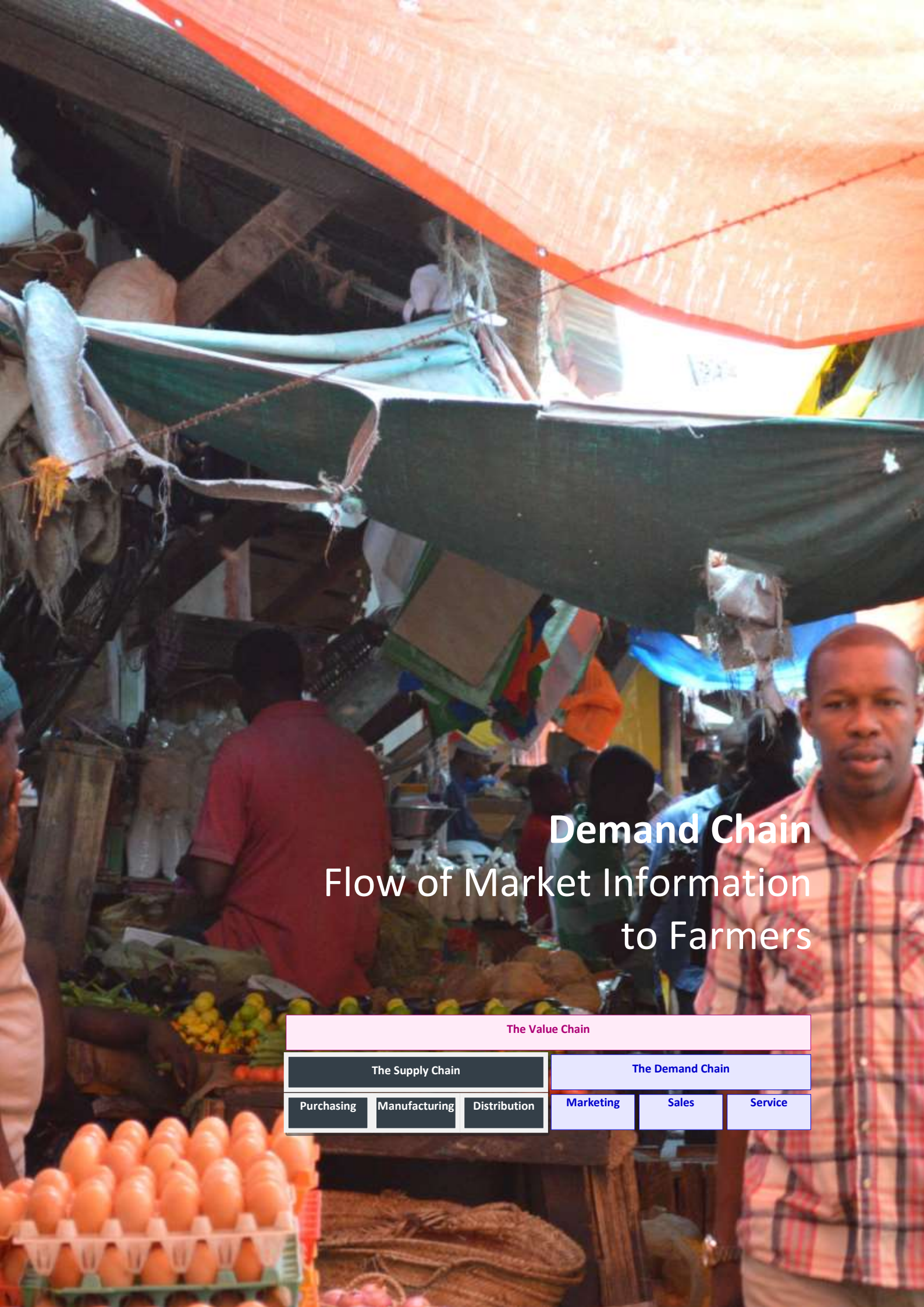
Hotels were then asked for their reasoning behind their choice of supplier. The results are shown below:

