IMPACT ANALYSIS OF THE LINKAGE BETWEEN AGRICULTURAL EXPORTS AND AGRICULTURE'S SHARE OF GROSS DOMESTIC PRODUCT IN SOUTH AFRICA - A CASE OF AVOCADO, APPLE, MANGO AND ORANGE FROM 1994 TO 2011

MASTER OF AGRICULTURAL MANAGEMENT

(AGRICULTURAL ECONOMICS)

M.B BULAGI

2014

IMPACT ANALYSIS OF THE LINKAGE BETWEEN AGRICULTURAL EXPORTS AND AGRICULTURE'S SHARE OF GROSS DOMESTIC PRODUCT IN SOUTH AFRICA - A CASE OF AVOCADO, APPLE, MANGO AND ORANGE FROM 1994 TO 2011

By

MUSHONI BENEDICT BULAGI

Dissertation submitted in fulfilment of the

requirements for the degree of

Master of Agricultural Management (Agricultural Economics)

In

Department of Agricultural Economics and Animal Production

In the

Faculty of Science and Agriculture

School of Agricultural and Environmental Sciences

At the

University of Limpopo

Supervisor: Mr J.J. Hlongwane (UL)

Co-Supervisor: Prof. A. Belete (UL)

2014

ABSTRACT

The role of agricultural exports to agriculture's share of Gross Domestic Product (GDP) in South Africa is of extreme importance and exhibits strong interest from all parts of the economy. Many believe that agriculture can salvage the declining economic growth under such global economic conditions. The decision to diversify and expand exports of these avocados, apples, mangoes and oranges will improve the South African economy's unstable conditions. This study accounts for all the factors that are truly unique to South African's economy. Therefore, the study will help to shift the focus of avocado, apple, mango and orange growers to export more due to the international market demand for such produce.

The aim of the study was to analyse the link between avocado, apple, mango and orange exports and agriculture's share of Gross Domestic Product in South Africa. The specific objectives are to determine the correlation between avocado, apple, mango and orange exports and the agriculture's share of Gross Domestic Product in South Africa, investigate the contribution of avocado, apple, mango and orange exports and the agriculture's share of Gross Domestic Product in South Africa, determine the growth rate (trends) of avocado, apple, mango and orange exports and determine the volatility of avocado, apple, mango and orange exports. The study used secondary time series data that covered a sample size of 17 years (1994 - 2011) of avocado, apple, mango and orange exports in South Africa. Two Stages Least Square models and Growth rate and Volatility models were used for data analysis.

Empirical results for agricultural exports equation revealed that agricultural economic growth in South Africa was significant with a positive coefficient. While a negative relationship between the Net Factor Income (NFI) and the agricultural exports in South Africa was noticed. Real Capital Investments had a significant positive coefficient. Consequently, results from agricultural economic growth equation revealed that agricultural exports were significant with a positive correlation. A relationship between NFI and agricultural GDP was also witnessed. Like other variables, Real Capital Investment was significant but negatively correlated. The results of growth rate and volatility models showed positive trends. Furthermore, results showed that the quantity of agricultural exports was positively related to agricultural economic growth. Another point of interest was that while these exports were positive and significantly related, the magnitude of its coefficient is smaller than the coefficients of Real Capital Investments. It is in this framework that the positive correlation exists between agriculture economic growth and agricultural exports.

It is recommended that investment opportunities in the agricultural sector need to be investigated further because there is limited knowledge of the subject. The Department of Agriculture, Forestry and Fishery and the private sector need to join hands and build a mutual relationship to aid develop an agricultural economy which can be able to exports more than what it imports. This can also be done by subsidising farmers with capital to relieve them of other expenses.

ACKNOWLEDGEMENTS

Glory and thanks to GOD, our heavenly father for giving me energy, knowledge, passion and patience to see this study through. The same LORD, who continuously showers blessings and delivers me through all hardships endured during this cause. My undying faith and words of gratitude are due to him and my heart yearns for his love forever.

Oh, what a human being! Mr J.J. Hlongwane, who guided me on this academic venture, supported and motivated me throughout the study. Without your hard work, dedication and brotherly love this study could have not been a success. I also appreciate my co-supervisor, Prof. A. Belete for his support and commitment during difficult times.

Words of appreciation go to my family and friends for their genuine love, financial, emotional and social support. My single mother, Mrs Makwarela Lydia Bulagi, has been a pillar of strength and my older brothers who are rocks at the corner of the house. My younger brothers and sister, you were a fountain of inspiration that will never dry nor stop pumping water. I have a special friend in Mosibudi, thank you for the love, support and inspiration you gave throughout all hardships.

Word of appreciation goes to all staff members at the University of Limpopo, the people that dedicated their time and contributed towards this study to be precise; Dr. J. Singh for her research guidance through research workshops and Mr L. Seabi the kind librarian who helped with relevant articles. To the department of Agriculture Economics and Animal Production I salute you all. Huge thanks to ABSA for sponsoring this degree, special thanks to the ABSA bursary team.

DECLARATION

I declare that the dissertation hereby submitted to the University of Limpopo, for the degree of Masters of Agricultural Management in Agricultural Economics has not previously been submitted by me for a degree at this or any other university; that it is my work in design and in execution, and all material contained herein has been duly acknowledged.

…….. ……..

Surname and initials Date

DEDICATION

To my late father (Mphalaleni Daniel Bulagi),

mother (Makwarela Lydia Bulagi), siblings

(Luambo, Itani, Azwinndini and Munzhedzi) as well as all avocado, apple, mango and orange exporters in South Africa.

Singo Rambau, dzivhani la Mushungwa a huna ngwena. Tshalo ndi u phirimedza. Vha ha nya miri I a na maluvha ya vhanwe I tshi a na ndalama. vhe mutshena ha li nonzhe, nonzhe I liwa nga vhakuna. Dzulani zwanu Singo Rambau!

LIST OF TABLES

LIST OF FIGURES

LIST OF ACRONYMS

2SLS	: Two Staged Least-Squares
ASEAN	: Association of Southern Asian Nations
CGA	: Citrus Growers Association
DAFF	: Department of Agriculture, Fishery and Forestry
ELG	: Export Led Growth
EU	: European Union
GDP	: Gross Domestic Products
GNP	: Gross National Products
GVP	: Gross Value of Production
INV	: Real Capital Investment
NDA	: National Department of Agriculture
NFI	: Net Factor Income
NFPM's	: National Fresh Produces Markets
OLS	: Ordinary Least Squares
OECD	: Organisation for Economic Co-operation and Development
SAAGA	: South African Avocado Growers Association
SAMGA	: South African Mango Growers Association
SIC	: Semi Industrialised Countries
SPSS	: Statistical Package for Social Sciences
URAA	: Uruguay Round Agreement on Agriculture
WTO	: World Trade Organisation

TABLE OF CONTENTS

List of Content **Page**

CHAPTER ONE

INTRODUCTION

1.1 Background of the study

In Africa, South Africa is one of the largest countries in the continent and it also has the largest economy, with a per capita Gross Domestic Product (GDP) lower than Egypt (UN, 2010). South Africa has undergone immense social and economic changes over the last years, following the abolition of apartheid and fundamental reforms aimed at creating a more open and market-oriented economy. Partial reforms, mainly concerning democratic elections in 1994 and the lifting of international economic sanctions against South Africa opened way for broad liberalising reforms (OECD, 2006).

