Ministry of Foreign Affairs

The Zimbabwean Fruit and Vegetable Sector

Standards for export and agro-processing

Commissioned by the Netherlands Enterprise Agency

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The Zimbabwean fruit and vegetables sector

Standards for export and agro-processing

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Qpoint quality in agri & food

Commissioned by: Netherlands Enterprise Agency

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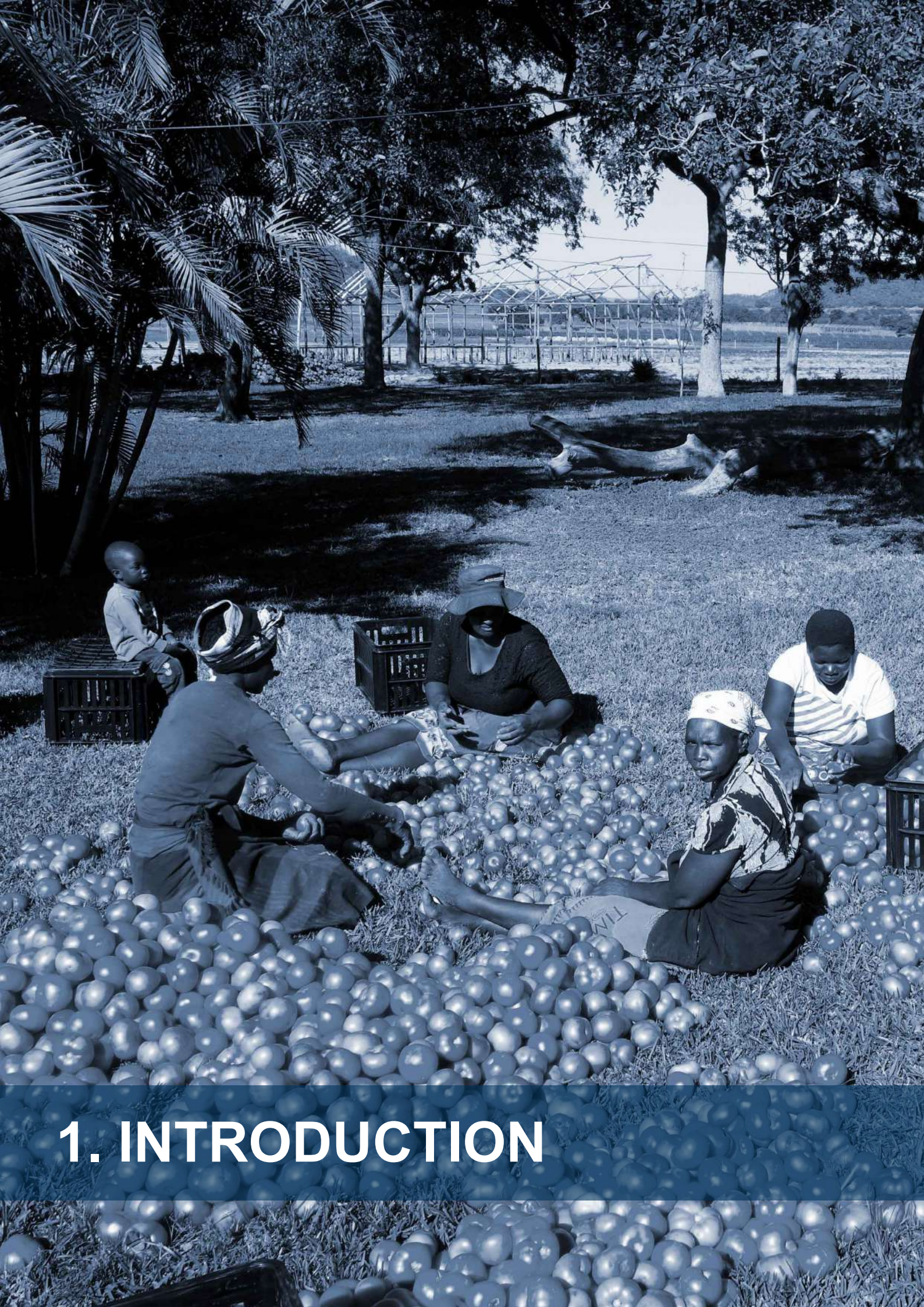
Contents

List of figures

List of tables



1. INTRODUCTION

The Netherlands Enterprise Agency (RVO) and the Embassy of the Kingdom of the Netherlands in Harare, Zimbabwe (EKN) have commissioned a scoping study to identify the feasibility of the adaption and implementation of internationally recognised market driven food safety and quality management systems in Zimbabwe.

This study offers an in-depth overview of the fruit and vegetables agro-processing sector in Zimbabwe. It describes the value chain in terms of structure, actors and their position in the value chain. Based on the analysis, bottlenecks of the industry are identified in order to uncover opportunities for further development. More specifically, this study has been conducted with the aim to inform the Embassy of opportunities whereby Dutch experts and businesses can be mobilised to contribute to the development of the value chain. The study objectives are:

- **Identification of the feasibility of the adaption and implementation of internationally recognised market driven food safety and quality management systems in Zimbabwe.**

- **Identification of the bottlenecks and opportunities in the fruit & vegetables agro-processing value chains.**

- **Outlining of strategies and a roadmap on how Dutch experts and businesses can engage in the implementation of international food safety and quality management standards in the fruit and vegetables value chain in Zimbabwe.**

The higher purpose of the value chain analysis is to prepare a roadmap with interventions to support local companies in closing the gaps in quality and safety standards, enabling them to develop their export through creating lucrative partnerships with Dutch enterprises.

2. METHODS

2.1 Study assumptions and definitions

To assess the feasibility of implementation of internationally recognised market driven food safety and quality management systems in the fruit and vegetables sector with a focus on agro-processing it is necessary to define the concepts ‘agro-processing’ and ‘food safety and quality management systems’. In the following section both concepts will be addressed and defined.

Agro-processing

A common and traditional definition of the agro-processing sector refers to a subset of the manufacturing sector that process raw materials and intermediate products derived from the agriculture sector (FAO, 2009). This simply means the transformation of raw materials and of intermediate products originating from agriculture (crops), forestry and fisheries.

The processing industry covers a broad range of activities. Suppliers’ activities include growing crops, raising animals, harvesting timber and other plants and animals on farms or from their natural habitats. Following UNIDO practice, the agro-industrial sector covers the following eight manufacturing industries:

1) food and beverages
2) textiles
3) wearing apparel
4) tanning and dressing of leather
5) wood and wood products
6) paper and paper products
7) rubber products
8) tobacco products

In consultation with the Embassy of the Kingdom of the Netherlands in Harare, the focus of this study has been limited to the horticulture sector in Zimbabwe, more specifically the production and processing of fruit and vegetables. The horticulture sector is currently perceived as underdeveloped, yet it has a great potential to develop a strong global competitive position due to its fertile lands and beneficial agro-ecological climate, thereby providing economic benefits for the country and supporting Zimbabwe in its sustainable economic growth.

In addition, the Netherlands offers valuable knowledge and experience as the world’s second largest agricultural exporter. The Dutch horticulture sector has a leading international position in vegetables, fruits, ornamentals, flower bulbs and trees. Within these product groups, extensive experience in breeding and production is combined with extensive industrial activities in support, logistics and services. With a focus on potential economic benefits, this study extends the definition beyond manufacturing/transformation and includes value addition through handling, logistics and other post-harvest services. Such as keeping products fresh (maintaining the cool chain) and transporting them quickly from farm to shelf adds value .

Value is also added through packaging and processing. The large-scale packaging and preparation of fresh fruit and vegetables also fall into this category. As with the concentration of input suppliers and the kind of products they provide farmers (e.g. seed suppliers), fresh-produce exporters also shape agricultural production by influencing producers with their sourcing decisions. At the other extreme, agricultural processing can involve the transformation of agricultural raw materials into a variety of processed products. (UNIDO, Global value chains in the agrifood sector, 2006).

Based on the above we have defined agro-processing as: “the post-harvest activities involving the transformation, preservation and preparation of agricultural raw materials and intermediate products for intermediary or final consumption. It comprises of artisanal, minimally processed and packaged agricultural raw materials, the processing of intermediate goods, and the fabrication of final products derived from agriculture” (AFDB, 2017).

Food safety and quality management systems

The term food safety and quality management systems consists of two components: food safety, and quality management systems. Food safety refers to hazards, both chronic and acute, that could negatively impact the health of the consumer, there is a clear distinction from food quality, which includes all other factors that influence a product's value to the consumer. As such, food safety includes negative attributes such as spoilage, contamination with dirt, discolouration, off-odours and positive attributes such as the origin, colour, flavour, texture and processing method. The distinction between safety and quality is connected to the development of public policy and influences the nature and content of the global food control system. Food control is defined by WHO and FAO as:

"..a mandatory regulatory activity of enforcement by national or local authorities to provide consumer protection and ensure that all foods during production, handling, storage, processing, and distribution are safe, wholesome and fit for human consumption; conform to safety and quality requirements; and are honestly and accurately labelled as prescribed by law." - (WHO, 1997)

Enforcing food laws that protect consumers from unsafe, impure and fraudulently presented food is the main responsibility of food control systems.
The second component of Quality Management Systems (QMS), is defined by Rotaru as:

"..a set of coordinated activities to direct and control an organization in order to continually improve the effectiveness and efficiency of its performance."
- (Rotaru, 2005)

The set of coordinated activities refers to the standards that are used to ensure compliance to the food safety and quality regulations as prescribed by food control systems. However, implementation of standards is not always compliance driven. In recent decades the development of private standards has become increasingly important in the food sector. Private standards refer to labels used by private companies to differentiate their products by guaranteeing superior safety, quality and environmental standards. Implementation of standards here is not driven by compliance but driven by marketing value and demand. Considering the above, we define food safety and quality management systems as:

The standards that are applied either voluntary or mandatory to comply with national and international food laws. Food safety and quality management systems and standards will be used interchangeably in this paper.

2.2 Approach

This study has taken a value chain approach and can be categorised as an exploratory study. The study started with qualitative data that at the end of the research process led to concrete findings as a result of observations. Desk-research was combined with primary data collection in Zimbabwe. Multiple value chain stakeholders were studied as separate cases to understand the differences and the similarities between the cases. Multiple case studies can be used to either augur contrasting results for expected reasons or augur similar results in the studies. This approach supports the objective to understand the complex dynamics of the Zimbabwean fruit and vegetables agro-processing value chain.

Value chain approach

The agro-processing value chain is central to the approach of this study. The 'Value Chain System' concept as developed by Porter can be applied at firm level as well as at chain actor level (group of firms) (Porter, 1985). For this study we applied the concept at chain level by analysing the agro-value chain and its full range of activities, goods and services needed to create a product or service for the final consumer. It is a market systems approach that seeks to understand the wide range of stakeholders that operate within an industry. These stakeholders can be labelled as chain actors, service providers or influencers that make up the enabling and constraining environment of the industry. This approach provides a broad scope for industry analysis and therefore enables to create a holistic overview of the market system with all its bottlenecks and opportunities and its environment.

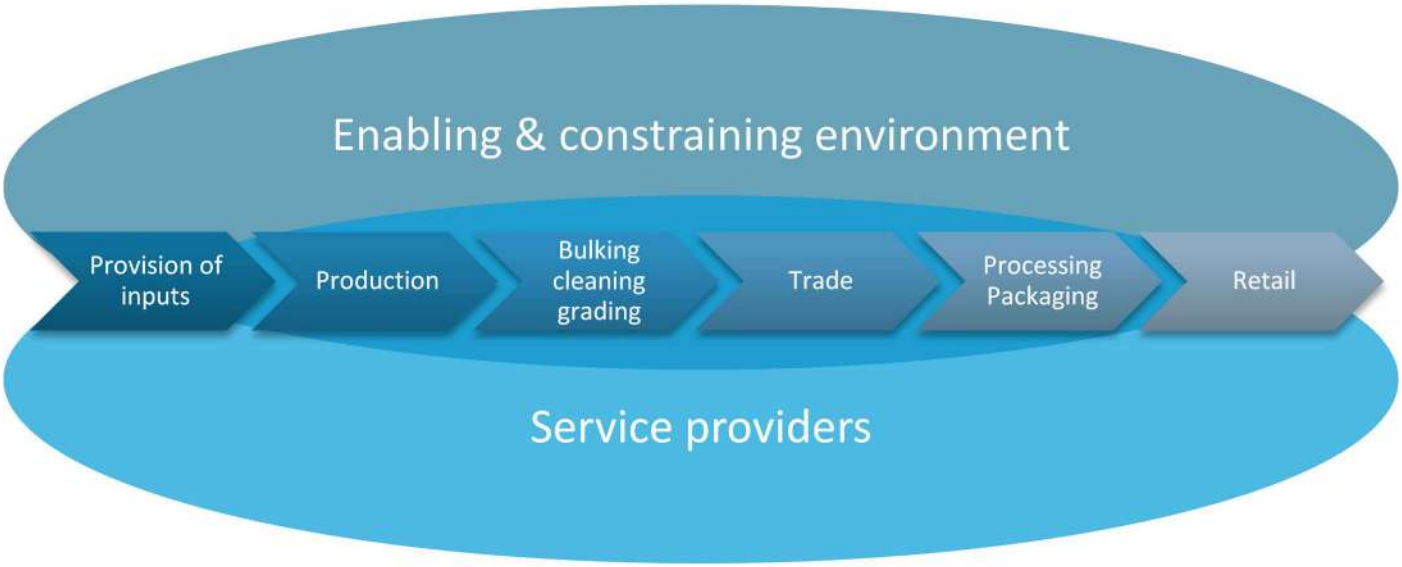


Figure 1 – Schematic overview of the value chain approach. Source: Author

Desk study

Throughout all phases of the study, a desk review of existing literature provided important input for the analysis. The first stage of the study involved an extensive literature review in order to gain a deep understanding of Zimbabwe, its horticulture sector and the fruit and vegetables value chain. The review allowed initial mapping of the value chain and understanding the context in which the stakeholders operate. Furthermore, stakeholder identification and selection for the key informant interviews, and development of semi-structured interview checklists was done based on the desk study. The review of literature throughout the study provided valuable input for the comparison of fieldwork results (key informant interviews and focus group discussion) with factual data.

Semi-structured interviews

The second stage of the study comprised of in-depth interviews with key stakeholders. Criteria for the selection of stakeholder engaged in the fruit and vegetables value chain were:

- Organisations engaged as chain actors.
- Dutch importers of fruits and vegetables from Zimbabwe.
- Organisations providing support services.
- Organisations influencing the environment of the value chain.

A wide range of chain actors was selected, from producers to retailers, in order to comprehend the different perspectives along the value chain and the experiences of both small and large enterprises. Dutch importers were selected to gain understanding from a European perspective. Finally, supporting service providers and stakeholders influencing the industry's environment were selected in order to gain understanding of the context in which the value chain operates.
Semi-structured interviews were conducted face-to-face in May and September 2019 with stakeholders based in Zimbabwe. A total of 33 persons were interviewed, divided over 9 designations (Figure 2). Interviewees include amongst others government officials from the ministry of agriculture, manufacturing and quality managers at agro-processing companies, food safety and sourcing managers at international traders and farmers. A complete list of interviewed stakeholders is presented under Annex 1 - List of interviewees. During the visits to the stakeholders in Zimbabwe, valuable observations that contributed to the analysis were made. Additional interviews with Dutch importers about the current state of Zimbabwe's export market were conducted over the phone. An overview of field visits is presented in Table 1.

Figure 2 - Primary interviews by designation. Source: Author

Focus group discussion

In order to validate the preliminary findings, a focus group discussion was organised in November 2019. Preliminary findings and recommendations of the study were presented to the sector stakeholders and thoroughly discussed. Valuable inputs from the discussions were incorporated in the report and allowed for triangulation by comparing data from the literature review with the individual key-informant interviews and the data from the focus group discussion.

Competitive analysis

In order to address the study objectives in a concrete manner, a competitive analysis was conducted at three levels: country context level, sector level and value chain level. The distinction of the three levels allowed for an approach from different perspectives which starts with the outer layer, where context related issues are addressed, to the inner layer of the study, where sector and value chain specific issues are addressed. The three frameworks used for analysis are: PESTLE, Porter's five forces and SWOT. The first level, the context level, used a PESTLE analysis. This is a framework to analyse the key factors (Political, Economic, Sociological, Technological, Legal and Environmental) influencing an organisation from the outside. For the second level, Porter's Five Forces analysis was applied. Porter's Five Forces Framework is a tool for analysing competition of a business. It draws from industrial organisation economics to derive five forces that determine the competitive intensity and, therefore, the attractiveness of an industry in terms of its profitability. At the third level, the SWOT framework was applied to understand the strengths, weaknesses, opportunities, and threats on a value chain level.

Table 1 – Overview of field visits. Source: Author

Date	Activity	Study outcome
May 2019	Key informant interviews	- Validation of research framework - Preliminary selection of case studies - Identification of additional stakeholders - Data collection
September 2019	Key informant interviews	- Data collection
November 2019	Focus Group Discussion Key informant interviews	- Validation of preliminary findings and recommendations

3. CONTEXT

3.1 General overview

Zimbabwe is landlocked and situated in Southern Africa with a total land area of 390,757 square kilometres. Zimbabwe is bordered by Mozambique to the east, South Africa to the south, Botswana to the west, and Zambia to the north and northwest. The country is divided into 10 administrative provinces and 62 districts. The capital city is Harare and other major cities include Bulawayo, Gweru, Kadoma, Kwekwe, Masvingo and Mutare. The population of Zimbabwe is estimated to be 16.91 million (2018 Census) with an urban population of 32.2% and rural population of 67.8% (FAO, 2019).

3.2 Climate

Zimbabwe is in the sub-tropics, making rainfall the most important climate parameter. The country has one of the most variable rainfall patterns in terms of distribution across time and space, and dry spells and droughts are part of a normal cycle. During an average rainy season, it is normal for the country to experience four to five dry spells of different lengths. Zimbabwe has the hot rainy season with significant rainfall for about four months between October and March followed by a dry period of about six months. The cold dry season lasts for about three months from May to July. Flash flooding and hailstorms are often experienced during the rainy season. The higher-altitude districts along the central watershed and the eastern highlands typically experience greater amounts of rain (above 1,000 mm per season) than low-lying areas and in the west (350–450 mm per season).

Horticulture production predominantly occurs in regions I and II of the agro-ecological regions (see Figure 4). Region I lies in the east and is characterised by rainfall of more than 1,000 millimetres per year which falls throughout the year, low temperatures, high altitude, and steep slopes. Region II is in the middle of northern Zimbabwe. Rainfall ranges from 750 millimetres to 1,000 millimetres per year and is fairly reliable, falling from November to March/April. Because of the reliable rainfall and generally good soils these regions are suitable for horticulture production. Furthermore, the periods of low temperatures in the regions minimise the risk of pests and diseases.

Climate change is expected to bring an increase in average temperatures across the country of up to 4°C by the end of the century. Most climate models project a decrease in average rainfall in most parts of the country under the most probable and worst-case emission scenarios (Brazier, 2017). In March of 2019, Cyclone Idai has affected Zimbabwe. The tropical cyclone has worsened the situation in three key provinces that typically account for 30% of agricultural output. The drought has also led to a wider impact on the electricity and water sectors, causing widespread rationing and tariff adjustments to manage costs (WBG, 2019).

Figure 3 – Administrative divisions of Zimbabwe. Source: Wikipedia, 2019

Linking Zimbabwe's climate to the fruit and vegetables value chain, the climatic conditions in certain areas of the country are beneficial for horticulture production. However, during the fieldwork it became clear that irrigation systems are required for production of a wide variety of crops. Larger commercial farmers use a combination of pivot, overhead and drip irrigation systems. Smaller commercial farmers often use a combination of drip and overhead irrigation. Low and high investment irrigation technologies like these are available in Zimbabwe.

Climate also plays an important role in the availability of transportation and storage with regards to perishability of produce. Whilst a tropical climate with high temperatures and humid air speeds up perishability, Zimbabwe has a beneficial sub-tropical climate with cool nights. Especially in the cold season, when temperatures can fall below 10 degrees Celsius, perishable goods are well stored without intensive energy consumption.

AEZ	Area (000ha)	Annual rainfall (mm)
I	613	> 1000. Rain in all months of the year, relatively low temperatures.
II A&B	7,343	700-1050. Rainfall confined to summer.
III	6,855	500-800. Relatively high temperatures and infrequent, heavy falls of rain, and subject to seasonal droughts and severe mid-season dry spells.
IV	13,010,036	450-650. Rainfall subject to frequent seasonal droughts and severe dry spells during the rainy season.
V	10,288	< 450. Very erratic rainfall. Northern low veldt may have more rain, but the topography and soils are poor.

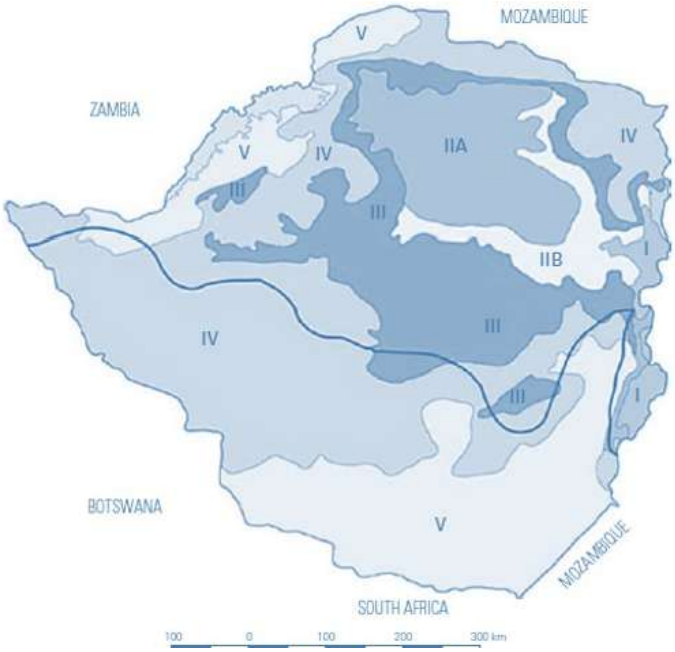


Figure 4 – Agro-Ecological Zones of Zimbabwe. Source: (FAO, 2019)

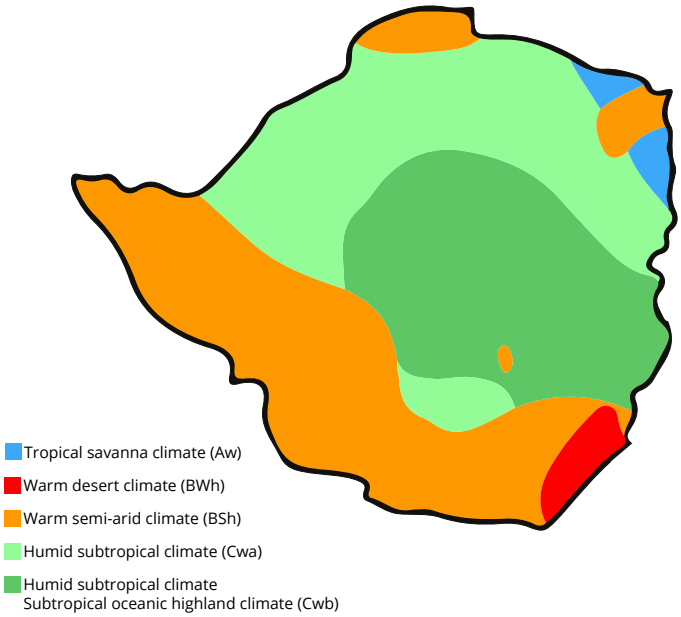


Figure 5 – Zimbabwe map of Köppen climate classification
Source: Peel et al. World map of the Köppen-Geiger climate classification

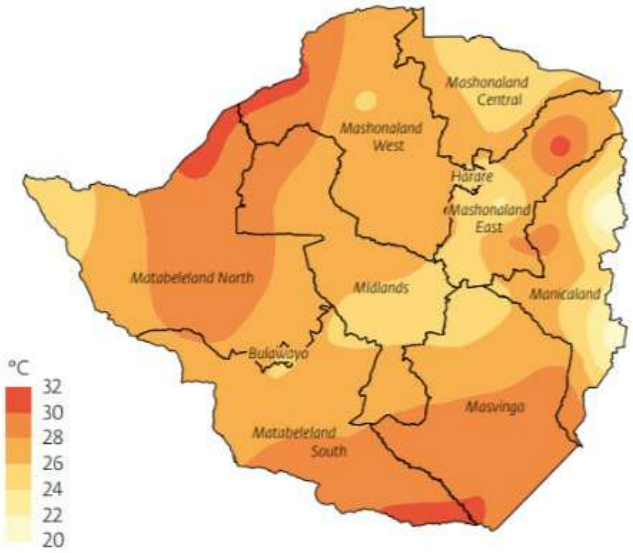


Figure 6 – Zimbabwe average maximum temperatures map 1980-2010
Source: Meteorological Service Department of Zimbabwe

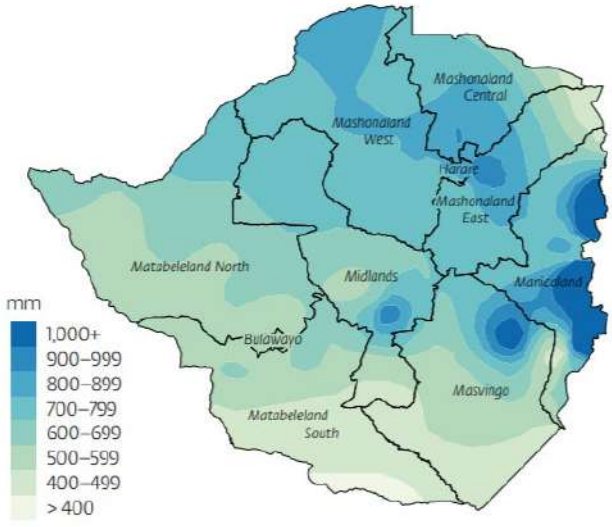


Figure 7 – Zimbabwe average annual rainfall map 1980-2010
Source: Meteorological Service Department of Zimbabwe

3.3 Economy

Zimbabwe's gross domestic product (GDP) grew 3.9% in 2019, and is forecasted to continue to grow in 2020, driven by a rebound in agriculture as rains largely return to normal (IMF, 2019). However, shortages of foreign currency and electricity are projected to persist in 2020, negatively affecting the recovery of industry and services. Weak domestic demand is likely to translate into a small current account deficit in 2019 (around 1% of GDP) which is likely to slightly increase in 2020 given continued foreign currency shortages (WBG, 2019).