**Reasons Hotels Buy From Their Existing Suppliers [Sample Size: 10]**

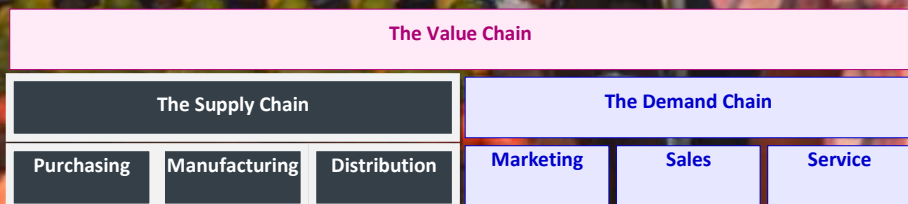


**Figure 32: Reasons Stone Town's Hotels Source Produce from Existing Suppliers**

If Zanzibar’s farming communities and Farmer Umbrella Organisations wish to become long term suppliers of produce to Zanzibar’s hotels and restaurants, it is important that they set themselves up in order to provide services that demonstrate the above criteria. Being able to promote that they serve locally grown produce is useful to hotels, but it seems likely that being able to guarantee supply will continue to be more important as customers that cannot eat are likely to be far less satisfied than those who are only able to eat imported food.



# Demand Chain Flow of Market Information to Farmers



## 8. Fruit and Vegetable Demand Chain Analysis

**The Fruit and Vegetable Demand Chain in Zanzibar is immature, with poor visibility of market information (e.g. demand) for producers, limited sales and transaction support and no ‘after sales’ services / satisfaction feedback. Whilst some innovative schemes are beginning to address these issues, there is a considerable way to go.**

### 8.1. What is Market Information?

Market information, sometimes referred to as Market Intelligence, is data that provides visibility of demand and supply in a particular market. In the fruit and vegetable agricultural sector, this primarily refers to current and trend information regarding the following:

Specific Crop Information	Example Decisions Informed / Supported
Maximum Supply Capacity	What is the maximum amount of Casava that could be grown this season?
Available Stock throughout the Pipeline	How much Casava has been produced but not yet sold to the final consumer?
Demand Level per Customer Segment (Group)	How much Casava are hotels typically ordering at this time of year?
Final Selling Price	What is the average selling price of Casava at this time of year? To what extent does this fluctuate throughout the year?
Import Availability / Price	How much Casava is available for import and at what price at this time of year?

Table 2: Market Information Types (Nb. This list is not exhaustive) [6]

This information on the current situation and the outlook for agriculture shapes expectations of future prices and allows markets to function more efficiently. Better information to governments and market actors can improve transparency and enhance the market functioning by allowing each party to make decisions about what to grow / buy and the price at which they can expect to sell it. Additionally, It can also underpin policy choices and market behaviour, reducing the number and size of price fluctuations and panic-driven price surges. [6]

### 8.2. Flow of Fruit and Vegetable Market Information in Zanzibar

The market information model in Zanzibar is primarily ‘push’ driven where sellers throughout the supply chain actively generate demand for their produce via various marketing activity and adjusting price. Market “Push” tends to be based on independent transactions at each step, or between each node. Products may often be sold into a crowded and competitive market. The farmers are largely isolated from the consumer, and from the demands and preferences of consumers. [4]