South Africa's agriculture sector is dualistic; a developed commercial farming sector co-exists with a large number of subsistence (communal) farms. South African agriculture is increasingly export-oriented with approximately one third of total production exported. Changes in South African agriculture policies in the past decade have been shaped by substantial macroeconomic and social reforms implemented during the mid-1900s to date, although reforms of agricultural policies were also initiated. According to (OECD,2006) such policies included the deregulation of the marketing of agricultural products; abolishing certain tax concessions favouring the sector; reductions in budgetary expenditure on the sector; land reform; and trade policy reform.

The new trade arrangements and policy recommendations improved access to foreign markets for farmers and also introduced greater exposure to external competition in

international market. The main developments in trade policies are the replacements of direct controls over imports by tariffs, which were set below the rates bound in the World Trade Organisation (WTO), and the elimination of state controls over exports. The opening of the agricultural sector after 1996 placed South Africa among the world's exporters of agro-food products such as wine, fresh fruit and sugar. South Africa is also an important trader of agricultural exports in Africa. In the global market, Europe is by far the largest destination, absorbing almost one half of the South African agricultural exports. Imports were also growing but less rapidly than exports (DAFF, 2012).

One particular sector which has been given special attention in developing countries' strategies is agriculture. South African exports of agricultural goods on an annual basis increased from 2001 to 2005, due to an increase in the total world imports of agricultural products. Avocado, apple, mango and orange are some of the oldest cultivated fruit crops, grown in the tropics for at least 4000 years. They are now widely spread throughout the tropics and sub-tropics. These fruits occupy an important socio-economic position in South Africa and other developing countries where they are held in high esteem.

In South Africa and other developing countries the most important macroeconomic objective is rapid economic growth, which leads to development and exports growth that is an engine for economic growth. This objective for rapid economic growth in developing countries is attained through more trade. There are rich empirical and theoretical studies regarding the role of exports on improving economic growth and development. Classical economists like Adam Smith and David Ricardo have argued

that international trade is the main source of economic growth and more economic gain is attained from this trade. According to the export led-growth hypothesis, exports are the main source of economic growth.

Agricultural export raises more foreign exchange which can be used to purchase manufactured goods, capital goods and technology. These inputs contribute to economic growth. Exports, economies of scale, technological development, and increased capacity utilization indirectly promote growth via increased competition. Many positive externalities i.e. efficient management or reduction of organizational inefficiencies, better production techniques, positive learning from foreign rivals and technical expertise about product design are accrued due to more exports, leading to economic growth.

The South African GDP increased from 2.9% to 3.1% while agriculture contributes less than 3% to the share of GDP (DAFF, 2012). Wine and fruits production has seen the most dynamic development in the past ten years with a large share of total output exported, mainly to Europe. Agricultural products, particularly those with export potential, have been viewed by many underdeveloped nations around the globe as playing a vital role in economic development.

The role of agricultural exports to agriculture's share of Gross Domestic Product in South Africa is of extreme importance and exhibits strong interest from all parts of the economy. Many researchers [Haleem *et al.* (2005); Stiglitz (2007); Sanjuan-Lopez and Dawson (2010); Raza *et al*. (2012); Jatuporn *et al.,* (2011)] believe that agriculture can

salvage the declining economy under unstable global economic conditions. Avocado, apple, mango and orange production in South Africa over the decade has shown good growth trends. The debate on the relationship between agricultural export and agricultural GDP has exhibited considerable interest in the field of development economics. Several empirical studies [Xu (1996); Tyler (1981); Shirazi and Manap (2004); Faridi (2012)] were conducted to assess the role of exports towards the economic growth of developing countries from various aspects. While the true measure of these nations' development needs to be expressed through improvements in the standard of living, their economic growth plays a significant part in this process by providing increased per capita income, increased revenue for government sponsored social services and leading to export led-growth.

This export led-growth is said to result in increased output, employment and consumption, which lead to an increase in the demand for a country's output (Jung and Marshall, 1985). Furthermore, a buoyant export sector enlarges the domestic market so that firms achieve economies of scale and thus lower unit costs. This may be expected because an export sector allows a country to trade along its lines of comparative advantage, specialising not only in commodities that use its abundant factors intensively, but also were it's per unit costs are lower (Tyler, 1981). Trade may also benefit a country with positive export externalities which lead to increased productivity and economic growth (Bradford, 1994; Feder, 1983; Sengupta, 1991). More so, trade may help a developing country to overcome the ax-ante saving-investment gap and the

ax-ante import-export gap by providing the necessary foreign exchange for development (Chenery and Strout 1966; Wilbur and Haque, 1992).

The notion of the correlation between export growth and economic growth in developing countries has been of continuing interest both in theoretical and empirical literature for many years. A large number of empirical studies have been conducted during the last two decades to investigate the role of exports on economic growth or the export-led growth hypothesis, and have used either time-series or cross-section data. These studies have been conducted along a number of divergent lines and models. The early studies on this issue investigated the correlation between export growth and economic growth using the ladder. These studies generally concluded that there is strong evidence in favour of export-led growth hypothesis based on the fact that both export growth and economic growth are highly correlated. The main shortfall of this group of studies is that a high degree of positive correlation between the two variables was used as evidence supporting the export-led growth hypothesis.

The second group of studies differs with the first group. It took the approach of whether or not exports are driving output by estimating output growth regression equations based on the neoclassical growth accounting techniques of production function analysis, including exports or export growth as an explanatory variable. They used a highly significant positive value of the coefficient of export growth variable in the growth accounting equation and a significant improvement in the coefficient of determination with the inclusion of the export growth hypothesis in the regression equation as evidence for the export-led growth hypothesis. This group of models can be subject to

criticism based on a methodological issue. They generally make a priori assumption that export growth causes general output growth and do not consider the direction of the causal relation between the two variables.

A third group of, relatively recent [Tiffin and Irz (2006); Memon *et al*., (2008); Shombe (2008); Sanjuan-Lopez and Dawson (2010); Raza *et al*., (2012); Faridi (2012)}, studies have their main emphasis on causality between export growth and economic growth. This has been adopted in a number of recent studies designed to assess whether or not individual countries exhibit evidence for export-led growth hypothesis using time series data. The major disadvantage of these causality test results is that the Granger or Sims tests used in these studies are only valid if the original time series are co-integrated.

This study went on further to determine growth rates and volatility of avocado, apple, mango and orange exports. These macroeconomic factors are critical to the agricultural sector because they aid to stabilize the market and increase economic growth. Volatility is one of the most important macroeconomic concepts in the whole of finance. Volatility, as measured by the standard deviation or variance of returns, is often used as a crude measure of the total market risk of financial assets. Many value-at–risk models for measuring market risk require the estimation or forecast of volatility. There is a negative relationship between growth and volatility. Volatility as measured by term of trade shocks is harmful for growth. The potentially detrimental causal effect of volatility on growth is larger in countries with lower financial development, which may have important implications for welfare and policy (Aghion *et al.,* 2005).

1.2 Definition of concepts

Agricultural GDP

Economists and the media use many terms besides Gross Domestic Product to refer to the nation's annual output of goods and services, where output, total output, national output, income, total income, national income, and aggregate supply are common. Suppose that everything produced during the year was bought during the year. Then by adding up all expenditure on final goods and services during a financial season, it is then appropriate to measure the GDP of the year in question. This is the rationale behind the expenditure to measure GDP in the content of this study.