Inflation has been increasing since October 2018, driven by monetisation of sizable fiscal deficits of the past, price distortions, and local currency depreciation. Annual inflation reached 230% in July 2019 (compared to 5.4% in September 2018), with food prices rising by 319% in July 2019 while non-food inflation increased by 194%. Adjustment of external accounts was swift with the current account reaching a surplus in the first quarter of 2019 for the first time since 2009. The trade deficit also narrowed significantly in January-July 2019 as imports contracted by 31% (year-on-year) on the back of forex liquidity constraints and weak demand. The government mandated the use of the Zimbabwe dollar as a sole legal tender on 24 June, ending the multicurrency regime in place for over a decade. However, with critically low levels of official reserves, constrained access to external financing and limited tools by Central Bank to sterilise the economy, the local currency has continued to depreciate (WBG, 2019).

Within the fruit and vegetables value chain, stakeholders mentioned the inflation marginalises their operations. Actors along the value chain are unable to purchase inputs from abroad and invest in development of infrastructure due to the lack of foreign currency. For example, basic input materials like fuel need to be purchased from abroad and are becoming increasingly expensive. Without a stable export market, it is not possible to raise foreign currency capitol. This trend emphasises the need for a stable export stream to bring in foreign currency into the Zimbabwean economy and horticulture in specific.

Agriculture remains heavily protected and supported, including through high tariffs and a price band system. In Zimbabwe, agriculture is the most protected sector with an average applied MFN tariff rate of 25.1%, compared with 13.9% on non-agricultural products. Furthermore, Zimbabwe is among the regional leaders in the deployment and upgrading of computerised customs clearance systems (WTO, 2015). Despite the high tariff rate, the fruits and vegetable market in Zimbabwe is mostly dominated by imports and it was estimated that nearly 70% of the fruits distributed in the local market of Zimbabwe came from South Africa (Intelligence, 2018). This highlights the fragile state of the fruit and vegetables value chain in Zimbabwe and the challenge for local producers to improve their farming business in an environment where imported products are flooding the market despite the protection through tariffs.

3.4 Infrastructure

Zimbabwe has a well-developed road network; however, many roads are not paved, and paved roads are not regularly maintained. As a result, main roads are in a good state but roads in rural areas are difficult to access in the raining season. This means that logistics for the transportation of fruit and vegetables is a challenge. Quality of soft and perishable produce can be marginalised when it must be transported over bad roads in trucks that do not have a cooling system.
Zimbabwe has a railway system that is operated by The National Railways of Zimbabwe (NRZ). The system has a direct link with Zambia and connects it to the port of Dar es Salaam, Tanzania. The railway also connects Zimbabwe to the ports in Beira and Maputo in Mozambique as well as two ports in South Africa.

Power generation and distribution is regulated by Zimbabwe Electricity Supply Authority (ZESA). Approximately 78% of supply is generated by coal and other thermoelectric projects while 22% is hydroelectric power from the Kariba dam. The generation of power fails to keep up with the demand, leading to energy imports from Mozambique and South Africa. Additionally, all oil and gas are imported either over road or through the pipeline from the port in Beira in Mozambique. Imports of fuel are monopolised by the National Oil Corporation of Zimbabwe (NOCZIM) and have seen a shortage of supply for years whilst prices keep increasing despite the inflation of the Zimbabwe Dollar.

3.5 Horticulture sector

Horticulture is Zimbabwe's fifth-largest agricultural export earner, contributing 6.5% to the agricultural GDP (Table 2). Production of horticultural crops is mainly conducted close to major urban centres, and along roads connected to urban settlements both at large and small scale. A good connection to urban markets is necessary due to the perishable nature of horticultural crops and limited access to cold chain logistics.

Large-scale commercial horticultural production includes vegetables, fruits, and flowers. The produce mainly goes to the export market, local retailers and food processing companies. Fruits produced for export include citrus (oranges, grapefruit, lemons), subtropical fruits (bananas, mangoes, passionfruit), deciduous fruits (peaches, apricots, plums, other stone fruits (nectarine), apples, and pears), and strawberries. Vegetables include cherry tomatoes, sweet corn, chilies, peas, and fine beans. Certain crops have specific growing seasons and others can be grown throughout the year. An overview of growing seasons per crop is presented in Annex 4. Certain crops, fruits in particular, have short growing seasons leading to a surplus of produce in harvesting periods. In Zimbabwe infrastructure for cold chain logistics is not well developed. Peak production of perishable fruits in combination with limited access to cold storage leads to post-harvest handling issues that result in significant losses.

Small scale producers with access to irrigation systems and enough water supplies during the dry season produce for the market. Most of their fruit and vegetables produce is sold through the informal market, while a few are contracted to supply formal markets (retailers, agro-processors and export markets). There are certain companies (both retailers and processors) that offer contract farming to both small-scale and large-scale farmers. Contract farming is perceived to be more profitable and stable, as the returns are usually higher than selling on the local market (WBG, Zimbabwe: Agriculture Sector Disaster Risk Assessment, 2019).

Agro-processing

In literature, agro-processing is widely considered a key driver in the development of rural areas. Due to the bulky and perishable nature of agricultural produce, agro-industrial plants and small-scale processing companies are generally located near their sources of raw materials. Consequently, agro-processing operations have a positive impact on the social-economic status in rural areas (FAO, 2009).
Value adding activities are mostly implemented by established manufacturers mainly owned by multinational conglomerate companies with interest in farm produce supplied by large-scale commercial farmers. These stakeholders service both the export market and the Zimbabwean supermarkets and show best practice through production of a wide range of brands for both the bulk industrial market (e.g. tomato pulp) and the local and regional consumer market (e.g. canned fruit). Medium scale processors are going through a growth face, both in size and numbers, and mainly supply the local and regional market of products such as sauces, pastes and fruit concentrates. Small scale processing is usually done by small scale farmers that process for the local informal markets.

Processors producing for the domestic market generally offer low prices and take lower quality produce as input due to a shortage of supply of raw material. For example, tomatoes that are not sorted and graded, don't look attractive but are not rotting. Regarding food safety this imposes a threat because of the sanitary and phytosanitary contaminations that potentially enter the processing line, resulting in contaminated food that causes consumer illness. Especially smaller processors do not have the correct machinery and procedures for quality and safety control, sorting and grading. Large processors tend to pay more than smaller processors but have higher quality and safety criteria. Larger processors who are supplying the export market do apply quality and safety criteria and standards – either international standards or company-specific standards.

Markets for Zimbabwe's fruit and vegetables

Large volumes of fresh fruit and vegetables are produced for sale on both the export market and the formal and informal domestic markets. The export market is largely supplied by the large-scale commercial producers while the domestic market is supplied by all levels of the agricultural industry from multinational corporations to individual communal farmers. The domestic market can be divided in a formal and an informal market.

Table 2 – Zimbabwe's main Agricultural Commodities
Source: (WBG, Zimbabwe: Agriculture Sector Disaster Risk Assessment, 2019)

Agricultural commodity	Percentage of agricultural GDP (average 2012-16)*	Area (average 2012-16)(ha)**	Exports (average 2012-16, US$ 000s)***
Tobacco	36,08%	91,816	879,198
Cattle production (beef and dairy)	10,81%	-	34,059
Maize	10,07%	1,460,810	790
Cotton	9,89%	224,923	103,214
Sugarcane	6,59%	45,961	102,848
Horticulture (fruits, vegetables, etc)	6,59%	69,612	18,072
Poultry	6,23%	-	-
Wheat	2,38%	12,497	-
Groundnuts	1,83%	258,597	-
Total	***90,48%***	***3,452,125***	***3,197,974***

*Source: *Ministry of Agriculture of Zimbabwe, Agricultural Statistical Bulletin, 2016; ** Ministry of Agriculture of Zimbabwe, Agricultural Statistical Bulletin, 2016 and FAOSTAT (sugar, horticulture, total); *** International Trade Center.*

Table 3 – Fruits and vegetables in Zimbabwe. Source: Author

Fruit	Vegetables
Pineapple	Asparagus
Apple	Baby carrots
Pear	Baby corn
Peach	Butternut
Plum	Chillies and peppers
Apricot	Gem squash
Nectarine	Fine beans
Grape	Tomatoes
Currant	Courgettes
Melons and cantaloupes	Mangetout peas
Citrus (oranges, grapefruit, lemons, mandarins)	Sugar snaps peas
Kiwi	Sweet corn
Lychee	Runner beans
Banana	Baby onions
Mangoes, mangosteens and guavas	Carrots and turnips
Passion fruit	Cauliflowers
Blueberry	Broccoli
Strawberry	Chestnut
Raspberry	Cow peas
Avocado	Cucumbers
Nuts	Mushrooms
Artichoke	Sweet potato
Papaya	

Domestic markets

The domestic market has formal and informal channels. The domestic market for fresh fruit and vegetables is considered large yet difficult to quantify due to its complexity. An overview of fruit and vegetables grown for the domestic market is presented in Table 4.
The formal market is dominated by an estimated 20 wholesalers based in Harare. Generally, wholesalers have an exclusive marketing arrangement with certain retail supermarket chains to supply a large number of supermarkets. An example of a supermarket chain is SPAR, which has many supermarket stores under its brand. Certain wholesalers have integrated sourcing and retail systems where they sell their products directly through their own retail outlets as well as to other retail stakeholders such as large supermarket chains, companies, schools, hospitals and other institutions (SNV, 2014). The formal markets apply quality standards in sourcing; therefore, quality of products is overall higher in supermarkets than on informal markets. Also, the prices of fruit and vegetables in supermarket chains are generally higher than in smaller independent supermarkets and the informal markets.
Consumers are willing to pay higher prices because the products are neatly packed and often presented on cooled shelves. Organic products are sold in specialised individual supermarkets for the higher-class consumers. Supermarket chains usually offer no or little organic products. Labels used in supermarkets usually present the name of the product, packaging date and price. No information about source and use of pesticides is communicated on the labels or packaging.

The informal market is generally dominated by middlemen who visit farms to buy produce at the gate to resell on the informal local markets and to small supermarket shops. An example of an informal marketplace is Mbare market in Harare. Although produce sold on the informal market is difficult to quantify, SNV (2014) managed to quantify the sale of a wide range of crops on the Mbare market in the period of January to March 2014 (Table 5). Lower quality grades of fruit and vegetables often end up on the informal markets. Generally, no quality standards are applied to the products sold on informal markets. Produce is often presented in big heaps without individual packaging or labelling without information about the product or its source. Consumers have to look for the best quality fruit and vegetables within the heap and bargain for a price due to the different sizes and appearance of products. If available, information about source is transferred verbally. Information about use of pesticides is mostly absent.

Export markets

Zimbabwe's registered total trade value of fruit and vegetables exports is on average 18 million USD per year. Export of fruit and vegetables saw an increasing trend until 2016 but has been decreasing over the past years. Top export markets include South Africa, Zambia, Mozambique, the Netherlands and the United Kingdom. South Africa is a leading export market for both fruit and vegetables from Zimbabwe. European markets like the Netherlands and the United Kingdom are important markets for Zimbabwe's vegetables. Asia and North-Africa are very saturated markets that are hard to penetrate due to the well-developed production and processing industry, resulting in very competitive prices.
The main export vegetables grown are mangetout peas with 40% of the exports, French beans at 20% and baby corn at 10 to 15%. Others include sweet corn, baby carrots, chillies and cherry tomatoes. The main export fruits are citrus (which includes oranges, lemons, and tangerines, grapefruit), passion fruit,

Table 4 – Crops produced for the domestic market. Source: (SNV, 2014)

Brassicas (e.g. Cabbages)	Fine Beans
Kales	Egg Plant
Tomatoes	Sweet Potatoes
Onions	Butternut
Indigenous vegetables (pumpkin leaves, bean leaves, nyeve)	Garlic
Potatoes	Bananas
Carrots	Oranges
Lettuce	Apples (mostly imported)
Green pepper	Mangoes
Gem squash	

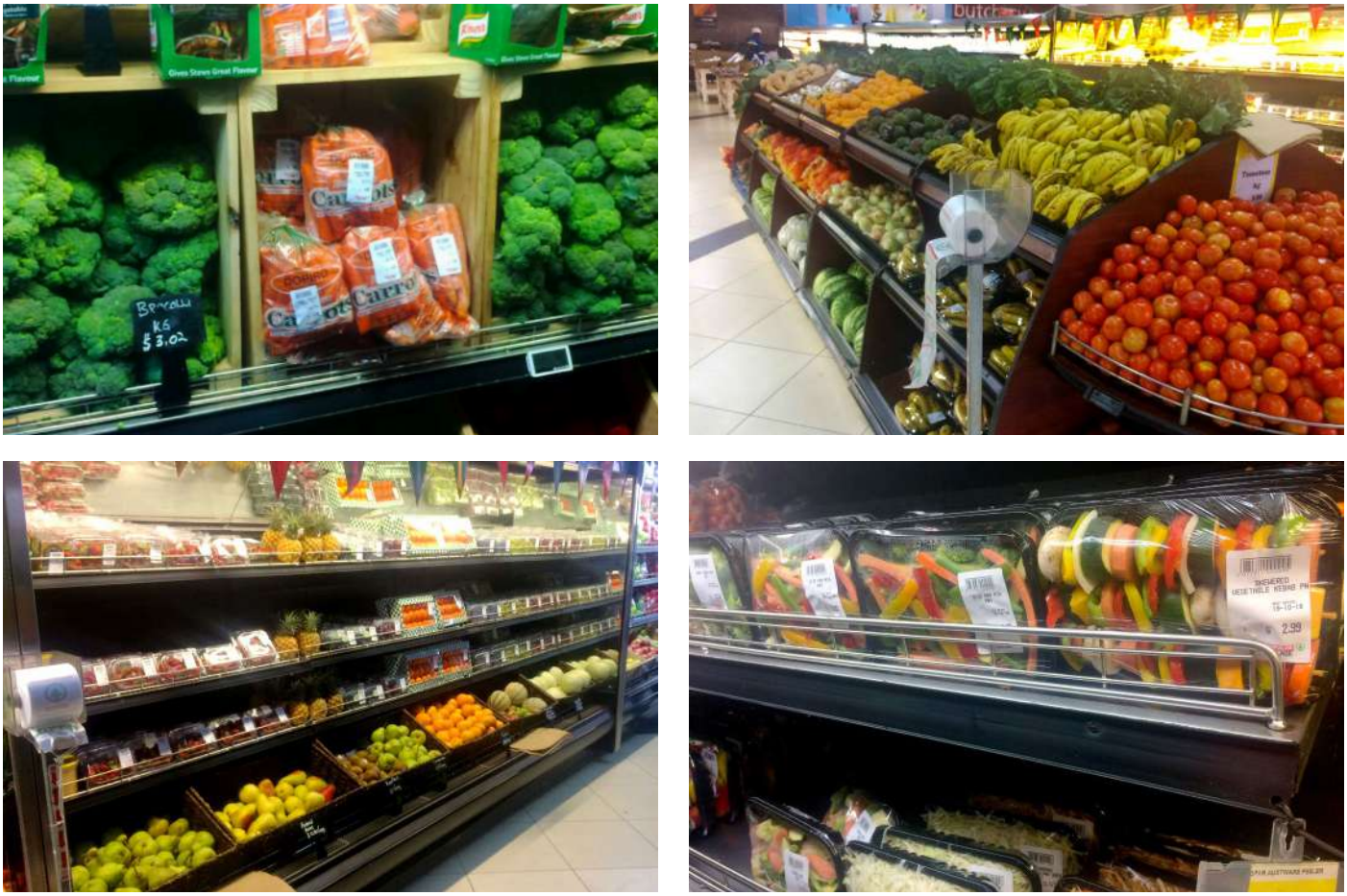


Figure 8 – SPAR supermarket in Harare. Source: Author

Figure 9 – Examples of labels in supermarkets. Source: Author

strawberry and avocadoes. Oranges account for approximately 90% of fruit exports, with all the other fruits accounting for 10% of the exports.
Exporters from Zimbabwe have good linkages with the end-markets around the world. Off-season lines of high-value crops are a competitive advantage of Zimbabwe's horticulture. Meaning, Zimbabwe can produce high-value crops in a period of the year when most countries in the world are unable to, due to climate conditions. This presents a marketing timeframe where Zimbabwe has an advantage in the market. In recent years, high-value out-of-season lines are fuelling expansion, spearheaded by mangetout peas, sugar snap peas, runner beans, baby corn, sweet corn, other baby vegetables, courgettes, etc. Passion fruit, plums, mangoes, nectarines and raspberries have also been identified as export winners, while new lines such as baby exotics and salad onions are being grown and exported in increasing volumes. In addition, new variations of presentation and processing are a focal point of the rapidly expanding export market. Mixed packs, vegetables that are pre-washed, sliced, diced and ready to cook are being increasingly produced to customer specifications. The deciduous fruit industry is concentrated in the Eastern Highlands. Sizeable volumes of mangoes, kiwi fruit, pineapples and bananas are grown throughout the country.

Regional exports

Exporting to regional markets is growing. Food quality and safety standards in neighbouring countries allows producers to pass sanitary and phytosanitary tests at the borders of neighbouring countries. Transport is usually done over road, air freight or sea freight. When transported over sea, the produce first needs to be transported to the closest port in Beira, Mozambique. When transported over a larger distance the climate is usually controlled. Crops produced close to the border are often transported over road without climate control. Regional export countries include South Africa, Zambia, Malawi, Botswana and Angola. Zimbabwe's train network is not compatible with Zambia's network which means that overhauling at the border is needed. Additionally, airlines are not always present for certain export countries. For example, export to Angola is currently only possible with small planes with limited space for cargo. Shipping from Beira around South Africa all the way to Angola is another option but costs a lot of time and money.

Exports to Europe

Europe is currently the biggest export market for the Zimbabwean horticulture sector. Following ITC data, Zimbabwe's exports to the European Union (EU, 28 member states) increased from USD 54,7 million in 2016 to USD 76,4 million in 2018. The growing trend line is a result of the increasing fruit exports, as vegetable exports are relatively stable over the past years. Top European countries importing fruit from Zimbabwe are the Netherlands, the United Kingdom, France and Ireland. For vegetables it is the Netherlands, the United Kingdom, France, Ireland, Germany, Belgium and Sweden. End-markets in the EU are interested in raw fruit and vegetables and processed concentrates. Exporting is done both directly and indirectly, indirectly meaning that crops are traded through other countries like South Africa. A South African company buys and aggregates to eventually sell produce to European buyers. For example, the company WestValia buys all avocadoes from Zimbabwe to export those to the EU. Export requires food safety and quality standard requirements, like GLOBALG.A.P. certificates and for the processing industry IFS, BRC and FSSC 22000 certificates. Transport to Europe is usually done with air freight or sea freight in a climate-controlled manner. When transported over sea, the produce first needs to be transported to the closest port in Beira, Mozambique.

Table 5 – Mbare wholesale market sales (January-March 2014). Source: (SNV, 2014)

Product	Quantity	Tonnage	ER (US$)
Cabbages	137,230	343	119,055
Potatoes	121,710	1,828	1,321,573
Bananas	32,333	582	420,332
Watermelons	27,900	139	66,600
Mangoes	21,400	107	85,600
Onions	15,795	158	145,875
Carrots	9,095	91	90,950
Lettuce	6,562	11	6,562
Apples	4,224	76	118,276
Butternuts	3,634	182	82,080
Green Beans	2,250	23	16,700
Cucumbers	1,950	20	11,700
Peas	1,000	10	6,000
Green Pepper	825	8	7,925
Red Pepper	575	6	5,275

Table 6 - Crops produced for the export market. Source: (SNV, 2014)

Mangetout peas	Butternut
French beans	Gem squash
Baby corn	Baby marrow
Sweet corn	Citrus
Chillies	Grapefruit
Cherry tomatoes	Passion fruit
Sugar snaps peas	Strawberry
Goose berries	Avocadoes

Table 7 - Top 10 importing markets for a product exported by Zimbabwe. Source: (ITC, 2019)

Ranking	Fruit	vegetables
1	South Africa	South Africa
2	Mozambique	Netherlands
3	Zambia	United Kingdom
4	Netherlands	Zambia
5	Hong Kong, China	Mozambique
6	Viet Nam	Ireland
7	United Kingdom	Egypt
8	Botswana	Kenya
9	United Arab Emirates	France
10	Bahrain	Germany

Table 8 - Top exporting products. Source: (ITC, 2019)

Ranking	Fruit	vegetables
1	Citrus (oranges, lemons etc)	Mangetout peas
2	Grapefruit	French beans
3	Passion fruit	Baby corn
4	Strawberry	Sweet corn
5	Avocadoes	Baby carrots
6	-	Chillies
7	-	Cherry tomatoes

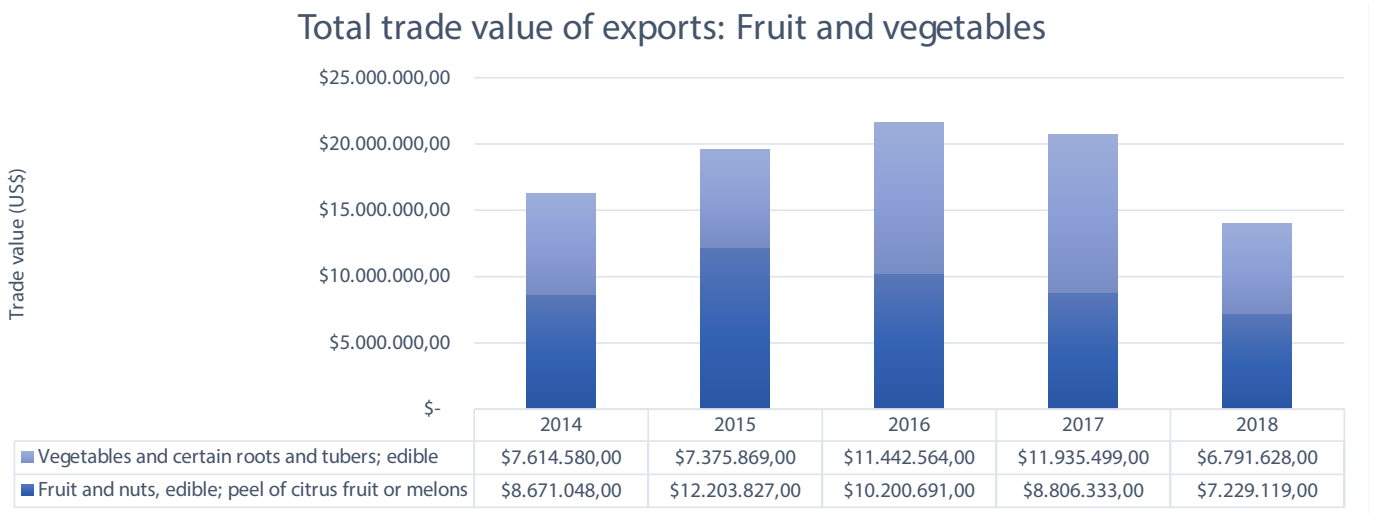


Figure 10 – Zimbabwe's total trade value of exports: Fruit and vegetables
Source: (UNComtrade, 2019), calculations by author