Price Visibility

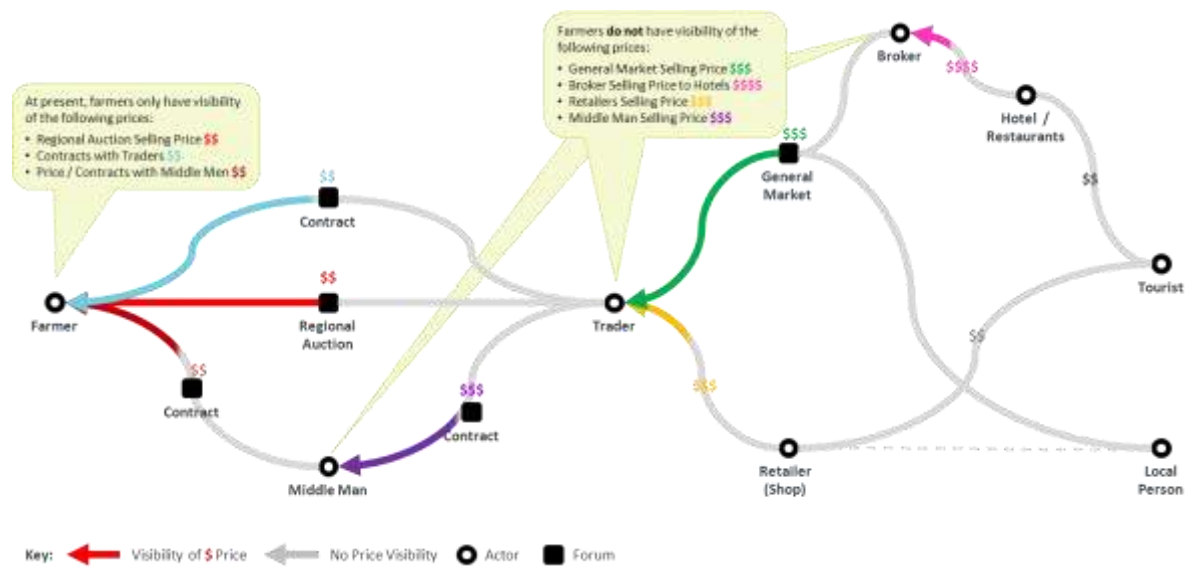


Figure 33: Farmer Price Visibility in Zanzibar (excl. Farmer Umbrella Organisations)

However, this situation is beginning to change with the establishment of umbrella farmer organisations, such as JUWA and UWAMWIMA. In addition to providing alternative routes to market, these organisations also assist in the distribution of market information (e.g. Prices) from General Markets and Brokers:

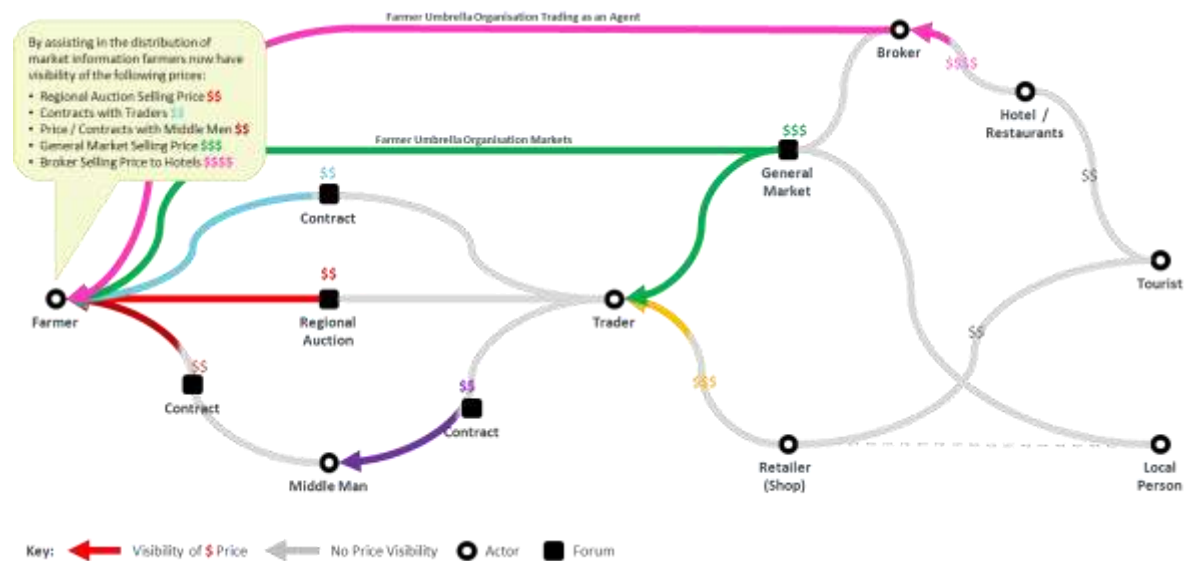


Figure 34: Farmer Price Visibility in Zanzibar (incl. Farmer Umbrella Organisations)

Farmer markets and promotional events organised by these umbrella organisations, in addition to other market information distribution services they provide (e.g. sending SMS messages to their members on a regular basis with the latest prices of fruits and vegetables), enable farmers to gain visibility of the final selling price of goods.

8.3. Methods of Distributing Market Information in Zanzibar

The vast majority of market information in Zanzibar is exchanged informally via working relationships between certain groups of actors. However a number of innovative new methods of Market Information distribution, based on new technology such as mobile, are now emerging as viable options:

### **Planning and Marketing Committees**

Some farmer umbrella organisations are considering creating PMCs (Planning and Marketing Committees) which are intended to meet regularly to discuss the latest market prices and then pass this information back to the individual farmer members within their group. These committees are also responsible for working with farmers to help them improve their packaging and presentation methods in order to help them sell their produce for a higher price.

