An economic overview of the baby vegetable industry in South Africa

by

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DECLARATION

I declare that the dissertation hereby submitted in partial fulfilment of the requirements for the degree Master in Commence in Agricultural Economics at the University of Pretoria is my own work and has not been submitted by me for any degree at any other institution.

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ABSTRACT

An economic overview of the baby vegetable industry in South Africa

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The study investigated and analysed the baby vegetable industry in South Africa in order to understand the profile, extent and economics of the industry. The study was conducted in the Mpumalanga, Gauteng, Limpopo and the Western Cape Provinces. Four baby vegetable categories were selected namely, baby carrots, baby sweet corn, baby gems and baby marrows and enterprise budgets for these baby vegetables were developed.

Baby vegetables are unique produce trading at a premium price to traditional vegetables. Unlike traditional vegetables, baby vegetables are not produced in large quantities in South Africa as only few producers are producing them on a scale smaller than traditional vegetables. Since it is such a small industry very little is known about the production, distribution and the marketing of baby vegetables, both in South Africa and in the export market. Thus the size, volumes, economics of production, distribution and marketing channels as well as the export market of the baby vegetable industry are not known. This is because research on baby vegetables is limited as data for these vegetables is not readily available and accessible. The cost involved in producing the four baby vegetables was also determined through the development of their enterprise budgets and labour costs were found to be the highest cost of production. The enterprise budgets developed are expected to assist farmers when planning and making production decisions as well as projecting future yields and cost of production.

The study ascertained that the supply chain for baby vegetables in South Africa is comprised of baby vegetable producers, staging companies, distribution centres, and the different markets. Markets for baby vegetables in South Africa consist of food retail outlets, fresh produce markets, fresh fruit and vegetable outlets, individual agents and the export market. Baby vegetables are also exported from South Africa. Europe is the largest market for South African baby vegetable exports. However, African countries such as Kenya, Zambia and Zimbabwe are also major role players in baby vegetable exports to the European market, followed by Swaziland. When compared to these countries, South Africa is not a major producer and exporter of baby vegetables.

The baby vegetable industry according to the study, is a competitive industry and the continuation of supply by all supply chain members is determined by adhering to set standards, which requires the supply of high quality produce which is safe for consumption and is traceable. In the South African market, also referred to as the domestic market, food retail outlets have high standards of food quality and food safety that producers must adhere to. In the export market, standards are set and monitored by the Department of Agriculture, Forestry and Fisheries and import agents and these standards include Global Good Agricultural Practices (GlobalGAP) and sanitary and phytosanitary (SPS) measures.

Further research into the baby vegetable industry is essential in order to know the size of the industry, the volumes of baby vegetables produced and the farm-to-retail price spreads within the industry, and to develop enterprise budgets that are representative of the baby vegetable industry. Since the data for baby vegetable production and sales are currently combined with those for traditional vegetables, it is important to document the industry separately.

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ACRONYMS

Abbreviation	Meaning
ARC	Agricultural Research Council
BRC	British Retail Consortium
DC	Distribution Centres
EU	The European Union
EurepGAP	Euro-Retailer Produce Working Group Good Agricultural Practices
FFV	Fresh fruit and vegetable
FPMs	Fresh Produce Markets
G&S	Grades and Standards
GlobalGAP	Global Good Agricultural Practices
HACCP	Hazard Analysis Critical Control Points
JIT	Just in Time Management Techniques
JFPM	Johannesburg Fresh Produce Market
Kg	Kilogram
PPECB	Perishable Product Export Control Board
SANAS	South African Accreditation System
SPS	Sanitary & Phytosanitary
USA	The United States of America

CHAPTER 1

INTRODUCTION

1.1 BACKGROUND

The diet composition of consumers worldwide in urban areas has evolved as consumers are developing healthy habits of consuming nutritious food, including fruits and vegetables. The purpose of the production of baby vegetables is to satisfy the increasing need of healthy yet convenient food since they serve as both vegetables and a healthy snack to consumers. Baby vegetables are innovative in the sence that they are unique in their size and shape, and they also have a sweet taste which is not found in traditional vegetables. The vegetables are convenient since they do not require a lot of time to prepare, and they can also be consumed raw. Speciality, dwarf, midget, miniature and mini vegetables are some of the names used for baby vegetables yet they are often referred to as dwarf and mini vegetables. Baby vegetables are also known as high value products (MMA, 2008:8), and according to the USDA (2005:3), high value vegetables are ready-to-eat products which are also perishable in nature. For the purpose of this study, the word baby will be used to describe these miniature vegetables since not all high value vegetables are baby vegetables. The major rise in the popularity of baby vegetables according to Bachmann (2002:1) began in Europe and was followed by their use in fine restaurants in the United States. Bachmann (2002:1) states that the trend has spread rapidly and now many types of baby vegetables appear in Fresh Produce Markets (FPMs), food retail outlets and restaurants in South Africa. Given their high price range, these types of vegetables are assumed to be consumed by high-income groups.

The changing diet composition of consumers has caused products to shift from unprocessed to value-added fresh foods with more emphasis placed on food safety, packaging, taste and flavour, freshness and whole year availability (Reardon, Condron, Busch, Bingen & Harris 2001:424). The liberalisation of

international agri-food trade and domestic markets also brought increased demand for quality and safety in products in the food industry (Reardon *et al*., 2001:422). Grades and standards (G&S) therefore have become the communication of product quality and food safety and are presented through certification and labels (Reardon *et al*., 2001:422). High value products require specialized shipping, packaging and handling (USDA, 2005:3) in order to avoid damage, spoilage and rot, and thus enhance customer satisfaction.

1.2 PROBLEM STATEMENT

The baby vegetable industry in South Africa is generally known to be a small industry when compared to the traditional vegetable industry. The economics, implying the profitability and viability of the baby vegetable industry remains unexplored. This is because few studies focused on baby vegetables due to large data limitations. DAI, (2007: 69) and DAI, (2007: 71) also discovered that data on the production and flow of baby vegetables in Europe is also not readily available. Without good information on the economics of an industry no policy and investment analyses are possible. It is therefore imperative to understand and document the production, distribution, and the marketing of baby vegetables, both in South Africa and in the export market. This should assist policy makers, financiers and also assist vegetable producers in South Africa to know whether or not to invest in this industry.

1.3 RESEARCH OBJECTIVES

The study builds on previous research conducted by several authors. Reardon *et al.*, (2001); USDA, (2005); MMA, (2008); Bachmann, (2002); Dolan, Humphrey and Pascal, (1999); Dolan and Humphrey, (2000); Daya, Ranto and Lestoalo, (2006) and Carlson and Lamb, (2007) but applies it specifically to the South African situation. The study by DAI, 2007 provided a useful framework for this study as it analysed the baby vegetable supply chain in greater detail.

The main objective of this study is to provide an economic overview of the baby vegetable industry in South Africa by investigating the production, distribution and marketing of baby vegetables. The study however will not determine the profitability of all the supply chain members involved in the baby vegetable industry, but will focus only on the profitability of producing baby vegetables at the primary level, through the use of enterprise budgets. Amongst the baby vegetables, the study specifically investigates the economics of baby carrots, baby sweet corn, baby marrow and baby gems in South Africa.

1.4 STUDY AREA

The study was conducted in four of the nine provinces of South Africa, namely Gauteng, Mpumalanga, Limpopo and Western Cape. The four provinces were selected as part of the study since consultation with some role players in the baby vegetable industry, revealed that producers of baby vegetables were dispersed throughout Mpumalanga, Limpopo and Gauteng provinces. The Western Cape Province was later also included in the study in order to be representative of the South African baby vegetable industry. The study included producers, a staging company, distribution centres of the major retail chains, fresh produce markets (FPMs) as well as exporters of baby vegetables. The study covers four types of baby vegetables, namely, baby carrots, baby sweet corn, baby marrow and baby gems. The location of the farms, DCs, staging company, fresh fruit and vegetable outlets, FPMs and exporters are detailed in Table 1.1 and Table 1.2 below.

1.5 METHODOLOGY

1.5.1 Sampling

This population of baby vegetable producers was established from a list of baby vegetable producers which was compiled from information received from fresh produce markets and fresh fruit and vegetable outlets, staging companies, exporting companies, the Western Cape Department of Agriculture and referrals from other baby vegetable producers. The population might not cover all baby vegetable

producers in the four provinces but it is at least the first rather comprehensive list of baby vegetables producers in the different provinces. Since the population is very small the study endeavoured to survey all producers resulting in only those that were not available or could not be contacted being excluded from the sample. The study excluded traditional vegetable producers and producers who had stopped producing baby vegetables because according to exporters and FPM agents, these baby vegetable produces found the baby vegetable industry to be non-profitable due to high production costs. Table 1.1 below show the population and sampled respondents of baby vegetable producers.

A case study was done on supply chain members involved in the baby vegetable industry and this is shown in Table 1.2 below. This includes a staging company, DCs, fresh fruit and vegetable outlets and exporting companies. Major food retail outlets based in the Western Cape were also contacted as they were envisaged to be part of the study but they did not participate in the study as they were reluctant to give out the requested information which they regarded as delicate. The Epping Market was not included in the study since Western Cape Province was the last province to form part of the study while food retail outlets to participate in the study were envisaged to be from the Western Cape Province as these were the contacts received. The Agricultural Research Council (ARC) was consulted regarding production of baby vegetables in hydroponics systems.

Table 1.1: Sampled respondents

Province	Population of baby vegetable producers	Sampled baby vegetable producers	Location
Gauteng	5	Farmer 1	Boksburg
		Farmer 2	Langseria
Mpumalanga	9	Farmer 1	Nelspruit
		Farmer 2	White River
		Farmer 3	Nelspruit
		Farmer 4	White River
		Farmer 5	Lows creek
		Farmer 6	Nelspruit
		Farmer 7	Lows creek
Limpopo	8	Farmer 1	Hoedspruit
		Farmer 2	Musina
		Farmer 3	Modimolle

Province	Population of baby vegetable producers	Sampled baby vegetable producers	Location
Western Cape	8	Farmer 1	Somerset West
		Farmer 2	Kraaifontein
		Farmer 3	Kraaifontein

Source: Survey data: 2011-2012

Table 1.2: Case studies conducted

Respondents	No of respondents	Province	Location
Fresh fruit & vegetable (FFV) outlets	3	Mpumalanga	Nelspruit
		Mpumalanga	White River
		Mpumalanga	White River
Fresh produce markets (FPMs)	2	Gauteng	Johannesburg FPM
		Gauteng	Tshwane FPM
Staging companies	1	Gauteng	East Rand
Non-retail Distribution Centres	3	Limpopo	Musina
		Western Cape	Somerset West
		Gauteng	Johannesburg
Exporting companies	2	Gauteng	O.R Tambo International
		Gauteng	O.R Tambo International

Source: *Survey data: 2011*

1.5.2 Data collection

Secondary data used was received from the Perishable Product Export Control Board (PPECB) which included statistics of baby vegetable exports from 2008 to 2010. Since the study aimed to investigate an area in agriculture that has very little information or prior studies, case studies were used to collect primary data and structured questionnaires and interviews were used as data collection tools.

To collect the data, the researcher travelled to the various places where the respondents are based, that is, to farms in Gauteng, Mpumalanga, Limpopo and Western Cape, to FPMs such as the Johannesburg Fresh Produce Market (JFPM) and Tshwane Fresh Produce Market. Research was also conducted with fresh fruit and vegetable outlets, distribution centres and a staging company, and exporting companies.

1.5.2.1 Questionnaire as a data collection tool

Three different questionnaires were administered to gather data from producers, retailers and exporters. An additional questionnaire was also developed to assist the process of completing the enterprise budgets. The questionnaires comprised of open-ended and closed-ended questions.

The producers' questionnaire covered aspects related to the production and processing of baby vegetables. Additional aspects covered food safety and food quality, markets were baby vegetable are sold, challenges and risks, as well as finance required for capital improvement. First rounds of questionnaires were administered with baby vegetable producers through face to face interviews. Upon administering the questionnaires, follow-up questions were also asked through telephonic interviews in order to confirm and clarify the information provided.

A second round of face to face and telephonic interviews were conducted with baby vegetable producers, through the use of the format for MicroCombud enterprise budgets for carrots, gem squash and sweet corn which were used as models to develop the enterprise budgets for baby carrots, baby corn, baby gems and baby marrows. Also, an additional questionnaire from the Western Cape Department of Agriculture was administered with baby vegetable producers, to developing part of the enterprise budgets. This questionnaire was used to gather data on the use of agricultural implements by baby vegetable producers. The data was entered in an Excel spread sheet that includes parameters and variables developed from the Guide to Machinery Cost to calculate the fuel cost, maintenance and repair costs.

The retailers' questionnaire covered baby vegetable supply and customer demand. The retailers' questionnaire was used to collect data from one fresh fruit and vegetable outlets and one distribution centre. This is because other fresh fruit and vegetable outlets, a staging company and FPM agents were interviewed without the use of a questionnaire in order to get an understanding of the baby vegetable industry. The Exporters' questionnaire covered questions about baby vegetable supply, baby vegetable exports in terms of quantity exported and export destinations,

the exporters' role in the baby vegetable industry and the market for baby vegetable exports. All four above mentioned questionnaires are attached in Appendix A.

1.5.2.2 Interviews as data collection tools

Questionnaires were administered by conducting face-to-face interviews with baby vegetable producers, agents from the JFPM, Tshwane FPM, a DC, a staging company and exporting companies. The face-to-face interviews resulted in an understanding of the functioning of the baby vegetable industry and its supply chain. Telephone interviews and e-mails were also utilised to pose follow-up questions, especially to producers and exporting companies who did not have all the information required during the initial interviews conducted.

1.6 LIMITATIONS OF THE STUDY

The process of administering questionnaires and having face-to-face interviews was time consuming and expensive, especially since four sets of questionnaires were administered and four provinces formed part of the study. Although it was envisaged that the four major food retail outlets in South Africa would be included in the study, three of these retailers were reluctant to be part of the study as they believed that they would be divulging sensitive information and one of the retailers did not respond at all. The reluctance of the major retail outlets to be part of the study limited the gathering of valuable information since retailers play a big role in the marketing of baby vegetables in South Africa.

Contacts for most baby vegetable producers from Gauteng, Mpumalanga and Limpopo were received from FPM agents and exporting companies but some of the producers could not be reached as they were unavailable, especially those in Gauteng Province. Some producers in Limpopo Province were no longer producing baby vegetables, thus they too could not form part of the study. Some of the baby vegetable producers reached did not have accurate production records thus information had to be verified with other baby vegetable producers in the same area.

Common practice for developing enterprise budgets involves having a study group with baby vegetable producers and other industry players such as input companies, who together will contribute significant information that will help develop representative enterprise budgets for that industry. This process did not take place in this study since there were few producers who participated in the study, and the producers and industry players in the baby vegetable supply chain were dispersed in different locations, thus conducting study groups would have been expensive to administer.

Therefore, to develop the enterprise budgets, individual producers were used. Three out of the 15 initial producers interviewed were interviewed to develop the enterprise budgets through the use of MicroCombud enterprise budgets and the questionnaire from the Western Cape Department of Agriculture since many baby vegetable producers were unreachable during the second round of interviews. None of the producers from Limpopo Province were reachable for telephonic interviews while all producers from Gauteng Province were reachable, but none of them had complete production records, as was the case through the first round of interviews conducted. Only one of the producers based in Mpumalanga was reachable for a telephonic interview. From the Western Cape Province, two out of the three baby vegetable producers were reachable and face to face interviews were conducted with both producers. As a consequence the budgets presented here should therefore not be considered as representative of the industry but are thus merely indicative of potential gross margins in the industry.

1.7 OUTLINE OF THE STUDY

The study comprises six chapters. Chapter two which immediately follows this introductory chapter details the production process of baby vegetables while Chapter three discusses the supply chain and marketing of baby vegetables in South Africa. Chapter four details the enterprise budgets for the four baby vegetables, Chapter five discusses the SPS measures for the export market and finally, Chapter six details the summary of the findings and the conclusions drawn from the study.

CHAPTER 2

THE PRODUCTION PROCESS OF BABY VEGETABLES

2.1 INTRODUCTION

Baby vegetables can be produced in two ways: by harvesting traditional vegetables earlier than the specified harvesting time, or by planting genetically dwarf varieties, also known as baby vegetable cultivars (Maynard, 2006:1). In this study, the focus was on the production of baby vegetables using baby vegetable cultivars.

The study was conducted in four provinces in South Africa: Mpumalanga, Limpopo, Gauteng and the Western Cape Province. Baby vegetables are produced throughout South Africa, yet according to the FPM agents interviewed from Gauteng Province, most of the baby vegetables produced for the JFPM and Tshwane FPM are from Mpumalanga and Limpopo Province, with Free State Province being a major baby carrot producer. Mpumalanga and Limpopo Province are major producers of baby marrow, baby gems as well as green and yellow patty pan. According to the FPM agents, provinces such as Gauteng, North West, Western Cape and the Northern Cape also produce baby vegetables.

The purpose of this chapter is to understand the production process for baby vegetables, focusing specifically on the selected four baby vegetables in the four provinces which form part of the study. The unique aspects of baby vegetable production and the SWOT analysis of baby vegetable production by baby vegetable producers will also be discussed in this chapter.

2.2 BABY VEGETABLES PRODUCED IN SOUTH AFRICA

Baby vegetables produced in South Africa include baby beets, baby carrots, baby corn, peas, fillet greens, baby lettuce, leeks, baby onion, baby cauliflower, eggplant, captain tomatoes, baby potatoes, baby gems and baby marrows, patty pans, baby

spinach, baby leave rocket and Chinese cabbage. The study will focuses only on baby sweet corn, baby carrots, baby gems and baby marrows since these are also popular baby vegetables. The four baby vegetables were chosen to form part of the study because they are generally considered to be the most dominant category of baby vegetables in South Africa.

2.2.1 Baby sweet corn

Baby sweet corn cultivation is a recent development. Thailand was the first country to cultivate baby sweet corn in the early 1970s for exports. Guatemala, Zambia, Zimbabwe and South Africa also started producing the vegetable for exports. Currently India and Thailand are the world leaders in baby sweet corn production. Big companies in India produce baby sweet corn on a large scale and most of the production is still standardized (Virmani, 2009). The largest market for baby sweet corn is the U.S.A, though baby sweet corn is used in most restaurants and is rarely available in U.S.A supermarkets (Virmani, 2009). Another major market for baby sweet corn is Germany, though Germany imports almost all of its baby sweet corn from Thailand (DAI, 2007:24).

2.2.2 Baby carrots

Baby carrots grow well under the sun, with regular water and in cool weather conditions. Baby carrots are harvested when they are still small, tender and sweet. Varieties of baby carrots are Baby Fingers, Primo, Lady Finger, Parmex and Thumbilina (Growing baby vegetables, 2010).

2.2.3 Baby gems

Baby gems are from the squash family. Originally squashes are from South America. They were introduced to Europe in the 16th century. South and North America have remained the developers of squash and it is only recently that squash regained popularity in Britain (Bird, 2003:18). Like baby carrots, baby gems require a warm

weather as they grow well under the sun with regular water (Growing baby vegetables, 2010).

2.2.4 Baby Marrow

Baby marrow belongs to the cucumber family and has a similar shape to a ridged cucumber. The colours for baby marrow range from green to light green and yellow. Marrows contain large proportions of water and are low in calories since they contain no starch, sugar, protein or fat. They have potassium and are beneficial for people with high blood pressure. They also contain vitamins A, B and a lot of vitamin C. Marrows contain antioxidants which are believed to reduce the risk of some cancers (Bird, 2003:13).

2.3 PRODUCTION OF BABY VEGETABLES BY PROVINCE

Below is the production analysis of baby vegetables and the volumes produced by the four provinces.

2.3.1 Mpumalanga Province

Mpumalanga Province is situated in the Lowveld Region of South Africa. The study was conducted in the Nelspruit, White River and Barberton Metropolis, which are all situated in the Ehlanzeni District where baby vegetables are produced in large volumes. The Ehlanzeni District is characterised by a sub-tropical climate which is suitable for vegetable production. Nelspruit is the capital city of Mpumalanga Province, and according to the Mpumalanga Department of Economic Development, Environment and Tourism, (2009:8), the Nelspruit-White River metropolitan areas host activities with high economic value.

According to the study, Table 2.1 below reveal that baby corn is produced mostly in Mpumalanga Province, followed by baby marrow, baby carrots and lastly gem squash. Other baby vegetables such as yellow and green patty pans, baby spinach, fennel, cocktail tomatoes and leeks are also produced in this province, both for the

domestic and export market. Baby corn is planted in May and harvested in July or August. Baby carrots are planted from February to September and from May to November. Baby gems and baby marrows are planted from January to August and harvested from March to December.

Table 2.1 below shows the estimated production of baby vegetables from producers in Mpumalanga Province during the study. The average production of baby carrots, baby gems and baby marrows is captured except for baby corn production values. This is because amongst the producers interviewed, there was only one producer who produced this crop thus the baby corn values do not show an average.

Table 2.1: Production statistics of baby vegetables in Mpumalanga Province by seven producers

Baby vegetables	No. of baby vegetable producers	Total area under production (ha)	Average quantity harvested (tons)	Average tons per ha
*Baby corn	1	20	240	12
Baby carrots	2	3.5	47.5	13.57
Baby gems	4	4.06	18	4.43
Baby marrow	7	7.93	51	6.43

Source: Survey data: 2011

**Baby corn: means that the baby corn volume produced is not an average since one producer was interviewed*

2.3.2 Gauteng Province

All four baby vegetables in the study are produced in Gauteng Province, together with baby spinach, baby lettuce, cocktail tomatoes, Brussels sprouts, and other baby vegetables. Interviewed baby vegetable producers from this province produce baby corn and baby marrows. Baby corn is planted in September and harvested in December and baby marrows are planted from August/September to February and harvested from November. Production information received from producers in this province regarding the tons of baby vegetables harvested was incomplete, even though face to face interviews were conducted. One of the reasons of the incomplete information might be due to a lack of production records, another reason might be that producers were reluctant to share their information. Therefore complete

production records from the producers interviewed from this province were not available.