GDP from agriculture is calculated as the proportion of total output of goods and services which are a result of the value added by the agricultural sector. Value added is the value of the gross output of producers less the value of intermediate goods and services consumed in production. It is calculated without making deductions for depreciation of fabricated assets or depletion and degradation of natural resources. Several things should be noted, that's current market prices which reflect the value society places on items and uses to aggregate different outputs to a total Rand. In this quest only final goods and services are included.

Agricultural exports

In the contest of this study, agriculture exports refer to avocado, apple, mango and orange exports from South Africa. It constitutes tonnes of these produce domestic and across all borders and destined for different markets.

1.3 Problem statement of the study

The opportunity to expand exports is a key determinant of the prospects for economic growth in developing countries. Regardless of whether or not exports drive economic growth, one of the primary aims of any country's economic policy includes trade, industry policy and internationally competitive sectors which contribute to job creation. It is within this framework that the linkage between avocado, apple, mango and orange exports and agriculture's share of Gross Domestic Product needs to be studied and its roles in economic development in South Africa need to be assessed. Literature [Katircioglu (2006); Shombe (2008), Khalafalla and Webb (2001)] on economic development and growth discusses the relationship between exports and economic growth. This group of studies found correlation between these two variables and better support an export led-growth hypothesis.

Given this emphasis of agricultural exports by some countries as a path to economic growth and development, the study on the linkage between avocado, apple, mango and orange exports on a nation's agricultural economic growth would be useful to policy makers. A study focused on an individual nation is necessary in order to account for all factors that are truly unique to a nation's economy. Therefore, the study will help to shift the focus of avocado, apple, mango and orange growers to export more due to the international market demand for such produces. This can be achieved by clustering agricultural produce based on their comparative advantage and exports potential. In South Africa much work has been done to study the impact of export growth, comparatively yet little has been done to analyse the impact of a single or few produce

within the agricultural sector. The study considered S.A as a case study and focus on avocado, apple, mango and orange exports because their production have a higher value adding processing potential and are scattered around the republic.

The study seeks to bring into question the effectiveness of the agricultural exports to the share of GDP and highlighting on the promotion of adequate information to help farmers, government, private entities and policy makers. Agricultural export is the important component of the favourable balance of payments, as one of the paramount macroeconomic objectives and a tool for economic growth in developing countries. This implies that the more South Africa exports, the better the balance of payments which trigger economic growth. Avocado, apple, mango and orange plantations in South Africa are favourable and tonnes are grown, which leads to surplus in the domestic market and results in dumping and less returns in the long-run.

The issue of how South Africa's agricultural sector can achieve economic growth is one of the fundamental economic questions which need proper considerations. An export-led growth hypothesis, which states that agricultural exports and other exports in general are keys to promoting economic growth, provides one of the answers to these fundamental questions. According to Abou-Stait (2005), an export-led growth strategy aims to provide producers with incentives to export their produce through various governmental policies. The strategy also aims at increasing the capacity of producing goods that can compete in the world market and make provision for foreign exchange. Agricultural exports can help South Africa to integrate in the world economy and help reduce the impact of external shocks on the domestic economy.

South Africa's trade policy on the agricultural sector was accelerated when the country became a signatory to the Uruguay Round Agreement on Agriculture (URAA), leading to the Marketing of Agricultural Products Act of 1996. This Act intervened than the WTO agreements and reduced state intervention in agricultural marketing and product prices. This Act is in pursuit of free access for all market participants in order to promote efficiency of agricultural products, improve opportunities for export earnings and enhance the viability of the sector to international market to earn much needed foreign currency.

During the process of implementing this Act, South Africa made large strides in terms of removing export subsidies and substantially reducing domestic support. However, high tariffs and the structure of support in areas such as avocado, apple, mango and orange, among other products, need to be revisited. South Africa should be aware that fundamental unilateral trade reforms are necessary if policies in agriculture are to meet the changing demands of consumers, at the same time avoiding any negative impacts on producers and international trade. The agricultural sector has a lower contribution towards the South African GDP compared to other sectors, which negatively affects agricultural exports and growth in the agricultural sector.

1.4 Motivation of the study

The relationship between agricultural exports and agriculture's share of GDP is debatable. It remains to be seen what agricultural exports can do to the South African economic growth. At present most developing countries depend on exports for foreign

exchange. Although some of them have access to foreign currency in the form of foreign aid and private loans, exports are still the primary supplier of foreign currency. Exports contribute to economic growth in a variety of ways namely: greater capacity utilisation, economies of scale, incentives for technological improvement, pressure of foreign competition and leading to more efficient management. Therefore, marginal factor productivities are expected to be higher in export industries than in non-export industries.

The South African agricultural industry has become less dependent on state support and internationally more competitive, although many sectors within the industry experienced a difficult period of adjustment and the distress concerning segmented level of farming groups. The country's key and rising agricultural exports generally face relatively low levels of border protection, in part, due to bilateral and general tariff concessions to South Africa following the Marketing of Agricultural Products Act of 1996. However, these preferences do not exclude South Africa from the seasonal elevation of tariff barriers, export quotas and from the implicit constraints of the entry prices built into the European Union (EU) regime for fresh fruits. This needs utmost attention since issues of seasonal elevation of tariffs affects South African's possibility of exporting fruits from provinces which have similar harvesting seasons to those in Europe and competing countries.

The overall performance in the agricultural sector and its exports is also affected by South Africa's participation in different trade agreements. South Africa is a signatory to a number of trade agreements which contributed to the liberalization of the agricultural

sector hence the agreements can be used to expand export growth. Participation in different global trade agreements and regional bilateral reduced distortions which existed from indirect export subsidies such as electricity, transport rebates, export finance, credit guarantees and marketing allowances. In addition, South Africa undertook several labour policy reforms. The combination of liberalization and stricter labour laws exposed the agricultural sector to the adverse effects of globalisation. In recent years there have been several efforts reflecting greater interest in exploring the possible relation between agricultural exports, international trade and agriculture's share of economic growth. GDP increase is the main target of almost every economy. Promoting agricultural exports of the country is one of the ways which can help achieve agricultural economic growth.

On average, South African avocado, apple, mango and orange production, in both commercial and small-scale sectors, is growing every year. This results in surplus quantity in the market. The direct link can contribute to the export-led economic growth. This export-led growth can create profit; allow the agricultural economy to balance its finances and surpassing the debts and lower returns which are challenges in South Africa's agricultural economy. The increased export growth can trigger more avocado, apple, mango and orange productivity, which create more exports. Farmers producing avocado, apple, mango and orange for exports purposes can receive exports tariff subsidies and better access to the local and expand to international markets.

These export quotas result in a negative balance of payments, which leads to unbalanced GDP. South Africa is one of the labour abundant countries producing

avocado, apple, mango, orange and other agricultural products which require extensive management. To this end the exports quota policy must be reviewed such that the quotas cost less and more money can go towards hiring more labours. The high rate of capital accumulation has its basis in the liberalisation of a labour-surplus economy that has a high saving rate. Therefore, investment unlike exports will be highly profitable because surplus labour will prevent the existent from rising significantly while the large pool of domestic saving prevents the interest rate from rising. This is due to our relatively lower skilled labour and lower level of technology utilization due to lack of skills. The resulting reduction in the demand for our agricultural goods in the world market could retard agricultural economic growth.