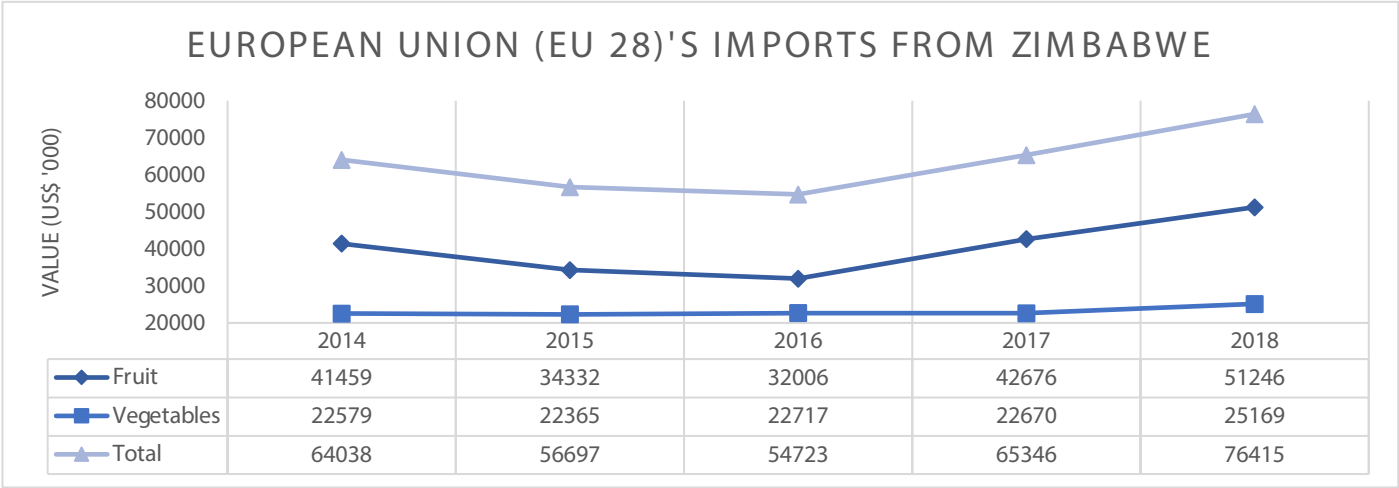
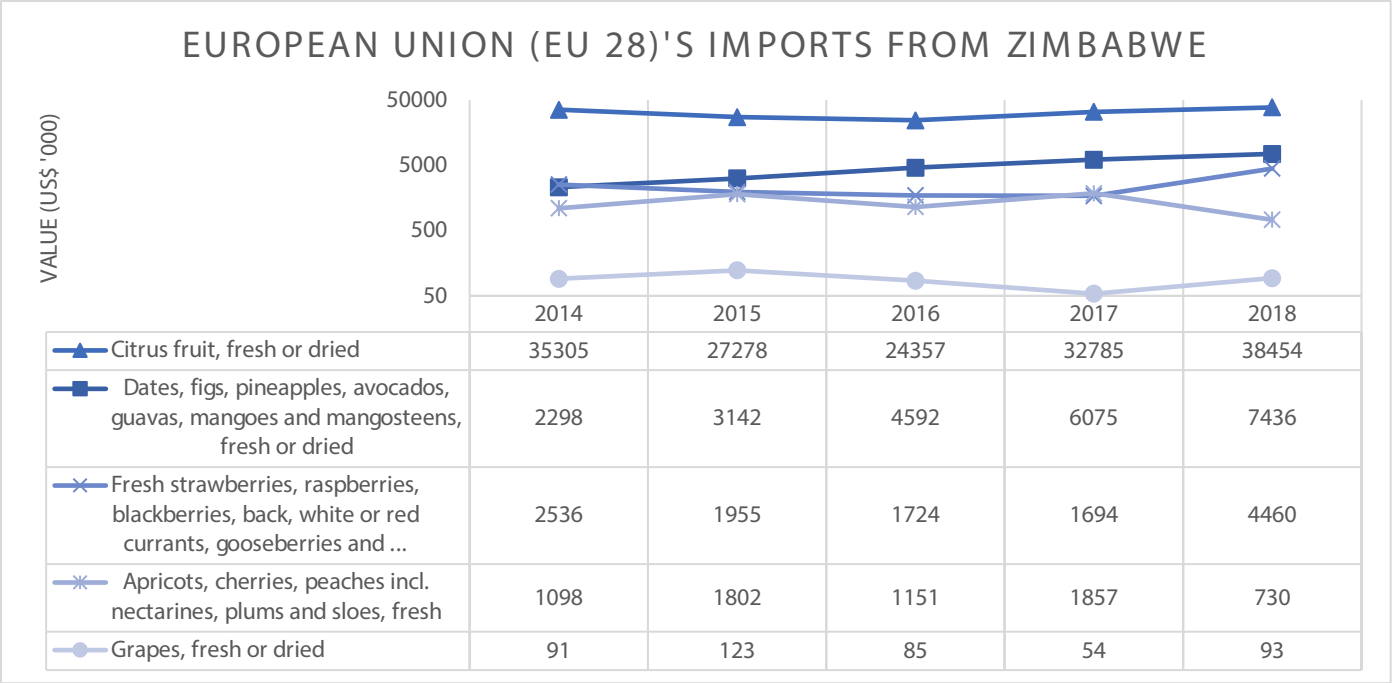
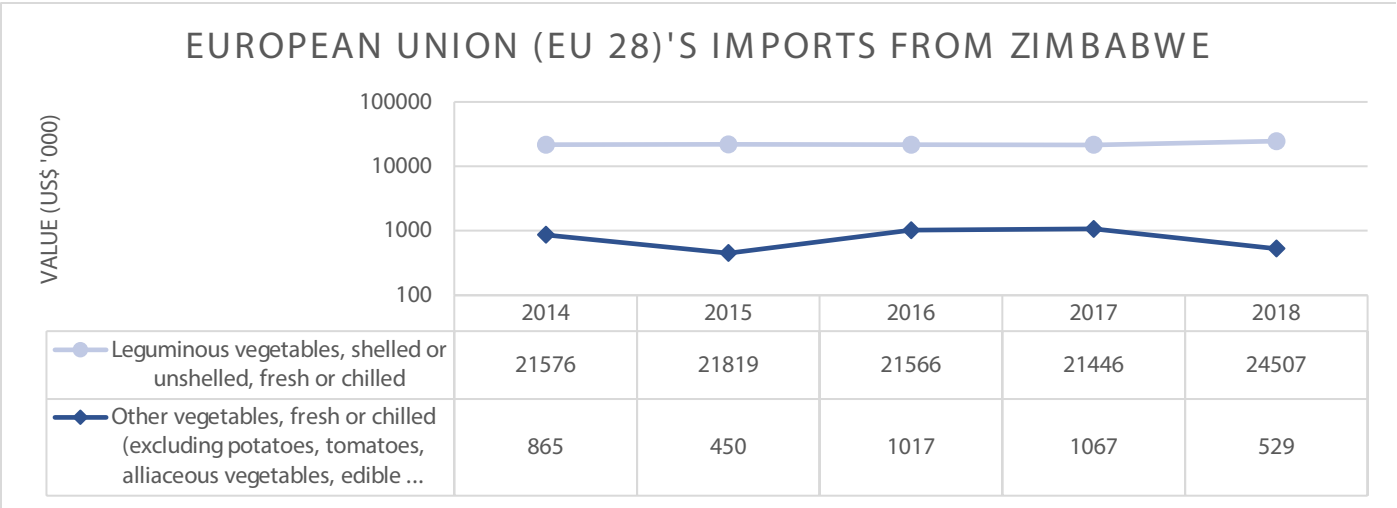


Figure 11 – Value of EU's fruit and vegetables imports from Zimbabwe (USD 000')
Source: (Comtrade, 2019), calculations by author



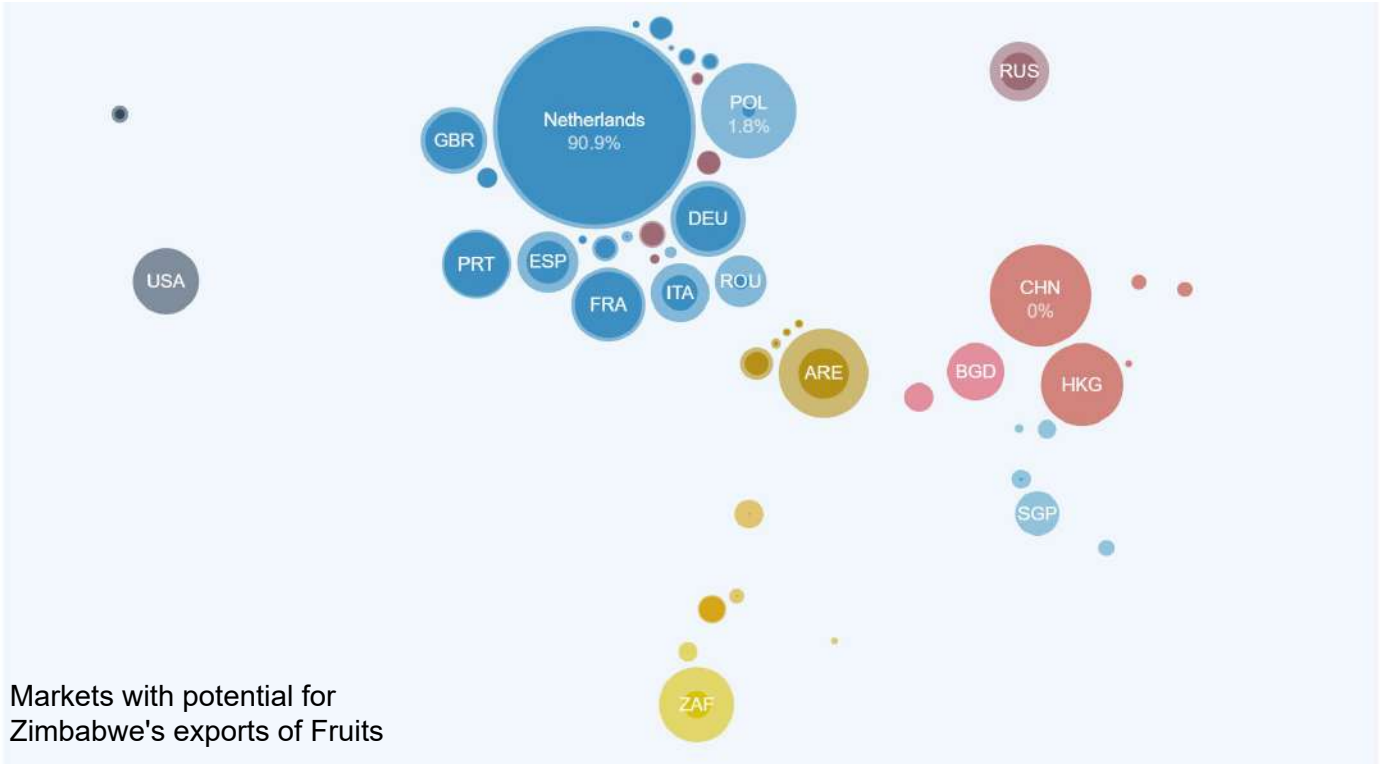
	2014	2015	2016	2017	2018
Citrus fruit, fresh or dried	35305	27278	24357	32785	38454
Dates, figs, pineapples, avocados, guavas, mangoes and mangosteens, fresh or dried	2298	3142	4592	6075	7436
Fresh strawberries, raspberries, blackberries, back, white or red currants, gooseberries and ...	2536	1955	1724	1694	4460
Apricots, cherries, peaches incl. nectarines, plums and sloes, fresh	1098	1802	1151	1857	730
Grapes, fresh or dried	91	123	85	54	93

Figure 12 – EU's fruit imports from Zimbabwe (USD 000'). Source: (Comtrade, 2019)

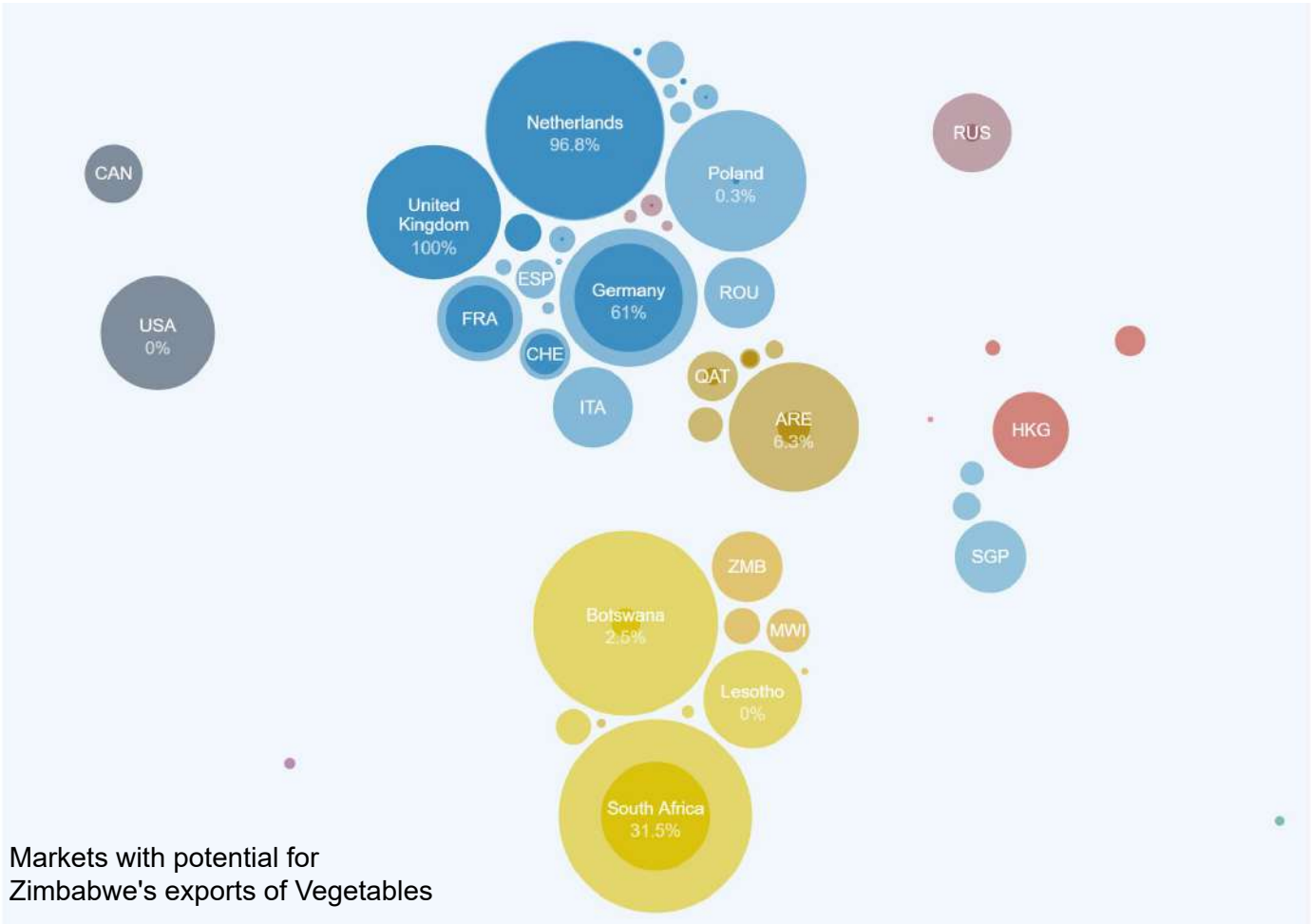


	2014	2015	2016	2017	2018
Leguminous vegetables, shelled or unshelled, fresh or chilled	21576	21819	21566	21446	24507
Other vegetables, fresh or chilled (excluding potatoes, tomatoes, alliaceous vegetables, edible ...	865	450	1017	1067	529

Figure 13 – EU's vegetables imports from Zimbabwe (USD '000). Source: (Comtrade, 2019)



Markets with potential for
Zimbabwe's exports of Fruits



Markets with potential for
Zimbabwe's exports of Vegetables

Legend

- Export potential
- Realized potential
- EU & West Europe
- SACU
- Middle East
- North America
- East Africa
- East Europe & Central Asia
- East Asia
- ASEAN
- Latin America
- Pacific
- Central Africa
- South Asia

Figure 14 – Zimbabwe's global export potential for fruit and vegetables
Source: (ITC, 2019)

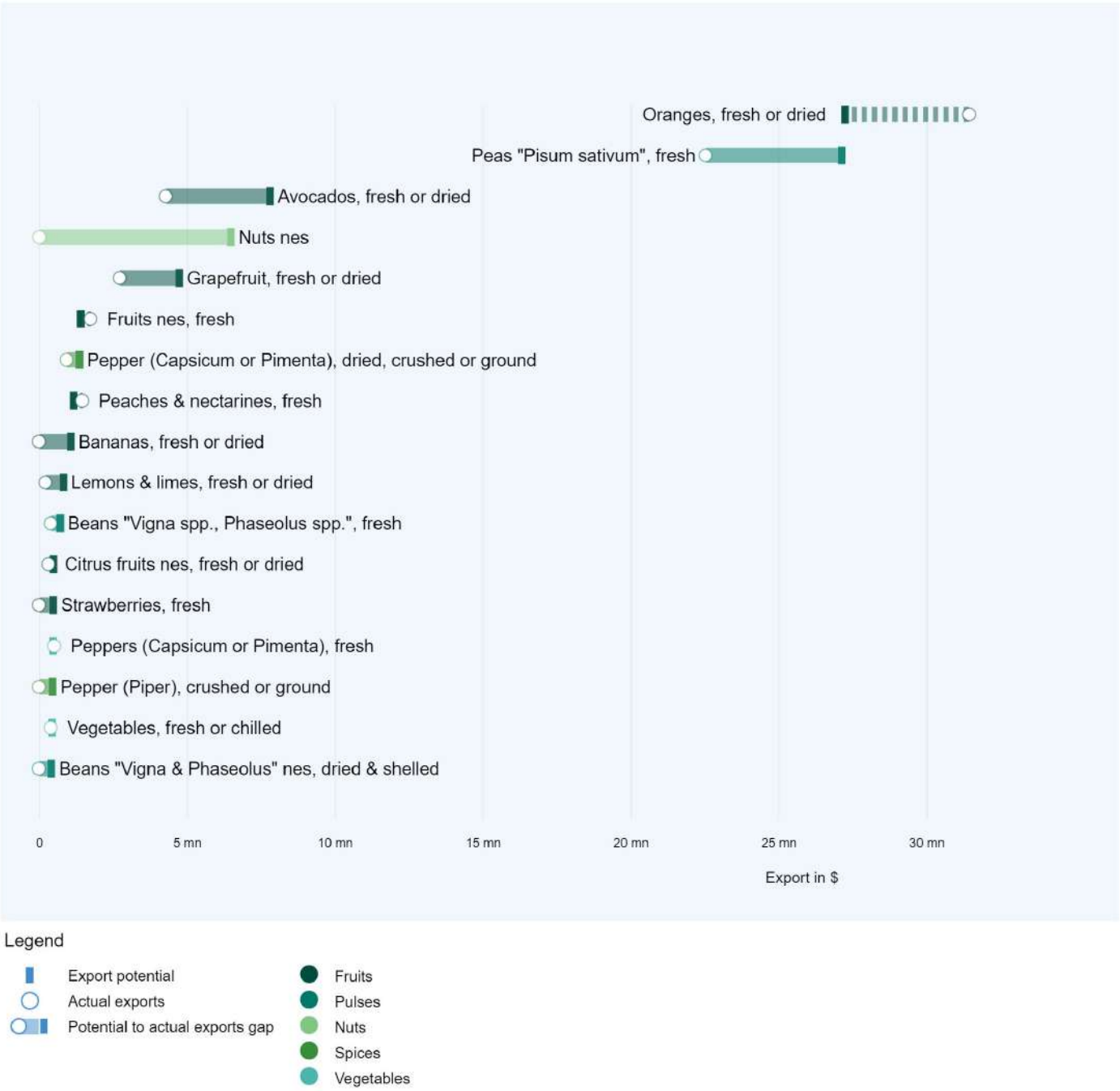


Figure 15 – Zimbabwe's products with export potential to the EU
Source: (ITC, 2019)

3.6 Sector disruption

The fast track land redistribution that was implemented by the Government of Zimbabwe from 2001 to 2013, resulted in some exporters losing their farming land and packing facilities. The land reform has benefited thousands of indigenous farmers who received land allocations under the resettlement models A1 and A2. An A1 model has plots with 5-6 ha arable and in excess of 6 ha for grazing. An A2 model has farms ranging from 15 to 50 hectares in the peri-urban areas, 15 to 250 ha in agro-ecological region I and 350 to 2000 ha in agro-ecological region V (Mhazo, Bvumi, NyaKudya, & Nazare, 2012).

As a result, the value of exports dropped approximately 70% (SNV, 2014). The decline in sector performance since 2009 had a significant impact on Zimbabwe's GDP. Due to the land redistribution the marketing channels became increasingly informal, with middlemen playing an important role. Also (foreign) investments in the horticulture sector stagnated due to the disruptions in commercial farming environment. Most of the packing facilities were no longer functional due to the resettlement of small-scale farmers and many of the food processing companies went bankrupt due to the shortage of raw materials. Many processing companies went bankrupt. Examples are Fresca – production of dried vegetables for Nestlé Zimbabwe and the export market, Zagrinda – processor of tomatoes, Lyons -processor of tomatoes, others are Flue pack, Muchero Wholesalers and Kutapira.

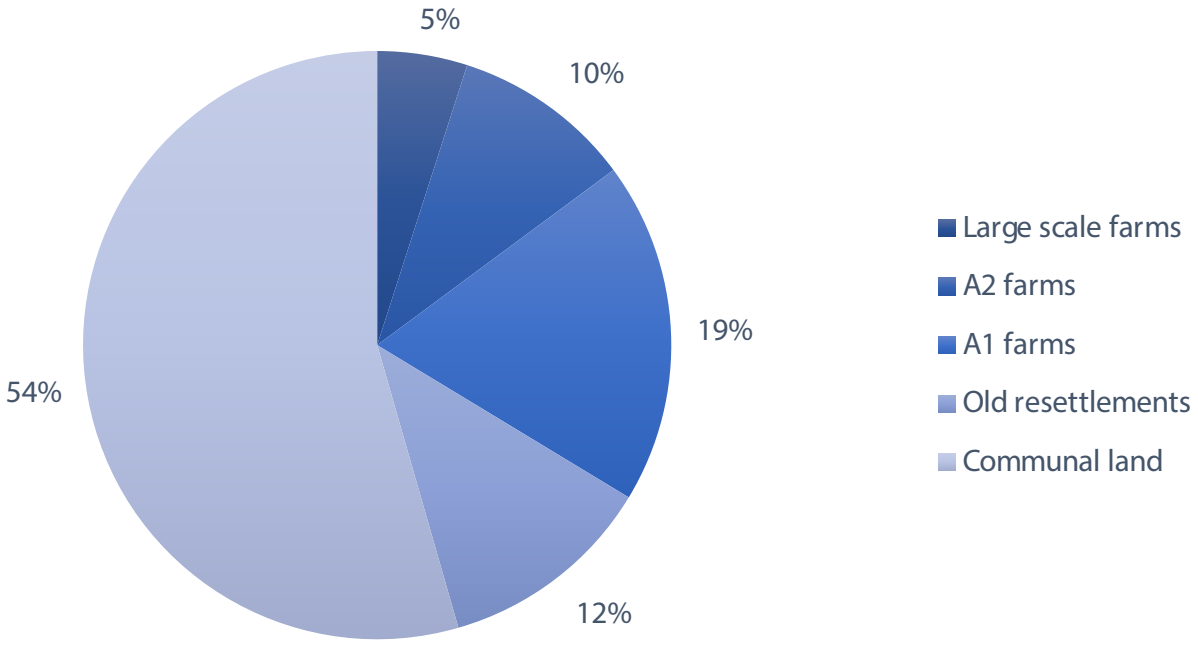


Figure 16 – Land distribution after land reform (2001 – 2013). Source: (SNV, 2014)

4. THE FRUIT AND VEGETABLES VALUE CHAIN

Mapping the value chain with all its components, linkages and actors allows to uncover relevant interdependencies in a complex system and to take a systemic approach in discussing interventions. During this study a value chain map was produced based on all information gathered. The map is presented in Figure 17. The following chapter elaborates on the three building blocks of the value chain, starting with chain actors, followed by service providers and enabling & constraining environment.

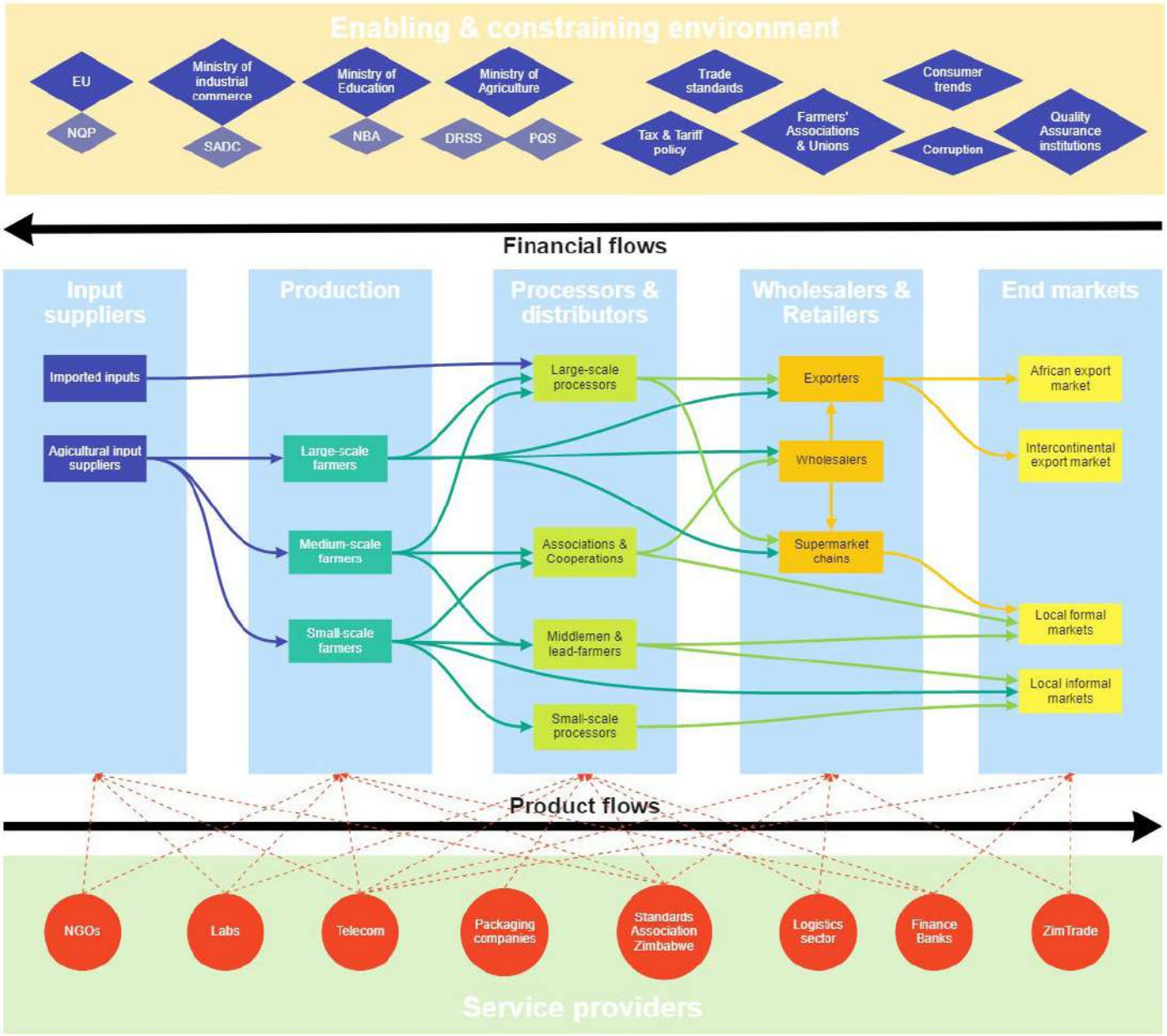


Figure 17 – Value Chain Map: Fruit and Vegetables in Zimbabwe. Source: Author

4.1 Chain actors

At the core of the value chain lies the chain of actors. These actors interact through transactions in order to add value to the final products. The importance of value chains is that wherever a business is located along a value chain, business success depends on an understanding of and ability to respond to the needs of the entire chain. For example, food quality and safety standards can only be met if the correct procedures are in place along the entire chain. By understanding the individual businesses and the relationships between them, new data and insights can be generated to analyse the performance of the value chain.