2.3.3 Limpopo Province

Production of baby vegetables in Limpopo Province is dispersed throughout the province: the baby vegetable producers interviewed are from Hoedspruit (Mopani District), Musina (Vhembe District) and Modimolle (Waterberg District). The study shows that Limpopo Province produces the most baby marrows and baby gems, but none of the producers interviewed produced baby corn and baby carrots. The other baby vegetables produced in large volumes are yellow and green patty pans. The production season for baby marrows and baby gems is February to June and June to September and the harvesting season is from March/April to November.

Table 2.2 below shows the hectares under baby vegetable production in Limpopo Province and the tons harvested.

Table 2.2: Production statistics of baby vegetables in Limpopo Province by three producers

Baby vegetables	No. of baby vegetable producers	Total area under production (ha)	Average quantity harvested (tons)	Average tons per ha
Baby gems	2	7.36	76.73	10.43
Baby marrow	3	15	150.33	10.02

Source: Survey data: 2011

2.3.4 Western Cape Province

The Western Cape Province is one of the major tourism destination places in South Africa. People from different countries, with different food preferences visit the province, thus the baby vegetables produced there are mostly consumed locally within the province. The baby vegetable producers in this study were situated at the Cape Metro and Cape Winelands Districts.

Many types of baby vegetables are produced in the Western Cape, including baby corn, baby gems, baby marrows, yellow and green patty pan, baby spinach, cocktail tomatoes and the like. According to the study, baby corn is the most produced baby vegetable and like the other provinces, baby vegetables in the Western Cape are also produced during the summer months. The production season for baby corn is in September and the harvest is in December. Baby marrows and baby gems are planted in October/November to February and harvested from November/December to March.

Table 2.3 below shows the hectares under baby vegetable production in the Western Cape Province and the tons harvested. While the average production of the other baby vegetables was captured on the table, baby corn is not an average. The table is the results of the information supplied by baby vegetable producers from this province during the study.

Table 2.3: Production statistics of baby vegetables from Western Cape Province by three producers

Baby vegetable	No. of baby vegetable producers	Total area under production (ha)	Average quantity harvested (tons)	Average tons per ha
Baby corn*	1	10	120	12
Baby gems	2	1.63	11.75	7.23
Baby marrow	2	2.63	19	7.24

Source: *Survey data: 2012*

2.4 PRODUCTION PROCESS OF THE FOUR BABY VEGETABLES

In South Africa, baby vegetables are planted mostly in summer months. More than 75% of the producers interviewed planted baby vegetables in summer. The reason for planting baby vegetables in summer, especially in Mpumalanga, Gauteng and Limpopo, is because baby vegetables are delicate to frost which occurs in cold weather conditions, and is likely to happen in winter. Some producers do plant baby vegetables in winter months, such as March to July, but the percentage of baby vegetables planted in winter is very low, in this case, less than 25% of baby vegetable producers planted baby vegetables in winter. According to baby vegetable

producers, the reason why some producers plant baby vegetables in winter is to take advantage of the higher prices in winter caused by the high demand for baby vegetables due to decreased supply.

According to baby vegetable producers and exporting agents, baby vegetables meant for the export markets are also produced in summer. Europe has an increased demand for baby vegetables during the European winter, which is summer in South Africa, and South African baby vegetable exports to Europe during this season are high. One of reasons for the increased demand for baby vegetables in winter is that baby vegetable producers in Europe do not plant baby vegetables during winter because of the cold weather conditions. As a result, European importers source more baby vegetables from exporting countries during the winter season. Holidays such as Christmas occur in winter in Europe and baby vegetable exporters from South Africa have noticed a trend of increased demand for baby vegetables during December.

This section details the introduction of the production process; planting and harvesting times for each of the four baby vegetables, also to be discussed, are the diseases that affect the four baby vegetable produce. However, the section is linked to Chapter 4 which deals with the economics of producing baby vegetables through the use of enterprise budgets. The two chapters were separated so that the production process can be discussed separately from the economic in baby vegetable production.

2.4.1 Baby sweet corn

The study discovered that few baby corn producers in South Africa produce large volumes of baby corn per year. Most of the baby corn producers are from Mpumalanga Province and the Western Cape Province produces significant baby corn as well. Baby corn can be produced using sweet corn or baby corn cultivars. Miles and Zenz, (2000), show that baby sweet corn can be produced in three ways. Firstly, a baby sweet corn variety can be planted to produce baby sweet corn only. Secondly, baby sweet corn can be grown from regular corn plants and harvested early, and thirdly, the ears of the corn are harvested before maturity after using

nitrogen fertilizer to develop the ears of the corn early. To produce baby sweet corn, the soil is ploughed with a tractor and one hectare of land is ploughed for approximately three hours. Seedbeds are formed and for this activity, a seedbed former can be used. It takes approximately six hours to prepare seedbeds for one hectare of land. The seed can be planted using a planter and are irrigated three times a day for 3 months. A producer conferred that disease resistant baby corn cultivars, such as PAN 6146, are available and it is more advantageous to plant these. Fertilizer is applied on a weekly basis and insecticides are also applied to the plants to prevent insects from damaging the plants. Herbicides are used to control weeds, though one of the two producers interviewed best controlled weeds by hand instead of spraying. According to this producer, using herbicides to control weeds is expensive since weeds grow faster and labour will still be required to remove weeds even when herbicides are applied. The baby corn plant grows for three months and can be harvested for 3 weeks.

Like traditional sweet corn, baby sweet corn is affected by both diseases and insects. Insects that affect baby sweet corn include locusts, cutworms and grasshoppers. Diseases that affect baby corn are known as Rust and Stemorod. The production process for baby corn is similar to that of baby sweet corn, except for the differences captured in Table 2.4 below. In the industry, the two cultivars are hardly differentiated since they are similar. The advantage of producing baby corn, however, is the long shelf life since it can be stored up to two months after harvest without refrigeration and the baby corn can also be used for animal feed, which is an advantage for mixed farming enterprises.

The baby sweet corn variety trail by Miles *et al.* (2000), showed that baby sweet corn produced by a speciality baby sweet corn variety have a very good overall ear appearance, with other varieties showing good, poor and very poor ear appearances. Baby sweet corn quality is determined by good ear appearance which includes row alignment where straighter rows are preferred, kernel size where petite is preferred and ear tip shape where pointed or narrowed is preferred (Miles *et al.*, 2000).

Table 2.4 below captures the differences between baby sweet corn and baby corn cultivars.

Table 2.4: Differences between baby sweet corn and baby corn

DIFFERENCE	BABY SWEET CORN		BABY CORN	
	ADVANTAGES	DISADVANTAGES	ADVANTAGES	DISADVANTAGES
Cultivar	Can plant sweet corn cultivar and harvest as baby corn		Specific baby corn cultivars are available	
Seed cost		Sweet corn seeds can cost (R9 000 / 25kg)	Baby corn seeds can cost (R1 000 / 25 kg)	
Harvest	Harvested after 2 months			Harvested after 3 months
Baby corn-cop harvested		Can harvest one cop per plant per season	Can harvest 2 cops per plant per season	
Plant hygiene		Upon harvest, some leaves are not removed, thus lice that appear on leaves will be visible on the cop	Upon harvest, leaves are removed from cops and lice that may have been attached to the plant leaves are removed together with the leaves	

Source: Survey data, 2012

2.4.2 Baby carrots

According to the study, only Mpumalanga Province was producing baby carrots during the period under review. Some baby vegetable producers in other provinces such as Gauteng, Limpopo and the Western Cape attempted to produce this baby vegetable but were unsuccessful owing to low profitability. Cultivars available for baby carrot production include Amsterdam little sweetheart and Tito.

To produce baby carrots, the soil is ploughed and approximately one hectare of land is ploughed for three hours with a 2.2 meter plough. Seedbeds are formed using a seedbed former. The seeds can be planted using a seed planter, fertilizer is applied and insecticides are used to prevent insects from damaging the plants. Baby carrots can be harvested after 8 weeks from the time of planting.

Baby carrots are affected by the same diseases as traditional carrots, such as petham, Alternaria (also known as rust and is a leaf disease), powdery mildew and downy mildew. Nematodes also affect baby carrots as the produce develops nods inside and this affects the growth of the baby carrots.

2.4.3 Baby marrow

Baby marrows are the most produced baby vegetables of the four baby vegetables studied as 93.3% of the baby vegetable producers interviewed produced baby marrows. Baby marrows are mostly produced in Limpopo Province followed by Mpumalanga Province refer to Table 2.2 and Table 2.1 above.

Baby marrows are planted in summer months and to plant them, a plough can be used to prepare the soil for planting and it takes approximately 8 hours to plough one hectare of land. Manure is spread by spreader or by hand, then seedbeds are prepared and a ridger can be used for this activity. Seeds are then planted by using a seed planter or by hand. Baby marrows are irrigated once a day for 5 to 8 weeks, which is the duration the plants remain on the ground, depending on when the producer wants to harvest. A boom sprayer can be used for fertilizer application and this process is repeated 8 times throughout the production process. Chemicals can be applied if non-organic baby marrows are produced. It is important that baby marrows receive good air circulation in order to prevent diseases.

Baby marrows are harvested 6 to 8 weeks after planting and are harvested with care by hand using a sharp knife or scissors since they are delicate products: most producers who harvest baby marrows by hand make use of a sharp knife.

Baby marrows are affected by diseases known as mosaic and powdery mildew. There are six different types of mosaic, which cause the plants to change their leaves. Mosaic can be found in tobacco and is transferable between plants, thus producers who are aware of this do not allow workers to smoke while working in the field with baby marrows. Baby marrows are also affected by fruit flies which mostly occur after the harvest of fruits, particular in the Western Cape.

2.4.4 Baby gems

The production process used to produce baby marrows is also used to produce baby gems as the two baby vegetables are said to be similar by baby vegetable producers.

Like baby marrows, baby gems are mostly produced in Limpopo Province followed by Mpumalanga Province, refer to Table 2.2 and Table 2.1 above.

Baby gems are planted in summer months and to plant them, a plough can be used to plough the land to prepare for planting. Like baby marrows, it takes approximately 8 hours to plough one hectare of land and manure is spread by a manure spreader or by hand. Seedbeds can be prepared using a ridger and seeds can be planted by using a seed planter or by hand. Baby gems are irrigated once a day for 5 to 8 weeks, which is the duration the plants remain on the ground, depending on when the producer wants to harvest. A boom sprayer can be used for fertilizer application and this process is repeated 8 times throughout the production process. Chemicals can be applied if non-organic baby gems are produced. Baby gems are harvested 6 to 8 weeks after planting.

Like baby marrows, it is important that baby gems receive good air circulation in order to prevent diseases. Baby gems are also affected by the same diseases as baby marrows such as mosaic, powdery mildew, and also fruit flies which mostly occur after the harvest of fruits.

2.5 UNIQUE ASPECTS OF BABY VEGETABLE PRODUCTION

Baby vegetables have a special characteristic in that they serve as a healthy snack for consumers. Baby vegetables are different in size, in taste since they are sweet, smooth, soft and tender, and have a unique shape. Baby vegetables are smaller and slimmer in size and have less bulk compared to normal vegetables, and so can be consumed over a short period of time. The shapes of baby vegetables are different from that of their normal counterparts: for example, baby carrots have a pointed end compared to normal carrots that can have a round end.

According to Maynard (2006), the difference between baby vegetables and traditional vegetables are fertilizer application, early harvest, closer spacing and more frequent successive plantings. Baby vegetables may be spaced closer together because of their small size and close spacing is useful for obtaining a small crop size. The time

from planting to harvesting of baby vegetables is shorter than that of traditional vegetables (Maynard, 2006) since baby vegetables are harvested after 5 to 8 weeks whereas traditional vegetables are harvested after 12 to 24 weeks from planting time. Baby vegetables are planted more regularly than traditional vegetables during the year, thus the frequent successive planting of baby vegetables enables the producer to benefit from the high turnover of baby vegetables due to quick harvests, thus increasing the income received from baby vegetable production (Maynard, 2006).

2.6 SWOT ANALYSIS FOR PRODUCERS OF BABY VEGETABLES

Only baby vegetable producers were requested to answer open-ended questions on the Strengths, Weaknesses, Opportunities and Threats (SWOT) analysis of baby vegetable production.

2.6.1 Strengths

Having access to land with infrastructure, farming implements and good quality water are strengths for baby vegetable producers since these enable producers to produce quality produce and receive premium prices. Baby vegetables provide a constant cash flow since they grow quicker than traditional vegetables: baby carrots, baby gems and baby marrows can be ready for harvest in up to eight weeks after planting. Differentiation by having a recognised brand name as a result of producing good quality baby vegetable produce is strength in the baby vegetable industry, especially when supplying to FPMs. Knowledge and experience in producing baby vegetables is also strength as producers are able to improve in producing better quality baby vegetables with higher volumes by learning from past experiences and knowledge gained.

2.6.2 Weaknesses

Access to production inputs such as land, labour and water is not guaranteed for some baby vegetable producers. Producers from Mpumalanga and Limpopo Provinces are faced with a shortage of good quality water. Government intervention

in terms of labour cost and land reform land claims also poses a risk to producers as they are not certain about the access to land or whether labour costs increase significantly. Though the risk in producing baby vegetables is high, producers also believed that this risk is limited as they estimate that baby vegetables only contribute a low percentage of the total farm income received, typically between 10% and 20%, the loss of which presents only a limited exposure. If, however, baby vegetables contributed a larger percentage of the total farm income for producers, for example between 80% and 90%, then the risk would be said to be high.

Baby vegetable producers are faced with high production costs, input costs such as seeds, fertilizer and chemical costs, labour and fuel costs. Labour costs are considered the highest cost of production by all baby vegetable producers interviewed, and is also a threat for producers who export baby vegetables since their competitors have low labour costs. The production of baby vegetables is highly dependent on labour as a production input since some producers' plant and harvest baby vegetables by hand due to their small size and delicate nature. Marketing costs are also considered high, with high transport and packaging costs. The handling costs of baby vegetables are also high since the produce is very delicate, thus to produce baby vegetables for most markets, producers are required to have pack houses and cold rooms and these are high capital costs. According to producers, the production of baby vegetables requires hard work and the production process is time consuming. Small scale producers are also faced with the challenge of not having enough funds to purchase production inputs and so end up delaying the planting of the baby vegetable crop. This however has a negative effect in the volumes and quality harvested since baby vegetables are seasonal crops planted at specific times of the year.

Some seed cultivars for baby vegetables are not readily available and few baby vegetable cultivars are disease resistant. A few markets give a firm contract to baby vegetable producers but the producers who do not have these contracts are faced with certainty as to whether their produce will be accepted by the markets. If there is an overproduction of baby vegetables, producers supply the excess baby vegetables to FPMs and end up receiving low prices. Unlike traditional vegetables, baby vegetables have low volumes harvested, thus there is no certainty that producers will

get their money back from producing these crops given the high production inputs. Another risk is that some markets do not pay producers on time. Producers who supply the export market for example might be paid four weeks after delivery while in the domestic market, producers may be paid from the day of delivery, or between 7 and 14 days after delivery.

2.6.3 Opportunities

According to some producers, the baby vegetable industry is a growing industry which indicates that there is an opportunity to produce more baby vegetables for both the domestic market and the export market. Accordingly, producers who are currently not GlobalGAP certified could get the accreditation and also supply markets such as the food retail outlets in South Africa and the export market. Producers who are currently involved in the export of baby vegetables believe that they can expand their supply by having access to new markets.

An opportunity exists in South Africa to utilise new farming methods and technology in the production of baby vegetables. Producers have identified disease resistant cultivars, new or improved planting and harvesting methods, knowledge and skills transfer from major producers of baby vegetables around the world, as some of the opportunities available for new or improved technology in the industry. Mentoring young producers is another opportunity which some baby vegetable producers are currently engaged in for skills transfer.

2.6.4 Threats

The instability of international markets causes the fluctuation of the exchange rate and this is a threat to producers who export baby vegetables it affects the cost of exporting baby vegetables as well as the price producers receive, thus surviving in a poor economic environment is a challenge for producers. High oil prices are another threat since they cause high fuel prices which lead to high input and transport costs, including airfreight costs for producers who export baby vegetables. All these costs result in decreased profit margins for the baby vegetable enterprises. Over-production of baby vegetables is another threat to baby vegetable producers since

baby vegetables are a niche market. Some markets are oversupplied with baby vegetable produce and this causes prices of produce to decrease. Because of the high production costs, it is difficult for some producers to break even, especially those producers who had to invest in infrastructure for the production and marketing of baby vegetables. Most producers who break even are those who have been producing traditional vegetables for a long time and already have infrastructure such as pack houses and cold rooms in place which they also use for baby vegetables. A few producers who do break even still felt that the baby vegetable industry was not profitable, as they only manage to break even, but no profits were made. Most producers, however, felt that the baby vegetable industry was profitable, though with a high cost of production.

Climate change in terms of wind, rain, hail and heat are threats to baby vegetable production as they cause poor growth to the seeds of baby vegetables and also damage and destroy the baby vegetable produce. Baby vegetables are also easily infected by diseases and lack of good quality water can also add to this problem. During harvest times, baby vegetables are harvested daily and the spraying of chemicals is halted when the baby vegetables are close to harvest and this may lead to disease infections. To prevent the spread of diseases amongst the plants and to also decrease the threat of losing produce owing to climate change, a few baby vegetable producers were already producing baby vegetables in tunnels and a few others were constructing or contemplating the construction of tunnels for these purposes. The majority of baby vegetable producers however felt that tunnels were expensive to construct and not worth investing in especially for the production of baby vegetables. These producers believed that they might not get back their high capital cost investments through selling baby vegetable crops, seeing that baby vegetables are currently not being produced on a large scale.

Theft of baby vegetables is also a threat especially baby marrows since some people consume the leaves of baby marrows as Morogo yet baby corn for example is not prone to being stolen as some people are not familiar with it. AIDS is also a threat to producers since some farm workers are infected and the high death rate from this disease amongst farm workers causes loose of productivity and high training costs to farmers. This is because the new farm workers employed take time to performing

their duties effectively, especially since baby vegetables require patience and hard work.

2.7 SUMMARY

Baby vegetables are unique products in South Africa and amongst the four provinces, the study discovered that these vegetables are produced mostly in Mpumalanga and Limpopo Provinces. Baby vegetables are produced for both the domestic market and the export market and baby marrows are the most produced crop locally. Producers of baby vegetables are faced with a number of challenges such as high production, marketing and capital costs; climate change and diseases that affect the produce; the instability of international markets; and the necessity of complying with industry standards in order to secure their markets. Value adding is important in the baby vegetable industry and is performed at the farm gate, although DCs and the staging company also perform some value adding activities.

CHAPTER 3

SUPPLY CHAIN AND MARKETING SYSTEMS OF THE BABY VEGETABLE INDUSTRY

3.1 INTRODUCTION

It is imperative to know the baby vegetable supply chain and marketing channels in South Africa in order to understand how the baby vegetable industry functions. This section details the market channels for baby vegetables; the domestic and export markets, also, the supply chain of baby vegetables, as well as the critical aspects to consider in the baby vegetable industry.

3.2 DOMESTIC MARKETS FOR BABY VEGETABLES

Domestic markets for baby vegetables in South Africa are comprised of formal markets were baby vegetables are sold. This is because baby vegetables, being high-value products, have a premium price and are bought by customers from middle to high income segments and are thus not largely sold in informal markets. This section describes the marketing channels for baby vegetables in South Africa and their supply chain, the competition amongst supply chain members, as well as challenges faced by these members in the domestic market.

3.2.1 Market channels for baby vegetables

Domestic channels describe the channels available to market baby vegetables in South Africa. Figure 3.1 below depicts the marketing channels for baby vegetables, were baby vegetable producers supply baby vegetables. The marketing channels includes food retail outlets, FPMs, FFV outlets, staging company, non-retail DCs and individual agents. According to Figure 3.1, FPMs are the biggest markets were baby vegetable producers supply baby vegetables in the South African domestic market,

followed by food retail outlets, FFV outlets, non-retail DCs, individual agents and the staging company.