1.5 Aim and Objective of the study

1.5.1 Aim of the study

The aim of the study is to analyse the link between avocado, apple, mango and orange exports and agriculture's share of Gross Domestic Product in South Africa.

1.5.2 The objectives of this study were as follows:

i. determine the growth rate of avocado, apple, mango and orange exports.
ii. determine the volatility of avocado, apple, mango and orange exports.
iii. investigate the contribution of avocado, apple, mango and orange exports to agriculture's share of Gross Domestic Product.
iv. determine correlations between avocado, apple, mango and orange exports and agriculture's share of Gross Domestic Product.

1.6 The hypotheses of this study were as follows:

Hypotheses of the study were:

i. there is positive growth rate of avocado, apple, mango and orange exports.
ii. there is volatility on avocado, apple, mango and orange exports.
iii. there is contribution of avocado, apple, mango and orange exports on the agriculture's share of Gross Domestic Product.
iv. there is correlation between avocado, apple, mango and orange exports and agriculture's share of Gross Domestic Product.

1.7 Organization of the study

The study is presented in seven chapters. Chapter two presents the literature review and the implications from that review, while Chapter three presents avocado, apple, mango and orange market value chain background in South Africa. Chapter four presents methods of analyses employed in the study. Chapter five focused on the descriptive analysis of the study covering analysis for both the Two Staged Least Squared System and Growth and Volatility Analysis model. Chapter six presents the results of empirical analysis. Chapter seven presents the summary, conclusion and policy implications. Then lastly references are listed thereafter.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter presents an overview of the role of agricultural exports on economic growth, literature on the contribution of agriculture and agricultural exports on agricultural GDP in developing countries, traces the causality between agricultural exports and GDP in developing countries. It went further to highlight the issue of export-led growth and developing countries. This chapter also looks at agricultural trade policy regulation and reform policy, which affect agricultural exports. However, there are a number of specific factors that the reviews of previous studies have been drawn in this study.

2.2 The role of agricultural exports on economic growth

Agriculture remains the backbone of the South African economy. Not only does it contributes to the GDP, but it is an important generator of foreign exchange, provides employment, has some of the strongest forward and backward linkages in the economy, as well as strong employment multipliers and it provides food security (Mala, 1998). According to DAFF (2011) South Africa is a relatively small avocado, apple, mango and orange grower in terms of global hectares and exports. Quantities exported by South Africa increased by a marginal 3% between the 2007/08 and 2008/09 marketing seasons. Furthermore, guided by the law of demand the declining prices of avocado,

apple, mango and orange will lead to higher export revenue due to higher quantity demanded.

Svedberg (1993) studies the relationship of several African countries and concludes that the decline in agricultural exports was one of the main reasons of economic crisis and sluggish Gross National Product (GNP) growth. Exports of avocado, apple, mango and orange to Africa have also been declining during the past three years, moving from 866 tons in 2007 to 396 tonnes in 2009. As a result, avocado, apple, mango and orange exports to the Americans have been consistent over the last decade, remaining below 100 tons for most of the decade and only peaking to 160 tons in 2001 (DAFF, 2011).

The argument concerning the role of mango export as one of the main determinants of economic growth is not new. Haleem *et al.* (2005) investigated export supply response of citrus and mangoes in Pakistan. The study reviewed performance of citrus and mango exports for the years 1975 - 2004. Export supply response was estimated for these two crops by employing Johansen's Co-integration technique. The share of fruit export declined during the time. Average growth rate of fruit exported during the period of study was 4.8%. There were nominal earnings from export of citrus and mangoes in early years which gradually increased with the passage of time. The fluctuating performance of citrus and mango exports was attributed to highly fluctuating domestic production, inconsistent export policies, currency devaluation, export duties, non-competitiveness of exports and uncertain situation in the international markets (Ghafoor *et al.*, 2010).

Following the highly successful East Asian export growth strategy during the 1970s and 1980s, export promotion strategy has received renewed attention and led economists to stress the vital role of exports as the engine of economic growth (Shombe, 2008). Currently, the fast growth of China and India is believed to be as a result of expansion in their export. The success of China and India was largely due to both export-led growth and access to technology through globalization (Stiglitz, 2007). Exports imply access to the global market and permit increased production while trade encourages efficient allocation of resources and contributes to economic growth by generating long-run gains (Easterly, 2007).

According to Jung and Marshall (1985), there are three factors responsible for the positive correlation between real export growth and growth in real Gross National Product (GNP). These factors are as follows: export growth directly contributes to growth in real GNP; increased exports lead to increased foreign exchange availability which may enable the economy to increase imports of intermediate and capital goods that in turn lead to growth in GNP; and growth in the export sector might result in positive externalities such as increased efficiency in the non-export sector and these externalities would lead to growth in the GNP. Ghana's economic reform policies have strongly promoted timber exports and also supported cocoa production for export (Hommond and McGowen, 1994). According to Korten (1994), Costa Rica has shifted state support from traditionally produced products for domestic markets to the production of high value non-traditional agriculture exports in hopes of stabilizing its economy and to bring in much needed foreign exchange.

Another hypothesis suggests, contrary to neo-classical theory, that marginal productivities across different sectors in developing economies are not the same and that marginal productivities are expected to be higher in the exporting sector due to their exposure to competitive factors from abroad. However, it is argued that despite the higher marginal productivities present in the export sector (as compared to the domestic sector), resources are diverted away from the export sector. It is suggested that developing countries can grow not only with the expansion of factors of production, namely capital stock and labour force, but also by the reallocation of resources from the less productive non-export sector to the more efficient export sector (Feder, 1983).

Henneberry and Khan (1989) analysed the relationship between agricultural exports and economic growth. The relationship between agricultural exports and GDP growth was demonstrated by the estimated parameter (Xa) for the independent agricultural export variable in the GDP equation and by the estimated parameter (GDP) for GDP growth in the agricultural exports equation. In all four models which estimated the GDP equation, Xa was found to be positive and statistically significant at a level of one per cent. According to these models, a one per cent increase in per capita agricultural exports would ultimately result in an increase of 0.22% to 0.36% in per capita GDP.

Most previous researches have concentrated on this relationship. At present most developing countries are dependent on exports for foreign exchange. Although some of them have access to much needed foreign exchange in the form of foreign aid and private loans, exports are still the primary supplier. According to the theory of ‘‘two gap,’’ the foreign exchange function of exports is only important when the economy is

facing an import shortage resulting from a foreign exchange constraint. Most of the previous works have implicitly assumed that import shortage was not a problem with the countries included in their studies. Esfahani (1991) carried out a study aimed at testing whether Semi-Industrialized Countries (SIC) are indeed facing import shortage due to a binding foreign exchange constraint. This implied that the positive impact of the exports on GDP observed in the past is likely to be due to the import shortage reduction rather than the externality effect.

Svedberg (1993) studies the relationship of several African countries and concludes that the decline in agricultural exports was one of the main reasons of economic crisis and slow GNP growth. Another study on China's economic growth suggests a strong relationship between the agricultural sector in general and economic growth. It is further concluded that agriculture is the driving force for all other economic sectors, even though its share in national income has been falling sharply over time. Moreover the study suggests that the growth in other sectors has had little impact on agricultural income. Another point of interest in this study is that while agricultural exports were shown to have a positive and significant relationship with GDP growth, the magnitude of its coefficient is smaller than the coefficient of manufactured exports share. This may imply that GDP benefits more from an export structure which is rich in manufactured goods. An empirical study of reallocation of resources in developing countries suggests that transferring labour from the agricultural sector to other sectors of the economy is associated with economic growth (Humphries and Knowles, 1998).