Input suppliers

A wide range of input suppliers are providing agricultural (e.g. seed, crop nutrition, plant protection products, greenhouses, irrigation technologies, storage facilities, extension) and industrial inputs (e.g. packaging materials, processing technologies, transportation technologies) to producers and processors in Zimbabwe. There is a wide range of input suppliers providing high quality inputs to producers and processors. Overall, there is a good availability of inputs throughout the country. This is especially the case for medium and large-scale farmers that can arrange transportation. There are local suppliers and suppliers from outside the country. Imported input supplies are dominating the market and are more expensive, due too little availability of local supplies. An overview of identified input suppliers is presented in Table 9, and active seed companies are presented in Table 10. Technology is often found to be outdated or even non-functional. Examples in the fruit and vegetables value chain are outdated irrigation systems and greenhouses, outdated and non-functional pack sheds and outdated processing and lab equipment.

Producers

The group of producers of fruit and vegetables can be divided into three groups: Small-scale, medium-scale and large-scale farming. For the distinction between the three groups see Table 11. Small-scale production takes place on communal lands, A1 resettlements, old resettlements, small-scale commercial farms, and peri-urban and urban gardens or backyards. Smallholders with access to irrigation and enough water supplies during the dry season produce for the market. Most of their produce is sold through the informal market, while a few are contracted to supply formal markets (retailers, agro-processors).
Medium-scale farming is done by contract farmers on A2 resettlements. Farmers are contracted as out-growers by wholesalers and processors. If medium-scale commercial farms are not part of an out-grower scheme they are usually part of an association to coordinate sales. Produce then goes to a lead-farmer or middleman for aggregation before it is sold. Large-scale commercial production mainly goes to the export market, local retailers and food processing companies.

Table 9 - Overview of input suppliers. Source: (SNV, 2014) and author

Fertilisers and technical services on crop nutrition	Agrochemical and technical services on plant protection	General purpose and packaging materials
ZFC	ZFC	Hunyani Paper Mills
Windmill	Agricura	Itachi Plastics
Omni	Windmill	Polypacking
Proffer	Pivotal	Rawplast industries
Superfast	Curechem	Natpak
Farmers World	Polachem	Giant Wrap
Bayer	Intercrop	Eco-pack wholesalers
Green Yard	Citichem	F Neill and Sons
Agricore	Technical Services Africa	K Davies Packaging
Prime Crop Protection (Part of Prime Seeds)		Mega Pak Zimbabwe

Table 10 – The three categories of farmers. Source: Author

Scale	Small-scale	Medium-scale	Large-scale
Area	5-6 ha arable land	15-50 ha in peri-urban areas	>250 ha
	>6 ha for grazing	15-250 ha in agro-ecological region I	
Off-takers	Middleman	Wholesale markets	Processors
	Lead farmer	Contractors	Retailers
	Local markets	Processors	Export market
	Small/medium processing	packhouses	
	Wholesale markets	Lead-farmer	
		Middleman	
		Export market	

Table 11 - Company activities identified in Zimbabwe. Source: (AccesstoSeeds, 2019)

Company	Crops in Portfolio		Company activities in country					
Companies selected for the Access to Seeds Index	Field crops	vegetables	Breeding location	Testing location	Seed production	Processing location	Sales	Extension services
Advanta	•	•		•			•	
Bayer	•	•		•			•	•
Bejo		•					•	
Capstone Seeds	•	•		•		•	•	
Corteva Agriscience	•		•		•*	•	•	
East-West Seed		•					•	
Enza Zaden		•					•	
Klein Karoo Africa	•	•	•	•	•*	•	•	•
Limagrain	•	•					•	
Mahyco	•	•					•	
Monsanto	•	•					•	
Nongwood Bio		•					•	
Pop Vriend Seeds		•					•	
Rijk Zwaan		•					•	
Sakata		•					•	
Seed Co**	•	•	•	•	•*	•	•	•
Syngenta	•	•	•				•	
Zamseed	•	•					•	

** Company involves smallholder farmers in seed production activities; **Company headquartered in Zimbabwe.*

Farmers' Associations

Farmers' associations are primarily set up by small-scale and medium-scale farmers to work together in terms of buying inputs, producing and marketing horticulture produce. Grouping and forming associations allows farmers to reduce transaction costs or gain better access to input and service suppliers. Associations also invest in facility development like packhouses and cold storage. Examples of farmers' associations are:

- Fresh Produce Marketers Association of Zimbabwe
- Citrus Produce Association of Zimbabwe
- Commercial Farmers Union
- Zimbabwe National Farmers Union
- Export Flowers Growers Association of Zimbabwe
- Fresh Produce Producers Association of Zimbabwe
- Deciduous Fruits Association of Zimbabwe
- Zimbabwe Flower Export Company (Zimflex)
- Blue Berries Association of Zimbabwe
- Horticulture Producers Association (HPA)
- Sisonke Ag Fresh Farmers' Association (SAF)
- Murewa Agriculture Producers Association (MAPA)
- Domboshava Horticulture Producers' Association (DOPA)
- Zimbabwe Horticulture Farmers Association (ZHFA)

Wholesalers and traders

Zimbabwe's formal fruit and vegetables marketing channels are dominated by wholesalers. It is estimated that there are 20 wholesale companies operational (SNV, 2014). An example of a wholesale company is FAVCO, based in Harare. FAVCO has a marketing arrangement with the OK Supermarkets chain to supply 40 out of its 55 stores in Zimbabwe. This amounts for 75% of FAVCO's produce sales. The other 25% is sold to other wholesalers, retailers, catering companies and institutional customers such as schools, hospitals, army and air force.

Traders are mostly middlemen who visit rural areas to buy products and sell these products at local formal and informal markets. It is possible that produce is indirectly ending up at processors or exporting wholesalers through middlemen. The middlemen visit the farms and purchase fruit and vegetables at low prices at farm level. The collapse of many off takers such as wholesalers due to the land reform policy resulted in a shrinking market, which forced farmers to sell their produce for low prices.

Processors and distributors

For processors, operations comprise all kinds of preservation methods from simple technologies (such as cutting and sun drying) to more sophisticated technologies (production of pastes and concentrates). For distribution no transformation of products is involved, grading and packing of fresh produce is their main operation.

End markets

Domestic formal markets

Formal retailers are mainly located in urban, peri-urban and rural town areas. A division can be made between large supermarket chains with more than 10 shops, medium-sized supermarket chains with up to ten shops and small independent grocery shops. An example of a large-scale supermarket chain is SPAR Zimbabwe. Being part of the wider SPAR family of 46 countries on 4 continents, the chain has 45 stores located all over the country. Also, the international retail giant Pick n Pay currently has over 55 stores countrywide and has a partnership with TM Supermarkets. The larger supermarket chains usually have their own wholesale branch in order to trade produce effectively and efficiently and to cut transaction costs with third parties. There is a trend in offering online shopping and delivery of groceries. The major supermarket chains in Zimbabwe are: Food World Zimbabwe, TM Pick n Pay, Food Lover's Market, OK Supermarket, Bon Marché and SPAR Zimbabwe.

Table 12 – Overview of processors and distributors. Source: Author

Company	Brands	Products
Probest Veg	Probest Veg	Mangetout beans Sugar beans Fine beans Chillies
Associated Foods Zimbabwe	Mama's Farmgold	Peanut butter Jam and marmalade Fruit in syrup Chakalaka Chopped tomatoes Tomato puree Marmalade, jam and mince Chutney
Cairns Foods	Spuds Charhons Thingz Savonuts Sipcool Cashel Valley Chompkins Madras Piccadilly Mukuyu Sun Williards Custards and jellies Brono Carimba	Canned vegetables Canned fruit Marmalade Jam Custards and jellies Peanut butter
Chegutu Canners	Green Valley Holbrooks Cartwrights	Baked beans Canned fruits Curries Mustard Vinegar Sauces Marmalade Jam

Figure 18 – Logos of Zimbabwe's supermarket chains. Source: Brand websites

Domestic informal markets

There is not a lot of information available about informal markets in Zimbabwe. Most small-scale farmers sell produce at the farmgate to middlemen or consumers. Informal local markets are also an important selling point for small-scale farmers. The primary local fruit and vegetables markets in Zimbabwe are:

- Mbare & Lusaka – Highfield (Harare)
- Malaleni & Bulawayo Upmarket Traders Association (Bulawayo)
- Sakubva & Chipangano (Mutare)
- Kudzanayi & Kombayi (Gweru)
- Garikayi & Mucheke (Masvingo)
- Kwekwe
- Chinhoyi

Export markets

Regional and intercontinental export markets are supplied by wholesalers and processors. Examples of wholesalers are: LonrhoAgri, Probest Veg, FreshTrade, BrandsFresh and Selby enterprises. Enterprises engaging in the export market usually provide grading and packing services or export in bulk. Export markets can be divided into two groups: Eastern and Southern Africa, versus other export regions such as North Africa, North America, Europe and Asia.

4.2 Service providers

Apart from the chain actors there is a need for specialised services within the value chain. A range of service providers support the chain actors in their operations. Service providers include amongst others: NGOs, labs, packaging and logistics companies and finance institutions.

Labs

There are multiple labs in Zimbabwe that provide services to the agricultural sector. These include public labs like the labs of several departments of the Ministry of Agriculture and of the Standards Association of Zimbabwe, and private labs such as Zimlabs. These labs provide a wide range of testing for the agriculture sector. Examples are:

- Standard soil test for pH, Ca, Mg, Na, K, NO3, P, TSS
- Horticulture tests for pH, Ca, Mg, Na, K, NO3, P, TSS, Cu, Mn, Zn, Fe
- Irrigation and stock water analysis for Ca, Mg, Na, K, Mn, Cu, Fe, pH, E Coli, Coliform etc.
- Mechanical test to check soil structure
- Plant tissue analysis for N, P, K, Ca, Cu, Zn etc
- Fertiliser, compost and manure analysis
- Microbiological evaluation of horticulture produce for export certification
- Soil sampling

Private labs that claim to be certified are either not known by many stakeholders or not trusted for their accuracy. The lack of ISO/IEC 17025:2005 certified labs proves to be a major issue for the sector. The public labs are not accredited, and stakeholders indicated that they cannot rely on the test results. The instruments are expensive to operate due to the price of input materials. With the current foreign currency problems, the labs face problems in purchasing input materials.
Additionally, the equipment is usually scattered over multiple labs and often lack regular calibration. Stakeholders have indicated that there is no clarity about which services are provided by which labs and that lab results often lack accuracy. As a result, producers, importers and exporters prefer to do their lab tests abroad, usually South Africa or Europe. Especially European importers prefer to do lab testing in Europe when shipment of first samples takes place.

Logistics sector

The logistics sector provides refrigerated trucking, mainly used for the export of fruit and vegetables produced by large commercial farmers. Small and medium scale farmers usually transport their produce in small trucks without refrigeration. There are several companies that provide cold trucking services on demand. Cold storage of produce is done by large and medium scale commercial farmers. Commercial

farmers often have a cold storage and packing shed on their premises. However, the cold cells are often not operational due to Zimbabwe's current electricity issues. Many producers and processors are relying on generators for their electricity supply. This in combination with Zimbabwe's fuel shortage makes electricity very expensive. As a result, many cold storages remain inactive.

Consultancy and certification services

Certification bodies for various certification schemes (GAP, FSSC, BRC etc.) are not present in Zimbabwe. The Standards Association of Zimbabwe (SAZ) is the only institute in Zimbabwe that provides certification services. However, the organisation does not provide certification for the horticulture sector that is required for export. For example, SAZ does not offer GLOBALG.A.P. certification. Although there are independent consultants that offer services for implementation of standards, there are no accredited certification bodies within the country. As a result, auditors from offices in Kenya and South Africa need to fly in for auditing and certification. This in combination with the small size of the sector results in relatively high prices for certification services.

Standards Association Zimbabwe

The SAZ plays a large role in standards implementation in Zimbabwe. Next to the government, the Standards Association of Zimbabwe (SAZ) is the national standards body for Zimbabwe and is a member of the International Organisation for Standardisation (ISO). The institute, funded by the Ministry of Infrastructure and Commerce, is a non-government and non-profit organisation which operates third party certification and registration schemes for Zimbabwe standards. Meaning, SAZ operates as an association and does not have a mandate to develop or enforce legislation, it solely facilitates the development and use of standards that can be used voluntarily.
The status of SAZ standards is that they are voluntary upon publication but are mandatory when referenced in legislation. The association also provides technical services for the testing of manufactured food and raw materials. With over 2500 standards SAZ provides implementation and certification services for a wide range of sectors. A large number of standards is applicable to the horticulture sector, an overview is presented in Annex 5. SAZ works closely with the ministry and associations to build capacity in standards implementation and to develop new standards. In recent decades however, no horticulture association existed to work closely with SAZ. It is therefore no surprise that SAZ and its services are not known to many horticulture stakeholders. The stakeholders who were aware of SAZ were not certain about their capacity and their focus on agriculture. The perception is that SAZ consists of a small team that focuses on a wide range of sectors and therefore does not play a large role in the horticulture standards environment.

Trade promotion bodies

Horticulture Promotion Council

The Horticulture Promotion Council of Zimbabwe (HPC) was a group of industry players that formed an important pillar for the horticulture industry. HPC was initiated by horticulture producers with the aim to support horticulture trade and was an active platform for sector stakeholders to engage and establish trade agreements. The platform became idle due to the land reform policies which affected many of HPC's members. As a result, the council faced a lack of funds which forced scaling down of the operations.

ZimTrade

ZimTrade is currently leading in the effort of trade promotion for a wide range of industries. ZimTrade is the National Trade Development and Promotion Organisation of the Republic of Zimbabwe. It was established in 1991 as a unique joint-venture partnership between the private sector and the government of Zimbabwe. Working closely with their Zimbabwean and international partners, industry experts and development cooperation partners, ZimTrade provides services that focus on supporting Zimbabwe's export. They assist Zimbabwean exporters, including first-time exporters and potential exporters, to develop, promote and facilitate export of their goods and services to the world. Examples of their services are an export helpdesk, training in export branding, market access research, online tools (EU export support), trade information through an online portal, and expertise support of international experts (PUM).

Horticulture Development Council

The Horticulture Development Council was initiated in June 2019 and aims to reinstate the efforts of the HPC in supporting the horticulture industry in its development. HDC aims to serve as a platform for sector

stakeholders to share information, facilitate trade, and provide services in order to improve production and processing operations.

Farmers' unions

The farmers' unions represent the interests of the farmers growing specific commodities such as horticulture. They lobby for producer prices, search for cheap inputs and equipment, and advise government on behalf of its members, provide technical advice and organise issues affecting their members. Active farmers' unions in Zimbabwe constitute of:

- The Zimbabwe Farmers' Union (ZFU), representing over a million of communal and small-scale farmers. It is hierarchically organised through local clubs and represents the interests of associations and area councils.
- The Commercial Farmers' Union of Zimbabwe (CFU), representing mainly large-scale and intensive commercial farmers, and corporate members (e.g. input suppliers, manufacturers, traders) and farmers who were displaced by the Land Reform Programme and who are seeking compensation for the loss of their investments.
- The Zimbabwe Commercial Farmers' Union (ZCFU), representing primarily large-scale indigenous commercial farmers who entered the business of commercial farming after independence.

Finance institutions

Financial services for farmers in Zimbabwe are mainly provided through the Commercial Bank of Zimbabwe - CBZ Holdings (CBZH). CBZH provides a complete range of financial services through various subsidiaries whose activities include banking, short- and long-term insurance, asset management, securities trading and property investments. CBZH was established in 1980 as the Bank of Credit and Commerce Zimbabwe Limited (BCCZ) that was a joint venture between the Government of Zimbabwe and the Bank of Credit and Commerce International Holdings Limited (BCCIH). Stakeholders indicated that CBZH only offers its services to established entities with enough collateral and maintains high interest rates. This makes it unattractive for farmers and processors to borrow funds for upgrading of facilities or for working capital. Other banks that have agribusiness desks to support horticulture and agriculture businesses include: Agribank, NMB, MetBank and BancABC.

4.3 The enabling and supporting environment

In the previous section we have defined the chain actors, collectively making up the value chain through direct transactions, and the service providers that provide specialised services to the chain actors. However, critical issues might also appear outside of the chain, due to a lack or failure in the environment in which the value chain is embedded. A sound environment provides the foundation for chain development and growth. This requires the existence and implementation of governmental policies, the availability and accessibility of market information as well as logistical, financial and market infrastructure. Furthermore, educational institutions and basic technologies such as telecommunication are essential for chain actors to interact and operate effectively.

The national enabling environment

Financial and logistics infrastructure is available but far from optimal due to the limited access to basic resources such as fuel, water and electricity. Many systems are dependent on electricity (e.g. cold chain transport, ATMs, cell phones, mobile network) and are therefore unable to function when there is limited access to power. The uptake of new technologies requires either substantial investment in research and development or comes with high cost when imported from abroad.

Market infrastructure and information

Market infrastructure refers to the critically important institutions responsible for providing clearing, settlement and recording of monetary and other financial transactions. For example, payment systems, which is a set of instruments, procedures, and rules for the transfer of funds between or among participants. Market infrastructure and information sets the parameters for chain governance, i.e. the organisation of interactions between chain actors.
The Reserve Bank of Zimbabwe (RBZ) is the authority in providing market infrastructure and derives its powers to oversee, supervise and operate payment systems primarily from the Reserve Bank Act and the National Payment Systems (NPS) Act Chapter. The NPS Act empowers the Reserve Bank to adequately monitor and regulate the payment system activities in order to ensure compliance and financial stability.
In addition, the Central Bank is also guided by international best practices and standards. This is proven by endorsing and adopting the Bank for International Settlements (BIS), Committee on Payment and Market

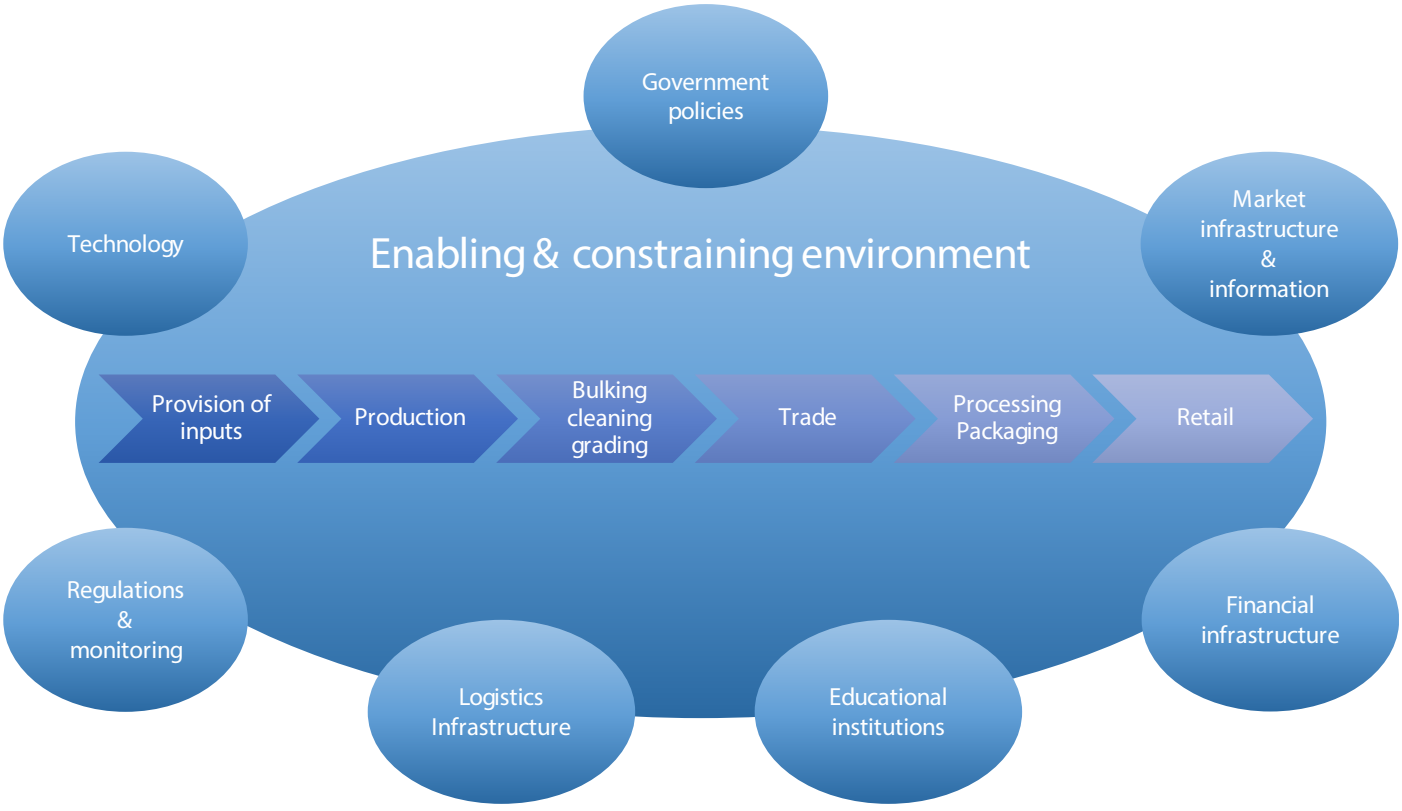


Figure 19 – The enabling and supporting environment. Sourcea: Author

Infrastructures (CPMIs), 24 Principles for Financial Market Infrastructures (PFMIs) and five Central bank responsibilities (see below). The PFMIs provide a single set of standards that cover different risks inherent in various payment, clearing and securities settlement systems. The Five Central Bank Responsibilities are:

1. Regulate, supervise, and oversee FMIs
2. Have powers and resources to regulate, supervise, and oversee
3. Disclose Oversight policies with respect to FMIs
4. Apply PFMIs
5. Cooperate with other authorities

Educational institutions

Technical and agricultural education Institutes (Universities, Polytechnic, TVET) hold a key position in the development of the agricultural sector in Zimbabwe. Stakeholders indicated that graduates have limited experience, practical skills and could improve in problem solving skills. A large number of highly educated graduates is available for work but lack the experience needed to build up the agro-processing sector. The attitude of youth towards agriculture remains negative, resulting in the preference for a desk job. With regards to food safety and quality management systems, there are technical colleges and universities that provide education on standards. However, graduates lack experience to make impactful changes in terms of food safety improvement. Food safety and QMS professionals deployed in Zimbabwe have left the market.

Government

The government plays an important role in creating the environment where the value chain is embedded. Government regulations are influencing amongst others the economic environment, educational institutions, import and export tariffs and possibilities and general infrastructure of the country. Although the government has direct and indirect influence on many critical components of the value chain environment, the following chapter only addresses a few components that directly influence the fruit and vegetables value chain.

Ministry of Agriculture

The Ministry of Agriculture (MOA) is a government ministry responsible for agriculture in Zimbabwe, including the management of agricultural land use, but not land reform. MOA's mission is to promote and sustain a viable agricultural sector and to develop and manage land resources through the provision of appropriate technical, administrative and advisory services in order to contribute to equitable and sustainable social and economic development in Zimbabwe. MOA has 10 departments that deal with different aspects of agriculture (MOA, 2020):

- Livestock Production and Development
- Veterinary Field Services and Tsetse Control
- Veterinary Technical Services
- Agricultural Economics and Marketing
- Agricultural Engineering and Technical Services
- Agricultural Research and Extension (AREX)
- Agricultural Education
- Finance and Administration
- Human Resources
- Internal Audit

State corporations, a.k.a. parastatals, are business enterprises where the government or state has a significant control through full, majority, or significant minority ownership. State corporations under the direction of the MOA include (MOA, 2020):

- Agricultural Bank of Zimbabwe (AGRIBANK)
- Tobacco Industry and Marketing Board (TIMB)
- Pig Industry Board (PIB)
- Agricultural Rural Development Authority(ARDA)
- Grain Marketing Board (GMB)
- Tobacco Research Board (TRB)
- Cold Storage Commission (CSC)

Land ownership

Land ownership is one of Zimbabwe's most sensitive issues. Under Zimbabwe's constitution all agricultural land belongs to the government. The fast track land redistribution that was implemented by the Government of Zimbabwe from 2001 to 2013, resulted in exporting producers losing their land and packing facilities to be given back to resettling farmers. The white farmers who remained were issued with five-year renewable leases by the state and the black resettling farmers were granted 99-year leases.
Corruption in Zimbabwe is found to be endemic within its political, private and civil sectors. As a result, many farmers fear for expropriation by the government despite their 99-year lease agreements. Due to this insecurity many farmers refrain from long term investments such as upgrading of facilities and the construction of greenhouses. If there is no formal and informal security allowing for return of investment, substantial investments that will benefit the production of fruit and vegetables will remain absent.

Food control in Zimbabwe

In the scope of the fruit and vegetables value chain and its standards environment, this report focuses on the food safety issues and all corresponding regulations. Considering the entire chain might be in danger if only one actor does not comply with food safety regulations, the government plays a very important role in safeguarding food safety. Regulations need to be in place and well implemented. Additionally, it is essential that their compliance is measured and that sanctions are in place when entities fail to comply. This has to be implemented effectively in order to function.

Currently, Zimbabwe's food control and regulatory system is characterised by poor infrastructure, lack of coordination and skills, and legislation that needs to be updated to reflect changes in technology and current practices. The responsibility for food control is divided over numerous government departments in various ministries and local authorities. The large number of legal instruments implemented by these authorities lead to overlaps and gaps in some areas.

There are two principle measures that impact food safety control, the Food and Food Standards Act as administered by the minister responsible for Health and Child Care. However, Zimbabwe does not have a formal food safety policy. Additionally, enforcement of existing policies is lacking due to the lack of financial and infrastructural resources. The main causes of weakness in the food control and regulatory system in Zimbabwe are the lack of the requisite resources in terms of funding, infrastructure, equipment and skills.