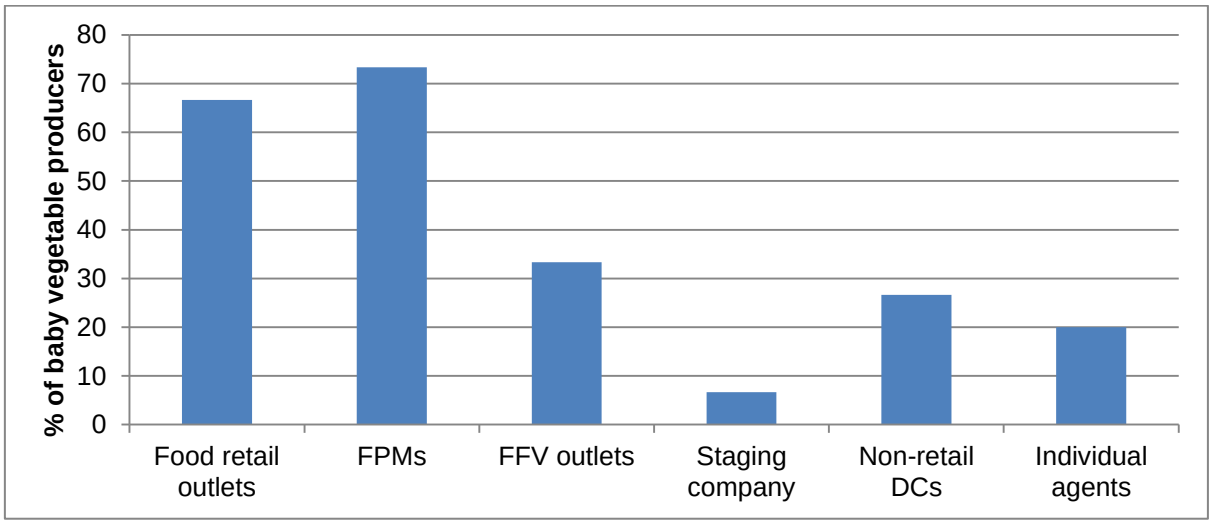

Figure 3.1: Share of producers supplying baby vegetables to the South African domestic market

Source: Survey data, 2011-2012

Table 3.1 below depicts the number of baby vegetable producers interviewed who market baby vegetable produce through more than one marketing channel. Seven out of the 15 baby vegetable producers interviewed market the baby vegetable produce through both retail outlets and FPMs.

Table 3.1: No of producers who use more than one outlet

Market outlets	No of producers
Retail outlets & FPMs	7
Retail outlets & Non-retail DC	2
FPMs & Non-retail DCs	2
FPMS & Individual agents	2

Source: Survey data, 2011-2012 *N=15*

3.2.1.1 Fresh Produce Markets

FPMs are the largest markets for baby vegetables in South Africa. Since they are the major trade centres for fresh vegetables in South Africa, FPMs serves as the link between suppliers and buyers who trade in fresh vegetables on daily basis. Baby

vegetable producers supply large volumes of baby vegetables to FPMs on daily or weekly basis. Some baby vegetable producers sell their baby vegetables to FPMs as a first option and they supply high quality baby vegetables. Other producers, however, supply baby vegetables that were rejected, for example, at retail outlets for low quality or by PPECB during inspections of baby vegetable exports.

Producers deliver baby vegetables either directly or indirectly to FPMs, where market agents sell the baby vegetables on their behalf. Since the demand for baby vegetables is more limited than that for traditional vegetables, it is possible for baby vegetable producers to flood the market with baby vegetables. In other instances there may be limited supplies of baby vegetables since baby vegetables are produced seasonally, and in such instances, market agents' source baby vegetables from different provinces. Most fresh fruit and vegetable outlets and some food retail outlets purchase baby vegetables from FPMs. Individual customers also buy baby vegetables at FPMs, and most of these individuals are said to be from the middle to high income groups, with homemakers forming the largest part of this customer segment. The Johannesburg FPM is the largest FPM where baby vegetables are traded daily, followed by the Tshwane FPM. The Epping Market in the Western Cape also plays a role in the trade of baby vegetables in the Western Cape.

FPMs are the biggest market channel where baby vegetable producers supply baby vegetable produce in South Africa as 73.33% of producers interviewed supply baby vegetables to FPMs, this is comprised of 12 out of the 15 baby vegetable producers interviewed. Figure 3.2 shows the percentage of producers interviewed who supply baby vegetables to FPMs and approximately 60% of the baby vegetable producers that sell to FPMs, sell baby vegetables to the Johannesburg FPM, 40% to the Tshwane FPM and 13.33% to the Epping market. The baby vegetable producers that were interviewed and supply their baby vegetable produce to the JFPM and Tshwane FPMs are from Gauteng, Mpumalanga and Limpopo Provinces and some of these producers supply both the markets at the same time. Baby vegetable producers interviewed from the Western Cape supply their produce to the Epping market and do not supply FPMs in other provinces.

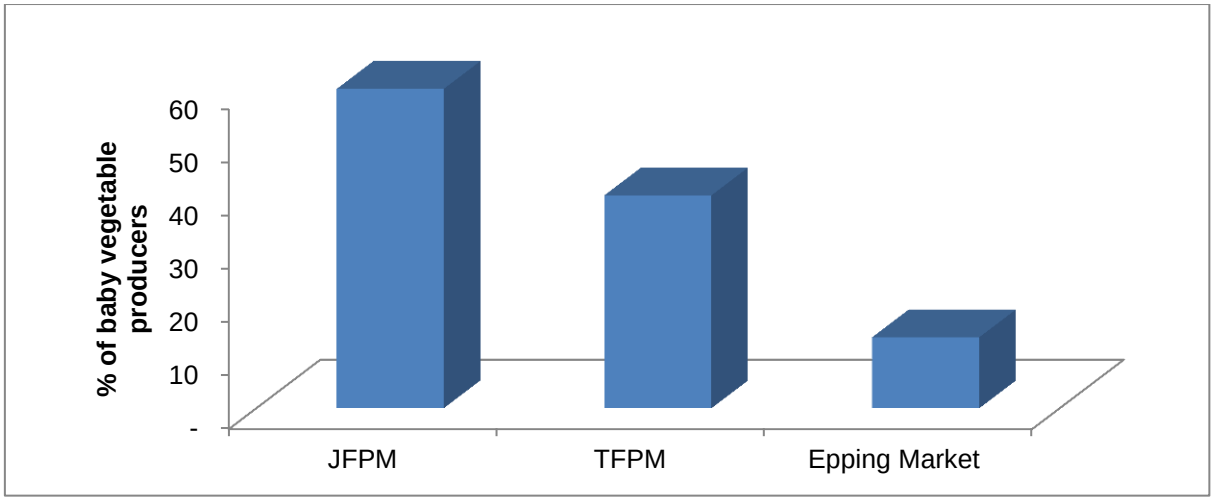

Figure 3.2: Producers supplying baby vegetables to FPMs

Source: Survey data, 2011 – 2012

3.2.1.2 Food retail markets

Retail outlets play a significant role in the baby vegetable industry. Since they deal directly with consumers, retail outlets know what consumers demand and prefer. Recently, customers have been buying ready mixed varieties of baby vegetables, packed in small containers, thus the packaging and display of baby vegetables are also important. Figure 3.3 shows that 66.67% of baby vegetable producers sell their baby vegetables to different food retail outlets. This percentage is comprised of 10 baby vegetable producers. According to the study, most producers interviewed sell baby vegetables to Spar, Woolworths, Fruit & Veg City, Freshmark and Pick ‘n Pay and approximately 33.33%, 33.33%, 33.33%, 26.67% and 13.33% of producers supply these markets with baby vegetables on a weekly basis respectively. Though 33.33% of producers interviewed sell baby vegetables to Spar, more Spar outlets were supplied with baby vegetables, making Spar the biggest market for baby vegetables amongst food retail outlets. Combined, the five food retail outlets serve as the second major market for baby vegetables in South Africa after FPMs.

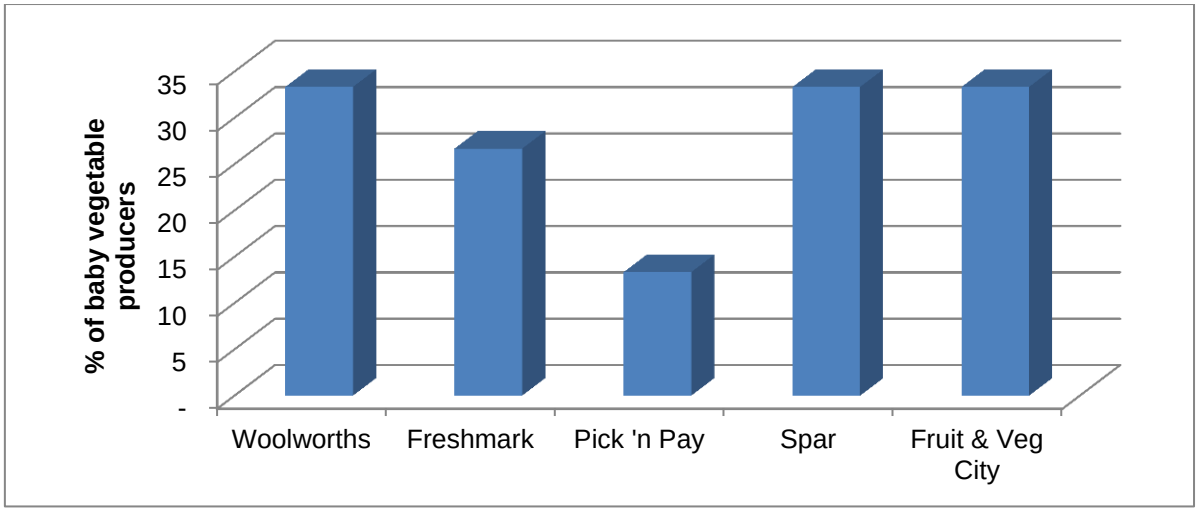

Figure 3.3: Retail market outlets used by baby vegetables producers

Source: Survey data, 2011-2012 N=10

3.2.1.3 Staging company and non-retail DCs

According to Figure 3.4 below, 6.67% of producers deliver baby vegetables to the staging company and 20% of producers deliver baby vegetables to non-retail DCs.

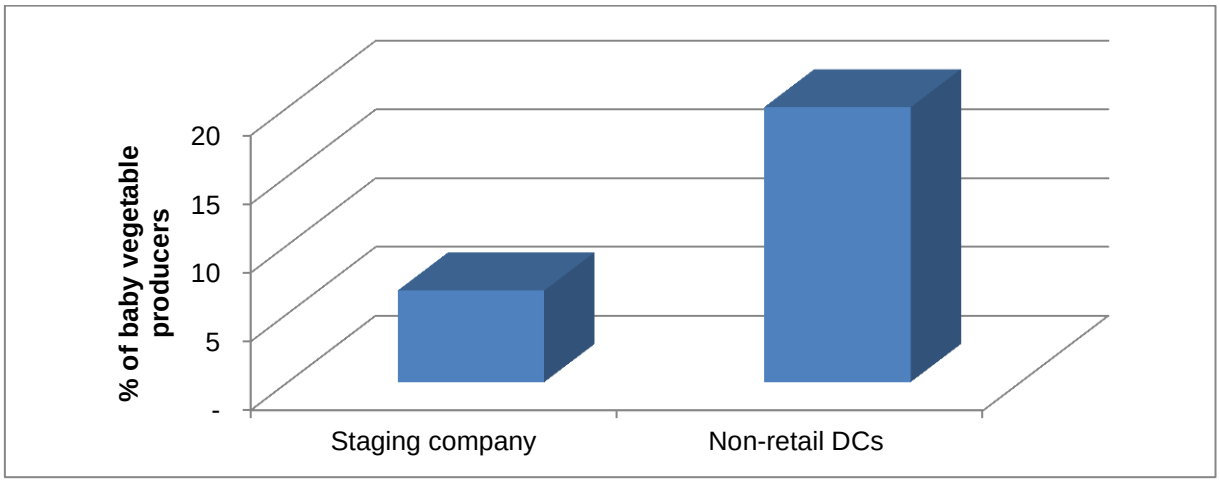

Figure 3.4: Producers supplying baby vegetables to non-retail DCs and the staging company

Source: Survey data, 2011-2012

3.2.1.4 Fresh Fruits and Vegetable outlets

Fresh fruit and vegetable outlets are outlets in urban areas that specialise in selling mostly fresh fruits and vegetables. Local baby vegetable producers are the biggest

suppliers of baby vegetables in these markets, yet some fresh fruit and vegetable outlets also source baby vegetables from national and local FPMs. Homemakers form the majority of customers who buy baby vegetables from fresh fruit and vegetable outlets, followed by other individual customers and the hospitality industry (restaurants, Bed & Breakfast, hotels, caterers, etc.).

Homemakers and individual customers who buy baby vegetables from fresh fruit and vegetable outlets are assumed to be from the middle to high income groups. Fresh fruit and vegetable outlets do not add value to baby vegetables as baby vegetable producers deliver baby vegetables already pre-packed with all the value-adding activities having taken place at the farm. Approximately 33.33% of producers supply baby vegetables to fresh fruit and vegetable outlets.

3.2.1.5 Individual agents

Individual agents comprise of commercial producers and non-producers also referred to as agents who buy baby vegetables from producers to resell the produce or for own consumption. Commercial producers buy baby vegetables from small scale baby vegetable producers in order to sell them with their own baby vegetables to food retail outlets or to the export market. Individual agents buy baby vegetables from producers to sell them to established markets such as food retail outlets, farm stalls and restaurants. Other individual agents buy baby vegetables directly from farms for own consumption. Agents in the Western Cape sell baby vegetables to restaurants and farm stalls. Approximately 20% of producers supply baby vegetables to individual agents on a weekly basis.

3.2.2 Demand for baby vegetables in the domestic market

Of the producers interviewed, 87% answered a question concerning the current demand for baby vegetables in the domestic market. None of the producers believed that the market demand was average instead 33% believed the demand for baby vegetables was high, another 33% believed the demand was low. Producers who

believed the demand was between low and average was 7% while 13% believed the demand was seasonal.

Of the producers who believed the demand for baby vegetables to be high, some producers were able to meet the demand for baby vegetables since they had contracts with the markets. Though this was the case, producers still believed that the overall domestic market demand for baby vegetables was high, although there was limited supply. A lesser percentage of these producers could not meet the demand for baby vegetables as their supply was less than demand.

Of the 33% of producers who believed that the market for baby vegetables is low, 40% could meet the current demand for baby vegetables since it was a limited demand, while another 40% believed that there was an oversupply of baby vegetables in the market. A lesser percentage (20%) believed that although the current market demand was low, it is growing. Also, the 7% who believed the market demand to be between low and average believed that the demand was growing. Producers, who believed that the demand was seasonal, believed that there was an oversupply of baby vegetables in summer, and this caused prices to be low, yet in winter, the supply of baby vegetables was limited and prices were said to be high. Though some producers did not believe that the current demand of baby vegetables in the domestic market was high, few producers believed that the demand was growing.

3.3 EXPORT MARKETS FOR BABY VEGETABLES

The baby vegetable export market is an open market which is determined by continuity of supply and having good relationships with customers, in this case, importers. According to exporting companies and producers from South Africa, the export market offer producers better prices than the domestic market, as is shown in Table 4.1 in Chapter 4.

Baby vegetables exported from South Africa namely, baby carrots, baby marrow, baby sweet corn, and baby gems are destined for Africa, Central Europe, the United

Kingdom, the Far East and Asia, the Middle East and the Mediterranean, and America, as indicated in Table 3.2 below. Africa is the largest export destination for baby carrots, with South Africa having exported 51% of total baby carrots to Africa in 2009. The United Kingdom (U.K.) is the largest export destination for baby sweet corn. South Africa exported 78% of the total baby sweet corn exports to the U.K. in 2009. The Far East and Asia is the largest export destination for baby marrow. South Africa exported 39% of the total baby marrow exports to the Far East and Asia in 2009. Central Europe was the largest export destination for baby gem squash in 2009. South Africa exported 86% of the total baby gem squash to Central Europe in 2009.

Table 3.2: Export destination of baby vegetables in 2009

Export Destination	Baby Carrot	Baby Sweet Corn	Baby Marrow	Baby Gems
Africa	51.2 %	5.6 %	26.1 %	8.9 %
Central Europe	32.0 %	6.8 %	14.0 %	86.0 %
United Kingdom	13.4 %	78.2 %	19.3 %	0.0 %
Far East & Asia	2.7 %	0.7 %	39.3 %	5.1 %
Middle East & Mediterranean	0.4 %	8.8 %	1.1 %	3.7 %
America	-	-	0.2 %	-

Source: PPECB (2010)

Figure 3.5 below shows the baby carrot export destination in 2009.

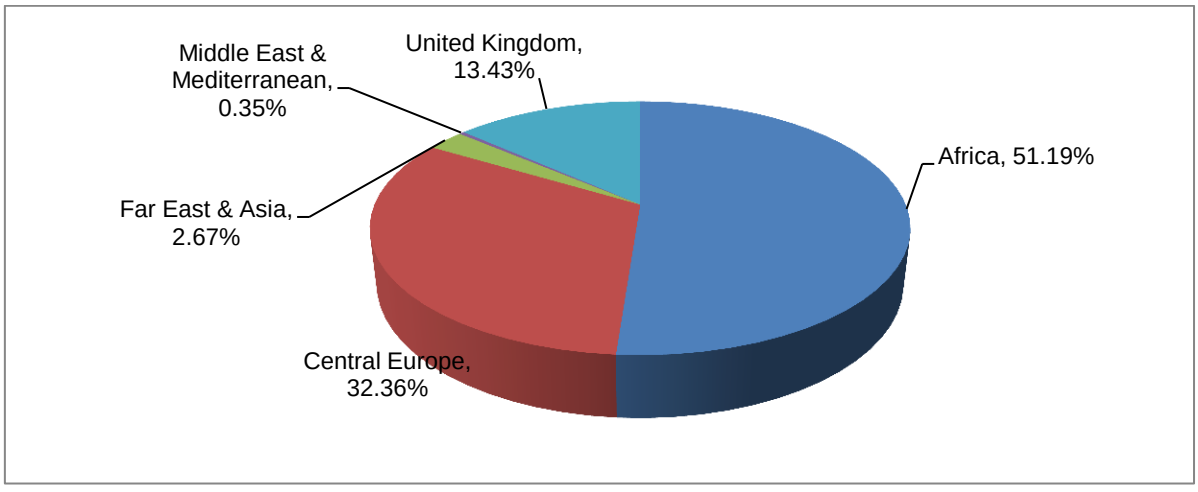

Figure 3.5: Baby carrot export destinations for the year 2009

Source: PPECB (2010)

Baby carrots, were the most exported baby vegetables from South Africa to Africa in 2009, in the same year, Africa was the second largest export destination for baby marrows from South Africa. Though PPECB, (2010) reveal that South Africa exports baby vegetables to four continents, namely Africa, Europe, Asia and the Middle East of which the largest exports were found to be to Europe (Central Europe and the U.K.) followed by Africa. The study discovered that South Africa exports baby vegetables to Europe, Asia and the Middle East but no results were found on baby vegetable exports to Africa. In Europe, South Africa exports baby vegetables to the Netherlands, the U.K and Switzerland. In Asia, South Africa exports baby vegetables to Hong Kong and in the Middle East, South Africa exports baby vegetables to Saudi Arabia.

The results of the study show that large volumes of baby vegetable exports from South Africa destined for Europe go to the Netherlands (Amsterdam being the major market), Switzerland and the U.K., see Tables 3.3 and 3.4 below. The baby vegetable export market to Europe is one of the growing industries and MMA, (2008:8) estimated that the market for baby vegetables in Europe is expected to grow over the next five years. The expected growth was associated with the growing consumer demand for convenience food. Leading importers of baby vegetables into the U.K. stated that the market for baby vegetables was growing at around 4% year-on-year which meant that high value products were growing their share of the overall shopping basket (DAI, 2007:13). The four leading importers of fresh vegetables in Europe are Germany, the U.K., France and the Netherlands, also known as the “Big 4” and account for 70% of EU imports by value (DAI, 2007:51).

The demand for baby vegetable imports into Europe, however, is seasonal. European baby vegetable producers are able to produce baby vegetables in summer and meet their market demand, but are unable to meet the market demand in winter. One South African baby vegetable exporter has had a 15 to 20% increase in demand for baby vegetable exports to Europe for the past 5 years during October and December, with December having the highest demand, especially before Christmas. European producers are protected by EU import tariffs aimed at protecting domestic EU production of fruits and vegetables during the European growing season (DAI,

2007:53). DAI, (2007:53) add that higher tariffs are placed on vegetables as a majority of vegetables can be produced within the EU.

Hong Kong is the market destination for baby vegetable exports from South Africa to Asia and is one of the small markets for baby vegetable exports from South Africa with approximately 0.25 tons of baby carrots and 0.3 tons of baby marrow exported per month as shown in Table 3.3 and Table 3.4. Saudi Arabia is the market destination for South Africa's baby vegetable exports to the Middle East and is the smallest market for South Africa's baby vegetable exports. Low volumes of baby carrots and baby marrows are exported per month at approximately 0.25 tons and 0.2 tons respectively, as shown in Tables 3.3 and Table 3.4.

3.3.1 Exported volumes

Table 3.3 below shows the estimated monthly baby vegetable exports by two major export companies in South Africa, their export destinations and volumes exported for baby carrots, baby gems and baby marrows. Baby corn is not exported by these two export companies. Other baby vegetables exported by the two companies include baby yellow and green patty pans, leeks and fennels, as displayed in Table 3.4 below.

Table 3.3: Estimated monthly baby vegetable exports in tons – by two exporters

Export destination	Baby carrots	Baby gems	Baby marrows
	Exporter 1		
Netherlands	96	0	76
Switzerland	12	2	-
Middle East	8	2	4
	Exporter 2		
U.K.	8	0.2	6
Amsterdam	5	0.1	2
Hong Kong	0.25	-	0.3
Saudi Arabia	0.25	-	0.2

Source: Survey data, 2011

Table 3.4: Estimated monthly other baby vegetable exports in tons - by two exporters

Export destination	Baby patty pan (yellow)	Baby patty pan (green)	Fennels	Leeks
Exporter 1				
Netherlands	104	64		
Switzerland	36	16		
Middle East	16	12		
Exporter 2				
U.K.	3	2	2	2
Amsterdam	5	3	3	3
Hong Kong	0.2	0.2	0.2	0.1
Saudi Arabia	-	-	0.2	0.2

Source: Survey data, 2011

3.4 BABY VEGETABLE SUPPLY CHAIN IN SOUTH AFRICA

Supply chain is the movement of materials or goods from their raw state to the final product were they are ready for consumption or for further processing. The supply chain for baby vegetables involves the movement of baby vegetables from the farm gate through all the chain, and finally to the consumer in the domestic or export market. The movement of baby vegetables involves many players in the chain. The baby vegetable supply chain in South Africa is shown in Figure 3.6 below. In the domestic market, the following chain members are involved: baby vegetable producers, staging companies, DCs, and the market which consists of food retail outlets, FPMs, Fresh fruit and vegetable outlets and individual agents. In the export market this includes baby vegetable producers, exporting companies, airline companies, import agents and supermarkets. The role played by each member in the chain is different but equally important for effective and efficient movement of the baby vegetable produce to the end consumer.