In the above literature, the export-led growth and growth driven-export hypotheses have become a debate for researchers and policy makers alike for almost three decades. The export-led growth hypothesis generally reflects the relationship between exports and economic growth; in particular, that output growth is driven by exports. As export is one of the components of GDP, the export-led growth hypothesis claims that export expansion is one of the main determinants of growth (Shombe, 2008). There are several studies conducted on the exports and economic growth, some of them are country specific and some are conducted on different economic regions. Most of them have found a strong positive relationship between export and economic growth for example (Ghafoor *et al.*, 2010), Jung and Marshall (1985), Khalafalla and Webb (2001). However, there are few cases where there is no causality found as in the case of Argentina (Chow, 1987).

2.3 The contribution of agriculture and agricultural exports to agricultural GDP in developing countries

The potential contribution of agriculture to economic growth has been an on-going debate of much controversy among development economists. Early work on this issue agreed with the debate on the role of agriculture in promoting economic development in low-income nations in the aftermath of extended periods of colonial rule (Fei and Ranis, 1961; Jorgenson, 1961; Johnston and Mellor, 1961; Schultz, 1964). Johnston and Mellor (1961) observe that agriculture contributes to economic growth and development through five inter-sectorial linkages. The sectors are linked via: supply of surplus labour to firms in the industrial sector; supply of food for domestic consumption; provision of

market for industrial output; supply of domestic savings for industrial investment; and supply of foreign exchange from agricultural export earnings to finance import of intermediate and capital goods.

According to Valdes (2010) the direct, traditional contribution of agriculture is well studied: it contributes to GDP, employment, and foreign exchange earnings. These contributions usually decline with the level of development, and in more developed countries, agriculture might be called a small sector. As a general rule, in terms of absolute impact, in middle income countries growth in non-agriculture sector is more important than growth of agriculture. But, as mentioned above, there are indirect effects of agriculture on poverty reduction, because agricultural growth influences non-agricultural growth. For some middle income countries, estimates show that these indirect effects can be large. Relative to its GDP share, agriculture can have a greater impact on poverty reduction than non-agriculture. Levin and Raut (1997) studied the effect of primary commodity and industrial exports on economic growth. This study concluded that industrial exports were the main source of economic growth and the exports of primary products had a negligible effect.

Dawson (2005) looked at the contribution of agricultural exports to economic growth in least developed countries. He used the two theoretical models in his analyses. The first model was based on agricultural production function, including both agricultural and non-agricultural exports as inputs. The second model was dual economy model i.e. agricultural and non-agricultural where each sector was sub divided into exports and non-export sector. Fixed and random effects were estimated in each model using a

panel data of sixty two less developed countries for the period 1974 – 1995. The study provided evidence from less developed countries that supported theory of export led growth. The results of the study highlighted the contribution of agricultural exports in economic growth. The study suggested that the export promotion policies should be balanced (Feder, 1983).

The findings of the study showed that export sector had significantly higher social marginal productivities. Hence the study concluded that an export oriented and outward looking approach was needed for high rates of economic growth in Pakistan. Kwa and Bassoume (2007) examined the linkage between agricultural exports and sustainable development. The study provided the case studies of different countries that were involved in agricultural exports. Nadeem (2007) provided the empirical analysis of the dynamic influences of economic reforms and liberalization of trade policy on the performance of agricultural exports in Pakistan. The author examined the effect of both domestic supply side factors and external demand on the performance of agricultural exports. The major finding of the study was that export diversification and trade openness contributed more in agriculture exports performance. The results of the study suggested that agricultural exports performance is more elastic to change in domestic factors hence improved share of GDP (Faridi, 2012).

Recently, Sanjuan-Lopez and Dawson (2010) estimated the contribution of agriculture exports to economic growth in under developed countries. They estimated the relationship between Gross Domestic Product and agrarian and non-agrarian exports. Panel co integration technique was used in analysing the data set of 42 underdeveloped

countries. The results indicated that there existed a long run relationship and the agriculture export elasticity of GDP was 0.07. The non-agriculture export elasticity of GDP was 0.13. Based on the empirical results, the study suggested that the poor countries should adopt balanced export promotion policies but the rich countries might attain high economic growth from non-agricultural exports.

2.4 Casualty between agricultural exports and GDP in Developing countries

Tiffin and Irz (2006) used the Granger causality tests to examine the causal relationships between agricultural value-added and economic growth for a panel of countries. They found strong evidence in support of causality from agriculture to economic growth for developing countries, but the causality results for developed countries were inconclusive. The study was an improvement on previous cross-sectional analyses since it employed recent advancements in time series modelling techniques (co-integration and error correction models). Nevertheless, their empirical results may suffer from misspecification problems (e.g., omitted variables) because they failed to control the potential influence of other key determinants of economic growth.

As emphasized in earlier critiques of related literature on economic growth, simple bivariate causality analyses of this sort are prone to spurious correlation because they ignore the potential role of other important factors (e.g., trade, capital and labour) as suggested by neoclassical growth theory [Edwards (1993), Frankel and Romer (1999) and Awokuse (2008)]. Ekanayake (1999) analysed the causal relationship between economic growth and export growth by using error correction and co integration models.

The study used time series data of eight Asian developing countries covering the period from 1960 – 1997. The results concluded that there was a bi–directional causality between export growth and economic growth in all the developing countries included in the analyses except Malaysia. This was evident due to the strong evidence for long run Granger causality in all countries.

Shombe (2008) investigated causal relationships among agriculture, manufacturing and exports in Tanzania using the time series data for the period between 1970 and 2005. The empirical results found the evidence of Granger causality where agriculture causes both exports and manufacturing. Khalafalla and Webb (2001) empirically test the export-led growth hypothesis for Malaysian economy undergoing major structural changes. They investigated the relationship between the exports and economic growth in Malaysia using the quarterly data from 1965 – 1996.

In Pakistan, several studies were conducted on both the agricultural sector and exports; however, none of them was on the relationship among the two main sectors of the economy. Bashir (2003) studied the impacts of economic reforms and trade liberalization on agricultural export performance in Pakistan. The study suggested that the agricultural export performance is more sensitive to the domestic factors, which changes due to economic reforms. Khan and Saqib (1993) established positive relationships between real GDP, real exports, real manufactured exports, and real primary exports in a study for Pakistan.

Shirazi and Manap (2004) re-investigate the exports-economic growth nexus, using the data from 1960 to 2003 period. The results strongly support a long-run relationship among the three variables i.e. imports, export and output. As far as the causality between the exports and output growth is concerned, exports cause output growth, but converse is not true. Ahmed and Martini (2000), in agricultural policy analysis in Pakistan, argued that both agricultural and industrial sector have to be in balance in order to sustain growth and ultimately development. Khan *et al.* (1995) investigated the direction of causation between exports growth and economic growth using the granger causality test and co-integration methods. They found stable long-run two way relationship between total exports and output while one way relationship between output and primary exports. They also found the bi-directional causality between total exports growth and economic growth.

Kavoussi (1984) conducted a study on low-income and middle-income countries and found a positive relationship between the export growth and economic growth. The study also found that export expansion is associated with economic performance and that one important cause of this association is the favourable impact of exports on economic growth. In the past several studies have been conducted on the exports and economic growth, some of them are country specific and some are conducted on different economic regions. Most of them have found a strong positive relationship between export and economic growth for example Balassa (1978), Jung and Marsahll (1985), Keong and Liew (1998), McCarville and Nnadozie (1995). However, there are a few cases where there is no causality found as in the case of Argentina (Chow, 1987).