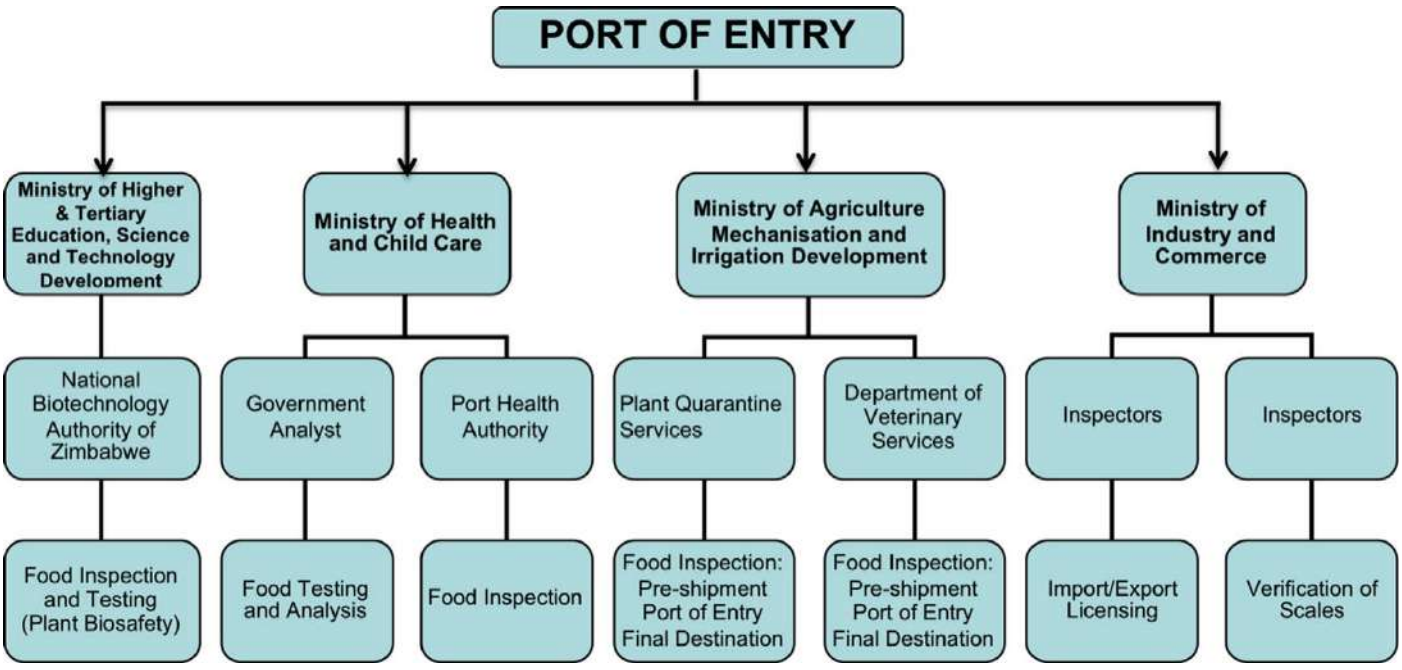


Figure 20 – Overview of ministries and government departments involved at the ports of entry
Source: (Pswarayi, 2014)

5. STANDARDS IN ZIMBABWE

5.1 Food law and technical regulations

In Zimbabwe, the Food Standards Advisory Board (FSAB) revises the food laws in order to harmonise them with the Codex standards. However, the existing laws are outdated and fail to adequately address the food safety concerns. Furthermore, the multiple jurisdictions and overlapping and outdated legislation hampers the effective regulation and control of food.

The FSAB has no enforcement power as it is an advisory board that makes use of existing government institutions. These government institutions have their own reporting structures, and therefore they have no obligation either to report to or get instructions from the FSAB. The organisational structure of the FSAB is bureaucratic and hampers effective action on food safety issues. The FSAB does not have a separate budget and therefore food safety issues compete for other departmental funding. Overall resources such as infrastructure, manpower and equipment are inadequate to provide effective food control.

There are several acts that impact food safety control in the country, for example the Food Act and Food Standards Act. An overview is presented in Table 13.

The food control regulatory agencies are facing lack of resources. This in combination with the fragmentation of the different legislative and implementation authorities leads to a constraint in terms of implementation. Ensuring food safety throughout the chain remains a challenge. The many regulatory service agencies act as individual food control systems. However, due to the absence of a clear mechanism to coordinate their activities they act individually except at times of national food safety challenges.

Currently, the implementation of the Hazard Analysis and Critical Control Point (HACCP) system is adopted on a voluntary basis and it is not a compulsory requirement for the food industry. The stringent international food safety requirements as maintained by developed country markets for exporting countries remain challenging for Zimbabwe to comply with. There is a need for strengthening Zimbabwe's national food safety control systems in order to improve international food trade.

Inspection services

Food inspectors of the ministry lack logistical support in terms of transport and inspection equipment to carry out inspections. The food inspectors have a low professional status and are not highly regarded. This compromises their impartiality and makes them relatively susceptible to intimidation, corruption and bribery. The prosecution procedures for non-compliance are very long and complicated, in most cases the penalties charged are not a deterrent and the prosecutions are not published to warn potential offenders. Lack of coordination among the various government departments leads to inefficient hygiene checks.

The multiple and overlapping inspections result in confusion for the producer as sometimes conflicting solutions for compliance are proposed. Results of a survey conducted by Macheka et al. (2013), show that the regulatory authorities do not have a standardised inspection schedule (Macheka, 2013). Some food

Table 13 – Zimbabwean acts impacting food control. Source: (Pswarayi, 2014)

Zimbabwean Acts impacting food control
Administered by the minister responsible for Health and Child Care: • Food and Food Standards Act • Public Health Act
Administered by the minister responsible for Agriculture, Mechanisation and Irrigation Development: • Animal Health Act • Dairy Act • Grain Marketing Board Act • Agricultural Marketing Authority Act • Fertiliser and Farm Feeds Act
Administered by the minister responsible for Higher and Tertiary Education, Science and Technology Development: • National Biotechnology Act
Administered by ministry responsible for Industry and Commerce: • Parts of Trade Measures Act
Administered by the minister responsible for Water Resources and Development: • Water Act

manufacturing companies have monthly inspections while other companies have been inspected only once or not at all over a period of two years. The inspections are done on a random basis and are not decided based on risk.

Laboratory services

The Government Analyst Laboratory (GAL) under the Ministry of Health and Child Care (MoHCC) is the main facility for testing food for regulatory purposes. The GAL does not have ISO 17025 certification, has limited capacity and is overwhelmed with food analyses leading to delays. The limited capacity of the GAL compromises food safety. Since full and comprehensive analyses of the food cannot be produced, there is the danger that hazardous food will be consumed by the public. Furthermore, there is no overview of all government lab equipment and specific services provided by the different labs under GAL. Coordination of lab equipment and specific capacities of the labs is limited and leads to inefficient spending of resources. The GAL should be strengthened as it plays a key role in food quality monitoring and food import and export certification for Zimbabwe. This would require more funding. In the interviews it was mentioned that the operational laboratories are not trustworthy. This is due to the inconsistency of the lab results and the lack of punctuality. Producers and European buyers prefer to do lab tests in South Africa or in Europe.

Reform

The Zimbabwean food control system is currently undergoing a review as part of the National Quality Policy. This is part of the Trade Related Facility (TRF) as established by the European Union (EU) and the Southern African Development Community (SADC). Zimbabwe has been awarded a EUR 1.4 million project under the trade protocol. The project focuses amongst others on the development of an effective policy and strategy to guide the establishment of a National Quality Infrastructure that is aligned with international best practices, included related capacity building. Other key result areas are related to the development of supportive legal and regulatory framework, technical regulatory framework bill and formulation of new food safety legislation. This supports the overall objective to harmonise the functions of ministries, departments and agencies to effectively regulate quality, standards and SPS. Ratification of the bill for the national quality policy is currently ongoing. Implementation of the harmonisation strategy will start after ratification.

Availability of certification

Traceability of food is currently absent. There are no certification schemes in place, not for retail nor for export. Private sector should be included in driving the quality and safety standards but faces a lack of resources to do so. Implementation of standards is demand driven. It opens up export markets but requires access to finance to fund implementation. A crosscutting problem is the absence of accredited certification bodies in Zimbabwe and the lack of accredited and trustworthy laboratories. Traceability and HACCP are currently not obligatory by law. This in combination with a lack of demand for traceability by consumers leads to a food safety environment where traceability and food safety are not a priority.

International standards

A limited number of producers is GLOBALG.A.P. certified by accredited bodies from South Africa and Kenya. Zimbabwe currently does not have local certification bodies for important standards like GLOBALG.A.P., FSSC 22000, IFS and BRC. The same counts for social, environmental and organic certification. This proves to be a bottleneck as the cost of certification is higher because auditors need to be flown in from South Africa or Kenya. Local service providers such as SAZ do not provide extensive consulting for implementation and are not accredited to give out certificates for these standards. This reflects the current state of mind that standards are on the bottom of the list. There is no push for compliance and therefore no demand. Without demand for standards implementation and certification it is not lucrative for standards to open a local office.

5.2 Lessons learned

The standards environment in Zimbabwe is characterised by:

- Multiple authorities, lack of coordination and skills;
- Legislation that needs to be updated;
- Poor infrastructure;
- Limited financial resources for food control;
- Lack of accredited laboratories;
- Limited human resources;
- Lack of locally accredited certification bodies for GLOBALG.A.P., FSSC 22000, BRC, IFS and other required standards for export.

In terms of the food safety and quality requirements for export to the EU (overview presented in Annex 6), the current Zimbabwean standards and the gaps that prohibit Zimbabwean producers to export we can conclude from the above that the standards environment in Zimbabwe does not provide enough support. Implementation of international standards as required by the EU requires laboratory services and certification from entities in South Africa, Kenya, Europe or elsewhere.

Table 14 – Gap overview between the EU food safety and quality requirements and Zimbabwe's standards environment. Source: Author

Topic	Standard	EU status	Zimbabwe status
Food safety and quality certification	GLOBALG.A.P.	• Required	• "No accredited certification body Voluntary Horticulture ZIM GAP certification provided by SAZ"
	BRC	• Required	• No accredited certification body
	IFS Food	• Required	• No accredited certification body
	SQF Food	• Required	• No accredited certification body
	FSSC 22000	• Required	• No accredited certification body
	HACCP	• Stops per 1 January 2021, now integrated in BRC, IFS and FSSC 22000.	• Voluntary certification provided by SAZ
Organic certification	EU Organic	• On own initiative	• No accredited certification body
	Soil Association	• On own initiative	• No accredited certification body
	Naturland	• On own initiative	• No accredited certification body
	BioSuisse	• On own initiative	• No accredited certification body
Social and environmental certification	IDH sustainable trade initiative	• On own initiative	• No accredited certification body
	BSCI	• On own initiative	• No accredited certification body
	GSCP	• On own initiative	• No accredited certification body
	SMETA	• On own initiative	• No accredited certification body
	ETI	• On own initiative	• No accredited certification body
	GRASP	• On own initiative	• No accredited certification body
	PlanetProof	• On own initiative	• No accredited certification body
	Fair for Life	• On own initiative	• No accredited certification body
	Fairtrade	• On own initiative	• No accredited certification body
	Rainforest Alliance/ UTZ	• On own initiative	• No accredited certification body

6. THREE STAKEHOLDER STORIES

In the following chapter we elaborate on the experiences of three stakeholders. The selected cases zoom in on agro-processing, trading and farming businesses in order to provide insight in the reality of certain value chain actors.

6.1 Probest Veg

Probest Investments Ltd, trading as Probest Veg, is a Zimbabwean registered private limited company that exports fresh vegetables. It specialises in the growing of near organic snow peas (mangetout and sugar snaps) as well as fine beans for the export market. The company is relatively small and was set up in 2016 with support of the 3-year Fit for Market programme funded by the Europe-Africa-Caribbean-Pacific Liaison Committee (COLEACP). The programme aims at assisting the growth of enterprises, by improving their access to domestic and international markets, while at the same time strengthening the horticultural value chain through capacity building in food safety. Probest Veg received support in linking with European buyers and was trained on food safety standards in order to comply with the European legislation.
Probest Veg is mainly exporting to countries in Europe. It has exported 40 tons through air in 2018 and over 100 tons in 2019. Although exports are paid in FOREX the company is not able to access all its funds due to the instable economic situation in Zimbabwe. This limits the company in its further development and expansion as it is hampering investments in its contracted farms and infrastructure development (cold chain).
Probest Veg is currently working with an out-grower scheme of 75 hectares in total divided over three farms in the areas Mashonaland East and Central. In 2016 the company started its first partnership with Sligo farm, producing beans on 25 hectares irrigated soils for export. In 2017 a second farm was added to the out-grower scheme, adding 40 hectares of irrigated soils. In 2018 the third farm joined, a large farm of 150 hectares of which 10 hectares irrigated soils for production of beans. Probest Veg supported all three farms in becoming GLOBALG.A.P. certified to produce mangetout, sugar snaps, fine beans and chillies.

Implementation of GLOBALG.A.P. was not an easy process due to the lack of capacity within Zimbabwe. Because local capacity is not on the same level as the EU, where that was the target market of the company, it was a challenge to upgrade the farms to the desired level of food safety standards. Although SAZ has a wide range of capacity with regards to standards, it was not possible to receive GAP certification through them. Another factor that played and continues to play a role is the lack of local consultants specialised in food safety standards required by the European market. Implementation of GAP was supported by a local consultant and the external audits for certification were done by SGS South Africa.

The company is currently grading, packing and exporting, but wants to expand its operations towards processing of produce. The aim is to set up a processing facility for washing, cutting, mixing and packing of vegetables to produce packets of mixed and cut vegetables. Challenges hampering implementation are a lack of access to finance to invest in setting up a processing facility; lack of central packing facility that is well connected to the three farms; and limited cold chain logistics in order to transport produce from farm to processing facility.

Figure 21 – Workers in a field of beans at Sligo farm, contract farm of Probest Veg. Source: Author

Figure 22 – Members of Sisonke Ag-Fresh famers' association and trainers of Q-Point B.V.

6.2 Farmers' association Sisonke Ag-Fresh

Sisonke Ag-Fresh (SAF) is a farmers' association with 10 members, covering approximately 2000 ha, located in the province of Mashonaland West. The group of farmers is driven to increase production to supply the Zimbabwean and international market. However, the group lacked knowledge about the standards and did not know where to receive support for implementation. Q-Point B.V. trained the farmers in the implementation of GLOBALG.A.P. and supported implementation on several farms. This describes the crosscutting issue at the beginning of the value chain in Zimbabwe that many farmers lack awareness about food safety and standards implementation. The association pointed out that although knowledge is present within Zimbabwe, it is not available for the community. SAF members indicated that there is currently no platform for stakeholder engagement and that platform development is a key objective in order to bring the sector forward. In the past there was the HPC – Horticulture Producers Coalition, but the platform collapsed when the foreign farmers were removed from their lands due to the land reformation policies.

Furthermore, funding is a large issue for the members of the association. Now that there is knowledge on GLOBALG.A.P. and motivation to implement standards, the bottleneck is funding for preparation for the certification process and the certification itself. Currently there is no accredited certification body for GLOBALG.A.P. in Zimbabwe. External auditors have to fly in from either South Africa or Kenya for audits. This makes the procedure of auditing and certification cost intensive. Due to the current economic instability in the country this makes it a challenge for farmers to become certified. It is especially the initial certification that is perceived as a challenge since the farmers do not have any foreign currency income to fund the certification process. Once certified and once export of produce has been established, it is easier to locate funds for the annual external audits. The government provides loans funding through CBZ to finance commercial farmers through loans. However, this is not accessible for farmers without collateral. Thus, even after capacity building on GLOBALG.A.P. and the start of implementation, members of the association are now unable to become certified due to lack of access to finance.
Also, the infrastructure imposes challenges for the farmers. The instable energy network and limited access to water has a large impact on the farming operations. The country is facing energy/electricity problems now and due to the use of pumps for irrigation, no power means no water for the group of farmers. Infrastructural problems like these are a major bottleneck because it hampers crop production. Additionally, the group pointed out that farming is a warehousing and distribution business. Due to the limited access to proper warehousing and cold storage in rural areas they are facing logistics issues that result in post-harvest losses. Improper storage of produce also leads to food safety issues.

6.3 Schweppes Limited Zimbabwe

Schweppes Zimbabwe Limited (SZL) is a large agro-processor whose core business is manufacturing, sales and distribution of beverages under license from The Coca-Cola Company. SZL manufactures and distributes Mazoe Crushes and Syrups, Minute Maid juices, Just Juice, Bonaqua and Schweppes bottled water brands. The company has four manufacturing plants, in Ruwa, Bulawayo, Norton and Mazunga, and nine distribution centres countrywide. The company employs over 900 employees around the country.

One of the manufacturing plants is based in Norton and is operated by Best Fruit Processor Limited, a joint venture of the Agricultural and Rural Development Authority (ARDA) and Beitbridge Juicing Limited (BBJ) which is part of SZL. BBJ is the managing partner in the joint venture, with 70 percent ownership, while ARDA retains the balance. The company procures raw fruits such as mangoes, guavas, oranges and tomatoes from community farmers within a 150-km radius and processes the fruits into purees and paste. The processing plant has an annual production capacity of 30 000 tonnes (10 tonnes per hour) of raw fruit which is processed into purees and pastes that are aseptically packaged and therefore preservative-free. The purees and pastes are marketed to both local food manufacturers and exported, mainly to the SADC region but BBJ also exports grapefruit concentrate to the EU. For the Norton plant the division is respectively 30% local and 70% export market, while the Ruwa plant prioritises the local demand for its manufactured products and sells its surplus on the export market.

BBJ invests in quality and food safety and is supported in this by its shareholders. Since it operates under the licence of Coca Cola, a lot of focus is put on certification for quality and food safety. Due to the top-down support for progressive certification because it supports market diversification, the company makes significant investments in its value chain. The Harare and Norton plants are FSSC 22000 certified, supported by SAZ, and is in the process of implementing GLOBALG.A.P. at the start of its value chain. BBJ has an in-house agronomist to support source farmers and to guarantee quality of inputs. He performs inspections following the standards set by BBJ. Implementation of GLOBALG.A.P. is market driven, as it is a world class standard that will open doors for export.
In terms of feedstock, raw material input, the plants face issues. BBJ currently has two anchor farms producing tomatoes, blueberry, potatoes and citrus. Tomatoes are both of own production and sourced from third parties, the other farms are partners. All citrus feedstock is sourced from third parties. On average the feedstock received is 60% good and 40% mediocre quality. Examples of feedstock issues are tomatoes with BRICS levels that are too low, inconsistent quantity input, inconsistent quality of tomatoes. The company indicated that processing of high-quality products with inconsistent feedstock is a challenge. More importantly, there is a need for increased quantity of feedstock since the plants are currently not operating on the potential level, having idle time. With a processing capacity of 10 tonnes per hour the plants do not receive enough feedstock to maximise operations. This is especially for citrus concentrate and tomato paste. Climate change plays a large role in the inconsistency of raw material input, as farmers are not able to irrigate their crops because they are confronted with droughts and even freezing temperatures.

This indicates that BBJ's business model heavily relies on the community's ability to invest in the production of relevant fruit for processing at a reasonable price and at the right quality. In order to ensure the company's existence and further growth, BBJ currently has an out-grower programme with over 300 farmers and is investing in upscaling the scheme. The business model for contract growing for fruit includes a mix of community irrigation schemes, small-holder farmers, farmers' groups but focuses on big commercial farmers and medium-sized commercial farmers that are clustered in associations of about 10 farmers with approximately 6 hectares per farmer. BBJ leases the land and pays farmers a salary to produce feedstock for the plant. Initially the out-grower programme started with a lack of skills that resulted in losses. Currently there is a head agronomist supporting implementation of company and GLOBALG.A.P. standards. There is also a strict grower selection procedure in place and as a support measure BBJ has set up centres of excellence and a graduation programme to educate the farmers on standards and best practices. The farmers receive support for a period of 5-8 years, after graduation the operations will be fully handed over to the farmers.
There is a lot of focus on the development of local production because the cost of importing feedstock is high. High demand for raw material input in combination with the import prices makes processing a capital-intensive business. Directly and indirectly imported raw materials (e.g. packaging and concentrates) make up an average of 40% final product cost of produced beverages.

6.4 Lessons learned

The different perspectives described above highlight a diverse collection of lessons that are independent yet linked to one another through the vale chain. From the experiences of the three diverse stakeholders described above we can deduct the following lessons learned:

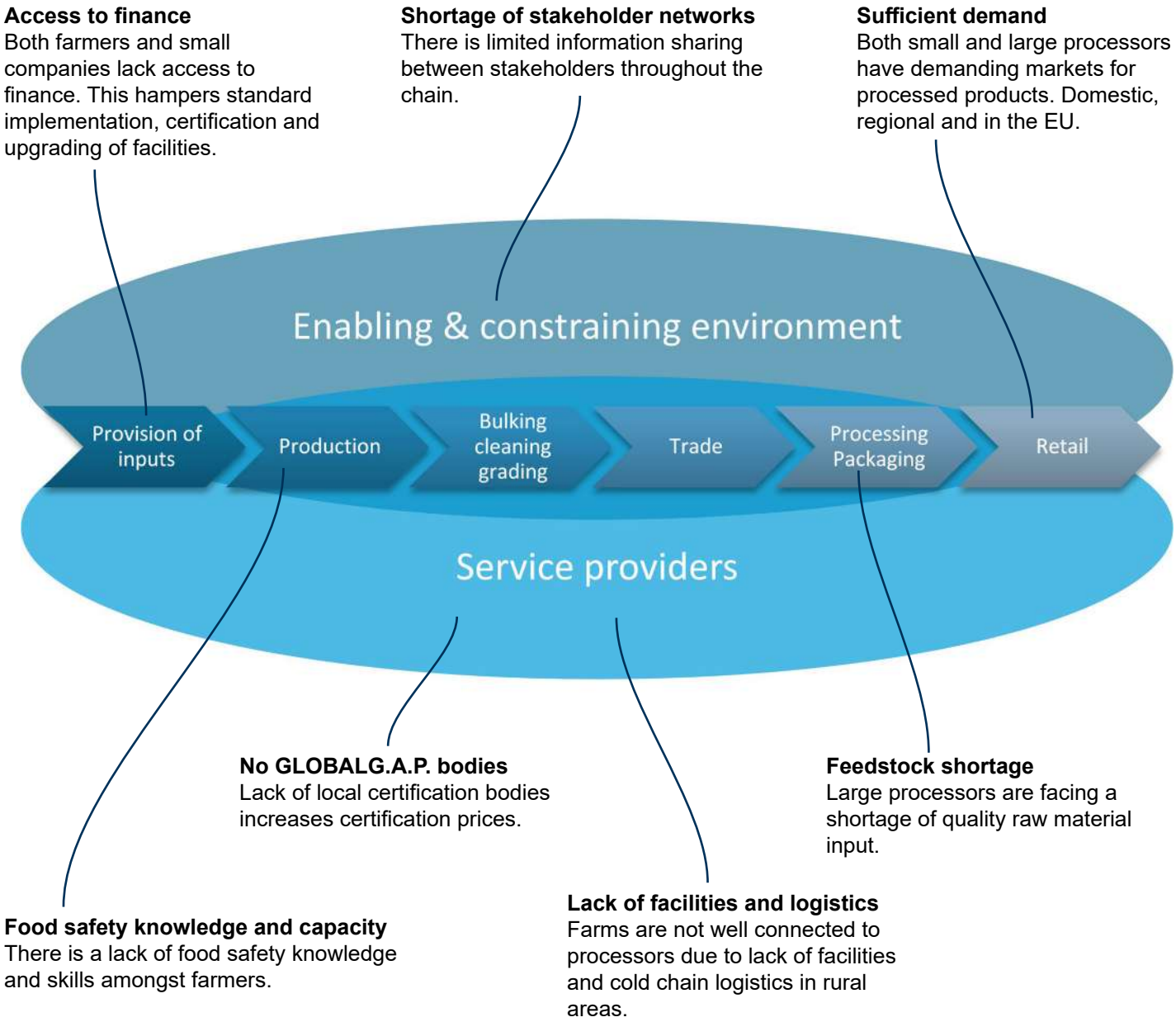


Figure 23 – Lessons learned

7. COMPETITIVE ANALYSIS

The competitive analysis provides insight in the current status of the Zimbabwean agro-processing sector. The analysis is done in three steps: PESTLE analysis, Porter's 5 forces of competition and a SWOT analysis. The PESTLE provides an overview of the macro-environment in which the agro-processing sector is operating. Subsequently, Porter's 5 forces of competition looks into the domestic, regional and intercontinental levels of trade, analysing the forces that influence the sector's competition. Finally, the SWOT provides insight in the strengths, weaknesses, threats and opportunities of the fruit and vegetables value chain in a concrete manner.