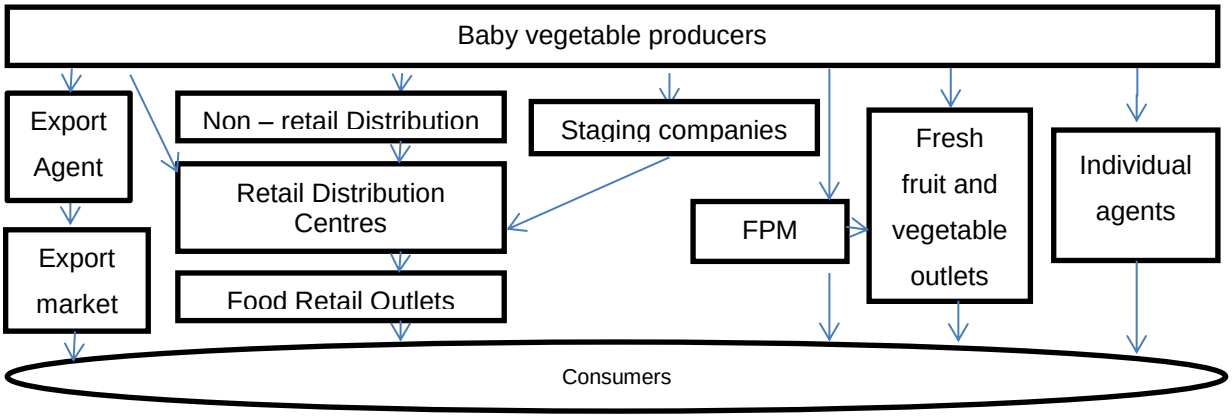

Figure 3.6: Baby vegetable supply chain in South Africa

Source: Survey data, 2011

This section aims to discuss the role played by supply chain members in the baby vegetable industry, in the domestic market and the export market.

3.4.1 Supply chain members in the domestic market

3.4.1.1 Baby vegetable producers

Baby vegetable producers play a big role in the supply chain of baby vegetables. A total of 87% of baby vegetable producers interviewed are commercial farmers and 73% of these producers produce baby vegetables on a large scale, though most of them still produce traditional vegetables on a bigger scale then baby vegetables. The remaining producers are comprised of one semi-commercial farmer and another small scale farmer and both these producers are producing baby vegetables on a small scale.

Producers source markets where they can supply baby vegetable produce: food retail outlets, Fresh fruit and vegetable outlets, FPM's, exporting companies or individual agents. Most markets have either a verbal or written contract with producers, and for food retail outlets and exporting companies, producers produce baby vegetables according to a growing programme from these markets. The growing programme specifies, amongst other things: the estimated number of hectares which producers must plant per baby vegetable product: the cultivar and the size of baby vegetables that must be planted: planting and harvesting times: and fertilizer and chemical application. The growing programme will also include the weekly and annual volumes which the farmer must supply, packaging specifications including labelling, the price per kilogram as well as the income which the farmer will receive per product. Markets such Fresh fruit and vegetable outlets also specify the volumes which producers must supply on a weekly basis. Baby vegetables producers perform post-harvest activities on the baby vegetables and then deliver the produce to the markets.

3.4.1.2 Staging companies

The purpose of a staging company is to minimise the transport costs of producers, thus increasing efficiency in the supply chain of baby vegetables. This is achieved by producers delivering baby vegetables in bulk to the staging company so that the staging company can deliver the baby vegetables to the retailer as required. Thus, the farmer delivers bulk baby vegetables once-off to the staging company and avoids delivering baby vegetables to the retailer on a daily basis, as the retailer would demand. The farmer, however, has a contract directly with the retail outlet, and not with the staging company.

Staging companies are characterised with good storage facilities. In the staging company interviewed, baby vegetables were stored in cold rooms at low temperature of 0.5^{0}C. The staging company packs the baby vegetables in punnets as specified by the retailer and labels the product with the retailer's barcode. The staging company then delivers the baby vegetables to the retailer on the farmer's behalf at the specific time indicated by the retailer. The markets where the staging companies deliver the baby vegetables are DCs of the major food retail outlets on a daily basis, ranging from five to six days a week per DC. The staging company is also involved in baby vegetable exports as they consolidate the consignment that will be exported.

3.4.1.3 Distribution centres

A distribution centre (DC) is described by Damewood (2012) as "a building, structure or group of units used to store goods and merchandise that are to be delivered to various places on an as-needed basis". The DCs consist of warehouses to store merchandise or goods that are distributed to wholesalers, retailers or to customers, and are strategically located in geographic areas where they operate in (Damewood, 2012). DCs play a major role in the supply chain of baby vegetables in South Africa.

The major DCs for baby vegetables in South Africa are Spar, Woolworths, Freshmark and Pick 'n Pay and are situated in the Gauteng and Western Cape Provinces. Producers who have contracts with food retail outlets do not supply baby vegetables directly to these markets but instead deliver the produce to the retailers' DCs, with

the exception to Spar since producers can deliver baby vegetables directly to Spar outlets in their locations. Producers deliver pre-packed baby vegetables to the DCs where further handling such as packing in larger consignments, storing and refrigerating takes place before baby vegetables are dispersed by the DCs to the retail outlets throughout the country. Some retail outlets, however, send trucks to pick up the baby vegetables from the farms and transport the produce to the DCs thus these farmers do not have to deliver the baby vegetable produce and therefore save on transport cost.

Private DCs exist, which are owned by private companies other than food retail outlets. Producers deliver baby vegetables to these DCs and the DCs pack, label, store and deliver the baby vegetable produce to DCs belonging to food retail outlets and also to exporting companies. Private DCs perform the same functions as staging companies, the only difference is that private DCs buy baby vegetable produce from producers and sell them to food retail outlets and exporting companies whereas a staging company delivers the produce to food retail outlets on the producer's behalf.

3.4.1.4 Retail outlets

Food retail outlets refer to the major food retailers in South Africa. Food retail outlets are the chain members that deal directly with baby vegetable consumers, therefore they know what customers demand and expect to receive when they decide to buy baby vegetables. Food retail outlets have set standards that supply chain members must meet in order to supply the outlets with baby vegetables. All value adding activities for baby vegetables are performed by other chain members and not the retail outlets. Food retail outlets are responsible for selling baby vegetables to customers. Currently not many baby vegetable punnets are placed on retail shelves as compared to traditional vegetables since the demand for baby vegetables is not as high as for traditional vegetables.

Food retail outlets have written or verbal contracts with producers specifying the growing programme that producers should use. Food retail outlets also require that baby vegetable producers must supply quality products and must ensure continuity of supply. Baby vegetable producers can choose to deliver baby vegetables directly to

retail outlets through the DCs and bypass the middlemen, which are the staging companies. Producers deliver the baby vegetables using a cooler truck for long distances and a bakkie or truck without a cooling system to short distance markets.

3.4.1.5 FPMs

FPMs function on a commission basis since producers deliver baby vegetables to the market and market agents sell the produce on the farmer's behalf and producers must pay commission to the market and to the market agents.

FPMs do not have specifications regarding the production of baby vegetables, unlike food retail outlets and the export markets. The requirements for delivering baby vegetables at FPMs are only that they must be of good quality, be the same size (all baby vegetables packed in a single box or pallet must be the same size), must be pre-packed, the packaging must be branded and have a PUC code. Market agents store the baby vegetables received from farmers in cold rooms thus this is the only value adding performed at FPMs.

3.4.1.6 Fresh fruit and vegetable outlets

Fresh fruit and vegetable outlets specialise in the supply of fresh fruits and vegetables. Customers buy at these outlets expecting high quality produce at lower prices. Some fresh fruit and vegetable outlets like retailers require that producers deliver high quality baby vegetables. In order to maintain the production and supply of high quality baby vegetables, producers are expected to plant the right cultivar, use the correct pesticide, measure the amount of fertilizer and pesticides used, be hygienic, have cold rooms and packaging facilities, and lastly, ensure continuity of supply. Producers deliver baby vegetables directly to fresh fruit and vegetable outlets already pre-packed, in the right size and quantity as required by fresh fruit and vegetable outlets.

3.4.1.7 Individual agents

Individual agents are independent individuals who are involved in the supply chain of baby vegetables. They buy pre-packed baby vegetables directly from the farm in order to supply their own markets such as restaurants, farm stalls and retail outlets. The agents do not perform any post-harvest activities or value adding on the baby vegetables as they buy baby vegetables already pre-packed and sell them to markets in the surrounding areas using transport with no cooling facilities. Other individual agents such as commercial farmers buy bulk baby vegetables from small scale farmers and pre-pack, label and sell the baby vegetables together with their own baby vegetable produce.

3.4.2 Supply chain members in the export market

3.4.2.1 Exporting companies

Exporting companies buy baby vegetables from producers and sell them to the export markets such as import agents or supermarkets on behalf of the producers. This happens after exporting companies have formed relationships with import agents and supermarkets who want a supply of high quality baby vegetable produce. Such exporting companies have contracts with baby vegetable producers whereby producers do not have a relationship with import agents but supply their baby vegetable produce to exporting companies as their market. Other exporting companies however act as the middlemen between baby vegetable producers and import agents, thus linking producers with buyers by finding markets where producers can export their baby vegetable produce.

The function of exporting companies however is similar as they all search for baby vegetable producers to supply them with baby vegetable produce. Exporting companies form relationships with the producers and have written contracts with them to ensure that producers comply with GlobalGAP standards during production and handling processes of baby vegetables for exports as well as other standards which may be specified by the importers.

Baby vegetable producers deliver high quality, pre-packed baby vegetables to exporting companies who brand the produce in their name and supply the export market with high quality baby vegetables. Depending on the exporting companies, baby vegetables are exported ranging from daily exports to three days a week. Of the exporting companies interviewed, producers are the only suppliers of baby vegetables to these companies. Some exporting companies make use of cargo companies to handle their produce, including refrigeration and storage. Other exporting companies have offices in the export market who distribute the baby vegetable produce to the markets, for example, Yukon International has a branch in the U.K. called Yukon Fresh Produce Europe.

3.4.2.2 Airline companies

Due to the delicate nature of baby vegetables and their short shelf life, airline companies play a significant role in the export of baby vegetables since airfreight is the mode of transport used by exporting companies to export baby vegetables to the export markets. Exporting companies have established relationships with airline companies and receive allocation of provisional block space booking from the airline companies. Airline companies are aware of the business and cargo needs of exporting companies, thus they manage and control the temperature of the baby vegetables whilst in transit, thereby ensuring that the quality of the produce is maintained.

Though the availability of airline space is the main challenge when exporting by airfreight, airline companies prioritise the exports of perishable products and baby vegetables are amongst these products. Airlines used by exporting companies to export baby vegetables include the following: South African Airways, British Airways, Virgin Airline (exports to London), Swiss Airline (exports to Germany), KLM (exports to Amsterdam), Air France (exports to Europe) and the Middle East Airlines (exports to Saudi Arabia).

3.4.2.3 Import Agents

In Western Europe, import agents (also referred to as specialised fresh fruit and vegetable wholesalers) import fresh fruit and vegetables and supply directly to the major retail markets, the supermarkets (DAI, 2007:8). In the U.K., approximately 80% of vegetable imports are sold to supermarkets and the rest is sold to green grocers and foodservices (DAI, 2007:21). In the Netherlands, supermarkets represent 70% of wholesale sales and 30% is re-exported to Belgium, Scandinavia, Germany and other countries in Europe (DAI, 2007:23).

According to (DAI, 2007:8), the specialised wholesalers have taken over the import function as they have emerged in response to the demand by growing supermarket chains. These wholesalers have by-passed traditional importers and wholesalers of produce distribution as they handle direct import and distribution of produce. This is due to supermarkets wanting to shorten supply chains and have direct contact with growers and exporters. Since the U.K. is the largest importer of fresh fruit and vegetables, including baby vegetables, specialised wholesalers play a major role as they are the gate keepers to the supermarkets.

In Europe, importers source producers who produce high quality baby vegetables from different countries, to supply the European markets through exporting companies. Importers use set criteria to select producers to supply their markets with baby vegetables.

The most important criteria when assessing potential producers were (DAI, 2007:23):

- Supply capacity: ability to deliver the right quality, at the right time, in the right volume;
- Reliable technical information: traceability, shipment information, freight links, accreditation (Global GAP) and having a good pricing structure;
- Packing facilities, long term business plan, good management and good communication;

- Fundamentals: cheap labour and cheap land, good access to capital, good climate, water supply and irrigation

The following are other criteria used (DAI, 2007:22):

- A unique selling proposition (USP) which includes the price advantage, and contribution to the All Year Round (AYR) requirement of supermarkets;
- Providing a unique product.

3.4.2.4 Supermarkets

Supermarkets in Europe are the major export markets for baby vegetables from South Africa and throughout the world. According to (DAI, 2007:42), supermarkets in importing countries report on what consumers want and demand accordingly in terms of baby vegetable produce from import agents. In turn, import agents search for the best baby vegetable produce in terms of quality throughout the world and form long-term, trust based relationships with producers and exporting companies as this will allow them to source the best produce.

Some exporting companies export baby vegetable produce to supermarkets through the services of import agents, while others are able to export baby vegetables directly to the supermarkets without involving import agents. Some of the supermarkets in Europe where South African exporting companies export baby vegetables include: YPE in London, Natures Pride in Amsterdam, HPW in Zurich, MCP in France and Zimalman & Ranges in Fanford.

3.5 CRITICAL ASPECTS OF THE BABY VEGETABLE SUPPLY CHAIN

3.5.1 Food safety

According to Reardon *et al*. (2001:423), food safety is a characteristic of G&S which can refer to the characteristics a product is expected to have when it reaches a

specific point in the supply chain, for example, the amount of pesticide residue permitted on a product. According to Carlson *et al*. (2007), large retailers, exporters, importers and wholesalers expect producers to follow Good Agricultural Practices (GAP) especially with regard to the use of pesticide.

PPECB in South Africa audits the use of legislated pesticides on a regular basis by sampling food consignments of Food Business Operations (FBO's), such as those of exporting companies, destined for export markets (PPECB, 2012:1-06). According to PPECB, the above process forms part of the risk-based approach of the PPECB as mandated by the Department of Agriculture, Forestry and Fisheries (PPECB, 2012:1-06). Food safety management issues have been greatly emphasised by governments and consumers across the world as reports of foods scares incidences occurred (PPECB, 2008:5). Knutson, Penn, and Flinchbaugh (2004:5) make references to food scares incidences such as *E. coli* bacteria in hamburger, *Salmonella* in poultry, *Listeria* in dairy products and mad cow disease that was detected in Europe and was transferable to humans.

The detection of harmful substances in plants and animals has led many consumers to disregard biotechnology. The pressure is mostly applied on imported products as they are mistakenly criticized for not being able to meet the same standards as products in the domestic markets (Knutson *et al.,* 2004:5). South African baby vegetable producers are expected to meet GlobalGAP and Hazard Analysis and Critical Control Point (HACCP) standards as well as other standards set by retailers for the domestic market. Baby vegetable producers exporting baby vegetables to the EU are expected to meet the above standards together with International Organisation for Standardisation (ISO) and British Retail Consortium (BRC) standards (DAI, 2007: 15).

With regard to food safety and pesticide application, U.K market is viewed as very strict for exporters (Daya et al., 2006:12). Systems have been developed by U.K. supermarkets that enable products to be traced from the field to the supermarket shelf, since all supermarkets insist that products be bar-coded with the source of production (Daya et al., 2006:12). Exporting firms also have sophisticated quality assurance systems to guarantee food safety for vegetables (Dolan & Humphrey,

2000:16). These systems document seed procurement, planting schedules, pesticide and fertilizer use, spraying, and personal hygiene (Dolan & Humphrey, 2000:16).

In South Africa, The Agricultural Products Standards Act, No. 119 of 1990, covers standards regarding the quality of fresh vegetables, packaging, marking and labelling of agricultural products for export. Baby vegetable exporters have to ensure that they meet these standards in order to export products and failure to do so will result in them not being allowed to export their baby vegetable produce.

PPECB was mandated by the Department of Agriculture under the Agricultural Products Standards Act to ensure food safety compliance with the food safety standards by auditing all FBOs in terms of food safety requirements in order to export agricultural produce from South Africa. To ensure compliance with food safety and food hygiene by FBOs, FBOs are required to handle food products under hygienic, traceable conditions throughout the supply chain from point of production to point of export. PPECB also offers certificates such as HACCP, BRC and ErupeGap and is accredited by the South African Accreditation System (SANAS) (PPECB, 2008:5). The Agricultural Products Standard Act is used to measure specific requirements with regard to exporting products from South Africa to other countries, and is discussed below; this includes quality standards of consignments, container requirements, packing requirements, marketing requirements, sampling procedures, methods of inspection and chemical treatment.

3.5.1.1 Quality standards

The quality standards refer to the required standards for the consignments that are used to carry vegetables which are exported. There are four classes of vegetable consignments that classify the quality standards for consignments for vegetable exports, namely, Extra class, Class 1, Class 2 and vegetables for processing. The consignment of each class must comply with the specific standards and requirements for that class and specific vegetables of that class. A consignment of vegetables is referred to as Extra class if it has superior quality. The standard for Class 1 is that the consignment of vegetables has good quality. Class 2 has no specific standards, other than the general standards (Department of Agriculture, Forestry and Fisheries,

2005:16). It is important that consignments meet the stated standards for the particular class that it falls under. This will ensure that the quality standards for the exports of vegetables from South Africa are maintained.

3.5.1.2 Containers

Containers in which vegetables are packed must be suitable, clean and dry, and must not be damaged. Containers must not impart foreign taste or odour that may be harmful to human health and they must be strong enough to retain the original shape of the vegetables and must be free from visible signs of fungus growth (Department of Agriculture, Forestry and Fisheries, 2005:18).

3.5.1.3 Packing requirements

Only vegetables of the same quality, cultivar and size must be packed together in the same container. Each container must be packed to capacity. Packaging material of the containers used must be new, clean, dry and odourless, and the quality of the material must prevent the vegetables from being damaged. The packaging material must not transmit any substance to the vegetables that might be harmful to human health (Department of Agriculture, Forestry and Fisheries, 2005:19).

3.5.1.4 Marketing requirements

The labelling of the containers must be clear and neat. The label must include in it the type of vegetables, number of vegetables, the country of origin, and the name and trade mark of the business as well as the physical address. A packhouse code must be used to identify the vegetables' producer if the original producer of the produce cannot be traced or if a producer has more than one farm which needs separate registration (Department of Agriculture, Forestry and Fisheries 2005:21).

3.5.1.5 Sampling procedures

Sampling procedures entail that at least 2% of the containers in consignments be drawn randomly as a sample for inspection and this sample must be representative

of the whole consignment. In the case of bulk containers, 25% or two containers are taken as representative samples. It is important that the sample selected meets all the standards so that the represented consignments will qualify to carry vegetable exports (Department of Agriculture, Forestry and Fisheries, 2005:23).

3.5.1.6 Methods of inspection

An inspector is responsible to visually examine containers and packaging material to see if they comply with the stated requirements and that labels are marked as prescribed. The inspector will use a risk based plan to sample certain consignments to verify compliance with the level of chemical and biological contamination. The inspector can remove vegetables entirely from a package if the vegetables sampled deviate from the prescribed quality (Department of Agriculture, Forestry and Fisheries, 2005:24).

3.5.1.7 Chemical treatment

Any person who intends to export vegetables must give a certificate before submitting the first consignment for inspection specifying:

- The chemical remedies used on the vegetable plants during the spray program; and
- The chemical remedies used as postharvest treatment on fresh vegetables (Department of Agriculture, Forestry and Fisheries, 2005:26).

3.5.2 Food quality

Quality is the major factor that determines the marketability of fresh produce worldwide. Quality is said to be delivered when the seller's product or service meets or exceeds the customers' expectation (Kotler and Keller, 2006:146). According to Carlson *et al*. (2007), food trade requires products to be of commercial quality as defined by the trade rather than stated grades and standards.

Major role players in Europe have established their own post-farm gate requirements that all players in the supply chain are expected to adhere to (Vermeulen, Jordon, Korsten & Kirsten, 2006). These new requirements were in addition to the already established quality and food safety standards such as Euro-Retailer Produce Working Group Good Agricultural Practices (EurepGAP) and BRC (Vermeulen et al., 2006: 4). Consumers place pressure on retailers as they increasingly demand high quality produce and in turn, retailers place pressure on producers for the delivery of high quality produce. Consumers and retailers in developed markets such as Europe therefore have become trendsetters in the Vegetable Export Industry. As Reardon et al. (2001:429) argue, this is because firms in developing countries are not only “price takers”, but are also “G&S takers”.

According to Dolan *et al.* (1999:11), food products that are high in quality are visually appealing and have good shape, texture and flavour that are attractive to customers. Since the introduction of self-service for fruit and vegetables by wholesalers, consumers buy fruits and vegetables that have this good quality while leaving unattractive produce to rot on the shelves (Dolan *et al*., 1999:11). Quality with regard to baby vegetables is delivered when the produce has the right size, shape, colour, texture, does not have spots or marks and the produce is fresh and attractive.