Ahmad and Hanhirun (1996), studied the co-integration and causality between the exports and economic growth, they found that there is no statistical evidence of a long-term relationship from exports to economic growth in the Association of Southeast Asian Nations (ASEAN) region (Memon *et al.,* 2008).

Bahmani-Oskooee and Alse (1993) raised the reliability of the earlier studies, as they did not test for co-integration and did not establish that the economic time series were stationary, the results are questionable. They point out that Granger causal inference is invalid if the series used are co-integrated. Traditionally, it has been assumed that exports are exogenous to domestic output but this could be an inappropriate assumption because output can also affect exports (Shombe, 2008).

2.5 Export-led growth in developing countries

Literature suggests that there are a number of factors influencing the economic growth and thus specification bias or spurious regression will reflect only if the relationship between exports and economic growth is tested (Shah and Sun 1998). Export-led growth hypothesis generally reflects the relationship between exports and economic growth, in particular, output growth which is driven by exports. This relationship, however, remains the subject of debate. Some studies provided empirical results to support this hypothesis (Arnade and Vasavada 1995; Fosu 1996; Thornton 1996); some found contrasting evidence that export is Granger caused by the economic growth (Henriques and Sadorsky 1996; Al-Yousif 1999), while others demonstrated that there

exists a bi-directional relationship between these variables (Dutt and Ghosh 1994; Thornton 1997; Shan and Sun 1998).

Riezman *et al*. (1996) were among the few scholars, who looked at the multiplicity of the relationship between economic growth and exports. They investigated the validity of the export-led growth hypothesis for 126 countries annual data running from 1965 to 1999. They conducted three types of co-integration ways, namely: bivariate, tri-variate and 5-variable models. This study was different from previous literature in the sense that it included the variable of real import growth as one of the explanatory variables. Based on their argument, the omission of the important variable could lead to a biased finding. The variables selected were GDP, export growth, real import growth, primary school enrolment (as % of primary school age children) and the ratio of total investment over output.

On the other hand, Al-Yousif (1999) evaluated the robustness of the relationship between exports and economic growth in the context of a single county, that is, Malaysia. The model constructed consists of five variables, namely: real GDP, real export, real effective exchange rate, labour and capital. Results of two procedures were reported of co-integration, that is, Engle and Granger (1987) bivariate co-integration and Johansen (1988) multivariate co-integration. The study found that there was no long-run relationship between real GDP and real export if the bivariate co-integration was carried out. In contrast, using the multivariate framework in testing the long-run relationship between real GDP and some selected determinants, it was reported that both the trace

and maximum eigenvalue tests showed strong evidence that there exists a co-integrating vector among these variables.

Therefore, the author concluded that bivariate method produced spurious results since it omitted some relevant variables in its estimation and it is necessary to specify and estimate broader models. Furthermore, after determining the number of co-integrating vectors, Al-Yuosif (1999) proceeds to investigate the short-run causal relationship among the variables. The five-variable model is then pooled and estimated as a Vector Error-Correction Model (VECM) using Zellner's Seemingly Unrelated Regression (SUR) model. The study described a short-run dynamics causal effect from real exports to real GDP, but not for the inverse. Hence, Al-Yousif (1999) concludes that the hypothesis of export-led growth is supportive in the case of Malaysia. As a small open economy, Malaysia is highly dependent on the foreign trade.

Bhagwati (1978) investigated link among exports and growth by using Spearman rank correlation approach. The ordinary least square method was employed by Heitger (1987); Lussier (1993) and concluded that exports have the vital determinant of economic growth. Another empirical study in the case of 70 developing countries proved that export growth and ratio of exports to GDP positively affect economic growth (Gonclaves and Richtering, 1986). This exports led-growth hypothesis was rejected by Colombatto (1990). These studies assume similar economic structure across the countries but in reality this assumption is not viable. Hence, the results of these cross section studies cannot be free of criticism. The latest developments of econometrics estimation techniques demand to investigate time series of analysis in order to

determine the long run robustness between exports and GDP. Some studies have empirically investigated the export-led growth hypothesis by utilizing different econometric procedures ranging from simple Ordinary Least Squares (OLS) to co-integration techniques.

Choong *et al*. (2003) examined the link between exports and output and found that export-led growth hypothesis was valid for Ireland and Malaysia. Abul-Foul (2004) found unidirectional causality from exports to output in Jordan by using the VAR-L, VAR-D and ECM techniques. Mamun and Nath (2005) supported the export-led growth hypothesis for Bangladesh by employing the error correction model (ECM). Herzer *et al*. (2006) reported bidirectional causality between exports and output in Chili. Maneschiold (2008) tested the export-led growth hypothesis in the case of Argentina, Brazil, and Mexico by using co-integration approach to long run relationship and direction of causality determine through causality test. It further suggested export led hypothesis was valid to enhance the economic growth of these countries.

According to Hicks (1950) the rate of growth of exports, as a determinant of aggregate demand, directly affects the output growth; an increase in foreign demand can produce a rise in output due to greater employment, income and investment in the exportable sector. This direct connation is related to the foreign trade multiplier. It goes on to say that, the increase of exports can indirectly raise output growth based on the assumption of increasing returns to scale and spill-over effects from exports to other sectors of the economy. These externalities can produce a more efficient resource allocation, moving

resources from relatively inefficient non-tradable sectors to the higher productive export sector.

New growth and international trade theories emphasised these indirect channels of benefits of a dynamic export sector to economic growth (for example Islam, 1998; Ghartey, 1993; Dutt and Ghosh, 1994). This growth requires imports of capital and intermediate goods that allows a faster capital formation and, therefore, increasing rates of growth, and if exports do not rise as fast as import requirements, growth could be constrained by the balance of payments (as suggested, for instance, by Lamfalussy, 1963 and Thirlwall, 1979). The study noted that cross sectional data studies show two essential problems: the first one is the important limitation of correlation analysis because exports are built into output and counterfeit results can be achieved because of the bias in favour of correlation (Sheehey, 1990). Trying to avoid this bias of correlation between exports and growth a new literature has emerged including additional variables and, then, moving to a multivariate correlation and causality (for instance, Kónya, 2006 and Awokuse, 2008).

2.6 The South African Agricultural Trade Policy Regulation and Reform

The importance of the agricultural sector in South Africa cannot be stressed enough. In 2006, the agriculture sector contributed about 2.8% of Gross Domestic Product, 8.5% of total employment and approximately 4% of total exports (Statistics South Africa, 2007; Department of Trade and Industry (DTI), 2007). In South Africa, the objective of trade policy in the agricultural sector is to promote the integration of this sector into the world

economy in order to encourage greater access to markets, technology, capital as well as competition (OECD, 2006). The agricultural sector has three sub-sectors: agriculture, forestry and fishing. The agriculture sub-sector comprises field crops, horticulture and livestock farming. The performance of field crops has a pivotal role in the determination of food security and overall performance of the sector. Horticulture also played an important role as it accounted for 24.7% of agricultural sector production in 2006 (Department of Agriculture, 2007). In South Africa, horticulture consists of fruit (deciduous, citrus and subtropical), vegetables and flowers. Most horticultural exports are sent to the European Union.