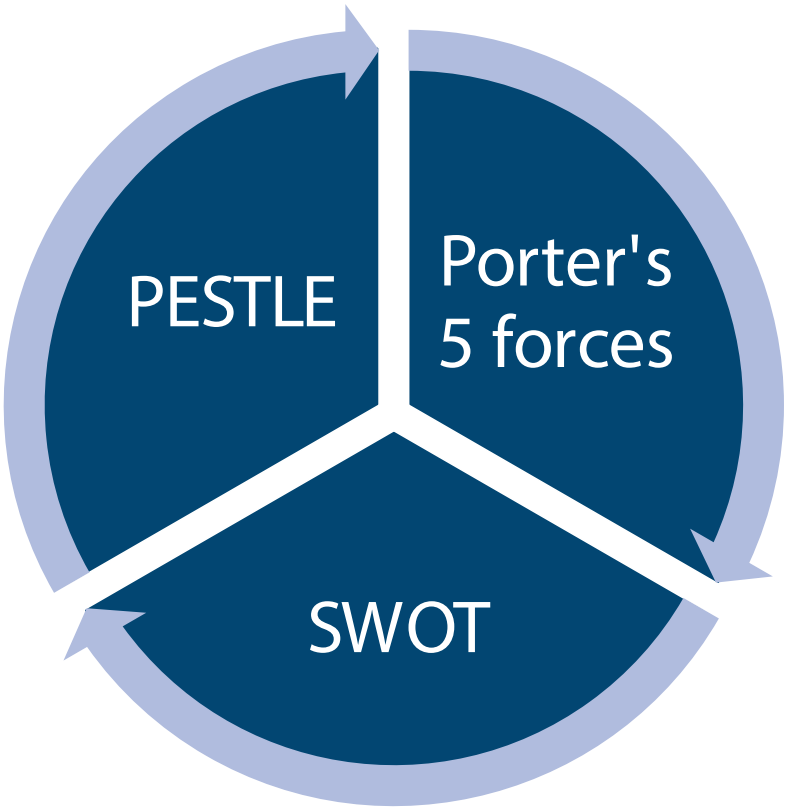


Figure 24 – Competitive analysis framework

7.1 PESTLE analysis

PESTLE analysis stands for 'Political, Economic, Social, Technological, Legal and Environmental analysis' and describes a framework of macro-environmental factors used in the study and interpretation of those events and trends which influence the fruit and vegetables sector. By using the PESTLE model, it is possible to analyse each segment at a time, thus focusing on the specific factors relevant for each segment.

Political

The political climate currently hampers development of a rigid and effective standards environment in Zimbabwe. Multiple authorities and a lack of coordination and skills lead to a complex ecosystem that proves to be a bottleneck for businesses to operate in an effective manner. Export operations are hampered by complicated bureaucratic procedures. The political climate also affects the availability of FOREX and electricity throughout the country.

Economical

The ongoing FOREX issues in Zimbabwe leads to a lack of financial resources for stakeholders to invest in their businesses. Investments for certification and upgrading of facilities need to be made in USD because supplies are imported. The lack of USD within the country prevents stakeholders to invest in further development of the fruit and vegetables value chain.

Social

Cultural aspects include career attitudes, consumer trends and emphasis on safety. Due to the declining economy and lack of stability in the past decades, many professionals have left for a brighter future in the neighbouring country South Africa. Consumer trends do not support improvement of food safety systems on the local market. Consumers are focused on the lowest price rather than the safety for consumption. Supermarket chains and other retailers reflect this focus by offering products for competitive prices. This trickles down throughout the value chain, creating a culture focused on 'lowest-price' rather than 'food-safe'. The status quo with regard to a suitable working environment such as safety procedures, decent hygiene facilities and decent wage, are not at the level that international standards demand. This creates a large gap for Zimbabwean companies to export considering the increasing importance of social standards. Inclusive value chains involving small-scale producers in contract farming are increasing, mainly being established by large processor companies that are trying to reduce their feedstock shortage through a value chain approach.
Honesty, trust and transparency within the value chain is generally not present. Due to the lack of standards implementation there is no way to verify the operations and activities related to food safety and hygiene at stakeholders.

Technological

Technological factors influencing the fruit and vegetables value chains are limited energy supply, poor infrastructure and limited logistics. The shortage of water combined with the country's dependence on hydropower results in a lack of energy supply. Unrelenting power cuts and fuel shortages have a negative impact on the local economy. Most producers rely on electricity for irrigation and cold storage, but only receive power for 6-12 hrs per day due to power cuts. Power generation using generators is expensive due to the fuel shortage and the resulting high fuel prices.

Legal

The current political climate affects the legal status in Zimbabwe. The food control and regulatory system is fragmented and consists of many entities in the Ministry of Health, the Ministry of Agriculture and in local authorities. There are no clear mechanisms to coordinate the activities of these different entities and, in practice, they act independently except in times of a national food safety challenge. This negatively impacts food safety throughout the value chain.

Environmental

The ecological and environmental aspects such as weather and climate have an overall positive impact on the fruit and vegetables value chain. Although climate change has an increasing impact on farming systems through long periods of droughts or extreme rainfall and storms, the availability of fertile soils and the country's suitable agro-ecological zones for fruit and vegetable production in the centre and north of Zimbabwe result in a suitable environment for further development of the sector.

7.2 Porter's five forces for competitive nations

This model analyses the competitive environment and strategic implications of Zimbabwe's fruit and vegetables agro-processing industry and the intensity of industry competition in terms of five major forces. The model explains why the industry is able to sustain a level of profitability.

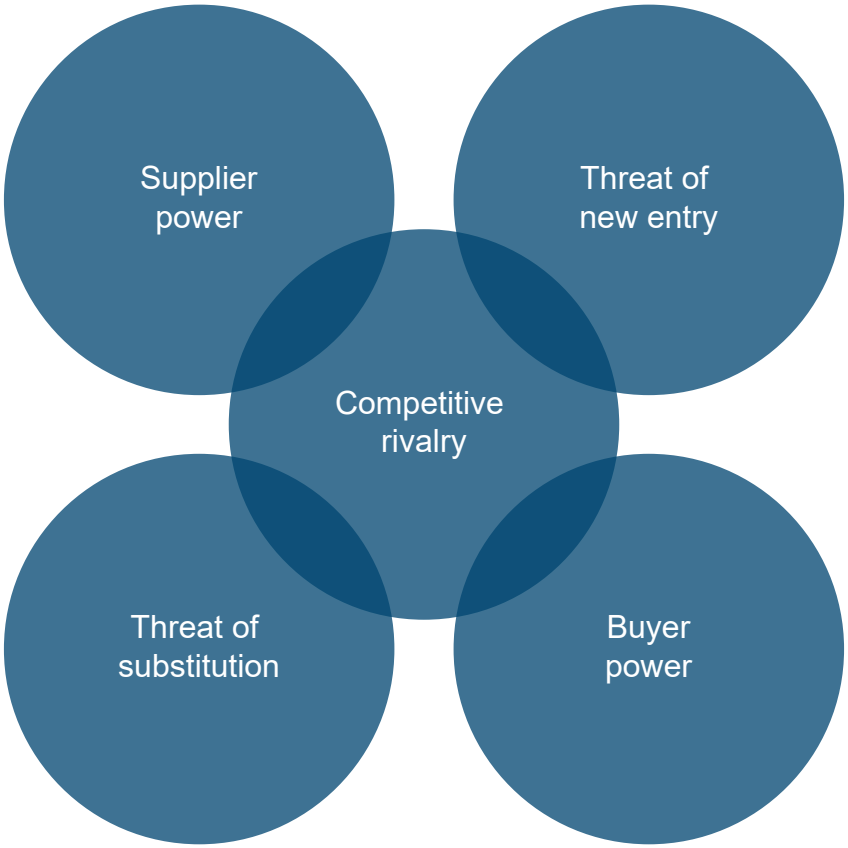


Figure 25 – Porter's five forces framework. Source: Author

Degree of industrial competition

The number of competitors in the agro-processing sector is small compared to developed markets. A distinction can be made between exporters of fresh produce (such as Shelby) and processors that produce jams for the domestic and regional market (such as Cairns Foods). The degree of competitive rivalry is considered low and therefore the companies engaging in agro-processing have the power to ask higher prices. On a domestic and regional scale, the market is not saturated. Companies can market their products without engaging in price wars with other suppliers. For the European market, the demand continues to grow for fruit and vegetables. Considering the above it can be stated that the markets are not saturated, and that the degree of industry competition is relatively low.

Potential of new entrants in the agro-processing industry

This force describes the ability of new companies to tender in the market, considering the time and capital needed. Both horticulture and agro-processing are capital intensive operations considering the required investment (irrigation, certification, cooling infrastructure, manufacturing, packing etc). For a new entrant to be effective in the agro-processing industry, initial investment is very high. Also, operational expenses are considered high due to the instable electricity network and fuel shortage. Experience in the industry is much needed in order to be effective. The fragmented standards environment, policy of multiple authorities one should comply with and the FOREX issues are examples of hurdles that one should have experience with when entering the agro-processing sector. It can be stated that the potential of new entrants in the agro-processing industry is low, not even considering the time needed for building a brand and economies of scale.

Power of suppliers

The power of suppliers addresses the availability of services that assist the industry, for example the supply of suited job seekers or the amount of cold transport suppliers. The fewer suppliers of key inputs, the more power suppliers have to drive up prices and the greater a company's dependence on a supplier. The number of key suppliers in Zimbabwe is very low, for example, the amount of cold chain logistics companies, consultants for standards implementation, labs etc. In order to operate a business in the agro-processing sector one is very dependent on a few key suppliers. For some cases there is an absence of key suppliers, for example the absence of accredited labs or certification institutions. The current situation gives a lot of power to suppliers and makes companies very dependent on the suppliers. The lack of competition among key-suppliers also results in a lack of quality of the services offered.

Power of buyers

Power of buyers describes the power of clients to drive the prices down. This factor is affected by how many buyers or customers a company has, how significant each customer is, and how much it would cost a company to find new customers or markets for its output. A smaller and more powerful client base means each client has more power to negotiate for better deals (price, quality, quantity, contractual arrangements etc). This also prevents a company to charge higher prices in order to increase profitability. The power of buyers in the agro-processing sector of Zimbabwe is relatively low on a domestic and regional scale when considering the large number of buyers such as small and medium supermarket chains. Sellers have a large number of buyers that amount for a small percentage of their revenue, which minimises the power of buyers. However, economies of scale provide large buyers with a bargaining position. For example, SPAR Zimbabwe with its large number of supermarkets is able to bargain with its providers because it is considered a large and important customer that amounts for a significant percentage of revenue for processors and producers. On another note, the power of European importers is relatively high, especially due to the fact that European buyers bring in scarce FOREX and prove to be a stable and growing market.

Threat of substitutes

Threat of substitutes is focusing on the threat of goods and services that can be used in the place of a company's goods and services. If a company or sector produces goods for which there are no substitutes, they have more power to increase prices and lock in favourable terms. In a market with a lot of substitutes, buyers have the bargaining power. For the case of the Zimbabwean agro-processing this depends on the crops. For example, Zimbabwe is geographically a good place to produce high quality oranges. When other suppliers in the world suffer from climate related issues and diseases like black spot, Zimbabwe can supply the market and has therefore an advantage. This is however time and crop bound and can fluctuate per season and region. Also, European buyers import fruit and vegetables from e.g. South Africa, Tanzania, Kenya and Madagascar. On the domestic market, there is a threat because approximately 70% of horticulture crops is imported. The Zimbabwean producers need to compete with these imports, which is a challenge. Considering the above it can be stated that the threat of substitutes is high in the domestic, regional and European market.

Figure 26 – Loading fresh tomatoes on the truck

7.3 SWOT of the fruit and vegetables value chain

The term SWOT is simply an acronym for Strengths, Weaknesses, Opportunities and Threats. A SWOT analysis can be used to identify and classify key strategic factors. Strengths and weaknesses are on an internal level, referring to the characteristics of the agro-processing sector within Zimbabwe. Opportunities and threats are on an external level, referring to the opportunities and threats from outside the Zimbabwean sector that affect the agro-processing sector.

Table 15 – SWOT analysis fruit and vegetables value chain

Strengths	Weaknesses
• Agro-ecological conditions • Domestic market for processed products • Underutilised land • Agriculture is a protected sector • Deployment and upgrading of computerised customs clearance systems • Horticulture Development Council • Access to laboratories	• Weak infrastructure • Limited access to and high costs of financing • Inadequate regulatory and institutional framework for food safety • Access to accredited labs • Access to certification institutions • Limited awareness on food safety issues • Level of sector organisation • Human resource capacity • Fast Track Land Reform Programme (FTLRP)
Opportunities	**Threats**
• Growing demand in Europe • Government focus on exports • Government labs • Local standards body SAZ • Horticulture Development Council	• Imports from the region • Erratic weather and climate change

Strengths

Agro-ecological conditions

Zimbabwe has a favourable climate for fruit and vegetables production. The agro-ecological regions I and II, in the Eastern highlands and Northern central part of Zimbabwe benefit from more than 1,000 millimetres of rainfall per year. The periods of low temperatures in the regions minimise the risk of pests and diseases. The rainfall is fairly reliable, and the soils are fertile. The country has available land for horticulture production, that is currently underutilised.

Domestic market for processed foods

The domestic market for processed products is growing. Processors indicate that there is a growing demand for purees, pastes, jams etc. This creates a demand for quality feedstock on agro-processing level that trickles down to the production level. This is perceived as a strength since it serves as a driver for further sector development.

Weaknesses

Weak infrastructure

The instable energy network and limited access to water has a large impact on the industry throughout the value chain. At the start of the value chain, lack of infrastructure like irrigation, pack sheds, cold storage and cold transport is resulting in production losses and post-harvest losses. This issue is also connected to limited access to FOREX. Because investments are usually made in USD and the Zimbabwean currency has suffered from inflation, companies are unable to invest in infrastructural development. Furthermore, horticulture and agro-processing are capital-intensive operations. On agro-processing level, inefficient equipment results in in production of high-priced unattractive products.

Access to finance

Years of macroeconomic decline with little new investment have led to an instable economy with a highly inflated currency. The instable economy and limited access to FOREX limits the operations through the inability to buy packaging materials and other inputs. Furthermore, investments for training, certification, and upgrading of facilities is not available. This also leads to high operational costs and high costs of input, making fruit and vegetables production and agro-processing very costly. Processors need to import

feedstock, packaging materials such as plastics and tin sheets for canning. Without FOREX this continues to be challenging. More export is needed in order to receive FOREX, which creates a vicious cycle. This negatively impacts the competitiveness of the agro-processing sector.

Inadequate regulatory and institutional framework for food safety

The food control regulatory agencies are facing lack of resources. This in combination with the fragmentation of the different legislative and implementation authorities leads to a constraint in terms of implementation. Ensuring food safety throughout the chain remains a challenge. The many regulatory service agencies act as individual food control systems. However, due to the absence of a clear mechanism to coordinate their activities they act individually unless in times of national food safety challenges.

Gap between national and international standards

The prominent gap between the national food safety regulations and international standards is a bottleneck for the industry. This leaves stakeholders with a great distance to cover in terms of food safety, preventing access to export markets. The absence of legislation on food safety such as HACCP and GLOBALG.A.P. results in a lack of push for food safety compliance. Furthermore, implementation of food safety standards is not stimulated by private sector since only large processors and exporters demand certification. The domestic market does not value food safety, so does not stimulate implementation of standards. Therefore, private sector stakeholders are not stimulated to invest in international food safety certification, not by government nor by private sector.

Access to accredited labs

Access to ISO 17025 accredited labs remains a challenge in Zimbabwe. Since testing by accredited labs is a requirement for international certifications this proves to be a major bottleneck. Currently stakeholders need to send samples to South Africa, Kenya and Europe in order to present credible lab results. There is a need for institutional and capacity strengthening of Zimbabwe's laboratories.

Access to certification institutions

The lack of accredited certification institutions increases the cost of certification because auditors need to fly in from either Kenya or South Africa. The lack of a GLOBALG.A.P. certification body is a weakness for the agro-processing sector. Because many medium sized fruit and vegetable producers are not certified they are unable to engage in export markets. This prevents the farmers from earning FOREX, which could be used for further improvement of infrastructure. Processors pointed out that this issue plays a role in the lack of feedstock.

Limited awareness on food safety issues

At the start of the value chain there is limited knowledge about food safety standards and quality management systems. Many farmers do not know about the existence, importance and requirements of standards such as GLOBALG.A.P. In combination with the relatively low level of national food safety legislation and limited enforcement, food safety in Zimbabwe is a serious issue. Also, stakeholders like SAZ remain unknown to farmers that are not engaged in export markets.

Level of sector organisation

After the collapse of HPC a void has been left in terms of horticulture networks. The lack of a sector platform hampers further development of the sector because key stakeholders do not communicate. Limited communication amongst private sector stakeholders and between private sector and government does not support collaboration. Furthermore, the private sector is currently not able to discuss with government authorities how to build the sector and to lobby for supportive policies.

Human resource capacity

Human resource capacity was mentioned as a bottleneck for successful implementation of food control. Stakeholders indicated that most of the government departments and agencies involved in food safety control are under-staffed and have a high staff turnover. This is due to the economic situation in the country that has led to emigration of highly skilled scientists and technical workers to countries like South Africa, where better opportunities are offered. Although graduates in the country are seen as knowledgeable and well-trained, industry stakeholders mention they lack experience to make impactful changes in terms of food safety improvement. It is necessary to strengthen human resources in the government and industry in order to realise successful implementation of food control and for further development of the food safety environment in Zimbabwe.

Opportunities

Growing markets

There is a growing demand for fruit and vegetables in the EU. Especially the demand for citrus and beans seems to be growing. This offers an opportunity for growth of the sector in Zimbabwe and a push for implementation of international standards in order to tap into the EU market.
Furthermore, the consumer market for processed goods in Zimbabwe is growing. For example, tomato ketchup sachets. The lack of quality feedstock is currently a problem, but the growing domestic demand creates a market for producers to enter.

Goverment focus on exports

The government is increasingly focusing on export of fruit and vegetables. This is exemplified by the ratification of the National Quality Policy as supported by the EU and SADC's TRF. Harmonisation of food safety policies and Zimbabwe's regulatory framework will benefit the fruit and vegetables sector and potential growth.

Government labs

Although the government labs are not accredited, they contain functional laboratory equipment and qualified personnel. This is an interesting starting point to work from in order to set up accredited and qualified laboratories. When an inventory of laboratories is available a strategy can be developed in order to strengthen the government laboratory.

Local standards body SAZ

Zimbabwe has its specialised standards association, SAZ. Currently SAZ offers a wide range of certifications but does not have international standards such as GLOBALG.A.P. in its portfolio. It is an interesting opportunity to strengthen SAZ in order to make GLOBALG.A.P. and other certifications available throughout Zimbabwe. Institutional capacity building of staff and linking with international standards would be an interesting starting point.

Horticulture Development Council

The Horticulture Development Council was initiated in June 2019 and aims to reinstate the efforts of the HPC in supporting the horticulture industry in its development. HDC aims to serve as a platform for sector stakeholders to share information, facilitate trade, and provide services in order to improve production and processing operations. HDC serves as an opportunity to improve sector organisation through connecting private sector players. This allows for improved communication between sector stakeholders.

Threats

Imports from the region

Imports of fruit and vegetables from the region are filling the gaps for processors. By importing quality produce the processors ensure their feedstock. However, this comes with competition for the Zimbabwean farmers since they are not able to produce the demanded quality and quantity for lower prices. They don't have the benefit of economies of scale and need to invest in standards implementation to reach the same level of quality.

Climate change

The impact of climate change on farming systems is increasing. Dry periods are prolonged and have a devastating impact in combination with the instable energy network that prevents systematic irrigation of the crops. Tropical cyclone Idai in March 2019 caused catastrophic damage and was one of the worst on record to affect Africa, taking more than 1,300 lives.

8. CONCLUSION

Based on the analyses in the previous chapters it may be concluded that the development of strong food safety standards and quality assurance systems throughout the chain is crucial in ensuring Zimbabwe's horticulture players competitiveness on the global market.

Larger value chain enterprises apply an open and market-oriented approach by focusing on product market combinations, maximisation of added value, establishing partnerships and information across the chain, rather than focusing solely on increasing productivity. They take an active role in the value chain by setting safety and quality standards for the entire chain, providing extension, arranging contracts and ensuring traceability. Contract farming involving both smaller and larger producers takes place, as a very effective means to coordinate chain efforts towards market demands. Contract farming is perceived to be more profitable and stable, as the returns are usually higher than selling on the local market. However, within the Zimbabwean context there are also many smaller enterprises that are not yet operating in a well-functioning value chain. There is an absence of adequate food safety assurance systems in small-scale production and marketing of fresh vegetables and fruits. Consumers of vegetables and fruits in Zimbabwe face a potential health risk due to this absence. With the exception of several larger enterprises that produce for the domestic and export market, who ensure food safety assurance through certification (e.g. GLOBALG.A.P).

Contamination of fruits and vegetables in production and marketing can come from soil, agricultural inputs and chemicals, water (irrigation, washing), manure, personal health, harvesting, handling, packaging and transport. Farmers depend on pesticides quite heavily in horticulture production in Zimbabwe. Several incidences of deliberate and unintentional abuse have been reported. Farmers, middlemen and traders need to be trained on safe fruit and vegetables production and hygiene practices.

The government encourages all the farmers to follow WTO regulations on sanitary (human and animal health) and phytosanitary (plant health) conditions. Instructions on farm level related to this regulation are missing. For the food industry, the implementation of the Hazard Analysis and Critical Control Point (HACCP) system is adopted on a voluntary basis, meaning it is not a compulsory requirement by law. The Food Standards Advisory Board coordination of food safety related activities have been quite difficult due to the many government institutions involved and different responsibilities and their lack of enforcement power.

For the export market, horticulture producers do have to meet requirements with regards to traceability, hygiene criteria, chemical contaminants, and pesticides. The lack of food safety assurance systems is a constraint for (small scale) farmers' access to horticulture export markets.

It is very expensive for farmers to become certified producers; this is also attributed to the fact that there is no certification institute available for standards required for different international markets. There is no ISO 17025 accredited lab in Zimbabwe. However, SAZ has established a laboratory to help farmers meet the international standards. There is a lack of skilled manpower on food and safety as well as phytosanitary expertise. No clear and up-to-date regulations about authorisations and use of plant protection products are available (e.g. MRLs, safe use). There are no special requirements from the government on packaging and labelling for fresh fruits and vegetables, which negatively impacts traceability of goods. For processed juices it is mandatory to label the foods with brand names, address of the manufacturers and expiry date.

The global trade boom, coupled with increased consumer demand, tastes and habits, has led to an increase in quality and safety requirements in international trade. Population growth and growth of the middleclass are indicators that the demand for fruit and vegetables in the domestic market will increase. There is also a trend towards more organic food and healthy diets that will spark increase of demand.

From the competitive analysis it can be concluded that Zimbabwe has very favourable climate conditions. However, financial and logistics infrastructure is far from optimal due to the limited access to basic resources such as fuel, water and electricity. Companies have limited access to finance, which hampers investments in the development or import of new technologies. Also, land ownership issues related to the lease contract and distrust (fear for expropriation) do not contribute to the stimulation of investments. European importers indicated that improvement of Zimbabwe's cold chain facilities is a requirement for further development of the fruit and vegetables export sector.

9. RECOMMENDATIONS

This report addresses the substantial challenges hampering further development of the fruit and vegetable sector in Zimbabwe. These valuable insights provide the opportunity to organise structured efforts to alleviate current issues. In order to guide future efforts, recommendations have been formulated in line with the Triple Helix model as developed by Etzkowitz and Leydesdorff (1997). The model advocates the strengthening of the collaborative relationships between academia, industry and government to improve innovation, and has been used in both developed and developing environments as integral policy making tool to enhance innovation and promote economic development. Recommendations have been formulated for the three stakeholder groups: private sector, government and education; and address four levels of the value chain: farm, post-harvest, market and enabling environment.

9.1 Private sector

Develop the value chain from production-oriented enterprises towards product-market combinations and collaboration across the chain to ensure good practices throughout, in line with contract farming. The private sector players such as traders, processors and retailers should maintain standards and require food safety standards from their suppliers. A clear need exists for specific training support to be developed for improved production of safe and quality fruits and vegetables, as well as for safer marketing practices.
On production level, key recommendation is to strengthen linkages between Zimbabwean farmers and existing international suppliers/importers in high-value vegetable and fruit markets. Amongst others, to streamline importation of improved varieties for fruits and vegetables in demand at end-markets.
The private sector is encouraged to link to the Trade Related Facility (TRF) as established by the European Union (EU) for Zimbabwe to make use of the opportunities for facilitation of export.
Adoption of good agricultural practices is advised, at a minimum aligned to FAO Code of Conduct on the Distribution and use of Pesticides and considering WTO regulations of sanitary (human and animal health) and phytosanitary (plant health) conditions. In case of export, GLOBALG.A.P. certification.
Recommendations related to post-harvest technologies; starting with improving the supply chain arrangements through chain integration, improved logistics, local packing and warehousing facilities.
Improved cooperation amongst private sector stakeholders is a necessary activity to strengthen the industry's environment. The recently initiated Horticulture Development Council (HDC) can function as a platform for sector stakeholders to share information, facilitate trade, and provide services in order to improve production and processing operations. A collaborative effort to attract certification institutions and the establishing of an accredited lab will have greater effect than lobbying by individual stakeholders. This platform should also link effectively with other initiatives like the Trade Related Facility (TRF), the Horticulture Centre of Excellence (HCoE) impact cluster, the Idai recovery projects, PUM activities and ZimTrade initiatives.
To overcome the energy hurdles, it would be beneficial to invest in the development of renewable energy infrastructure for horticulture producers in order to support the sector in these instable times. Wind, solar, biogas, and hydrogen are options to consider.

9.2 Government

Due to the prominent gap between national and international food safety standards, there is an opportunity to bridge the gap through improved alignment. The National Quality Policy as initiated by the EU and SADC's TRF is focusing amongst others on the development of an effective policy and strategy to guide the establishment of a National Quality Infrastructure that is aligned with international best practices, including related capacity building. Other key result areas are related to the development of supportive legal and regulatory framework, technical regulatory framework bill and formulation of new food safety legislation.
In addition to the strengthening of the national regulations, it would be beneficial to strengthen the capacity of SAZ to offer support for implementation of international standards such as GLOBALG.A.P., BRC, IFS and FSSC 22000. Currently SAZ does not offer implementation of food safety standards that are recognised by the international standards environment. Even when accredited certification bodies are absent, local support of SAZ will stimulate stakeholders to implement internationally recognised standards. SAZ should promote its services among farmers, such as training on standard implementation, and tailor its products and services for specific segments. Medium and large commercial farms is one segment that should prioritised.
The government also plays a crucial role in improving the enabling environment for the chain actors, referring to the infrastructure, electricity supply, financial resources (access and costs) for enterprises to be able to invest in value chain upgrading strategies and an ISO 17025 accredited lab that is functional and

accessible to private sector stakeholders.
It has been pinpointed by multiple stakeholders that energy problems are currently the bottleneck for horticulture production. Even though water for irrigation is available, there is no electricity to pump the water in order to irrigate fields. The government should make this issue a short-term priority. For instance, subsidies for renewable energy investments for the agricultural sector would help in overcoming this bottleneck.