3.5.3 Post-harvest activities

Since baby vegetables are delicate in nature, they require careful handling and processing. Maynard, (2006) adds that baby vegetables are more affected by post-harvest deterioration than traditional vegetables. Post-harvest activities for baby vegetables involve washing, sorting, cutting/ trimming, pre-packing, labelling, storing and transporting to the market. Carlson *et al*. (2007) are of the opinion that handling and processing is important in the supply chain since companies prefer products that are ready to be placed in shelves. Retailers have shifted processing activities onto producers in order to cut down on their own costs. Proper handling of produce also minimises and eliminates contamination of produce from foreign substances that can be harmful to humans when consumed.

Dolan et al., (1999:21) state that activities such as processing have been transferred from UK importers to African exporters. The major challenge for developing countries when supplying vegetables to developed markets became the need to continually invest in technology. This was important in order to guarantee the continual supply of vegetables otherwise suppliers in developing countries faced the risk of becoming excluded from the chain (Dolan et al., 1999:21). In South Africa, most post-harvest activities that should be performed by supply chain members along the chain are specified in their market contract or are verbally communicated. Supply chain members involved in the post-harvest activities for baby vegetables include producers, staging companies, DCs and exporting companies. It was discovered during the study that none of the markets where baby vegetables are supplied performed post-harvest activities: these includes FPMs, fresh fruit and vegetable outlets and food retail outlets, although in the export market, import agents do perform some post-harvest activities. The post-harvest activities are performed before baby vegetable produce is delivered to the market and are discussed below.

3.5.3.1 Wash

Baby vegetables are not usually washed, unlike traditional vegetables. Because baby vegetables are delicate and their quality deteriorates easily, more than 50% of baby vegetable producers do not wash baby vegetables after harvest. According to producers, baby vegetables are usually clean from being irrigated and they remain clean when handled properly throughout the harvesting period. Only 47% of the producers interviewed washed the baby vegetables after harvest: baby carrots are most suited to being washed whereas there is no need to wash baby corn since the crop is covered with leaves and the leaves serve as protection from the crop to get dirty.

3.5.3.2 Cut / trim

All the baby vegetable producers interviewed cut and trimmed the baby vegetables after harvest according to market specifications. The cutting and trimming of baby vegetables is usually done by knife. The cop of baby corn, for example is trimmed

and the leaves and hairs are removed by knife. The heads of baby marrows are measured and cut to a certain length specified by the market.

3.5.3.3 Sort

Baby vegetables are sorted according to quality, size and shape, as well as their colour. This is discussed in detail as follows.

Quality

When sorting baby vegetables, their quality is determined by outward appearance, such as the absence of scratches and spots, and by texture, such as the softness or hardness of the produce. Baby vegetables of high quality are delivered to markets that require Grade A produce, such as the export market and food retail outlets, and those of medium to lower quality are delivered to markets that accept Grade B produce, such as the FPM. Some producers however deliver high quality baby vegetables to FPMs as they value that their brand is associated with good quality produce.

Size and shape

Markets specify the size and shape of the baby vegetables required and also requires that baby vegetables of the same length, shape and size be packaged together as this ensures uniformity in the products supplied. Baby vegetables that do not meet the set requirements are delivered to the immediate domestic market such as fresh fruit and vegetable outlets as well as to FPMs, since these markets are not as strict as the major food retail outlets and export markets.

Colour

Colour is also taken to account when sorting baby vegetables. Any colour that appears different from the known and expected colour of the baby vegetable produce causes the produce to be rejected by some markets, such as food retail outlets and

the export market. The colour of baby vegetables is also significant to producers since certain diseases can be identified from the colour of baby vegetables' skin.

3.5.3.4 Packing

The packing of baby vegetables takes place throughout the supply chain by the supply chain members involved in post-harvest activities of baby vegetables. On the farm, baby vegetables are packed at pack houses with packing facilities which include wrapping machines. The packaging of the four baby vegetables is uniform as they are all pre-packaged in small punnets and covered with plastic wrapping, the only difference might be the size of the punnets. Baby vegetables are packed in punnets ranging from 125g to 1 kg, and sometimes different types of baby vegetables can be pre-packed together in the same punnet, known as a baby vegetable mix. Pre-packed baby vegetables are convenient and advantageous to consume for small families or individual households as only a few baby vegetables are packaged in a punnet and can be consumed in a short period of time.

Baby vegetables delivered to the staging company and DCs that do not belong to food retail outlets are delivered in bulk and the staging companies and DCs pre-pack baby vegetables in punnets. In the export market to Europe, DAI (2007:13) states that in the U.K. high value vegetables are available already pre-packed and since Europe has high labour costs, these vegetables are increasingly being packed in the exporting country.

3.5.3.5 Labelling

Baby vegetables are labelled differently depending on the market where they will be sold. Baby vegetables sold at the FPMs and fresh fruit and vegetable outlets have the producer's label. This label will include the brand name, the product name, the producer's name and contact details and the PUC code. The label for baby vegetables sold at food retail outlets has the retailer's outlet brand name and includes the sell-by date, the product bar code, the farm code and the traceability code. The label for baby vegetables sold at export markets has all the necessary information required to trace the products' origin and their path along the supply

chain. Traceability has become important in the supply chain of food products as it reassures chain members, customers and other stakeholders such as government, of the safety and quality of products.

3.5.3.6 Storage

Baby vegetables sold at markets farther from the farm are stored in cold rooms to maintain the correct temperature which will preserve the baby vegetables from deteriorating. The appropriate temperature for storing baby vegetables is 0.50C and at this temperature baby vegetables can last for 6 days in the cold room. Producers, however, do not keep baby vegetables in a cold room for this long since they deliver baby vegetables to the markets from the day of harvest to fresh fruit and vegetable outlets or at most 2 days after harvest to markets farther from the farm.

3.5.3.7 Transport

The appropriate temperature of baby vegetables must be maintained throughout the supply chain so as to maintain the quality of the baby vegetables. Baby vegetables sold to markets farther than the farm are transported with cooler trucks which have a refrigerated system that can be adjusted and monitored according to the temperature requirements of the baby vegetable produce. Baby vegetables sold not farther from the farm are transported with small trucks or bakkies without refrigerated systems and baby vegetables sold to the export market are transported with airfreights which have a controlled cooling system.

3.5.3.8 Innovation

Innovation has provided product diversity and differentiation (Desmarchelier and Szabo, 2008:122). The fresh produce range has been extended by supermarkets by introducing completely new products into the shelves (Dolan *et al.,* 1999:11). Baby vegetables are amongst this new range of products that have been recently introduced into the market. Advanced technology such as hydroponics systems are also used in the production of baby vegetables, though this has not been the case in

South Africa. Extended shelf life, new packaging shapes, and sophisticated engineering are other improvements that have come with innovation in agriculture (Desmarchelier *et al.,* 2008:122). Value adding such as pre-packing, cooling and refrigeration, and packaging takes place throughout the supply chain for baby vegetables in South Africa.

3.5.3.9 Logistics

No supply chain can function without a well-balanced logistics system in place. Logistics management can be defined as actions involved in the movement and storage of goods from point of origin to point of consumption (Vogt, Ranto & Lestoalo, 2005:6-8). Baby vegetable produce is transported by producers using their own or hired transportation to the different markets. Logistics companies are responsible for packaging, storage and handling, in addition to transportation (Vogt *et al.*, 2005:8) of products. In South Africa, staging companies and DCs perform the above activities for baby vegetables. It is important that logistics systems adhere to standards of quality and food safety as this minimises the risk of losing produce through handling and transit. Baby vegetable produce meant for the export market is transported to exporting companies by producers, staging companies or DCs and exporting companies make use of air transport to export baby vegetables to the markets.

The baby vegetables included in this study are amongst other fresh produce exported by exporting companies from South Africa to Europe and to other countries. The exporting companies in the study specialise in exporting fresh produce including baby vegetables by air, through airline companies which are strategically situated at the OR Tambo International airport near Johannesburg. The exporting companies have access to cold storage facilities which enables them to store baby vegetables and other produce upon delivery. PPECB conducts daily inspections at the exporting companies' facilities to ensure that quality and packaging standards as well as other standards are maintained.

According to Daya *et al.* (2006:12), transport cost is one of the barriers to trade and it is estimated that Africa has the highest transport cost at 13%, compared to the cost

of industrialized countries at 5.5%. Barrett, Browne, Ilbery, Jackson & Binns, 1997, cited in Dolan & Humphrey, 2000:24 state that the main challenge for African countries, especially exporters, is the availability and cost of airfreight.

High transport costs, according to Daya *et al.* (2006:12), have an impact on trade as costs of goods rise and this negatively affects competitiveness since these costs are shifted to the customers as freight costs. According to Dolan & Humphrey (2000:24), larger exporters have succeeded in transporting their goods by having joint ventures with freight forwarders. According to Barrett *et al*. (1997), cited in Dolan & Humphrey (2000:24), small exporters face the challenge of securing space on passenger lines and are not allowed pre-booked space. Produce often deteriorates on the tarmac before they are returned to storage (Dolan & Humphrey, 2000:24) if there is no available space on the airfreight. South African exporters who exported fresh produce to Europe were faced with this challenge in April 2010 (Fresh Plaza, 2010), when airlines were not functioning because of volcanic disruptions in Europe. When airlines re-opened, preference space in the airfreight was given to passengers, leaving fresh produce producers and exporters with a major loss as they could not secure freight space (Fresh Plaza, 2010). Baby vegetable exporting companies in South Africa have relationships with airline companies and the transportation costs are negotiated based on the minimum required weight.

3.5.3.10 Ethics

Baby vegetable producers involved in growing schemes, record and account on the production technique, for example, on the amount of fertilizer and chemicals used, as this is stipulated in the contract. Baby vegetable producers in South Africa must also adhere to the basic conditions of Employment Act which also includes the minimum wage payable to labourers and the estimated number of working hours they should work per week. In Europe, issues of labour and environmental standards have become important to consumers, and the UK government has been encouraging retailers to become actively involved in the development of standards. Retailers have therefore developed codes of practice regarding health and safety, employment conditions, and environmental management throughout the supply chain (Daya *et al*.,

2006:13). Baby vegetable producers who want to supply this market must adhere to these standards, and failure to do so results in supply chain members being excluded from the chain.

3.6 COMPETITION AMONGST SUPPLY CHAIN MEMBERS

FPMs constitute a competitive market as baby vegetable producers throughout the country supply baby vegetables to these markets. Baby vegetable producers compete with producers from their province and from other provinces: for example, baby corn producers from the Western Cape Province compete with baby corn producers from the Lowveld (Mpumalanga Province) who are also said to supply the Epping Market with baby corn. At FPMs, products superior in quality sell faster and at a higher price therefore producers aim to supply better quality as this will increase their chances of getting better prices. Baby vegetable producers also face much competition when supplying food retail outlets, even though some of them have verbal or written agreements with these markets. According to some baby vegetable producers, food retail outlets source baby vegetables from many producers in order to minimise the risk of limited supply and also to safeguard themselves from running out of stock. Therefore, in order for baby vegetable produce to be accepted by food retail outlets, it must be of superior quality otherwise the produce may be rejected.

Competition also exists between FPMs and food retail outlets. Though most baby vegetable producers have contracts with food retail outlets, they still supply large volumes of baby vegetables to FPMs since at times better prices are offered at the FPMs because prices at FPMs fluctuate because of supply and demand. Some baby vegetable producers have stopped supplying their produce to food retail outlets and instead have established good relationships with market agents and are supplying their produce to the FPMs. This is also because the standards set for producers to supply to FPMs are not as high as standards set by food retail outlets.

Africa is one of the continents that enjoys duty free tariff to the EU, owing to the EU-African, Caribbean, and Pacific (ACP) Free Trade Agreement (DAI, 2007:14). The trade agreement enables African countries to spend less when exporting to Europe,

although South Africa, because of its geographic location, has high transport costs when compared to other African countries. South African exporting companies and producers state that their direct competitors in exporting baby vegetables are Kenya, Zambia, Zimbabwe, Mozambique, Egypt and Morocco. Kenya is the major supplier of baby vegetables from Africa to the EU market.

According to DAI, (2007:17), Kenya has established long-term, trust based relationships with EU markets; has major investments that enable them to produce and export baby vegetables; have less labour and transport costs; and lastly, there is government and private sector participation in the baby vegetable industry. According to a South African baby vegetable producer, Mozambique also has low labour costs for producing baby vegetables and Swaziland is another neighbouring country that produces baby vegetables. In terms of baby vegetable volumes exported, South Africa is not a major exporter of baby vegetables when compared to other African countries like Kenya, Zambia and Zimbabwe. According to an export agent, South Africa's market share in the European market for baby vegetable exports is low, as South Africa supplies less than 20 % of the baby vegetables to the European markets. Table 3.5 below was adapted from DAI, (2007:93) and shows countries involved in the supply of baby vegetables to the U.K. market. Kenya and Swaziland are the two countries that export baby vegetables on an AYR basis. South Africa is a seasonal exporter of baby vegetables to the U.K, although it does supply baby corn AYR.

Table 3.5: U.K. market suppliers

Product	All Year Round (AYR) Suppliers	Seasonal Suppliers
Baby corn	Guatemala, Kenya, South Africa, Thailand, Swaziland, Zambia, Zimbabwe	Gambia, Sri Lanka, Nigeria, Uganda
Other baby vegetables	France, Costa Rica, Kenya (zucchini, carrots), Swaziland, Turkey, Gambia	Germany, the Netherlands, Spain, Portugal, South Africa, Zambia

Source: Adapted from (DAI, 2007:93)

Since Europe is South Africa's largest baby vegetable export destination, European producers are viewed as direct competition for South African baby vegetables exporters, especially during summer seasons since the producers are able to supply baby vegetables according to the demand in Europe. European baby vegetable

producers also export baby vegetables within European countries. Their disadvantage is the winter season when they are unable to meet demand owing to low production levels due to the cold weather conditions. South African baby vegetable exporters and producers also viewed Thailand, Spain, France, Guatemala, China and Vietnam as other international competitors in the exports of baby vegetables.

3.7 CHALLENGES WITHIN THE SUPPLY CHAIN

DAI, (2007:9), write that large orders of up to 25 % are often required throughout the supply chain, and chain members use non-compliance with high standards to reject some deliveries in order to match actual demand. In South Africa, excess baby vegetables caused by over-stocking by food retail outlets which are rejected on the basis of low quality are delivered to FPMs and according to market agents, some food retail outlets buy baby vegetables from FPMs. There is a limited supply of baby vegetables in certain seasons such as winter since baby vegetables are mostly produced in summer months, thus market agents from FPMs source baby vegetables from different provinces in different seasons in order to ensure the availability of baby vegetable produce.

There are high operational costs involved in participating in the supply chain of baby vegetables for example; the staging company stated that they have high directly allocatable variable costs such as packaging costs and high overhead costs such as electricity and transport costs. As discussed in Chapter 2, baby vegetable producers incur a lot of production and marketing costs during the production and supply of baby vegetables.

The demand for baby vegetables in the export market is greater than the supply and South African producers supply low volumes of the baby vegetables to this market. The limited supply is due to low production of baby vegetables since only a few hectares of baby vegetables are planted by only a few producers in South Africa. This is due to the high input costs of producing baby vegetables, the delicate nature of baby vegetables since they get bruised and damaged easily, and the strict and

high standards of food quality and food safety that producers must adhere to in order to export baby vegetables. Some producers of baby vegetables did not find the industry sustainable and as a result they switched from producing baby vegetables to producing traditional vegetables. As a result, most baby vegetable producers interviewed produce more traditional vegetables than baby vegetables and some of these producers do not produce baby vegetables in a continuous basis. Exporters therefore find themselves struggling to retain baby vegetable producers who will produce the required quantities of baby vegetables since producers do not remain in the baby vegetable industry for long. Yet exporters are still determined to encourage more producers to supply baby vegetables in order to take advantage of the growing demand for baby vegetables in the export market.

The following are the risks faced by South African baby vegetable producers and exporting companies when exporting baby vegetables:

- Temperature breakdown: one of the major risks when exporting baby vegetables are changes in the baby vegetable temperatures along the supply chain as this causes the quality of baby vegetables to deteriorate. Therefore, supply chain members who break the cold chain are held liable for the baby vegetable produce lost
- Fuel prices: the constant increase in oil prices is another major risk as it has a direct impact on the cost of production by increasing the input costs, including transport costs from the farm gate to the export destination;
- Foreign exchange rates: since international markets are volatile, fluctuations in exchange rates influence the prices that South African exporters will receive. When the Rand is strong, South African exporters will receive a low price, as opposed to when the Rand is weak;
- Unstable market conditions: any unstable economic or political conditions of trading partners in international markets pose a financial risk to South African baby vegetable exporters;
- Delayed payment: some import agents do not pay exporting companies according to their agreements. To safeguard themselves, exporters take

up credit insurance which will pay them in cases were their clients, the import agents, have failed to make payments on time.

3.8 SUMMARY

The supply chain of baby vegetables in South Africa includes baby vegetable producers, the domestic and export markets for baby vegetables as well as DCs and a staging company. In the domestic market, baby vegetables are marketed through FPMs, food retail outlets, fresh fruit and vegetable outlets and through individual agents. FPMs are the major markets for baby vegetables followed by food retail outlets. The Netherlands and the U.K are the major importers of baby vegetables from South Africa. South African baby vegetable producers nevertheless compete against each other for their products to be accepted in the domestic market and they also compete with a number of countries, including European and African countries for export market opportunities especially within the European market.

CHAPTER 4

ENTERPRISE BUDGETS FOR BABY VEGETABLES

4.1 INTRODUCTION

One purpose of this study was to determine the economics of the baby vegetable industry, by focusing on the profitability of producing baby vegetables through the use of enterprise budgets. This chapter details the development of four enterprise budgets for the four baby vegetables, namely baby corn, baby carrots, baby gems and baby marrows by three baby vegetable producers. Below is a discussion on the overview, composition and purpose of enterprise budgets, the income received from baby vegetables and the costs of producing the baby vegetables, which were used to develop the enterprise budgets. This will be followed by the actual enterprise budgets developed.

4.2 AN OVERVIEW OF ENTERPRISE BUDGETS

4.2.1 The use of enterprise budgets

Enterprise budgets are developed to assist producers with planning and budgeting for the enterprises which they want to produce. The enterprise budgets help estimate the income and expenditure of an enterprise; the price, yield as well as the direct and indirect variable allocable cost of producing the enterprise. This is followed by estimating the gross margin of that enterprise, which helps to determine whether the enterprise is profitable or not.

Enterprise budgets can also be used to project the most successful enterprise of the business in terms of viability and profitability, the expected production yields, expected profits, and expected resource needs, such as capital, labour and production inputs (Chase 2006:7). According to Chase (2006:1), enterprise budgets can be used to allocate limited resources such as land, labour and capital to the most

efficient use, such as profit maximisation. The baby vegetable enterprise budgets can be used as guidelines in the planning stage and in decision making. Chase (2006:3) identifies three decisions that can be guided by making use of enterprise budgets; pricing, changing production practices and product mix. Producers can make decisions on how to price their products based on the cost of producing the product, the price used by competitors and on the value of the product as perceived by customers and their willingness to pay based on the perceived value.

Chase, (2006:5), states that changing production practices, such as reducing production costs by using less labour to produce the same yield as before, can result in increased profitability. Thus, enterprise budgets can be used to track the effect that changes in production practices have on profitability. Lastly, enterprise budgets can be used to compare the different product mixes of the farm. The aim will be to determine which product mix or crops produced best utilise the scarce resources, being land, labour and capital, most efficiently.

4.2.2 Common practice for developing enterprise budgets

A common practice in developing enterprise budgets would be to conduct a study group comprised of baby vegetable producers and other baby vegetable industry players, who together would agree on common practices, prices and the cost of producing baby vegetables, which would result in representative enterprise budgets.

This process did not take place in the study, instead the enterprise budgets developed are a first attempt of budgets developed from one producer's information per enterprise budget, therefore these budgets are not representative of the baby vegetable industry. Enterprise budgets for baby corn, baby carrots, baby gems and baby marrows were developed in the study from information gathered from interviewing three baby vegetable producers. A producer in Mpumalanga Province was interviewed on the baby carrots enterprise budget. Two producers in the Western Cape Province were interviewed: one producer was interviewed on baby gems and baby marrows enterprise budgets and the other producer on the baby corn enterprise budget. The four enterprise budgets developed are a typical idea of the

cost and gross margin of baby vegetable produce by a specific producer. Though the enterprise budgets are not representative of the baby vegetable industry, they can still be used by other producers to determine the profitability of baby vegetable enterprises, the yield produced per hectare and to estimate the cost of producing these vegetables. The enterprise budgets below present therefore a good benchmark for other producers.

4.3 PRICES AND INCOME

4.3.1 Income from baby vegetable sales

The income received from selling baby vegetables is the product of the price and quantity of baby vegetables sold. The prices used to develop the four enterprise budgets were those received by baby vegetable producers from FPMs. Prices received from FPMs are determined by supply and demand and are monitored by market agents. Since this is the case and since the enterprise budgets were developed from individual producer's information and not a study groups' information, these prices are not representative of the entire baby vegetable industry.

Prices received from food retail outlets are those given by the retailers and are stated on the producers' contracts. Prices received from individual agents are benchmarked against FPMs' prices whereas other producers negotiate their prices with individual agents. Prices received by producers who supply exporting companies are benchmarked against international prices and are also compared to domestic prices, thus exporters aim to set the price higher than the domestic price.