In South Africa, the objective of trade policy in the agricultural sector is to promote the integration of this sector into world economy in order to encourage greater access to markets, technology, capital as well as competition (OECD 2006). All these activities have a direct or indirect impact on economic growth. A wide variety of tariffs applied to the same commodities across countries distorts trade and lowers efficiency and responsiveness on world markets (Josling, 2006). According to Hoekman and Olarreaga (2001), tariff peaks and tariff escalation have a disproportional impact on exports in Africa and other developing countries.

South Africa introduced incentive programmes during the 1970's and these incentives continued into the 1980's and these incentives boosted exports (Kirsten *et al*., 2009). Most of the support to farmers declined substantially during the implementation of the 1994 URAA, as explained by the decline in the levels of support after 1997. No export subsidy applies for agro-food products, even though the pricing regime for sugar

effectively subsidizes sugar exports, while the costs are carried by the domestic consumer.

It is important to mention that maize and citrus fruit imports decline the most due to the opening up of the markets. Domestic production of these two products increases substantially as a result of the reform process. This is mainly due to higher global prices as a result of the reform process, leading to more domestic production. The course-grain price increases on average about 0.4%. The overall change in the trade balance as a result of trade reform is positive. The improved market access conditions in the EU substantially boost agricultural export performance in South Africa. The increase is mainly due to an increase in sugar and fruit exports. OECD (2006) also concludes that the agricultural policy in the OECD countries is likely to bring benefits to South Africa. The gains would be more visible in products such as wheat, fruit and vegetables, dairy products, processed sugar and other processed foods.

Along the lines of studies by Gorter *et al.,* (2000) and Ingco (1995), this study also supports the notion that in the trade liberalization process, domestic reforms are important. In addition, given that there are major distortions in agricultural trade at the global level; further gains will be derived from a substantial reduction of existing export subsidies and reduction in other trade impediments by developed countries such as the EU. In the case of South Africa the scenarios did not apply any reductions in domestic support because the levels are already low relative to the EU (OECD, 2006). This calls for consideration for more support in agriculture in order to increase export performance in the sector. The type of interventions could be in areas such as policy and regulatory

framework; research, advisory services and training; and private sector development, marketing and rural finance. Future research, therefore, could investigate the impact of some of the interventions on export performance in the agriculture sector.

2.7 Volatility and exports

Exporters are subjected to demand volatilities in both domestic and foreign markets. These exporters supply the domestic market at different volatility than non-exporters. Linkages across markets impact on the stability of local markets; this linkage transmits foreign volatilities through to the domestic supply of exporters (Nguyen and Schaur, 2010). According to Vannoorenberghe (2012) exports share affect the relative volatility of its domestic sales, furthermore higher export share raised volatility of sales. These exporters are more volatile than comparable non-exporters and that the difference in volatility largely depends on the export share. Numerous researchers investigated this relationship including openness to trade.

Bailey *et al.,* (1987) argued that if exporters are sufficient risk averse, an increase in the exchange rate volatility raises the expected marginal utility of export revenue and therefore induces them to increase exports. Kroner and Lastrapes (1993) also indicated that under perfect competition increase in exchange rate volatility will increase exports. They also indicated that countries with a negative effect on trade are a result of this adverse relationship between volatility and exports.

Export share of an exporter mechanically affects the relative volatility of its domestic sales and of its exports. More open exporters have more volatile domestic sales and

less volatile exports, which is a direct consequence of the market substitution highlighted above: demand shocks induce an output substitution between markets which appears proportionally small for the larger market and large for the smaller market. This empirically strong effect raises the caveat that the volatility of sales on a particular market only gives limited information on the size of shocks on this market. Higher export share raises the volatility of the global sales of a firm, which suggests that exporting is an inherently volatile activity. Exporters are more volatile than comparable non-exporters and that the difference in volatility largely depends on the export share as asserted by [Rho and Rodrigue (2010), Blum *et al*., (2011) and Soderbery (2010)].

2.8 Volatility and Growth rate

Economic volatility has been seen from parts of international trade, due to higher fluctuations in commodity market. Literature, starting with Rodrik (1998) concludes positive correlation between trade and economic volatility. Growth and volatility correlates negatively across different borders, but positively across sectors. According to Imbs (2004) volatility and growth exhibit both a negative and positive link along a business cycle. Furthermore growth is affected by business cycle volatility, with negative in the presence of irreversibility or diminishing returns to investment (Imbs, 2007).

According to Ramey and Ramey (1995) aggregate growth and volatility correlate negatively, suppose volatile sectors grow faster in different countries but growth must be higher in other sectors of the first country. This simply means that aggregate volatility

will be higher there but low aggregate volatility is possible if a growth rate is not correlated across sectors. In other words, a negative link between aggregate growth and aggregate volatility could but mean aggregate shocks are large and important in low growth economies. And in fact, it shows that the country specific component of aggregate variance, for instance fiscal or monetary policy, is detrimental to aggregate growth. It does not inform the growth–volatility question beyond that (Acemoglu *et al.,* 2003).

Newbery and Stiglitz (1984) recognize that increasing volatility may reduce welfare. In most influential studies a link between volatility and important macroeconomic variables existed [Ramey and Ramey (1995) on growth; Koren and Tenreyro (2007) on development or Krebs *et al*., (2010)], which draw a renewed interest in the empirical relationship between trade and volatility. Other studies investigate this relationship at the country level using cross-section or panel data and find correlation between volatility of output growth [Rodrik (1998); Easterly *et al*., (2001); Kose *et al*., (2003)], these studies results support results drawn from studies by [Bejan (2006); Bekaert *et al*., (2006)].

FAO *et al.,* (2011) examined the evidence that volatility in international agricultural commodity prices was increasing, however it has been higher since 2000 than previous decades. Because agricultural markets are intrinsically subjected to higher prices within different markets, a period of higher and volatile prices was followed by a period of relatively low prices. This can help farmers refrain from volatile markets and opt to export in favourable economic trends. Furthermore, most agricultural commodity

markets are characterised by a high degree of volatility as a result of major market fundamentals. Business cycle fluctuations in demand for agricultural non-food commodities from rapidly growing, industrialised economies also contribute to this increased volatility.

2.9 Review of the previous studies

Various works have been disseminated highlighting the empirical relationship between exports and growth in the different countries. This empirical literature can be divided into three groups. One group of studies is based on a production function approach which implies that exports are introduced as one of the inputs of production [see: Alam (1991); Amirkhalkhali and Dar (1995)]. The second group is based on studies that utilise the rank and cross correlation in a bivariate framework [Kavoussi (1984); Singer and Gray (1988); Tyler (1981)]. Lastly, the third group is built upon causality tests complemented by co-integration [Islam (1998); Shan and Sun (1998); Xu (1996)].

Studies have often reported contradictory results. Thus it has been reported that results based on rank correlation and the production approach give support to the export-led growth hypothesis [Amirkhalkhali and Dar (1995); Kavoussi (1984)] whereas those based on causality tests are in general unsupportive of the export-led growth hypothesis; see, for example, [Bahmani-Oskooee *et al.,* (1991); Marin (1992); Shan and Sun (1998)]. Of course, some exceptions exist. For example, Bahmani-Oskooee *et al.,* (1991) concluded from a sample of eight less developed countries that a bi-directional causality between export and output growth is a valid hypothesis.