9.3 Education

Education firstly plays a very important role in providing resourceful and impactful graduates who can positively contribute to the food safety environment on policy level and on the ground within chain enterprises. Practical education on food safety and quality related matter needs to be improved. Linkages between the education and private sector need to be strengthened in order to increase experience of graduates, examples are: internships, mentorship programmes, apprenticeships, industry champions etc. On top of that, research can be used to unravel the realities on the ground related to food safety and quality assurance along the value chain. This can be done through conducting:

- Explorative research on improving supply chain arrangements.
- Collaborative research to test improved varieties for production and preservation.
- Research on the feasibility of cluster formations, to identify regions with a high density of export-oriented farms.
- Research into synergies that would be possible through better clustering. For example, shared infrastructure investments.

With regards to applied research, linking with the Horticulture Centre of Excellence (HCoE) impact cluster is encouraged. Education and research institutions have a crucial role in sustaining and further strengthening the public-private partnerships between government and the fruit and vegetables business sector. The business sector should be adequately engaged in the educational environment in order to maximise impact.

Table 16 - Overview of recommendations for government.

Government			
Farm level	**Post-harvest level**	**Market level**	**Enabling environment**
• Improve food safety and quality assurance enforcement.	• Improve food safety and quality assurance enforcement.	• Improve food safety and quality assurance enforcement.	• Reform food safety policy to improve alignment with international standards and best practices.
		• Create market awareness on functioning of the markets by providing price information, trends in demand and supply.	• Improve infrastructure, electricity supply and access to finance through e.g. subsidies for renewable energy investments for the agricultural sector.
			• Establish an ISO 17025 accredited lab that is functional and accessible to the private sector.
			• Attract certification institutions to provide their services in Zimbabwe.
			• Strengthen the capacity of SAZ to offer support for implementation of international food safety standards.

Table 17 - Overview of recommendations for education.

Education			
Farm level	**Post-harvest level**	**Market level**	**Enabling environment**
• Conduct research on improved varieties for production improvements and preservation.	• Conduct applied research on the feasibility of improved supply chain arrangements and cluster formations.	• Create inventory of best practices on product-market oriented value chain developments in the fruit and vegetables sector.	• Deliver skilled manpower on food and safety as well as phytosanitary expertise.
			• Conduct relevant research for sustainable development of the sector.
			• Improve engagement with private sector stakeholders through developing collaborative (research) projects.

Table 18 - Overview of recommendations for private sector.

Private sector			
Farm level	**Post-harvest level**	**Market level**	**Enabling environment**
• Import of improved varieties for fruits and vegetables in demand at end-markets.	• Introduction of post-harvest technologies for improved conservation.	• Improve logistics for improved market access.	• Improve collaboration between among private stakeholders through collaboration under the Horticulture Development Council.
• Develop specific training support for improved production of safe and quality fruits and vegetables.	• Improve supply chain arrangements through vertical and horizontal chain integration.	• Establish and improve cold chain facilities for improved market access.	• Manage collaborative effort to encourage Certification institutions to improve access to their services in Zimbabwe.
• Strengthen linkages between Zimbabwean farmers and existing international suppliers/importers in high value vegetable and fruit markets.	• Improve logistics, local packing and warehousing facilities.		• Manage collaborative effort to support the establishment of an ISO 17025 accredited lab.
• Adopt good agricultural practices at a minimum aligned to FAO Code of Conduct on the distribution and use of pesticides, and in case of export GLOBALG.A.P.			• Link to the Trade Related Facility (TRF) as established by the European Union (EU) for Zimbabwe.

9.4 Opportunities for the Netherlands

The challenges and recommendations outlined above also provide the opportunity for the Netherlands to engage in further development of the Zimbabwean fruit and vegetables sector. Strategies on how Dutch experts and businesses can engage in the implementation of international food safety and quality management standards are presented below.

Business support

- Strengthen linkages (e.g. joint ventures, contracts, arrangements) between Zimbabwean farmers/chain actors and existing Dutch suppliers (e.g. technologies, expertise) and importers in high value vegetable and fruit markets. Think of importation of improved Dutch varieties for fruits and vegetables in demand at end-markets, climate smart technologies (e.g. irrigation, tanks, tropical greenhouses), renewable energy solutions (e.g. bio composter, solar panels etc), post-harvest technologies, logistics, cold-chain facilities, testing equipment for residue testing, soil tests, weather forecasting etc. Furthermore, supply of fruit and vegetables processing technologies is an opportunity (e.g. cornflakes machines).

- Link to the Trade Related Facility (TRF) as established by the European Union (EU) for Zimbabwe and other relevant trade platforms like HDC and ZimTrade to scope for market opportunities for the Netherlands.

- Establish a certification institution in Zimbabwe as an offspring of institution in the Netherlands.

- Seek opportunities to tap into contract farming practices for sourcing of fresh fruits and vegetables of smaller farmers.

Technical support

- Support in the establishment of an accredited lab (technology and capacity building)

- Provide capacity building on Good Agricultural Practices, food safety standards, enforcement practices.

- Share our experience with public-private partnership, the circle of education, policy research and business. Support improved alignment of the knowledge circulation in order to improve the food safety environment.

- Develop specific training support for improved production of safe and quality fruits and vegetables and marketing practices for chain operators, relevant governmental bodies and SAZ.

- Organise exchange programmes to learn from the sector in the Netherlands and to benchmark as well.

Educational partnerships

- Establish partnerships in relevant research undertakings and capacity building projects on higher educational level.

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ANNEX

Annex 1 - List of interviewees

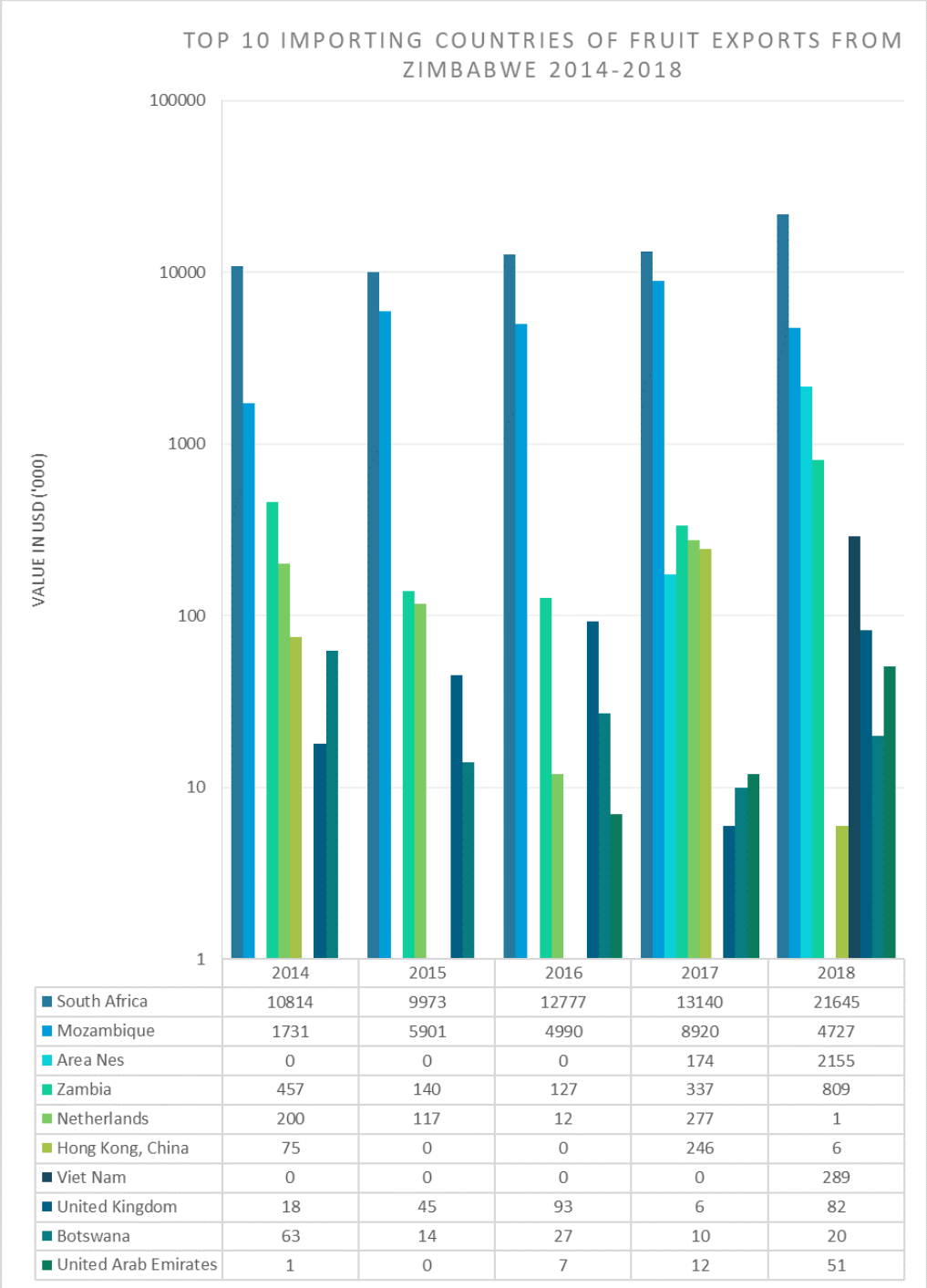
Nr	Stakeholder type	Organisation	Name
1	Association	CZI - Confederation Zimbabwe Industries	Mr. Katsande - Chairman
2	Association	Zimbabwe Horticulture Farmers' Association	Mr. Ashel Chingaya - Chair
3	Association	Zimbabwe Horticulture Farmers' Association	Ms. Doreen Badze - Treasurer
4	Association	Zimbabwe Horticulture Farmers' Association	Mr. Alec Chifadza - Board member
5	Government	Ministry of Agriculture - Department of Research and Specialist Services (DRSS)	Dr. Praxedis Dube
6	Government	Ministry of Agriculture - Horticulture Research Centre	Ms. Linda Muusha
7	Government	Ministry of Agriculture - Plant Protection Research- Plant Quarantine Services	Mr. Nhamo Mudada
8	Other	EU - European Union	Mr. Martin Zhou - Agriculture, Private Sector and Trade
9	Other	Southern African Development Community (SADC) - Trade Related Facility programme (TRF)	Mr. Aleck Masveure - Project manager
10	Other	Southern African Development Community (SADC) - Trade Related Facility programme (TRF)	Ms. Erica Mhaka - Procurement officer
11	Private sector	Cairns Foods	Ms. Sharron Maparura - CEO
12	Private sector	Cairns Foods	Mr. Philemon Makoni - Head of Manufacturing
13	Private sector	Cairns Foods	Ms. Melody Mupunga - QSHE manager
14	Private sector	Associated Foods Zimbabwe	Mr. Joseph Mavu - Operations Manager
15	Private sector	Associated Foods Zimbabwe	Mr. Austin ucheri - Senior accountant
16	Private sector	Probest Vegetables	Mr. Mango - CEO

Nr	Stakeholder type	Organisation	Name
17	Private sector	Beit Bridge Juicing (Schweppes)	Mr. Felix Vengesai - Head of Agribusiness
18	Private sector	Beit Bridge Juicing (Schweppes)	Mr. Chivandire Mumbengegwi - Farm Manager
19	Private sector	Best Fruit Processor Private Limited (Schweppes)	Ms. Brenda Mudyiwa - SHEQ Manager (Norton plant)
20	Private sector	Best Fruit Processor Private Limited (Schweppes)	Mr. Chris Mujaicachi - Plant manager (Norton plant)
21	Private sector	Sligo Farm	Ms. Charity Mateura - Owner
22	Private sector	Sligo Farm	Mr. Smart Luke - Farm manager
23	Private sector	Ling Flora ltd (Lingfield farm)	Mr. Rees karimazondo - Owner
24	Private sector	Sisonke Ag Fresh Farmers' Association	Mr. Kelvin Nyikadzino - Chair
25	Private Sector	FruitCon B.V.	Mr. Neville M Mchina - Consulting Director
26	Private Sector	Roveg B.V.	Mr. Ben Burgers - Food Safety Manager
27	Private Sector	Bakker Barendracht B.V.	Mr. Frank Brinkman - Strategic Sourcing
28	Standards body	SAZ - Standards Association Zimbabwe	Ms. Romana Marunda - Manager Standards Development & Information
29	Trade promotion body	Zimtrade	Mr. Kupakwashe W. Midzi - Client manager/ exports
30	Trade promotion body	Zimtrade	Mr. Tatenda Marume - Manager export-development
31	Trade promotion body	Zimtrade	Ms. Vivinah Matswetu - Client manager/ export development
32	Trade promotion body	Zimtrade	Mr Philip Phiri - Director operations
33	Trade promotion body	Horticulture Development Council (HDC)	Mr. Gorden Makoni - Chair

Annex 2 - List of attendees focus group discussion

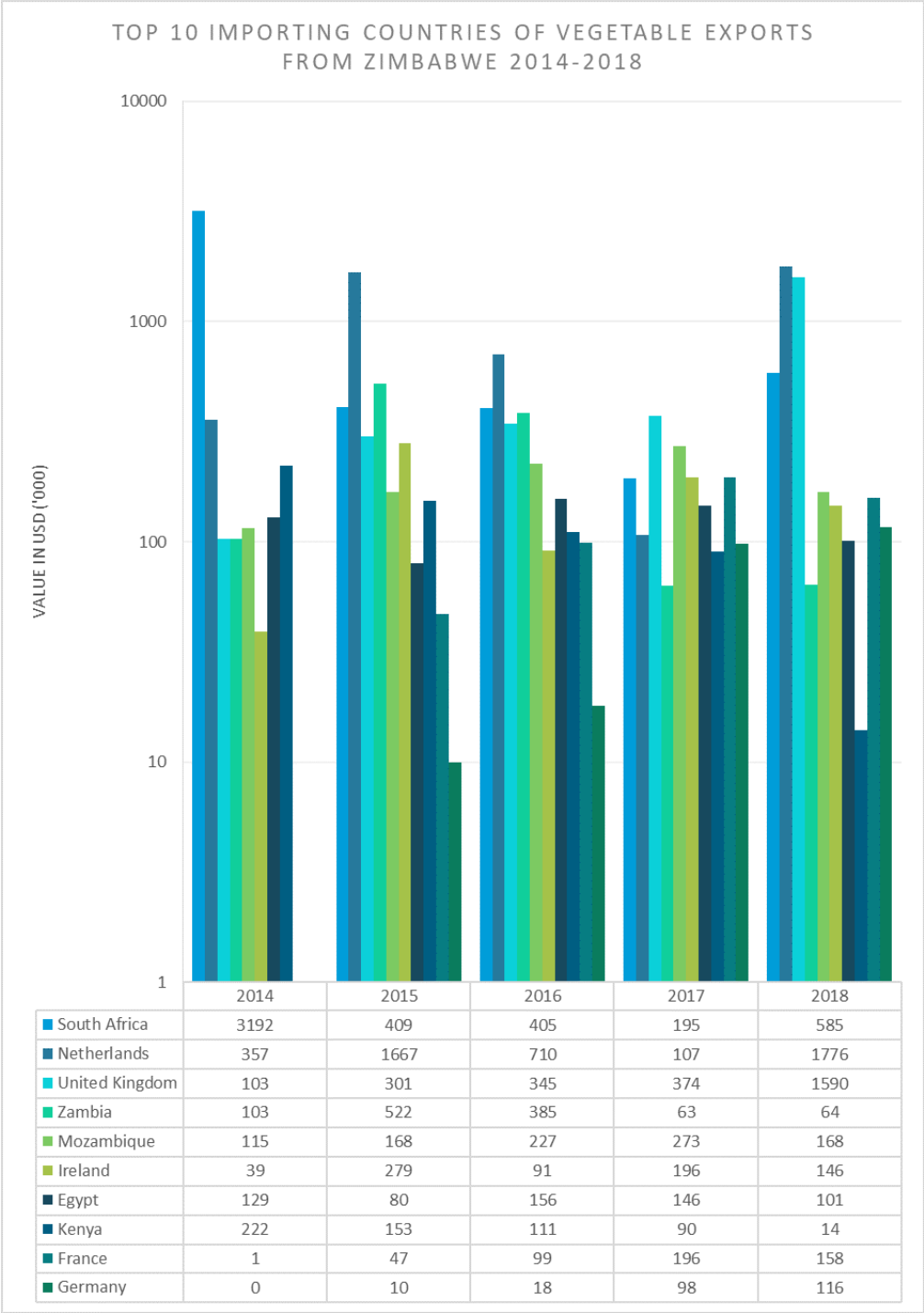
Nr	Stakeholder type	Organisation	Name
1	Government	Ministry of Agriculture - Department of Research and Specialist Services (DRSS)	Dr. Praxedis Dube
2	Government	Ministry of Agriculture - Horticulture Research Centre	Ms. Linda Muusha, Head of Department
3	Association	CZI - Confederation Zimbabwe Industries	Mr. Katsande, Chairman
4	Standards body	SAZ - Standards Association Zimbabwe	Ms. Romana Marunda, Manager Standards Development & Information
5	Standards body	SAZ - Standards Association Zimbabwe	Mr Ranganai Mutonono, Certification manager
6	Education institution	Chinhoyi University of Technology (CUT)	Dr. Ruth Ngadze
7	Education institution	Chinhoyi University of Technology (CUT)	Ms. Tsitsi Nyamupingidza
8	Other	Southern African Development Community (SADC) - Trade Related Facility programme (TRF)	Mr. Aleck Masveure, Project manager
9	Trade promotion body	Zimtrade	Mr. Kupakwashe W. Midzi
10	Private Sector	Bonata Farm Fresh	Mr. Hapymore Mapara, CEO
11	Trade promotion body	Horticulture Development Council	Mr. Gorden Makoni, chair
12	Private Sector	Edinnov Trading - Valley Farm Secrets	Ms. Edith Jaravani, Managing Director
	Association	Fresh Produce Marketing Association of Zimbabwe (FPMAZ)	Ms. Edith Jaravani, Managing Director

Annex 3 - Trade data



	2014	2015	2016	2017	2018
South Africa	10814	9973	12777	13140	21645
Mozambique	1731	5901	4990	8920	4727
Area Nes	0	0	0	174	2155
Zambia	457	140	127	337	809
Netherlands	200	117	12	277	1
Hong Kong, China	75	0	0	246	6
Viet Nam	0	0	0	0	289
United Kingdom	18	45	93	6	82
Botswana	63	14	27	10	20
United Arab Emirates	1	0	7	12	51

Source: ITC, 2019



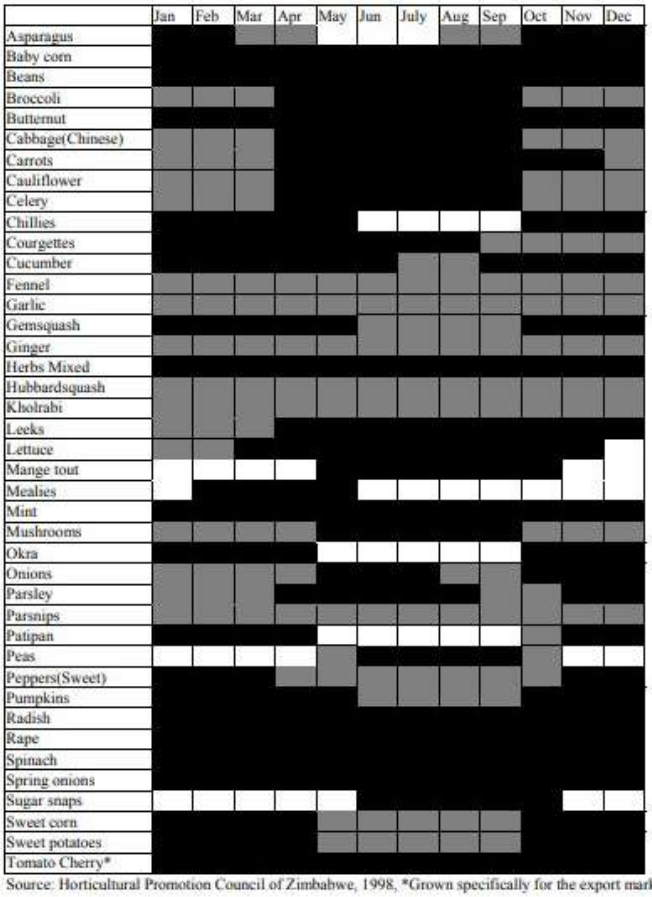
	2014	2015	2016	2017	2018
South Africa	3192	409	405	195	585
Netherlands	357	1667	710	107	1776
United Kingdom	103	301	345	374	1590
Zambia	103	522	385	63	64
Mozambique	115	168	227	273	168
Ireland	39	279	91	196	146
Egypt	129	80	156	146	101
Kenya	222	153	111	90	14
France	1	47	99	196	158
Germany	0	10	18	98	116

Source: ITC, 2019

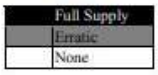
Export markets for fruit and vegetables (2014-2018). Source: ITC, 2019

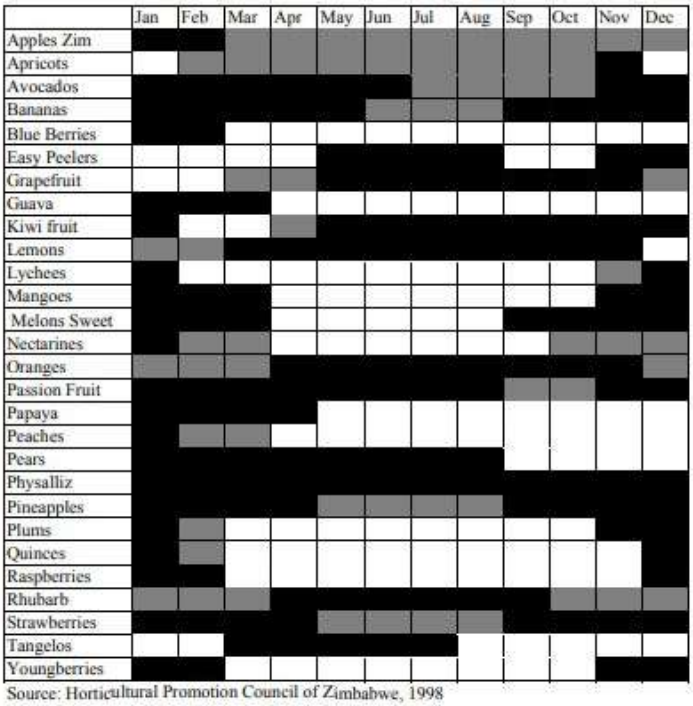
Exports to Africa	Other exports
Botswana	Australia
Ethiopia	Belgium
Kenya	Canada
Malawi	China
Mali	Egypt
Mozambique	France
Namibia	Germany
South Africa	Ghana
Zambia	India
	Malaysia
	Netherlands
	Russian Federation
	Sweden
	Thailand
	Turkey
	United Arab Emirates
	United Kingdom
	United Rep. of Tanzania
	USA
	Viet Nam

Annex 4 - Fruit and vegetables production periods

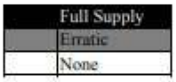


Source: Horticultural Promotion Council of Zimbabwe, 1998, *Grown specifically for the export market





Source: Horticultural Promotion Council of Zimbabwe, 1998



Annex 5 – SAZ standards relevant for horticulture agro-processing

SAZ standards relevant for horticulture agro-processing. Source: SAZ, 2019

Topic	Standards
65 Agriculture	ZWS 862:2004 The production, processing, labelling and marketing of organically produced foods
65.020 Farming and forestry	ZWS 915:2012 Organic Farming ZWS 1019:2017 Zimbabwe Horticulture – Good agricultural Practice (GAP) **65.040.10 Farm buildings and installations in general** ZWS 859:2003 Safety – Requirements for electric fence energizers
65.060 Agricultural machines, implements and equipment	**65.060.20 Soil working equipment** ZWS N7:1971 Agricultural discs ZWS 861:2003 Farm-animal drawn plough share **65.060.30 Sowing and planting equipment** ZWS ISO 7256: 2000 Sowing equipment – Test methods **65.060.35 Irrigation and drainage equipment** ZWS 362:994 Aluminium tubes for irrigation purposes ZWS 363:1996 Irrigation equipment – Irrigation sprayers and rotating sprinklers ZWS 531:1996 Polyethylene (PE) pipes for irrigation laterals ZWS 620:1985 Flexible polyvinyl chloride garden hose (metric units) **65. 060.40 Plant care equipment** ZWS 849:1969 Knapsack sprayers **65.060.50 Harvesting equipment** ZWS 209:1992 Sickles **65.060.70 Horticulture equipment** ZWS 679:1999 Power lawnmowers, lawn tractors, lawn and garden tractors, professional lawnmowers and lawn and garden tractors with lawn-mowing attachments
65.080 Fertilizers	ZWS 866:2003 Fertilizers – Magnesium nitrate ZWS 867:2015 Fertilizers – Potassium sulphate ZWS 868:2017 Fertilizers – Magnesium silicate anhydrous ZWS 870:2015 Fertilizers – Potassium nitrate (Nitrate of Potash) ZWS 871:2015 Fertilizers – Ammonium nitrate ZWS 872:2015 Fertilizers – Monoammonium phosphate (MAP) ZWS 874:2015 Fertilizers – Urea ZWS 875:2015 Potassium chloride (muriate of potash) Fertilizer ZWS 1021:2016 The safety of water treatment chemicals for use in the food industry ZWS ISO 8157:2015 Fertilizers and soil conditions - Vocabulary ARSO ZW HS 72:2016 Fertilizers – Sampling from a conveyor stopping the belt