### **Mobile Market Information SMS Services**

The farmer umbrella organisation sends regular SMS messages to all their members containing the latest market information. Zantel provides the Farmer Umbrella Organisation with access to a special website which allows someone to type a message and send it (as an SMS) to a large list of phone numbers. The umbrella organisation is able to buy bulk packs of discounted SMS messages (e.g. 5000 SMS messages) from Zantel.

Up-to-date, reliable Market Information reduces the risks and lowers the transaction costs for farmers and other actors participating in the agricultural value chain. These efficiency gains lead to a number of benefits including:

- Increased ability of farmers to participate in the agricultural value chain
- Greater stability of prices by enabling farmers to adjust supply to meet demand
- Reduction of bargaining power inequality between farmers and other value chain actors

There is already widespread adoption of mobile phones amongst the farming community making this an ideal way of sharing information to farmers who are spread out across Zanzibar..

### **Mobile Farmer Tariffs**

When farmers join a farmer umbrella organisation their number is added to a special Zantel 'pot' of numbers which contains the numbers of all the other members. Each month the farmer can choose to buy a special Zantel bundle for a fixed price which allows them to make unlimited calls to any of the other numbers in the 'pot' for free that month. If the farmer chooses to leave the farmer umbrella organisation, their number is removed from the 'pot'.

This service reduces the cost of obtaining market information for farmers by enabling them to call each other for free to exchange ideas on agricultural issues, marketing etc.

### **Z-Kilimo Service**

Z-Kilimo is a free SMS service provided by Zantel which provides a number of agricultural services. This service can be accessed from any Zantel mobile phone by dialling: \*149\*50#. This service is available in Swahili and English and is free of charge but there must be some credit on the phone.

Z-Kilimo provides a virtual notice board for farmers to advertise their produce and request information that will help them grow their crops. By removing the geographical constraints farmers face with regard to obtain marketing information, and the associated time and money cost of having to travel around Zanzibar to get this, Z-Kilimo allows farmers to be more informed whilst enabling them to spend more time working on their farms. Additionally, as the Z-Kilimo service knows the location of each farmer, the information requested by the farmer can be contextualised to make it specific to them.

## **8.4. Marketing: Raising Awareness of Produce**

The primary issue with marketing produce in Zanzibar is that the prices and availability of produce vary dependent on the season but hotels and restaurants do not always change their menu with the season. As such, a price list or guarantee cannot be made or would have to be updated regularly depending on the quantity harvested at this time as when the market is flooded the cost is reduced. In contrast the suppliers and those importing from mainland have a fixed price for the duration of the agreement as they will find somewhere to source the produce regardless of season.



Based on our observations and conversations with farmers, the following methods appear to be the primary mechanisms through which produce is promoted in Zanzibar:

#### **Selling at local market**

A regular presence would mean that the customers would know the farmer would be there although what produce and quantity they have is not likely to be known prior to the day

#### **Approaching hotels and restaurants themselves**

When questioning of hotels we found an example of where a farmer would directly go there and on occasion their goods would be purchased. This is a great risk to the farmer as they incur costs before they have sold anything - our baseline surveys highlight that many would like to go to market but cannot afford to do so due to daladala costs (produce and travel costs, dependent on size but often between TZS 500 and 1,000). Also a risk is the majority of hotels have existing agreements with suppliers so they may go and not sell any produce as it is not required

#### **Word of mouth**

This is particularly strong in close communities but there is a limit to how far the knowledge would reach. It is likely to go to neighbors and not form business connections or reliable markets.

#### **Farmers associations**

Arguably the most effective as they have access\* to more marketing channels than an individual farmer may have including:

- Leaflets promoting buying locally
- Leaflets promoting local markets
- Social media e.g. promotion on Facebook page
- Campaigning
- Events
- Organised markets bringing their farmers together

\*access is key here. An individual farmer may set up his own Facebook page or leaflets but this requires resources and time that many do not have to spare. It is also questionable whether it is worth an individual farmer doing so.