Table 4.1 below show the estimated average prices for baby vegetables per kilogram received by producers. The prices received from FPMs and food retail outlets were provided by the producers and prices received from export markets were provided by the exporting companies. Owing to the limited number of producers interviewed who produced baby corn and baby carrots, prices for these baby vegetables could not be made an average since the prices from the producers were too differing and an

average would not be a true representative of the baby vegetable price, and this may lead to faulty conclusions.

Table 4.1: Average baby vegetable prices for April 2012 received by producers at different markets

Baby vegetables	FPM (R/Kg)	Food retail outlets (R/Kg)	Export market (R/Kg)
Baby gems	R 8.00	R 10.50	R 35.00
Baby marrow	R 7.00	R 10.50	R 35.00

Source: Survey data, 2012

The prices used to develop the four enterprise budgets however were not average prices, but prices which producers received from FPMs, with the exception of one of the baby carrot enterprise budgets which was developed from a price received from a food retail outlet.

The quantity of the different baby vegetables harvested and sold ranged from 7 000 kg per hector to 13 500 kg per hector, see Table 4.6 to Table 4.10 below.

4.4 PRODUCTION COSTS

4.4.1 Labour

Labour is imperative in the baby vegetable industry as it is needed throughout the production process, partly because baby vegetables are delicate and can get damaged easily, thus they require a lot of attention in terms of handling processes. The industry is therefore very labour intensive. In the study, 33.3% of baby vegetable producers interviewed prefer to plant and harvest baby vegetables by hand, which increases the demand for labour. Accordingly, labour is required for preparing the land before planting, during planting, irrigating, fertilizing and weeding (by hand or applying chemicals), harvesting and performing post-harvest activities. A few producers use machinery for the production and harvesting of baby vegetables.

According to all the baby vegetables producers interviewed in the study, labour is said to be an expensive production cost. The labour cost is calculated by multiplying the wage rate by the number of hours spent to perform an activity, multiplied by the

number of workers. The labour costs for pre-harvesting and harvesting activities for baby vegetables were calculated as follows:

Wage rate per hour x (number of working hours x the number of farm workers)

The time it took for labourers to complete different production activities in terms of producing and harvesting baby vegetables was different from one farm to the other. Baby vegetable producers also offered differing wage rates from one producer to another and some producers also offered a different wage rate according to the type of work performed by the labourers. For example, some producers offered tractor drivers a higher wage rate than the other labourers because tractor drivers are regarded as skilled labour, see Table 4.2 below. Since in this study, no study groups were conducted with baby vegetable producers to determine common practise in terms of the development of enterprise budgets for baby vegetables such as using common price, wage rate, number of working hours etc. The wage rate and number of hours spent to perform production and harvesting activities were given by the individual producers, the three producers who were interviewed for the development of enterprise budgets.

Table 4.2: Wage rate received by farm labourers involved in the baby vegetable production process

Baby vegetable	Baby corn	Baby carrots	Baby gems	Baby marrow
Rate/hour: other labourers	R7.70	R9.00	R7.50	R7.50
Rate/hour: tractor drivers	R7.70	R14.00	R16.00	R16.00

Source: Survey data, 2012

Producers also differed in the number of labourers used to perform certain tasks. For some tasks such as planting baby vegetables with a tractor, producers used one labour, while other tasks such as harvesting, producers used 5 to 6 labourers, with only one producer using up to 80 labourers to harvest baby vegetables per hector. The number of hours it took to complete the different tasks also differed from one producer to the other.

It is important to note that baby vegetable producers use the same labour to perform other farm activities since producers produce other enterprises either than baby vegetables on the farm. In the enterprise budgets, the labour cost therefore does not imply that, that was the income that farm workers received per month. Since baby vegetables are seasonal produce and producers have other enterprises on the farm, the labourers are also involved in producing other enterprises. Therefore only the hours spent for baby vegetable production were taken into consideration, excluding the total hours spent by labourers producing other enterprises.

4.4.2 Seed, fertilizer and chemicals

The quantities of seed, fertilizer and chemicals used to compile the enterprise budgets were received from the baby vegetable producers together with the seed prices and some fertilizer and chemical prices. Other fertilizer and chemical prices used were received from the Western Cape Department of Agriculture database which consists of fertilizer and chemical prices collected from fertilizer and chemical companies.

Most baby vegetable producers interviewed in the study indicated that the seed, fertilizer and chemical costs were high and this was believed to be the results of high crude oil prices.

4.4.3 Fuel, maintenance and repair cost

A questionnaire from the Western Cape Department of Agriculture was administered with baby vegetable producers to develop enterprise budgets. This questionnaire was used to gather data on the use of agricultural implements by baby vegetable producers. The data was entered in an Excel spread sheet that includes parameters and variables developed from the Guide to Machinery Cost to calculate machinery running cost (R/ha) which is the fuel, maintenance and repair cost per hectare. To calculate the machinery running cost, the cost per hour (R/hour) was multiplied by duration per hectare (Hour/ha).

To calculate the cost per hour (R/hour), the variable cost comprised fuel, repairs and maintenance, oil, tyres, and a contingency was added to the fixed costs which comprised interest, depreciation, licence fees and insurance. Fuel costs (R/ha) were calculated by multiplying the fuel usage (litre/hour) by the diesel price. R11.50/litre is the diesel price used as this was the diesel price when the enterprise budgets were compiled. In order to calculate fuel usage (litre/hour), the following assumptions were made (Department of Agriculture, Forestry and Fisheries, 2010:4-6):

- Low-power demand tractor: fuel consumption is based on: 35% of kW used and fuel litres used per kilowatt hour is at 0,40; and
- Medium-power demand tractor: fuel consumption is based on: 45% of kW used and fuel litres used per kilowatt hour is at 0,35; and
- High-power demand tractor: fuel consumption is based on: 60% of kW used and fuel litres used per kilowatt hour is at 0,30.

Duration per hectare (Hour/ha) was calculated by using the work width, work speed and the effectiveness of the farming implements, thus the following equation was used.

10000 / (work width (m) x (work speed (km/h) x 1000)) x effectiveness (%)

4.4.4 Transport, packaging and marketing costs

With an exception of one farmer, all baby vegetable producers interviewed from Mpumalanga and Limpopo Provinces supply baby vegetables to markets in Gauteng Province. The transport costs for these farmers are high, unlike baby vegetable producers from Gauteng and Western Cape Provinces who supply markets within their province. Because of the high fuel costs when the study was conducted, baby vegetable producers were faced with high transport costs. Some producers had to supply markets three or four times a week, and this made the cost even higher.

In the study, marketing cost refers to the cost of selling baby vegetables through FMPs in the form of commission which is paid from the baby vegetable sales. The

commission is paid to the City Council or market for making use of the FMP facility and also to the market agents who sell the baby vegetable produce on behalf of the farmers. Commission paid to market agents is negotiable between the farmer and the agent. Baby vegetable producers who sell their produce through the JFPM and the Tshwane FPM pay commission amounting to 12.5%, of which 5% is paid to the market and 7% is paid to the market agents. Baby vegetable producers who sell baby vegetables to the Epping market pay commission of 14%, of which 7% is paid to the market and the other 7% is paid to the market agents.

Packaging costs were also included in the enterprise budgets though producers use different punnet sizes to package baby vegetables, thus packaging costs differed from one producer to the other, as soon on Table 4.6 to Table 4.9.

4.4.5 Water and electricity costs

All 15 baby vegetable producers interviewed in the study (this number is inclusive of the three baby vegetable producers interviewed for the development of the enterprise budgets), were unable to quantify the litres of water and the quantity of electricity used for the production of baby vegetables. This is because all 15 producers had other enterprises on the farm, which they used water and electricity for, thus they could not give the cost of water and electricity for the production of baby vegetables.

4.4.6 Capital costs

Baby vegetables require high capital costs since they require good cooling systems and must be pre-packed before they can be sold. Baby vegetable producers must invest in cold room and packing facilities that are GlobalGAP certified in order to supply baby vegetables to certain markets, such as food retail outlets and the export market. Table 4.3 below shows the type of farming assets that producers must invest in, in order to produce and market baby vegetables. Land as an asset is however omitted from the table as it is assumed that to produce baby vegetables, producers must have access to land.

Table 4.3: Assets used in the production of baby vegetables

Assets/Technological improvements
Necessity
High Clearance Tractor
Irrigation system (Drip irrigation is mostly used)
Packing & storage facilities
Truck with cooling system for long distance markets
Farming implements
Optional
Shed (for tools)
Tunnels

Source: Survey data, 2011 - 2012

4.5 ENTERPRISE BUDGETS

The format for MicroCombud enterprise budgets for carrots, gem squash and sweet corn were used as models to develop the enterprise budgets for baby carrots, baby corn and baby gems since there are considerable similarities in the production processes. Also, a baby vegetable producer verified that the production process for baby corn is similar to that of baby sweet corn, therefore the enterprise budget for sweet corn was used as a model for baby corn.

The geographic areas where the enterprise budgets were developed have an influence on the yield produced per hectare and on some of the input costs. For example, factors such as the use of labour, other production inputs, machinery and equipment, farming implements, and capital may differ from one producer to the other. These therefore are the other reasons why the enterprise budgets developed should not be regarded as representative of the baby vegetable industry.

4.5.1 Development of enterprise budgets

Table 4.4 below shows the additional information for compilation of the budgets. FPM prices received by farmers were used for developing all four enterprise budgets, being Table 4.6 to Table 4.9. The same producer was interviewed for the development of the baby gems and baby marrows enterprise budgets and according to this producer the two baby vegetables have a similar production process.

Table 4.4: Enterprise budgets compilations

Variables	Baby corn	Baby carrots	Baby gems	Baby marrows
Planting	Plant 8000 seeds by tractor	Plant by tractor	Plant 15000 seeds by tractor	Plant 15000 seeds by tractor
Wage rate / hour	R 7.70 for all labour	Tractor driver: R14 & other labourers: R9	Tractor driver: R16 & other labourers: R7.50	Tractor driver: R16 & other labourers: R7.50
Other	Fertilizer application done by hand	Not labour intensive but more capital intensive	Labour cost for harvesting is calculated at R0.4/kg harvested	Labour cost for harvesting is calculated at R0.4/kg harvested

Source: Survey data, 2011 - 2012

Enterprise budgets, shown in Table 4.6 to Table 4.9, were developed to show the estimated income received from the four baby vegetables as well as the pre-harvest and harvest costs for producing the baby vegetables. Gross margins were determined on the enterprise budgets and according to the Agricultural Segment of The Standard Bank of South Africa Limited, van Zyl, Coetzee, Blignaut, Kirsten & Geyser, (2005:48), gross margins can be used to compare different enterprises.

Figure 4.1 below shows the estimated gross margin for baby corn, baby gems and baby marrows and according to this figure, baby gems have the highest gross margin which may be caused by the high price and low indirect allocable variable costs when compared to the two other baby vegetables. The gross margin for baby carrots was not included in this comparison since the price and costs of production for baby carrots was too different from those of the other vegetables as shown in Table 4.7.

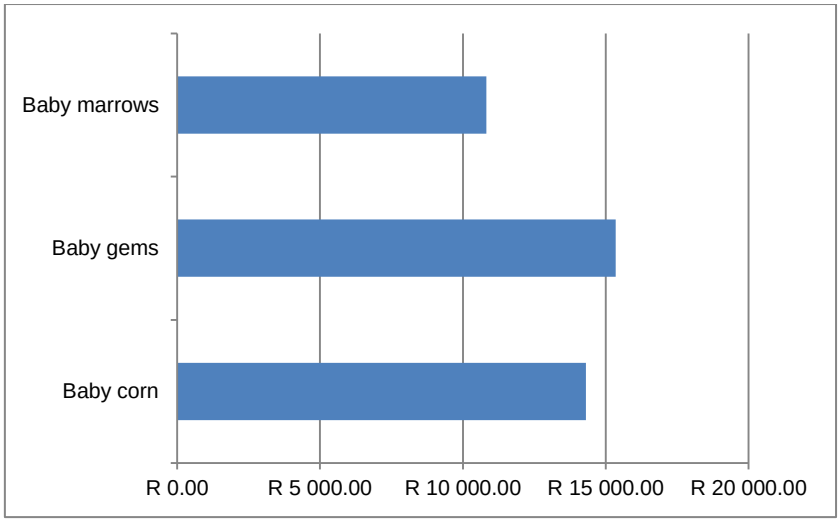

Figure 4.1: Gross margin per hectare for baby marrows, baby gems and baby corn

Source: Survey data, 2011

An enterprise budget, Table 4.10, was developed for a producer selling directly to food retail outlets. The same producer's information was used to develop the baby carrots enterprise budgets shown in Table 4.7 and Table 4.10 as the producer based in Mpumalanga Province supplies baby carrots to both the FMP and to food retail outlets in Gauteng Province. The objective of developing the enterprise budget in Table 4.10 was to compare the income and costs of producing and supplying baby vegetables by the same producer to the two different markets. Table 4.10 reveals that the price and gross margin received from supplying food retail outlets are higher than the price and gross margin from supplying FMPs as shown in Table 4.5 below. The producer however incurred additional transport costs when supplying food retail outlets. This is because transport costs were charged at R0.90 per 3000 punnets to a FMP and R1.80 per 2000 punnets to the food retail outlet. Table 4.6 to Table 4.10 are the enterprise budgets developed for the four baby vegetables, namely, baby corn, baby carrots, baby gems and baby marrows.

Table 4.5: Comparison between baby carrots sold at FPM and at food retail outlets

Variables	Baby carrots: FPM	Baby carrots: food retail outlets
Price / kg	R 28.00	R 40.00
Estimated Gross Margin / ha	R 193 316.09	R 401 666.09

Source: Survey data, 2011

Table 4.6: Baby corn enterprise budget

ENTERPRISE: BABY CORN				
REGION: WESTERN CAPE - CAPE METROPOLE DISTRICT - KRAAIFONTEIN				
DESCRIPTION	**UNIT**	**PRICE OR COST/UNIT**	**QTY**	**VALUE/HA**
GROSS INCOME				
Baby corn	**Kg**	**6.00**	**12 000.00**	**72 000.00**
MARKETING COST				
Market & Agent commission	%	14.00	72 000.00	10 080.00
GROSS INCOME minus MARKETING COSTS				**61 920.00**
ALLOCATABLE VARIABLE COSTS				
Directly allocateable Variable Costs				**44 004.94**
PRE-HARVEST COSTS				**11 480.14**
Labour cost				
Soil preparation	Hour	7.70	9.00	69.30
Planting	Hour	7.70	4.00	30.80
Fertilizer & Spraying	Hour	7.70	64.30	495.11
Irrigation	Hour	7.70	810.00	6 237.00
Fertilizer - Add				
1:00 (40) + 6% S	Kg	4.86	260.00	1 262.30
MAP 5g Zn	Kg	7.45	66.00	491.70
KCL	Kg	6.42	186.00	1 193.93
Trace elements	Litre	35.00	20.00	700.00
Pest control - spray				
Bulldock	Litre	450.00	0.80	360.00
Metimophosis	Litre	60.00	4.00	240.00
Planting material - Seed				
Baby corn seed	10 Kg	400.00	1.00	400.00
HARVEST COSTS				**32 524.80**
Labour cost	Hour	7.70	324.00	2 494.80
Packaging cost: Punnet (125g)		2.00	13 500.00	27 000.00
Packaging cost: Box		3.00	90.00	270.00
Transport costs (Truck)	Litres	11.50	240.00	2 760.00
GROSS MARGIN ABOVE DIRECTLY ALLOCATABLE VARIABLE COSTS				**17 915.06**
In Direct Allocatable Variable Costs				**3 612.24**
PRE HARVEST COSTS				**3 398.73**
Fuel costs	Litres	11.50	196.87	2 264.01
Maintenance and repair costs				1 134.72
HARVEST COSTS				**213.52**
Fuel costs	Litres	11.50	12.97	149.16
Maintenance and repair costs				64.36
TOTAL PRE HARVEST COSTS				**14 878.87**
TOTAL HARVEST COSTS				**32 738.32**
GROSS MARGIN ABOVE TOTAL ALLOCATABLE VARIABLE COSTS				**14 302.82**

Source: Survey data, 2012

Table 4.7: Baby carrots enterprise budget

ENTERPRISE: BABY CARROTS				
REGION: MPUMALANGA - EHLANZENI DISTRICT - NELSPRUIT				
DESCRIPTION	UNIT	PRICE OR COST/UNIT	QTY	VALUE/HA
GROSS INCOME				
Baby carrots	**Kg**	**28.00**	**13 500.00**	**378 000.00**
MARKETING COST				
Market & Agent commission	%	12.50	378 000.00	47 250.00
GROSS INCOME minus MARKETING COSTS				**330 750.00**
ALLOCATABLE VARIABLE COSTS				
Directly allocateable Variable Costs				**134 753.02**
PRE-HARVEST COSTS				**37 688.02**
Labour cost				
Soil preparation	Hour	14.00	12.00	168.00
Planting	Hour	14.00	4.00	56.00
Fertilizer & Spraying: tractor driver	Hour	14.00	4.00	56.00
Fertilizer & Spraying: labourers	Hour	9.00	8.00	72.00
Irrigation	Hour	9.00	283.50	2 551.50
Fertilizer - Add				
4.3.4 (NPK)	Kg	4.00	400.00	1 600.00
NPK 1.0.1 (36)	Kg	5.38	200.00	1 076.00
Kanas	Kg	7.20	250.00	1 800.00
Micro elements	Kg	6.60	250.00	1 650.00
Pest control - spray				
Round up	Litre	29.00	6.00	174.00
Linagan	Litre	196.56	4.50	884.52
Nemacure	Litre	300.00	2.00	600.00
Planting material - Seed				
Baby carrots seed	kg	4 500.00	6.00	27 000.00
HARVEST COSTS				**97 065.00**
Labour cost	Hours	9.00	9 735.00	87 615.00
Packaging costs: Box + labelled punnet (200g)		1.80	3 750.00	6 750.00
Transport costs	Punnet	0.90	3 000.00	2 700.00
GROSS MARGIN ABOVE DIRECTLY ALLOCATABLE VARIABLE COSTS				**195 996.98**
In Direct Allocatable Variable Costs				**2 680.89**
PRE HARVEST COSTS				**2 119.93**
Fuel costs	Litres	11.50	108.66	1 249.63
Maintenance and repair costs	Litres			870.30
HARVEST COSTS				**560.96**
Fuel costs	Litres	11.50	34.58	397.65
Maintenance and repair costs	Litres			163.31
TOTAL PRE HARVEST COSTS				**39 807.95**
TOTAL HARVEST COSTS				**97 625.96**
GROSS MARGIN ABOVE TOTAL ALLOCATABLE VARIABLE COSTS				**193 316.09**

Source: Survey data, 2012

Table 4.8: Baby gems enterprise budget

ENTERPRISE: BABY GEMS				
REGION: WESTERN CAPE - CAPE METROPOLE DISTRICT - KRAAIFONTEIN				
DESCRIPTION	**UNIT**	**PRICE OR COST/UNIT**	**QTY**	**VALUE/HA**
GROSS INCOME				
Baby gems	**kg**	**8.00**	**7 000.00**	**56 000.00**
MARKETING COST				
Market & Agent commission	%	14.00	56 000.00	7 840.00
GROSS INCOME minus MARKETING COSTS				**48 160.00**
Directly allocateable Variable Costs				**30 224.22**
PRE-HARVEST COSTS				**21 521.72**
Labour cost				
Soil preparation	Hour	16.00	5.00	80.00
Planting	Hour	7.50	180.00	1 350.00
Fertilizer & Spraying	Hour	7.50	45.00	337.50
Irrigation	Hour	7.50	120.00	900.00
Fertilizer - Add				
NPK 1.0.1 (36)	Ton	5 380.00	0.90	4 842.00
MAP 5g Zn	Ton	7 450.00	0.15	1 117.50
Potassium Nitrate	Ton	11 100.00	0.20	2 220.00
Organic (manure)	Ton	100.00	25.00	2 500.00
Pest control - spray				
Bladbuff	Litre	7.00	16.00	112.00
Bravo 500 SC	Litre	121.59	8.00	972.72
Decis	Litre	150.00	1.60	240.00
Flowable Sulphur	Kg	18.00	25.00	450.00
Lebaycid	Litre	200.00	2.00	400.00
Planting material - Seed				
Baby gems seed	1000 seeds	400.00	15.00	6 000.00
HARVEST COSTS				**8 702.50**
Labour cost	Hour	0.40	7 000.00	3 535.00
Packaing costs: Boxes + Punnets (300g)		0.65	2 100.00	1 947.50
Transport costs	Litres	11.50	280.00	3 220.00
GROSS MARGIN ABOVE DIRECTLY ALLOCATABLE VARIABLE COSTS				**17 935.78**
In Direct Allocatable Variable Costs				**2 591.99**
PRE HARVEST COSTS				**2 405.07**
Fuel costs	Litres	11.50	146.44	1 684.06
Maintenance and repair costs				721.01
HARVEST COSTS				**186.92**
Fuel costs	Litres	11.50	12.74	146.51
Maintenance and repair costs				40.41
TOTAL PRE HARVEST COSTS				**23 926.79**
TOTAL HARVEST COSTS				**8 889.42**
GROSS MARGIN ABOVE TOTAL ALLOCATABLE VARIABLE COSTS				**15 343.79**