	ARSO ZW HS 73:2016 Fertilizers – Determination of nitrate nitrogen content ARSO ZW HS 74:2016 Fertilizers – Determination of bulk density (loose) ARSO ZW HS 212:2016 Fertilizers – Marking – Preservation and declaration ARSO ZW HS 213:2016 Fertilizers and solid conditioners – Final samples – practical arrangements ARSO ZW HS 500:2016 Solid fertilizers – Sampling ARSO ZW HS 501:2016 Compound fertilizers – method of test ARSO ZW HS 504:2016 Fertilizers – Ammonium sulphate – method of Test ARSO ZW HS 505:2016 Fertilizers – Ammonium sulphate ZWS ISO 18644:2016 Fertilizers and soil conditioners – controlled release fertilizer – General requirements
65.100 Pesticides and other agrochemicals	ZWS 158:1975 The use and disposal of acaricides (cattle dips) ZWS 224:1978 The handling, storage and disposal of pesticides and their containers ZWS 250:1980 Code of practice for the handling, storage and disposal of pesticides and used pesticides containers ZWS 345:1991 Pesticides in the form of five percent disulfoton granules
65.100.10 Insecticides	ZWS 344:1991 Insecticides in the form of one percent or three percent trichlorfon granules ZWS 346:1991 Insecticides in the form of two and half percent trichlorfon granules
67 Food technology	**67.020 Processes in the food industry** ZWS 126:1997/1999/2001 Food hygiene ZWS 650:1997 Efficacy of cleaning plant, equipment and utensils – Swab technique ZWS 651:1997 Efficacy of cleaning plant, equipment and utensils – Strip technique ZWS 652:1997 Efficacy of cleaning plant, equipment and utensils – Agar sausage technique ZWS 676:1998 Code of practice for the application of pesticides in the food industry ZWS 749:2010 Requirements for a hazard analysis and critical control point (HACCP) Systems 8086:2005 - Dairy plant – Hygiene conditions – General guidance on inspection and sampling procedures ZWS ISO 15161:2003 Guidelines on the application of ISO 9000:2000 for the food and drink industry ZWS ISO 22000:2018 Food safety management systems requirements for organizations throughout the chain ZWS ISO/TS 22002:2009 Technical specification – Prerequisite programmes on food safety – Food Manufacturing
67.040 Agricultural food products in general	ZWS 373:1993 Agricultural food products – Determination of crude fibre content – General method ZWS 375:1993 Agricultural food products – Determination of crude fibre content – Modified Scharrer

	method ZWS ISO/TS 22002:2013 Prerequisite programmes on food safety ZWS ARS AES 02:2017 Fisheries – Sustainability and ecolabelling Requirements
67.060 Cereals, pulses and derived products	ZWS 330:1991 Storage of cereals and pulses ZWS 331:1991 Storage of cereals and pulses
67.020 Processes in the food industry	ZWS 806:2012 Hazardous waste management ZWS ISO/TS 22002:2009 Technical specification – Prerequisite programmes on food safety – Food Manufacturing ZWS ISO /TS 22003:2008 Food safety management systems – requirements for bodies providing audit and certification of food safety management
67.050 General methods of tests and analysis for food products	ZWS 332:2015 Labelling of food and feed that are and not products of genetic modification
67.060 Cereals, pulses and derived products	ARSO ZW HS 864:2015 Dry beans – Specification ARSO ZW HS 865:2015 Dry green grams ARSO ZW HS 866:2015 Dry chickpeas ARSO ZW HS 867:2015 Dry cowpeas ARSO ZW HS 868:2015 Dry pigeon peas ARSO ZW HS 869:2015 Dry whole peas ARSO ZW HS 870:2015 Lentils ARSO ZW HS 873:2015 Faba beans - Specification ARSO ZW HS 874:2015 Dry lima beans – Specification
67.080 Fruits, vegetables	**67.080.01 Fruits, vegetables and derived products in general** ZWS ISO 750:1998 Fruit and vegetable products – Determination of titratable acidity ZWS ISO 751:1998 Fruit and vegetable products – Determination of water in soluble solids ZWS ISO 762:2003 Fruit and vegetable products – Determination of mineral impurities content ZWS ISO 763:1982 Fruit and vegetable products – Determination of ash insoluble in hydrochloric acid ZWS ISO 1026:1982 Fruit and vegetable products – Determination of dry matter content by drying under reduced pressure and of water content by Azeotropic distillation ZWS ISO 1842:1991 Fruit and vegetable products – Determination of pH ZWS ISO 1955:1982 Citrus fruits and derived products – Determination of essential oil content (Reference Method) ZWS ISO 2173:2003 Fruit and vegetable products – Determination of soluble solids – Refractometric method ZWS ISO 5517:1978 Fruits, vegetables and derived products – Determination of iron content – 1,10 – Phenanthroline photometric method ZWS ISO 5518:2007 Fruits, vegetables and derived products – Determination of benzoic acid content – Spectrophotometric method

	ZWS ISO 5519:2008 Fruits, vegetables and derived products – Determination of sorbic acid content ZWS ISO 5520:1981 Fruits, vegetables and derived products – Determination of alkalinity of total ash and of water-soluble ash ZWS ISO 5522:1981 Fruits, vegetables and derived products – Determination of total sulphur dioxide content ZWS ISO 7447:1998 Fruit and vegetable products – Determination of tin content **67.080.10 Fruits and derived products** ZWS 458:1994 Wax emulsion for coating citrus fruits ZWS 746:2004 Fruit jams, jellies and marmalades ZWS 747:1971 Canned fruits COMESA ZWS HS 364:2004 Peanuts COMESA ZWS HS 452:2005 Recommended code of practice for packaging and transport of tropical fresh fruits and vegetables COMESA ZWS HS 453:2005 Avocadoes COMESA ZWS HS 454:2005 Fresh mangoes COMESA ZWS HS 455:2005 Fresh papaya COMESA ZWS HS 456:2005 Dried apricots COMESA ZWS HS 460:2005 Dehydrated fruits and vegetables including edible fungi COMESA ZWS HS 476:2005 Desiccated coconut COMESA ZWS HS 501:2005 Canned mangoes COMESA ZWS HS 516:2005 Canned strawberry **67.080.20 Vegetables and derived products** ZWS S5:1970 Canned vegetables ZWS S6:1972 Quick frozen vegetables ZWS S18:1968 Worcestershire sauce ZWS S19:1968 Cucumber pickles ZWS S25:1970 Canned soups ZWS S33:1971 Potato crisps ZWS S37:1972 Chutneys COMESA ZWS HS 427:2005 Baby corn COMESA ZWS HS 566:2005 Quick frozen broccoli COMESA ZWS HS 635:2005 Canned sweet corn COMESA ZWS HS 638:2005 Canned carrots COMESA ZWS HS 644:2005 Canned tomatoes COMESA ZWS HS 646:2005 Processed tomato concentrates

Annex 6 – The international and EU standards environment

The international standards environment has gone through a serious transformation in recent decades. Twenty years ago, the term ‘standard’ focused on the technical product standards. Nowadays standards encompass much more. Standards can be described as agreed criteria by which a product or service’s performance, its technical and physical characteristics and the process and conditions under which it has been produced can be assessed (UNIDO, Global value chains in the agrifood sector, 2006).

The current standards environment includes not only standards that assess the testable physical characteristics of products, but also those relating to production, handling and processing to ensure that products meet safety requirements. Process standards can also be the focus point itself. Labour and environmental standards are examples of process standards where the value of implementation is not related to the end product and its characteristics but lies in the process itself.

Food safety and quality management systems are a group of standards that are applied to the food industry. Examples of these quality assurance (QA) standards are GMPs (Good Manufacturing Practices), GHPs (Good Hygiene Practices), GAPs (Good Agricultural Practices), or other prerequisite systems and HACCP (Hazard Analysis Critical Control Points) and ISO (International Organisation for Standardisation) standards. Such standards are internationally recognised and recommended for food quality and safety assurance (Rotaru, 2005).

This paper discusses amongst other things, the most important QA systems for the food industry, in particular for the horticulture sector and the fruit and vegetables value chain. Rotaru et al. (2005) describes how food quality and food safety are inseparable. To be considered safe for consumption, food must meet legislative requirements, technological criteria, hygiene requirements, transport and handling requirements, trading conditions and satisfy its intended use. This illustrates a hierarchy where international and national legislation, statutory and customer requirements influence the company food safety and quality policies which finally feed into the companies’ quality management system (QMS) and it supporting documents and records (Figure).

Table - The nature and purpose of standards. *Source:* (UNIDO, Global value chains in the agrifood sector, 2006)

Goal of standard	*Means of control*	*Example*
1. To ensure that products conform to specified physical characteristics.	Inspection and testing of products.	Incoming frontier inspections of food for pesticide or antibiotic residues, microbiological contamination, general cleanliness, adequate packaging, etc.
2. To ensure that products conform to specified physical characteristics.	Specification of process standards at various stages in production, transport and processing. Enforcement through inspection of facilities and certification.	Inspection of seafood-processing plants by US and EU inspectors to ensure that they conform to HACCP requirements, with the goal of ensuring food safety.[a]
3. To ensure that processes conform to specified characteristics in order to achieve goals defined in terms of the process or its impact.	Specification of process standards at various stages in production, transport and processing. Certification.	EurepGAP environmental standards, which set out procedures for monitoring the environmental impact of food production.

Source: Author.

[a]Among the many documents explaining HACCP principles, see the FAO training manual on food hygiene and HACCP which is available on the Internet (FAO, 1998).

Figure – Hierarchy in food safety and quality management systems

Table - Examples of food safety and quality assurance programs for fresh produce growers. Source: (Soon, 2013)

Standard	Standard-setting body	Status of the standard-setting body
Assured Produce scheme	Assured Food Standards	Private association owned by the food chain
BRC Global Food Standard		British retailer organization
GlobalGAP	EUREP	Food retailers association
Tesco Nurture	Tesco PLC	Food retailer
Field to Fork	Marks and Spencer	Food retailer
Farm Biodiversity Action Plans	Sainbury's Supermarket Ltd	Food retailer
ASDA Brand	ASDA Stores Ltd	Food retailer
(e.g., Good for you!)		
Morrisons "The Best"	Morrisons PLC	Food retailer

EUROPEAN FOOD SAFETY POLICY

Europe is very demanding when it comes to food safety. The requirements and standards set for exporting to Europe are guided by EU food safety policy. EU food safety policy and action is concentrated in 4 main areas of protection (EU, 2019):

- **Food hygiene**: food businesses, from farms to restaurants, must comply with EU food law, including those importing food to the EU.
- **Animal health**: sanitary controls and measures for pets, farmed animals and wildlife monitor and manage diseases, and trace the movement of all farm animals.
- **Plant health**: detection and eradication of pests at an early stage prevents spreading and ensures healthy seeds.
- **Contaminants and residues**: monitoring keeps contaminants away from food and animal feed. Maximum acceptable limits apply to domestic and imported food and feed products.

There are various legal and other buyer requirements, but also additional and niche market quality standards such as organic and Fairtrade fruit and vegetables. Requirements for exporting fresh fruit and vegetables to Europe can be categorised under food safety, product quality, social, environmental and business compliance. This chapter provides an overview of both the most common and more specific requirements and standards.

EUROPEAN LEGISLATION

PESTICIDES

To avoid health and environmental risks, the EU has set maximum residue levels (MRLs) for pesticides in and on food products. The EU Pesticide Database provides an extensive database of MRLs that provides information on active substances per product group which allows for status checking of approval under Reg. (EC) No 1107/2009. Products containing more pesticides than allowed will be withheld or withdrawn from the European market. In addition, certain buyers in several Member States such as the United Kingdom, Germany, the Netherlands and Austria use MRLs which are even stricter than the MRLs laid down in

European legislation. Supermarket chains are the strictest and usually demand within a range of 33% to 70% of the legal MRL.

Furthermore, buyers are becoming more cautious and request upfront information about pesticide spray programmes and records. Also, shipments are usually checked before being sent to the retailers. Failure to comply with set MRLs will result in denial of produce.

CONTAMINANTS

Substances that are unintentionally added to food during the various stages of its production, packaging, transport or storage are called contaminants. Similar to MRLs for pesticides, the EU has set maximum levels for contaminants. In particular the limits for aflatoxins in dried fruits and nuts, nitrate (in spinach and lettuce) and heavy metals such as cadmium, lead, mercury and inorganic tin, are relevant for fresh fruit and vegetables. For most fresh fruit or vegetables, the limit for lead contamination is 0,10 mg/kg and for cadmium 0,050 mg/kg. An overview of the maximum levels for certain contaminants in foodstuffs is presented in the Annex of Regulation (EC) 1881/2006.

MICROBIOLOGICAL CRITERIA FOR PRE-CUT FRUIT

Microbiological hazards such as salmonella and E. coli should be considered when supplying pre-cut fruit and vegetables, as well as unpasteurised juices or sprouted seeds. EU regulation requires absence of these substances. European Regulation (EC) No 2073/2005 provides extensive information about testing methods, sampling plans and measuring limits. In order to maintain excellent hygiene practices in production processes to avoid microbiological contamination it is unavoidable to work with hygiene standards and risk assessment such as HACCP, BRC and IFS.

PLANT HEALTH

Fruit and vegetables exported to the EU must comply with European legislation on plant health. The EU has laid down phytosanitary requirements to prevent the introduction and spread of organisms harmful to plants and plant products in Europe. These requirements are managed by the competent food safety authorities in the importing and exporting countries. Most importantly, sourcing countries need to have phytosanitary agreements with the European Union in place in order to be allowed to export to Europe. Fruit and vegetables are subject to health inspections and require phytosanitary certificates prior to shipping.

IMPORT CONTROL

To ensure food safety and avoid environmental damage, import products are subject to official controls. These controls are carried out to ensure that all foods marketed on the European market are safe and in compliance with all applicable regulatory requirements. There are three types of checks: documentary checks, identity checks and conformity checks to marketing standards. In case of repeated non-compliance of specific products originating from particular countries, the EU can decide to carry out controls at an increased level or lay down emergency measures. Controls can be carried out at all stages of import and marketing in Europe. However, most checks are done at the points of entry. For importers of fresh fruit and vegetables, the traceability of products is compulsory. To fulfil this obligation, European importers will require the provision of proof of origin for all fruits and vegetables. In addition to a bill of lading, phytosanitary certificate, packing list and custom documentation,

exporters must use a unique traceability code such as a lot number or GLOBALG.A.P. Number (GGN).

Furthermore, EU legislation sets general and specific marketing standards for the minimum quality and the minimum maturity of all fresh fruit and vegetables. This standard determines the characteristics of “Extra Class”, Class I and Class II products, the different size codes, and the allowed tolerances in quality and size.

CERTIFICATION AS GUARANTEE

As food safety is a top priority in all European food sectors, most buyers request extra guarantees from exporters in the form of certification. All buyers in the supply chain, such as traders, food processors and retailers, require the implementation of a food safety management system based on hazard analysis and critical control points (HACCP). There are over 200 standards for the food supply chains. Examples are GLOBALG.A.P., BRC and IFS Food. All the mentioned management systems are recognised by the Global Food Safety Initiative (GFSI), which means that they are generally accepted by the major retailers. Compliance with certification schemes varies between countries, trade channels and market situations. The following chapter elaborates on the most relevant standards for fruit and vegetables in Zimbabwe.

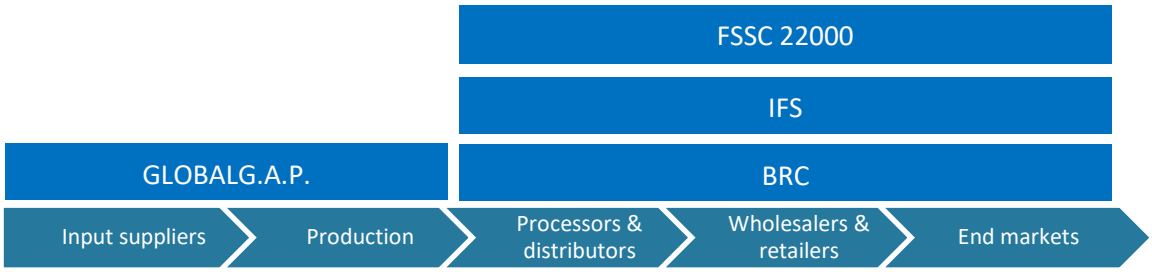


Figure - Overview of certification standards throughout value chain. Source: Author.

GLOBALG.A.P.

GLOBALG.A.P. is the most commonly requested certification scheme and is a prerequisite for exporting fresh produce to Europe. This is a pre-farm-gate standard that covers the whole agricultural production process from before the plant is in the ground to the non-processed product (processing not covered). GLOBALG.A.P. focuses on food safety as well as the environment, labour conditions and product quality. It has become a minimum standard for most European supermarkets.

The GLOBALG.A.P. Integrated Farm Assurance (IFA) Standard consists of General Rules and Control Points and Compliance Criteria (CPCC) The GLOBALG.A.P. IFA CPCC are modular-based consisting of:

- The All Farm Base Module: This is the foundation of all sub-scopes and defines all the requirements that all producers must first comply with to gain certification.
- The Scope Module: This defines clear criteria based on the different food production sectors. GLOBALG.A.P. covers 3 scopes: Crops, Livestock and Aquaculture.
- The Sub-scope Module: These CPCC cover all the requirements for a particular product or different aspect of the food production and supply chain.

The scopes (e.g. crops) are automatically coupled to the sub-scopes that a producer applies for. For example, for fruit and vegetables; a strawberry grower must comply with the All Farm Base, the Crops Base, and the Fruit & Vegetables CPCC to receive a GLOBALG.A.P. IFA Fruit & Vegetables Standard Certificate. Once certified, producers receive a Global Gap Number (GGN) for the products that are certified. The GGN serves as a traceability system for other value chain actors to check the origin and status of certification of the product.

GLOBALG.A.P. offers add-ons that focus on specific biosecurity, social and environmental aspects that complement the IFA certification. Examples are: GRASP, TR4 Biosecurity Bananas, and Tesco's NURTURE module.

- GRASP stands for GLOBALG.A.P. Risk Assessment on Social Practice and is a voluntary ready-to-use module developed to assess social practices on the farm, addressing specific aspects of workers' health, safety and welfare.
- The TR4 Biosecurity add-on is a tool that provides farmers with a risk mitigation plan to prevent the introduction (and/or further spreading) of the TR4 pathogen (a.k.a. Foc 4 and Panama disease) to, within, and from their GLOBALG.A.P. certified farms.
- The NURTURE Module focuses on Plant Protection Product List (PPPL) management and the transition to GLOBALG.A.P. does not affect how suppliers manage their PPPLs.

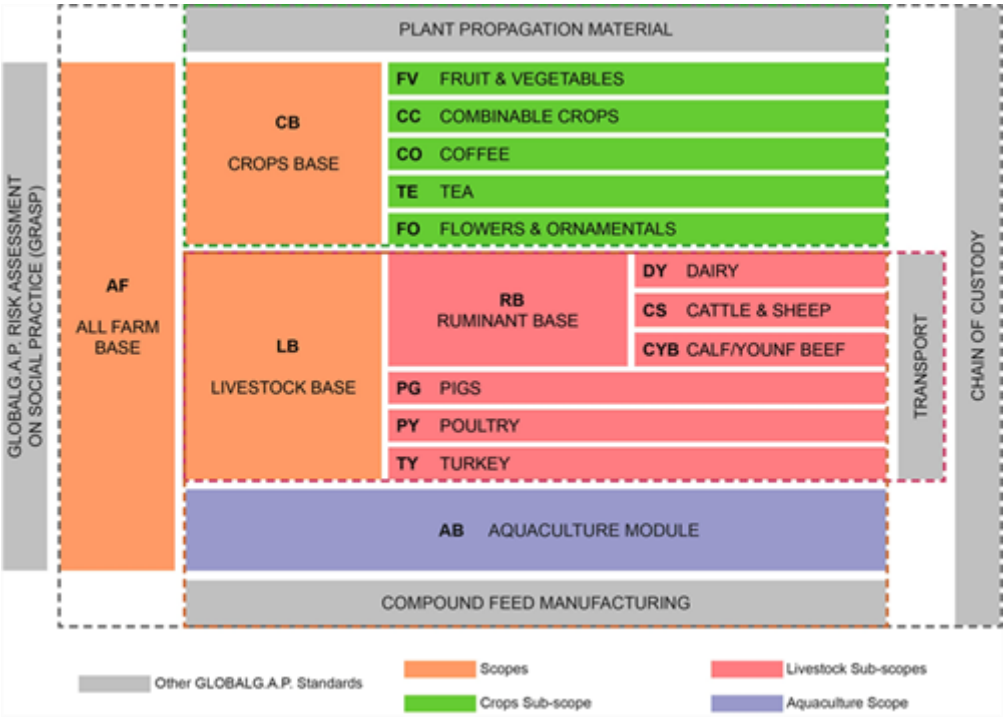


Figure - Overview of GLOBALG.A.P. modules. Source: GLOBALG.A.P.

BRC

The Global Standard for Food Safety, also known as BRC Food, is developed by food industry experts from retailers, manufacturers and food service organisations. Introduced by the British Retail Consortium and first published in 1998, the Food Safety Standard is now in its eighth issue and is well-established globally. It provides a framework to manage product

safety, integrity, legality and quality, and the operational controls for these criteria within the food manufacturing, processing and packing industry. The standard doesn't apply to food products which do not undergo any process at the site audited or to activities relating to wholesale, importation, distribution or storage outside the direct control of the company. The Standard focuses on:

- encouraging development of product safety culture;
- expanding the requirements for environmental monitoring to reflect the increasing importance of this technique;
- encouraging sites to further develop systems for security and food defence;
- adding clarity to the requirements for high-risk, high-care and ambient high-care production risk zones;
- providing greater clarity for sites manufacturing pet food; and
- ensuring global applicability and benchmarking to the Global Food Safety Initiative (GFSI).

IFS FOOD STANDARD

The IFS Food Standard is a GFSI (Global Food Safety Initiative) recognised standard for auditing food manufacturers. The focus is on food safety and the quality of processes and products. It concerns food processing companies and companies that pack loose food products. IFS Food applies when products are “processed” or when there is a hazard for product contamination during primary packing. The Standard is important for all food manufacturers, especially for those producing private labels, as it contains many requirements related to the compliance with customer specifications. The IFS Food Standard is used to audit food manufacturers regarding food safety and quality of processes and products. The list of requirements is organised in the following topics:

- Senior management responsibility
- Quality and food safety management system
- Resource management
- Planning and production process
- Measurements, analysis, improvements
- Food defence

SAFE QUALITY FOOD (SQF) PROGRAM

The SQF Code meets the needs of all suppliers in the food industry through an internationally recognised certification system, featuring an emphasis on the systematic application of HACCP for control of food safety hazards. The SQF family of food safety and quality codes are designed to meet industry, customer, and regulatory requirements for all sectors of the food supply chain - from the farm all the way to the retail stores. The implementation of an SQF management system addresses a buyer’s food safety requirements and provides the solution for businesses supplying local and global food markets. Components are:

- SQF practitioner requirement enhances and promotes food safety culture year-round, 24/7.
- The SQF Food Safety Codes are segmented based on industry scope

- Third-party assessment to verify adherence to the rigorous requirements of SQF Code

FSSC 22000

The FSSC 22000 scheme uses international and independent standards such as ISO 22000, ISO 9001, ISO/TS 22003 and technical specifications for sector specific Pre-Requisite Programs (PRPs), such as ISO/TS 22002-1. These standards were developed through a wide and open consultation with a large number of international stakeholders. In contrast to ISO 22000, which is used as a foundation, FSSC 22000 is recognised by GFSI and has a more limited scope. Scopes include farming, perishable animal products, food processing, feed production, food ingredients and food packaging material manufacturing.

The FSSC 22000 scheme consists of three components: ISO 22000, sector specific PRPs and additional requirements. Besides these three components there's a FSSC 22000-quality option based on the additional requirements of ISO 9001. For organisations wishing to integrate their food quality management system into the scope of their certification, FSSC 22000-Quality certification is available. FSSC 22000-Quality consists of a combined FSSC 22000 and full ISO 9001 audit.

SOCIAL AND ENVIRONMENTAL CERTIFICATION

More and more attention is being paid to the social and environmental conditions in the producing areas. Most European buyers have a code of conduct to which they will expect you to adhere. Social compliance is increasingly important for most fresh fruit and vegetables, although product quality is the top priority. Initiatives and attention relating to corporate social responsibility (CSR) vary across the various parts of Europe. In the eastern part of Europe, fewer buyers require strict social compliance, while in western Europe some multinationals even have their own compliance programme. Examples include Unilever's Sustainable Agriculture Code and Tesco's NURTURE accreditation. Examples of buyer initiatives are:

- the IDH Sustainable Trade Initiative, which has a Fresh & Ingredients programme with the aim to increase imports of sustainably produced crops by 25% in 2020 (against the 2016 baseline)
- the Business Social Compliance Initiative (BSCI) in north-western Europe
- the Global Social Compliance Programme (GSCP), which provides reference and self-assessment tools
- Sedex Members Ethical Trade Audit (SMETA), a non-profit membership organisation to evaluate and manage your performance on labour rights, health and safety, the environment and business ethics
- the Ethical Trading Initiative (ETI) in the UK

Examples of social or sustainable labels for fresh fruit and vegetables are:

- GRASP
- PlanetProof
- Fair for Life
- Fairtrade

- Rainforest Alliance/UTZ (as part of the Sustainable Agriculture Network).

ORGANIC CERTIFICATION

An increasing number of European consumers prefer food products that are produced and processed using natural methods. Organic fruit and vegetables have a higher cost of production but are also better valued on the European market. To market organic products in the European Union, organic production methods have to be used which are laid down in EU legislation. These organic production methods should be applied for at least two years before one can market the fruits and vegetables as organic. Once implemented, producers must apply for an import authorisation from EU organic control bodies. After being audited by an accredited certifier, producers may put the EU organic logo on their products. Examples of standards holders are:

- Soil Association (especially relevant in the UK)
- Naturland (Germany)
- BioSuisse (Switzerland)

The European Commission made a proposal for new organic legislation in 2014 and a new set of rules are scheduled to be implemented in July 2020. According to the European Council, this new agreement aims to guarantee fair competition, prevent fraud and improve consumer confidence. Importers have already started to implement the stricter regulations. In general, organic regulation and testing are expected to become rigorous. Traces of unauthorised substances can result in a direct withdrawal of organic certification.

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