### **8.5. Marketing: Packaging and Processing**

In order to get farmers to work as a business and work beyond subsistence farming, they are encouraged to add value to their produce. Such 'value adding' includes making:-

- Jams
- Juices
- Sauces (including tomato and pilipili)
- Ice creams

Another example of value addition is packaging with the use of jars, bottles and labels. The intention is that this could open their sales to tourists who presumably would pay a higher premium for the goods compared to locals.

From our observations so far and the baseline survey, little time is spent on packaging and manufacturing the goods, for example juices and sauces are in unlabelled reused plastic bottles. Long term volunteers have attributed this lack of focus on value addition to the farmers lack the time and patience. Further it is clear that in order to do so an amount of initial capital is required to invest in the materials required. This model of adding value is also reliant on the farmers having access to reliable markets.

## 8.6. Sales: Financial Flows

The flow of finance is outside the scope of this report, but it emerged as a key challenge following discussion with a large number of farmers so a high level description is included here.

At present, money tends to move independently between actors next to each other in the supply chain. In addition to creating barriers to market information flow (e.g. prices) this also can result in cashflow issues towards the end of supply chain where supply must be aggregated to fulfil large customer orders and/or contracts. For example, many farmers expressed dissatisfaction at often having to return to town the following day to collect their payment from wholesales and/or farmer umbrella organisations as these organisations do not have sufficient capital reserves to pay the farmers upfront before they have received payment for the sold goods from the final customer.

Additionally, supply chain actor access to credit across the supply chain also varies considerably across the supply chain, with small scale farmers often unable to access credit due to lack of assets against which these loans can be secured.

There a number of initiatives and services underway in Zanzibar that aim to help resolve these financial issues associated with the supply chain:

### **Farming Community Microfinance Schemes**

The majority of smallholder farmers in Zanzibar are unable to access credit from traditional channels (such as banks etc.) due to a lack of assets against which these loans can be secured. Unsecured loans from other brokers typically have interest rates - making them unsuitable for the majority of farmers in Zanzibar who follow the Islamic faith.

A number of Farmer Umbrella Organisations (such as UWAMWIMA) have set up innovative microfinance schemes where farmers in particular areas create communal pots of money which they lend out between themselves. Additionally, larger loans are available from centralised funds owned and managed by the Farmer Umbrella Organisation.

### **Mobile Banking and Transaction Services (e.g. EzyPeza)**

This concept involves establishing local Mobile Money Agents within farming communities to enable farmers to receive income and send microfinance repayments. In rural areas where there are currently no Ezy-pesa (or other mobile money) agents, a nominated farmer is registered with Zantel as an Ezy-pesa agent. Farmers in this rural area can then use this farmer to access Ezy-peza services rather than having to travel to town each time. This will allow farmers to:

- Receive payment from Farmer Umbrella Organisations rather than having to travel to town another day to collect their payment
- Making repayments for microfinance loans from Farmer Umbrella Organisations

The adoption of Ezy-Peza services by farming communities would have benefits across the value chain as it streamlines the flow of capital between parties (e.g. Hotels > Farmer Umbrella Organisation > Farmers).

The major benefit of this is that it avoids the need for the person paying and the person being paid to be in the same place at the same time. From the perspective of farmers, this means they don't have to make multiple trips to town to collect payment where payment is not available when they initially bring their goods to town. In addition to avoiding having to pay two sets of daladala fares, this also allows farmers to spend more time on their farms.

## 8.7. After Sales Service: Customer Satisfaction / Feedback

During the analysis, no examples of customer satisfaction being measured, or formal feedback regarding the quality of the received produce, were encountered. Instead, customer feedback is expressed primarily through footfall, with customers dissatisfied with a previous purchase simply choosing not to make any future purchases from the seller concerned.



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# About the CASH Project

This document was produced as part of the Commercial Agriculture for Smallholder Farmers (CASH) project which aims to empower smallholder farmers to participate in the market and transform agriculture from a subsistence activity to a profitable enterprise.

## References

The project is supported by Cordaid and Accenture, and is implemented by VSO in collaboration with Uwamwima, JUWA, UWZ and KATI. The project operates in the framework of VSO Tanzania Secure Livelihoods Programme

which aims to improve agriculture value chains by ensuring smallholder farmers have access to productive resources (land, microfinance), appropriate technology (irrigation, seeds), good agriculture practices and market linkages.

For more information please visit:  
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