Source: Survey data, 2012

Table 4.9: Baby marrow enterprise budget

ENTERPRISE: BABY MARROW				
REGION: WESTERN CAPE - CAPE METROPOLE DISTRICT - KRAAIFONTEIN				
DESCRIPTION	**UNIT**	**PRICE OR COST/UNIT**	**QTY**	**VALUE/HA**
GROSS INCOME				
Baby marrows	**kg**	**7.00**	**7 000.00**	**49 000.00**
MARKETING COST				
Market & Agent commission	%	14.00	49 000.00	6 860.00
GROSS INCOME minus MARKETING COSTS				**42 140.00**
Directly allocateable Variable Costs				**28 724.22**
PRE-HARVEST COSTS				**20 021.72**
Labour cost				
Soil preparation	Hour	16.00	5.00	80.00
Planting	Hour	7.50	180.00	1 350.00
Fertilizer & Spraying	Hour	7.50	45.00	337.50
Irrigation	Hour	7.50	120.00	900.00
Fertilizer - Add				
NPK 1.0.1 (36)	Ton	5 380.00	0.90	4 842.00
MAP 5g Zn	Ton	7 450.00	0.15	1 117.50
Potassium Nitrate	Ton	11 100.00	0.20	2 220.00
Organic (manure)	Ton	100.00	25.00	2 500.00
Pest control - spray				
Bladbuff	Litre	7.00	16.00	112.00
Bravo 500 SC	Litre	121.59	8.00	972.72
Decis	Litre	150.00	1.60	240.00
Flowable Sulphur	Kg	18.00	25.00	450.00
Lebaycid	Litre	200.00	2.00	400.00
Planting material - Seed				
Baby marrow seed	1000 seeds	300.00	15.00	4 500.00
HARVEST COSTS				**8 702.50**
Labour cost	Hour	0.40	7 000.00	3 535.00
Packaing costs: Boxes + Punnets (300g)		0.65	2 100.00	1 947.50
Transport costs	Litres	11.50	280.00	3 220.00
GROSS MARGIN ABOVE DIRECTLY ALLOCATABLE VARIABLE COSTS				**13 415.78**
In Direct Allocatable Variable Costs				**2 591.99**
PRE HARVEST COSTS				**2 405.07**
Fuel costs	Litres	11.50	146.44	1 684.06
Maintenance and repair costs				721.01
HARVEST COSTS				**186.92**
Fuel costs	Litres	11.50	12.74	146.51
Maintenance and repair costs				40.41
TOTAL PRE HARVEST COSTS				**22 426.79**
TOTAL HARVEST COSTS				**8 889.42**
GROSS MARGIN ABOVE TOTAL ALLOCATABLE VARIABLE COSTS				**10 823.79**

Source: Survey data, 2012

Table 4.10: Baby carrots enterprise budgets for food retail outlets

ENTERPRISE: BABY CARROTS - SOLD AT A FOOD RETAIL OUTLET				
REGION: MPUMALANGA - EHLANZENI DISTRICT - NELSPRUIT				
DESCRIPTION	**UNIT**	**PRICE OR COST/UNIT**	**QTY**	**VALUE/HA**
GROSS INCOME				
Baby carrots	**Kg**	**40.00**	**13 500.00**	**540 000.00**
ALLOCATABLE VARIABLE COSTS				
Directly allocateable Variable Costs				**135 653.02**
PRE-HARVEST COSTS				**37 688.02**
Labour cost				
Soil preparation	Hour	14.00	12.00	168.00
Planting	Hour	14.00	4.00	56.00
Fertilizer & Spraying: tractor driver	Hour	14.00	4.00	56.00
Fertilizer & Spraying: labourers	Hour	9.00	8.00	72.00
Irrigation	Hour	9.00	283.50	2 551.50
Fertilizer - Add				
4.3.4 (NPK)	Kg	4.00	400.00	1 600.00
NPK 1.0.1 (36)	Kg	5.38	200.00	1 076.00
Kanas	Kg	7.20	250.00	1 800.00
Micro elements	Kg	6.60	250.00	1 650.00
Pest control - spray				
Round up	Litre	29.00	6.00	174.00
Linagan	Litre	196.56	4.50	884.52
Nemacure	Litre	300.00	2.00	600.00
Planting material - Seed				
Baby carrots seed	kg	4 500.00	6.00	27 000.00
HARVEST COSTS				**97 965.00**
Labour cost	Hours	9.00	9 735.00	87 615.00
Packaging costs: Box + labelled punnet (200g)		1.80	3 750.00	6 750.00
Transport costs	Punnet	1.80	2 000.00	3 600.00
GROSS MARGIN ABOVE DIRECTLY ALLOCATABLE VARIABLE COSTS				**404 346.98**
In Direct Allocatable Variable Costs				**2 680.89**
PRE HARVEST COSTS				**2 119.93**
Fuel costs	Litres	11.50	108.66	1 249.63
Maintenance and repair costs	Litres			870.30
HARVEST COSTS				**560.96**
Fuel costs	Litres	11.50	34.58	397.65
Maintenance and repair costs	Litres			163.31
TOTAL PRE HARVEST COSTS				**39 807.95**
TOTAL HARVEST COSTS				**98 525.96**
GROSS MARGIN ABOVE TOTAL ALLOCATABLE VARIABLE COSTS				**401 666.09**

Source: Survey data, 2012

4.6 DISCUSSION OF FINDINGS

The enterprise budgets developed from individual farmers, and reported in Table 4.6 to Table 4.9 reveal positive gross margins. This means that the income received from the sale of the baby vegetable enterprise is higher than the cost of the producing the baby vegetable produce.

Baby carrots produce a gross margin of R193 316.09, which was more than 10 times the gross margins of the other three baby vegetables. One explanatory factor here is that the price for baby carrots received by this producer is far higher than the prices of baby corn, baby gems and baby marrows: R28/kg versus between R6/kg to R8/kg. In Chapter 2, it was noted that some baby vegetable producers from Gauteng, Limpopo and the Western Cape attempted to produce baby carrots but stated that they were unsuccessful, owing to low profitability. Therefore the gross margin for baby carrots is only representative of one producer's enterprise budget, not the entire Baby Carrot Industry since this budget, like the other three enterprise budgets were developed by using only one producer's information.

4.7 SUMMARY

Four enterprise budgets were developed in the study. Also, the baby vegetable prices and gross margin of two enterprise budgets for baby carrots produced by the same farmer for two different markets were compared. Baby vegetable producers can use enterprise budgets on the planning process as well as in decision making to determine the right price for their produce; to change or adapt production practices to reduce production costs and increase profitability. Enterprise budgets can also be used to allocate scarce resources such as land, labour and capital to crops more efficiently. The results of the enterprise budgets reveal that all four enterprise budgets developed were profitable as they all had positive gross margins.

CHAPTER 5

SANITARY & PHYTOSANITARY MEASURES FOR BABY VEGETABLE EXPORTS

5.1 INTRODUCTION

According to Department of Agriculture, Forestry and Fisheries (2012:7), phytosanitary is defined as the action related to protecting plants from diseases in three ways namely, bio control, cultivation practices and the application of pesticides. Department of Agriculture, Forestry and Fisheries (2012:7) explains that South Africa can achieve global competitiveness through trade in plants and plant products by reducing phytosanitary risk and therefore complying with phytosanitary import conditions of the targeted export markets by dealing with regulated pests.

This chapter aims to discuss the requirements that exporting companies should meet in order to export baby vegetables, as well as to discuss the quality and food safety of baby vegetables, and this is maintained throughout the supply chain.

5.2 THE REQUIREMENTS FOR EXPORTING BABY VEGETABLES

Agricultural products from South Africa, including baby vegetables, cannot be exported without a sanitary and phytosanitary (SPS) certificate issued by the Department of Agriculture, Forestry and Fisheries to FBOs to prove that all SPS standards have been met, since this certificate is presented to the importing countries. According to DAI (2007:54), accuracy and reliability in obtaining SPS certificates by exporters is important in order to build international trade relations.

In South Africa, PPECB is the official certification agency mandated by the Department of Agriculture, Forestry and Fisheries to provide inspection services for perishable products destined for export (PPECB, 2012:1-05). PPECB is accredited by the South African National Accreditation System to issue, amongst other

certificates, HACCP, BRC and GlobalGAP certificates (PPECB, 2012:1-05). PPECB conducts food safety audits on all registered FBOs to ensure that FBOs comply with food safety standards stipulated under the Agricultural Products Standards Act 119 of 1990 (PPECB, 2012:1-06). This includes audits on the use of legislated pesticides by sampling consignments from FBOs destined for the export market, on regular basis (PPECB, 2012:1-06).

The study established that consignments of baby vegetables belonging to exporting companies destined for the export market through the OR Tambo International Airport are sampled and inspected by PPECB inspectors based at the airport. The inspection is conducted in order to verify food safety and quality of the baby vegetable produce before it can be exported. Produce that is approved as meeting the set standards receives a PPECB stamp written “passed for export” which according to PPECB (2012:1-05) serves as a symbol of quality assurance to importers and consumers of perishable produce around the world.

In addition to these food audits which must be conducted, the various importing countries have their own differing and particular requirements which exporting countries must also meet before exporting vegetable produce. The minimum requirements that exporting companies should meet before exporting baby vegetables to overseas markets are as follows:

- Exporting companies must be registered with the South African Revenue Services (SARS) and obtain an exporter’s code;
- Must have permission to export;
- Must meet the standards set in the Agricultural Products Standards Act No. 119 of 1990 published by the National Department of Agriculture – these standards specify requirements with regard to exporting products from South Africa to other countries;
- Must have a supplier invoice which specifies the product’s place of origin.

5.3 FOOD SAFETY

Good Agricultural Practices (GAP) are food safety requirements relating to the production and handling of agricultural produce, such as fruits, vegetables, flowers and animal feed, before leaving the farm (PPECB, 2012:4-03). Given the increasing demand for food safety in the domestic and export markets, producers who supply baby vegetables to the export market as well as to most food retail outlets in South Africa, are GlobalGAP certified. These markets interact with consumers and as a result they are determined to ensure that produce consumed is safe by ensuring that baby vegetable producers are GlobalGAP certified. GlobalGAP certification means that producers have met standards regarding food safety, food traceability, worker welfare and environmental issues.

5.3.1 Types of hazards that affect baby vegetable produce

According to PPECB (2012:4-03), food safety requirements outline three categories based on the hazards they represent, namely, microbiological contamination, chemical and physical contamination.

5.3.1.1 Microbiological contamination

Microbiological contamination includes food hygiene which is for the benefit of the consumer: personnel hygiene, during production and distribution; and environmental hygiene which covers air, soil and water pollution PPECB (2012:4-03). During the production process for baby vegetables, personnel hygiene is maintained by baby vegetable producers by ensuring that farm workers adhere to hygiene practices such as washing of hands before handling plants and produce. While handling the produce, workers also wear protective clothing such hair caps, which are meant to prevent foreign materials such as hair from falling and contaminating the baby vegetable produce.

To protect farm workers from chemicals during fertilizer and chemical application, workers wear protective clothing such as gloves and overalls. To protect the spread

of diseases to plants, workers are not allowed to smoke in the fields. Smoking in fields where baby vegetables are planted is prohibited because some diseases like mosaic can be found in tobacco and can easily spread amongst baby gem and baby marrow plants. PPECB (2012:4-20) also states that microbiological contamination can be controlled by good personnel practices and also by ensuring that the food products are stored separately from other food products, before the produce is transported.

5.3.1.2 Chemical and physical contamination

In PPECB (2012:4-20), chemical contamination refers to the contamination of food products and the environment by pollution caused from exhaust gasses, petroleum and other products used in the storage and transportation of food products. Supply chain members are aware of the importance of food safety and so they use appropriate packaging suitable for transportation purposes, as most baby vegetable produce is packaged at the farm and transported using enclosed refrigerated trucks throughout the supply chain, for long distance markets. Physical contamination of products, on the other hand, involves contamination of food products from foreign objects such as glass, screws, metal, nails and pieces of different packaging and loading material used during transport and handling – PPECB (2012:4-20).

Therefore, it is important for supply chain members to handle baby vegetables in such a manner that all food contamination in all value adding processes throughout the supply chain is eliminated.

5.4 FOOD QUALITY

The baby vegetable industry requires that high quality baby vegetables be produced by producers who comply with standards set by food retail outlets in the domestic market, including the GlobalGAP standards. For the export market, producers are expected to comply with GlobalGAP and EuroGAP standards. These standards specify, amongst other things, the amount of fertilizer and pesticides to be used, safety clothes, food handling and packaging specifications. The baby vegetables are

packed at pack houses with cooling systems, and are packaged in coded and branded containers according to the specified market standards. Baby vegetables sold at domestic markets are transported using cooler trucks and airfreight is used for the export markets.

The quality of baby vegetable produce is important in both the domestic and the export market. Baby vegetable producers are able to secure markets by supplying high quality produce. Since the baby vegetable industry is competitive, products of inferior quality do not make it to the market. The handling, storage and transportation of baby vegetables must be carried out in a manner that will preserve the quality of the produce. The quality of baby vegetable produce is measured by the appearance, the texture and colour of the baby vegetables and the absence of marks, bruises and scratches on the skin of the baby vegetable produce.

Since baby vegetables are delicate produce, being more soft and tender than traditional vegetables, they are susceptible to rapid damage if not handled correctly and this causes deterioration in the produce. Monitoring the cold chain of baby vegetable produce is necessary in order to preserve the quality of the produce since baby vegetables have a short shelf life.

5.4.1 Temperature requirements for baby vegetable produce

According to PPECB (2012:4-05) cold storage is a process whereby products are kept at optimum temperatures so as to obtain their maximum storage life. Normally, baby vegetables do not spend more than three days on the farm after being harvested as producers supply baby vegetables to the local and export market on a daily basis, or between two to three times per week.

Baby vegetable producers deliver high quality, pre-packed baby vegetables to exporting companies who safeguard themselves from being held liable for quality deterioration of baby vegetables by checking the temperature and quality of baby vegetables upon delivery by producers. After the audit has been performed by a PPECB agent, exporting companies repack the baby vegetable punnets into pallets

with the exporters' brand names and also manage and control the temperature of baby vegetables in cold rooms so as to maintain the appropriate temperature throughout the chain.

According to the exporting companies interviewed, airline companies are aware that baby vegetables need to be stored in cold units upon arrival from the exporting companies. Airline companies store baby vegetable cargo in holding fridges at their warehouses which are situated at the airport, and baby vegetables are loaded at a chilled facility onto airfreight. It is important that airfreights have cooling systems in place to ensure that the baby vegetables' quality is maintained. It is the airline's responsibility to monitor and manage the cooling system of the baby vegetables since these are delicate to temperature change. If the baby vegetables are damaged owing to quality deterioration caused by temperature changes while on the airfreight, the airline companies will be liable for the loss of the baby vegetable produce. Baby vegetables are exported on a weekly basis, ranging from three times a week to seven days a week and the produce reaches the export market still in good quality.

If the temperature or quality of baby vegetables is compromised and thus deviates from that which was agreed upon between producers and exporting companies, then the baby vegetable produce is rejected by the exporting company. In this case exporting companies may offer to sell the produce at FPMs on the producer's behalf or the producer may be expected to supply replacement produce from the exporting company.

For the export market, the optimal storage temperature for baby carrots is from 0.5^0C to 3.0^0C. For South Africa exports, the recommended storage is 0.5 ^{0}C, since baby carrots become bitter when stored at warmer temperatures, such as 4^0C.The required Relative Humility (RH) for baby carrots is set at 95 % (PPECB, 2012:4-31). Baby marrows are kept at 8^0C in exporters' cold rooms, where they are stored for a maximum of 7 days before they are exported to the different destinations (Agrilink website, 2008).

The optimal storage temperature for sweet corn is 2^0C. The Relative Humility (RH) is high at 95 % which should be maintained to ensure that the flavour of the produce is

retained. Under these conditions, some sweet corn varieties can be stored for more than 3 weeks when the optimal temperature and RH are kept at 2^0C and 95 % respectively (PPECB, 2012:4-31). Therefore since baby corn is similar to sweet corn, these temperature conditions will appear to baby corn as well. Baby gems must be kept at temperatures between 0^0C and 4^0C in order to prevent the vegetable from turning yellow. In order to maintain high quality and reduce waste, sufficient air circulation is required. Baby gems may not be stored for more than 4 to 5 weeks. Since baby gems are delicate by nature, proper handling and care is needed in order to reduce loss and to extend their shelf life (PPECB, 2012:4-31).

5.5 TRACEABILITY

The increasing demand for food safety has caused traceability to become a requirement for food trade across the world and it is included as part of GAP. Traceability is the ability to trace a product from its current state, back throughout the supply chain to its original source. PPECB (2012:4-03) describes traceability as “the ability to quickly and correctly trace a product back through all the handling and distribution steps to a production unit”. In case of product recalls, retailers must be able to trace products to their origin (DAI, 2007:17), and this is achievable with a good traceability system.

According to PPECB (2012:4-03), the production, packing, storage, transporting and distribution information of a product, and the product quality and packaging specifications are all important items of information necessary to trace a product. This information is therefore linked to a product identification code, which is found on all products that are exported, including all baby vegetable produce destined for the export market.

According to DAI (2007:55), the rules of GAP, which include traceability, aim to develop transparency in the supply chain, amongst certain other things. Produce accordingly can be traced as to its handling, including worker and facility hygiene, the packaging material used and its suitability to storing and transporting and storing, as well as the temperature conditions of the produce throughout the supply chain.

5.6 SUMMARY

Sanitary and phytosanitary measures are implemented when exporting baby vegetables in order to ensure food quality and safety. It is important that food is not contaminated microbiologically, chemically and physically and also important is the ability to maintain the quality of the baby vegetable produce throughout the supply chain. This ensures that the produce does not have marks, bruises and scratches on the skin which labels the produce as low quality. Monitoring of the cold chain is also imperative as this is one of the causes of baby vegetable deterioration when not managed properly. Furthermore, products can be traced back through a traceability system to their original source in case of product recalls and faults.

CHAPTER 6

SUMMARY AND CONCLUSIONS

6.1 SUMMARY

The study was conducted to investigate the economic overview of baby vegetables; baby corn, baby carrot, baby gems and baby marrows in South Africa. This includes the production, distribution, and marketing of these baby vegetables in the South African domestic market as well as the export markets. The study made use of enterprise budgets to determine the viability and profitability of baby vegetables.

Four provinces formed the study area namely, Mpumalanga, Limpopo, Gauteng and Western Cape Provinces. Case studies were used and a sample of 15 baby vegetable producers was selected according to availability and face to face interviews were made through the use of structured questionnaires. Fresh fruit and vegetable outlets, a DC and exporting companies were also interviewed through the use of structured questionnaires, while market agents from the Johannesburg and Tshwane FPMs and a staging company were interviewed without questionnaires.

The SWOT analyses in Chapter 2 which was conducted only with baby vegetable producers, revealed the following:

- Baby vegetables yield a constant cash flow and that their prices are higher than those of traditional vegetables;
- The baby vegetable industry is however faced with high input costs such as labour costs, seed, fertilizer, chemical and fuel costs as well as marketing costs;
- Baby vegetables are expensive to farm with since producers must invest in high capital infrastructure in order to supply baby vegetables.
- Overproduction of baby vegetables in the domestic market;

- Diseases and adverse weather conditions are some of the threats in the baby vegetable industry.

Chapter 3 detailed the post-harvest activities carried out by supply chain members, mostly being baby vegetable producers, in order to maintain the quality of baby vegetables and to also conform to industry standards such as GlobalGAP, set by food retail outlets and exporting companies. Chapter 5 adds to this by discussing the requirements, including SPS measures that FBOs should meet before exporting baby vegetable produce. PPECB plays a major role in ensuring that exported baby vegetables are safe for human consumption and are of high quality by conducting food safety audits on all FBOs before baby vegetables are exported.

6.2 CONCLUSION

The conclusion of the study was drawn from the economics of producing baby vegetables as well as the supply chain and marketing of baby vegetables.

6.2.1 Economics of producing baby vegetables

The production economics of the four baby vegetables in the study was estimated by developing enterprise budgets which detailed the estimated yield and cost involved in producing the baby vegetables as shown in Chapter 4. The purpose of enterprise budgets are to discover the profitability of the baby vegetable enterprises as well as assist producers when planning and making production decisions by projecting future yields and costs of production.

The enterprise budgets developed in the study are not representative of the baby vegetable industry as the common practice of developing enterprise budgets by conducting a study group with baby vegetable producers and other industry leaders in order to gather information that is representative of the industry, was not followed. Instead, these budgets were developed by making use of individual producers' information. Of the 15 baby vegetable producers interviewed, only 3 baby vegetable producers were interviewed to develop the enterprise budgets since the other

producers were not reachable during the second round of interviews conducted specifically to develop enterprise budgets.

All the baby vegetable enterprises; baby corn, baby carrot, baby gems and baby marrows were profitable as they all had positive gross margins as indicative in the enterprise budgets developed. This means that the income received from selling the baby vegetable produce is higher than all the costs involved in producing the baby vegetables. The enterprise budgets for baby carrots were discovered to have higher gross margins than the other three baby vegetables. One explanatory factor is that the price for baby carrots received by this producer is far higher than the prices of baby corn, baby gems and baby marrows. Also, the enterprise budgets developed revealed that the gross margin for baby vegetables sold at food retail outlets is double the gross margin for baby vegetables sold at FPMs. This is because baby vegetable prices at food retail outlets are higher than prices offered in FPMs, as was displayed in Table 4.1.

Few baby vegetable producers however felt that the industry is not profitable, and the export agents interviewed mentioned that some producers discontinued producing baby vegetables because they too felt that the profit margins in this industry are low. Labour cost per hector is the biggest cost item. Since producers make use of seasonal labour to harvest baby vegetables, the labour costs for harvest activities are higher than those for pre-harvest activities. Marketing and commission costs, seed and fertiliser costs are also high costs in the production and marketing of baby vegetables.

Therefore the enterprise budgets developed are a first attempt to determine the individual producer's enterprise budgets (individual producer's income, cost and gross margin). Since the production practices, inputs used, machinery and equipment needed to produce and supply baby vegetables were identified in the study, these budgets can be used as a benchmark when representative budgets are developed by provincial departments of agriculture. Again, through this study, policy makers, financiers and vegetable producers in South Africa have become aware of the positive gross margins from the production of the four baby vegetables.

6.2.2 Supply chain and marketing of baby vegetables

The baby vegetable supply chain in South Africa is comprised of baby vegetable producers, DCs, staging companies and the markets, which are; food retail outlets, FPMs, fresh fruit and vegetable outlets, individual agents and the export market as indicated in Chapter 3. FPMs are the biggest market for baby vegetable produce in the South African domestic market, followed by food retail outlets and fresh fruit and vegetable outlets.

The demand for baby vegetables in the domestic market is not high, as the study revealed that only 33% of the producers interviewed believed the demand for baby vegetables to be high, and of the other producers, 33% believed the demand was low, 7% believed the demand was between low and average, and 13% believed the demand to be seasonal, and the rest were not certain.

According to baby vegetable producers who export baby vegetables, and export agents, Europe is the biggest market for South African baby vegetable exports, with the Netherlands and the U.K. being the leading markets. Unlike the domestic market, the export market especially to Europe has a high demand for baby vegetables and South African producers and exporters were not able to meet this demand due to low production volumes of baby vegetables in South Africa. To take advantage of the export market, all producers must adhere to industry standards such as GlobalGAP and EuroGAP where possible, which is attainable with the support of industry players such as PPECB, the Department of Agriculture, Forestry and Fisheries, and exporting companies.

The Deputy Minister of Agriculture stated in the 2012 budget speech that PPECB, in collaboration with Department of Agriculture, Forestry and Fisheries, was able to up-skill 1569 small holder producers throughout South Africa through technology transfer (Department of Agriculture, Forestry and Fisheries, 2012:10). The objective of the technology transfer was to assist smallholder producers to be aware of the export market and how it functions, and also to be ready to export their products successfully in the future. It follows that South African producers, both large scale and smallholder producers with the assistance of the government, can take

advantage of the available baby vegetable export markets. Producers should also establish trust-based relationships with exporting companies, since some exporting companies have already established relationships with foreign importers of baby vegetables.

Understanding and documenting the economics of the baby vegetable industry is important since it will encourage investments. Investments in the baby vegetable industry can result in health and labour benefits. Baby vegetables serve as both vegetables and a healthy snack to consumers since they satisfy the increasing need of healthy yet convenient food. The industry can also have labour benefits which are job creation since baby vegetable production is labour intensive.

6.3 RECOMMENDATIONS

Because of the limitations of the study, certain aspects of the industry are yet to be documented. This includes the size of the industry, the volumes of baby vegetables produced, farm-to-retail price spreads within the industry and enterprise budgets that are representative of the entire baby vegetable industry. Further research can address this in order to analyse the growth trends in the baby vegetable industry and to discover the distribution of income within the supply chain of baby vegetables.

The recommendations are:

- Convince farmers to improve record keeping of the volumes of baby vegetables produced. Currently data for baby vegetable production and sales is combined with those of traditional vegetables and since this is such a niche market, it is important to document the industry separately;
- Analyse the farm-to-retail price spreads by reporting baby vegetable prices throughout the supply chain;
- Develop enterprise budgets that are representative of the baby vegetable industry through the use of study groups with baby vegetable producers and other industry players, to determine common practice in producing baby vegetables. Producers would use these enterprise budgets to

budget, which involves estimating the income (the sum of the price and yield produced) and all costs involved in producing the baby vegetables. Also, the enterprise budgets can be used to plan and make decisions which include allocating limited resources efficiently (Chase, 2006:1).

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Appendix A
Questionnaires

PRODUCERS

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Interview questions

Thank you for participating in the interview. The purpose for the interview is to gather information about the baby vegetable industry in South Africa focusing specifically on baby corn, baby carrot, baby marrow and baby squash. The information gathered will help understand and analyse the baby vegetable industry in South Africa. The interview should not take more than 60 minutes. The interview is anonymous and confidential, thus you will not be identified. The answers you will provide for this interview will be for research purposes only.

PERSONAL INFORMATION

Name of interviewee	
Point of contact	
Date of interview	
Time of interview	**Start:** **End:**

Q1. Please tick **(√)**

Commercial Farmer	Small holder Farmer

Q2. Name of farm/company/business: _____

Q3. Location of farm/company/business

Nearest town	
Local Municipality	
District Municipality	
Province	

PRODUCTION

Q4. Which baby vegetables do you produce in the farm?

Baby vegetable	**Please tick (√)**	**Acreage planted (ha)**	**Planting season**	**Harvesting season**	**Harvest after how long**	**Quantity harvested (tons)**
Baby corn						
Baby carrots						
Baby gem						
Baby marrow						
Other						
Baby patty pan (Yellow)						
Baby patty pan (Green)						

Q5. Ha planted

Total ha of Arable land: _____

Total ha planted on baby vegetables: _____

Q6. When did the farm start producing baby vegetables?

For the domestic market _____

For the export market _____

Q7. Which farming system do you make use of in baby vegetable production? Please tick (√)

		Please tick (√)
Farming system	Manual Farming	
	Hydroponics system	
Type of farming	Organic Farming	
	Non-organic Farming	

Q8. What is the reason for this choice of farming system?

_____

Q9. Please explain the production process of baby vegetables?

_____

Q10. What kind of business assets do you need for baby vegetable production purposes?

No.	**Assets/Technological improvements**	**Cost**

Q11. Processing in this instance means to: *'wash, sort, package, grade and refrigerate / store'* baby vegetables.

Which of the processing activities do you perform?

Processing activities	**Activities done by yourself - please tick (√)**	**Activities sourced externally - please tick (√)**
Washing		
Cutting / Trimming		
Sorting		
Cooking/Preparing		
Packaging		
Storage		
Transportation		

FOOD SAFETY AND FOOD QUALITY

Q12. Do you have any ***food safety*** policies in place in terms of selling baby vegetables?

Please tick **(√)**

YES	
NO	

Q13. What do you do to ensure ***food safety*** in baby vegetables?
_____

Q14. Do you have any ***food quality*** policies in place in terms of selling baby vegetables?

Please tick **(√)**

YES	
NO	

Q15. What do you do to ensure ***food quality*** in baby vegetables?
_____

TRANSPORTATION

Q16. Which mode of transport do you make use of for transporting baby vegetables?

In the domestic market _____
In the export market _____

Q17. What special features does the mode of transport have?

In the domestic market _____
In the export market _____

IV. MARKETING

Q18. Who is your domestic market, within the borders of SA?

Domestic market	Location	Product	How often do you supply the market

Q19. Do you know the current market demand for baby vegetables?

_____

Q20. Are you able to produce according to the market demand?

Please tick(√)

YES	
NO	

Q21. Please explain

_____

Q22. Which baby vegetable/s is most demanded by customers?

_____

Q23. What do you think is the reason for the high demand for this baby vegetable/s?

_____

Q24. Which baby vegetable/s is least demanded?

_____

Q25. What do you think is the reason for the low demand for this baby vegetable?

_____

Q26. How are prices determined in the baby vegetable industry?

_____

Q27. Please answer the table below:

Baby vegetable	**SA Market**	**Quantity sold (tons)**	**Price/unit**
Baby corn			
Baby carrots			
Baby squash			
Baby marrow			
Other			
Baby patty pan (Yellow)			
Baby patty pan (Green)			

EXPORTS

Q28. Do you export the baby vegetables produced?

Please tick **(√)**

YES	
NO	

Q29. Which baby vegetables do you export?

Baby vegetable exported	**Please Tick (√)**	**Export destination**	**Quantity exported (tons)**	**How often do you export**	**Price/unit**
Baby corn					
Baby carrots					
Baby gem					
Baby marrow					
Other					
Baby patty pan (Yellow)					
Baby patty pan (Green)					

Q30. Who are your main competitors?

In the domestic market _____

In the export market _____

Q31. Why do you consider them as competition?

Domestic market _____

Export market _____

MARKETING STRATEGIES

Q32 What strategies do you have to market your business for baby vegetables?

Domestic market	**Please tick (√)**	**Export Market**	**Please tick (√)**
Word of Mouth		Word of Mouth	
Farm markets		Farm markets	
Price reductions		Price reductions	
Posters		osters	
Fliers		Fliers	
Newsletter		Newsletter	
Local newspaper		Local newspaper	
Billboards		Billboards	
Other:		**Other**:	
Market representative visits the farm		Market representative visits the farm	

Q33. How effective is the marketing strategy/s chosen?

_____

Q34. What are the business's top 5 strengths, weaknesses, opportunities and threats (SWOT Analysis) in terms of baby vegetable performance in your business?

Strengths	**Weakness**
1	1
2	2
3	3
4	4
5	5
Opportunities	**Threats**
1	1
2	2
3	3
4	4
5	5

Q35. What challenges do you encounter in your business?

No.	Types of challenges encountered
1	
2	
3	
4	
5	

Q36. What types of risk are encountered in your business?

No.	Types of risk encountered

Q37. What do you think should be done in order to minimise the risk?

_____

Q38. How are the assets used to produce baby vegetables financed?

Assets	Paid cash	Paid on credit - paid up	Paid on Credit - still owing

Q39. Are you able to access funds from the following?

	Please tick (√)
Government	
NGO	
Private companies	

Q40. How else do you raise funds for your business?

_____

THANK YOU FOR YOUR PARTICIPATION

RETAILERS

-

Interview questions

Thank you for participating in the interview. The purpose for the interview is to gather information about the baby vegetable industry in South Africa focusing specifically on baby corn, baby carrot, baby marrow and baby squash. The information gathered will help understand and analyse the baby vegetable industry in South Africa. The interview should not take more than 60 minutes. The interview is anonymous and confidential, thus you will not be identified. The answers you will provide for this interview will be for research purposes only.

PERSONAL INFORMATION

Name of interviewee	
Point of contact	
Date of interview	
Time of interview	**Start:** **End:**

Q1. Name of company/business: _____

Q2. Location of company/business

Nearest town	
Local Municipality	
District Municipality	
Province	

I. BABY VEGTEABLE SUPPLY

Q3. Does the retail outlet have farms that produce and supply baby vegetables?

Please tick **(√)**

YES	
NO	

Q4. If yes, please answer the table below:

Baby vegetable planted	**Planting season**	**Area planted (ha)**	**Harvesting season**	**Quantity harvested (tons)**	**Quantity delivered to the retail outlet**

Q5. Who are your main baby vegetable suppliers?

Main Suppliers	**Please tick (√)**	**How many**
Farmers		
Pack houses		
Fresh Produce Markets		
Wholesalers		
Others: Specify		

Q6. Which baby vegetables do you buy from suppliers?

PART A:

Supplier: (specify if farmer / processor)	Baby vegetable supplied	Please Tick (√)	Punnet / Pallet size	Quantity supplied /kg	How often are baby vegetables supplied	Farmer price / kg	Retail price / kg
Supplier 1							
	INDIVIDUAL						
	Baby corn						
	Baby carrots						
	Baby gems						
	Baby marrow						
	Baby patty pan (Yellow)						
	Baby patty pan (Green)						
Supplier 2							
	INDIVIDUAL						
	Baby corn						
	Baby carrots						
	Baby gems						
	Baby marrow						
	Baby patty pan (Yellow)						
	Baby patty pan (Green)						
Supplier 3							
	INDIVIDUAL						
	Baby corn						
	Baby carrots						
	Baby gems						
	Baby marrow						
	Baby patty pan (Yellow)						
	Baby patty pan (Green)						
Supplier 4							
	INDIVIDUAL						
	Baby corn						
	Baby carrots						
	Baby gems						
	Baby marrow						
	Baby patty pan (Yellow)						
	Baby patty pan (Green)						
Supplier 5							
	INDIVIDUAL						
	Baby corn						
	Baby carrots						

	Baby gems						
	Baby marrow						
	Baby patty pan (Yellow)						
	Baby patty pan (Green)						

PART B

Supplier: (specify if farmer / processor)	**Baby vegetable supplied**	**Please Tick (√)**	**Punnet / Pallet size**	**Quantity supplied /kg**	**How often are baby vegetables supplied**	**Farmer price / kg**	**Retail price / kg**
Supplier 1							
	Baby spinach						
	Baby leave rocket						
	Baby leeks						
	Baby Fennel						
	Cocktail tomato						
	Other:						
	Mix baby vegetables (specify)						
Supplier 2							
	Baby spinach						
	Baby leave rocket						
	Baby leeks						
	Baby Fennel						
	Cocktail tomato						
	Other:						
	Mix baby vegetables (specify)						
Supplier 3							
	Individual baby vegetables						
	Baby spinach						
	Baby leave rocket						
	Baby leeks						
	Baby Fennel						
	Cocktail						

	tomato						
	Other:						
	Mix baby vegetables (specify)						
Supplier 4	**Individual baby vegetables**						
	Baby spinach						
	Baby leave rocket						
	Baby leeks						
	Baby Fennel						
	Cocktail tomato						
	Other:						
	Mix baby vegetables (specify)						
Supplier 5	**Individual baby vegetables**						
	Baby spinach						
	Baby leave rocket						
	Baby leeks						
	Baby Fennel						
	Cocktail tomato						
	Other:						
	Mix baby vegetables (specify)						

Q7. In which season is the supply for baby vegetables more (supply greater than demand)?

_____

Q8. In which season is the supply for baby vegetables less (supply less than demand)?

_____

Q9. Which baby vegetables are readily available for supply, in any given season?

_____

Q10. Which baby vegetables are scarce for supply in any given season?

_____

CUSTOMER DEMAND

Q11. Who are your main customers?

Customers	**Please tick (√)**	**Percentage (%)**	**How often do they buy baby vegetables**
Individuals			
Homemakers			
Hospitality industry: Restaurants, B&B's, Hotels, Caterers etc			
Other:			

Q12. Which baby vegetable do customers buy most?

Baby vegetable	**Please Tick (√)**
Baby corn	
Baby carrots	
Baby squash	
Baby marrow	
Baby patty pan (Yellow)	
Baby patty pan (Green)	
Other	

Q13. Which baby vegetable do customers buy least?

Baby vegetable supplied	**Please Tick (√)**
Baby corn	
Baby carrots	
Baby squash	
Baby marrow	
Baby patty pan (Yellow)	
Baby patty pan (Green)	
Other	

Q14. What do you think is the current customer demand for baby vegetables?

Baby vegetable demand	**Please tick (√)**
High	
Moderate	
Low	

Q15. What according to you is the cause for this demand?

_____

Q16. What do you think is the growth of the baby vegetable industry.....

Industry growth	**In SA? (Please tick √)**	**In your Area (Please tick √)**
Fast		
Constant		
Slow		

Q17. Please explain Q16 above

_____

Q18. In which season/s is the demand for baby vegetables…..

High _____

Low _____

Q19. When is the demand for baby vegetables at its highest peak?

Demand at its highest peak	**Please tick (√)**
December holidays	
Easter holidays	
Other (specify):	

Q20. Are customers who buy baby vegetables delicate to price changes?

Please tick **(√)**

YES	
NO	

Q21. Please explain if you have answered yes in Q20

Q22. What according to you, do customers expect to receive (added advantage) from purchasing baby vegetables?

_____

Q23. At what rate do customers buy baby vegetables from your store?

Rate at which baby vegetables are bought	**Please tick (√)**
Fast rate	
Medium rate	
Slow rate	

Q24. Please explain your answer in question14 above

_____

Q25. How is the quality of baby vegetables maintained upon delivery?

_____

Q26. How is the quality monitored and maintained on the shelves in the shop?

_____

Q27. What are the requirements that suppliers must meet for them to supply the retail outlet with baby vegetables?

_____

Q28. What is the shelf life for the following baby vegetables?

Baby vegetable	**Shelf life (days)**
Baby corn	
Baby carrots	
Baby squash	
Baby marrow	
Other	
Baby patty pan (Yellow)	
Baby patty pan (Green)	
Baby gem	

Q29. Do you have a contract with the farmers supplying you with baby vegetables?

Please tick **(√)**

YES	
NO	

Q30. Please define the type of contract you have with the farmers

_____

Q31. How do baby vegetables sell when compared to the “normal vegetables?”

_____

Q32. What is the rate at which baby vegetable are replaced daily on the shelves

_____

Q33. What is the temperature (^{o}C) at which baby vegetables are kept under on the shelves?

_____

Q34. Is the temperature for storing baby vegetables the same as those of other vegetables?

_____

Q35. Where do you see the baby vegetable industry in five years' time?

_____

THANK YOU FOR YOUR PARTICIPATION

EXPORTERS

-

Interview questions

Thank you for participating in the interview. The purpose for the interview is to gather information about the baby vegetable industry in South Africa focusing specifically on baby corn, baby carrot, baby marrow and baby squash. The information gathered will help understand and analyse the baby vegetable industry in South Africa. The interview should not take more than 60 minutes. The interview is anonymous and confidential, thus you will not be identified. The answers you will provide for this interview will be for research purposes only.

PERSONAL INFORMATION

Name of interviewee	
Point of contact	
Date of interview	
Time of interview	**Start:** **End:**

Q1. Name of company/ business: _____

Q2. Location of farm/company/business

Nearest town	
Local Municipality	
District Municipality	
Province	

Q3. What is your role in the supply chain of baby vegetables?

Q4. Which baby vegetables do you export?

Baby vegetable	**Please tick (√)**	**Export destination**	**Quantity exported (tons)**	**How often do you export**	**Price/ unit**
Baby corn					
Baby carrots					
Baby gem					
Baby marrow					
Other					
Baby patty pan (Yellow)					
Baby patty pan (Green)					

Q5. Who are your suppliers of baby vegetables?

Suppliers	**Please tick (√)**	**How many**	**From which Province/s**
Individual farmers			
Co-operatives			
Retailers			
FPM			
Other: Specify			

Q6. After receiving baby vegetables from suppliers, how long does it take to export them to customers?

Time it takes to export baby vegetables	**Please tick (√)**	**Exporters shelf life**
< than a day		
One day		
Two days		
More than three days		

Q7. Which mode of transport do you make use of to transport baby vegetables?

From your business to the Airport _____

From the Airport to the Export destination _____

Q8. Which special features does your transport possess?

_____

Q9. Who are your major customers abroad?

Customers	**Please tick (√)**	**How many**
Individual customers		
Supermarkets		
Retailers		
Import agents		
Other: please specifically		

Q10. How is the quality of baby vegetables when farmers deliver them to you?

_____

Q11. How do you manage the quality of baby vegetables after arriving from farmers/suppliers?

_____

Q12. How is the quality when they reach the export market?

_____

Q13. What are the major risks when exporting baby vegetables?

_____

Q14. Who bares the risk when baby vegetables are exported?

_____

Q15. What does it take to survive as an exporter in the competitive global market?

_____

Q16. What standards do you have to comply with in order to export baby vegetables?

_____

Q17. What do you think is the demand for baby vegetables in your current markets?

Baby vegetable demand	**Please tick (√)**
High	
Medium	
Low	

Q18. What do you think is the growth rate of the baby vegetables from SA to abroad?

Baby vegetables growth rate	**Please tick (√)**
Growing in an increasing rate	
Growing in a constant rate	
Stagnant / not growing	

Q19. What is your current market share in all the markets where you export baby vegetables?

_____

Q20. How does the exchange rate affect your business?

_____

Q21. How is the local competition as a baby vegetable exporter?

_____

Q22. How is the international competition as a baby vegetable exporter?

_____

Q23. Which activities in terms of exporting baby vegetables do you perform?

_____

Q24. What are the consumption levels of the baby vegetables in the export market?

Consumption level	**Please tick (√)**
High	
Medium	
Low	

Q25. How is the market entry for baby vegetables in the export market?

Market entry	**Please tick (√)**

Q26. Who according to you are the leaders in terms of the supply of baby vegetables in the export market?

From Africa _____

From around the world _____

Q27. Do you export baby vegetables to Africa?

_____

Q28. What is your relationship with airline companies in terms of them transporting the baby vegetable produce to the export markets?

_____

Q29. Do import agents perform any value-adding activities?

_____

THANK YOU FOR YOUR PARTICIPATION

This questionnaire was extracted from the original questionnaire from the Western Cape Department of Agriculture as only the questions included were relevant to gather data on the use of agricultural implements by baby vegetable producers. The data was used to calculate the fuel cost, maintenance and repair costs which were used when developing the enterprise budgets.

Enterprise Budget Questionnaire

Grain Crops, Pastures, Silage & Hay & Vegetables

-

- **Mechanization**

- **Tractor & Implement**

	Date	**Action**	**Power source (kW)**	**4 X 4/ 4 X 2**	**Power demand (H=High, M=Medium, L=Low)**	**Implement**	**Implement Width (m)**	**Speed of Activity (km/h)**	**Repeats**
Pre-Plant:									
Planting:									
	Date	**Action**	**Power source (kW)**	**4 X 4/ 4 X 2)**	**Power demand (H=High, M=Medium,**	**Implement**	**Implement Width (m)**	**Speed of Activity (km/h)**	**Repeats**

					L=Low)				
Maintenance:									

	Date	Action	Power source (kW)	4 X 4/ 4 x 2	Power demand (H=High, M=Medium, L=Low)	Implement	Implement Width (m)	Speed of Activity (km/h)	Repeats
Harvest:									