Econometric evidence has an important role to play in investigating the relationship between the agricultural economic growth and agricultural exports. There are several studies with a hypothesis of export-led growth in general; however, very few studies were conducted to find the relationship between the specific sectors of economic growth and exports in particular. In recent studies, export-led growth has been put forward and declared significant to development strategies. It is also believed that it leads to higher total factor productivity growth. Export-led growth gains its importance in some empirical studies as it was found that it also encourages Foreign Direct Investments (FDI) in countries, which in-turn leads to increased productivity and reduced inefficiencies. The classical theory also argued about the importance of international trade in countries' economic growth and discussed the gains from specialization (Memon *et al*., 2008).

These theoretical arguments by classical and neo-classical in later stage have been supported by different empirical studies. Stiglitz (2007) found that the export-led growth and technology played an important role in the success of two growing nations in the sub-continent i.e. India and China. Maneschiöld (2008) has examined the role of export in the economic growth process in Argentina, Brazil and Mexico using causality tests within an error-correction framework. This finding lends support to an export-oriented growth strategy towards promoting an enhanced growth potential in these countries.

Shombe (2008) investigated causal relationships between agriculture, manufacturing and exports in Tanzania using the time series data for the period between 1970 and 2005. The empirical results found the evidence of Granger causality where agriculture causes both exports and manufacturing. Khalafalla and Webb (2001) empirically test

the export-led growth hypothesis for Malaysian economy undergoing major structural changes. They investigated the relationship between the exports and economic growth in Malaysia using the quarterly data from 1965-1996.

In Pakistan, several studies are conducted on both the agricultural sector and exports; however, none of them are on the relationship between the two main sectors of the economy. Bashir (2003) studied the impacts of economic reforms and trade liberalization on agricultural export performance in Pakistan. The author suggested that the agricultural export performance is more sensitive to the domestic factors, which changes due to economic reforms and established positive relationships between real GDP, real exports, real manufactured exports, and real primary exports in a study of Pakistan (Shombe, 2008).

Shirazi and Manap (2004) re-investigated the exports-economic growth nexus, using the data from 1960 to 2003 period. The results strongly support a long-run relationship of the three variables i.e. imports, export and output. As far as the causality between the exports and output growth is concerned, exports cause output growth, but the opposite is not true. Ahmed and Martini (2000), in agricultural policy analysis in Pakistan, argued that both agricultural and industrial sector have to be in balance in order to sustain growth and ultimately development.

Khan *et al.,* (1995) investigated the direction of causation between exports growth and economic growth using the granger causality test and co-integration methods. They found a stable long-run two way relationship between total exports and output while one

way relationship between output and primary exports. They also found the bi-directional causality between total exports growth and economic growth. Kavoussi (1984) conducted the study on low-income and middle-income countries and found a positive relationship among the export growth and economic growth. The study found that export expansion was associated with economic performance and that one important cause of this association was the favorable impact of exports on economic growth.

There are several studies conducted on the exports and economic growth, some of them are country specific and some are conducted on different economic regions. Most of them have found strong positive relationship between the export and economic growth for example [Balassa (1978); Jung and Marshall (1985); Keong and Liew (1998); McCarville and Nnadozie (1995)]. However, there are few cases where there is no causality found as in the case of Argentina (Chow, 1987).

Ghatak *et al*., (1997) found that for developing countries which have not yet achieved a critical level of economic development, primary exports and manufactured exports carry opposite signs. The study of export composition and economic growth in eight developing low-income African countries also comes to the same conclusion on the role played by primary exports on economic growth (Ukpolo, 1994). The study, however, cautions policy makers not to rely on this sector for long term growth because of the potential problem of deterioration in terms of trade for primary products. Most of the existing empirical studies are based on cross-section data across countries except for Ram (1987), which, as Ram pointed out, may result in loss of important parametric differences between countries.

Kwan and Cotsomitis (1996), make use of Granger causality test to study Chinese growth and foreign trade. They come to the conclusion that the output was an exogenous variable and there was a one-way causal relationship between the two. Lee (1993) added other variables, such as the trend of time and the lagging investment and so on, and concluded that export promoted economic growth by using the regression analysis. But also found the result was affected by regional differences. Ghartey (1993) verified the assumption of export led economic growth using time-series data and regression analysis. It was evident for the study that employment and output of manufacturing sector could promote export and economic growth.

Most studies used Granger causality test and co-integration test to test the hypothesis of Chinese export-oriented economic growth by the data of export and GDP in China from 1977 to 1998. It was found that there is a two-way causal relationship between the two, but no long-term and stable relations. The studies took only output and export into account, but import weighed with the export - output association. Grossman and Helpman (1990) found out that the impact of imports on economic growth should not be ignored. China is a developing country and its endowments elements vary considerably with developed countries and made an empirical analysis on economic growth model and pointed out that exports boosted economic growth, found that net exports had less relevance with economic growth and viewed that exports had a great role in promoting economic growth. QuanFa Yang (1998) analyzed Chinese data into Balassa model and found that export had a positive correlation with the economy. Xiao Peng Liu (2001) looked at the relevance of foreign trade and GDP growth rate and revealed that import

had a strong role in the promotion of national economy by analysing the data of China from 1980 to 1998. He also explained why Chinese export had weak correlation with the economy from the angle of export structure.

2.10 Summary

Both empirical and theoretical literature was reviewed to support the findings of the study. The role that agricultural exports played on economic growth was drawn out of the review. This is a result of agriculture being a backbone of the economy and a share of avocado, apple, mango and orange exports across the borders. Many studies witnessed a positive relationship between agriculture exports and economic growth. More can be said about the contribution of agriculture and its exports to the proportional share of GDP. This is because of the limitless contribution yielded from the export-led growth, which in the long run helps develop the economy. A two way causal relationship existed between agricultural exports and economic growth.

South Africa has gone under policy reforms since 1994 and is allied to many policies that regulate agriculture and trade issues. Liberalization and marketing policies opened trade borders for agricultural exports, which lead to the integration of the agricultural sector. Lately, policies in South Africa are aimed at increasing exports hence grow the economy. A handful of studies across different views and time period drove the notion of export-led growth. Most of these studies were drawn from other economies since there were limited findings in South Africa at the time of the study.

CHAPTER THREE

THE STATE OF AVOCADO, APPLE, MANGO AND ORANGE PRODUCTION IN SOUTH AFRICA

3.0 Introduction

This chapter describes the extent to which avocado, apple, mango and orange production, marketing and value chain analyses relates to the agricultural GDP in South Africa. It further elaborates on the provinces that produce avocado, apple, mango and orange, the volume in both the domestic and international markets and its exports throughout the boarder. A brief relation between these produces is given in this chapter.

3.1 Avocado background status in South Africa

3.1.1 Avocado production and Gross Value of Production from 1994 - 2011 in South Africa.

The avocado producing industry in South Africa is an export-oriented industry with most of the produce aimed primarily at the European market. Production is mainly in Limpopo and Mpumalanga province and to a lesser extent the Kwa-Zulu Natal province where climate conditions are cooler. The different regions give the industry the ability to produce avocados from the end of February to the beginning of November, with the bulk of the crops produced from the end of February until the beginning of September. The avocado industry in South Africa operates in a deregulated environment. This implies that prices of commodities are determined by market forces of demand and supply. The South African Avocado Growers Association (SAAGA) was formed in the late 1960's

with the mission to improve the economic viability of producing, packing and marketing of avocados (DAFF, 2012).

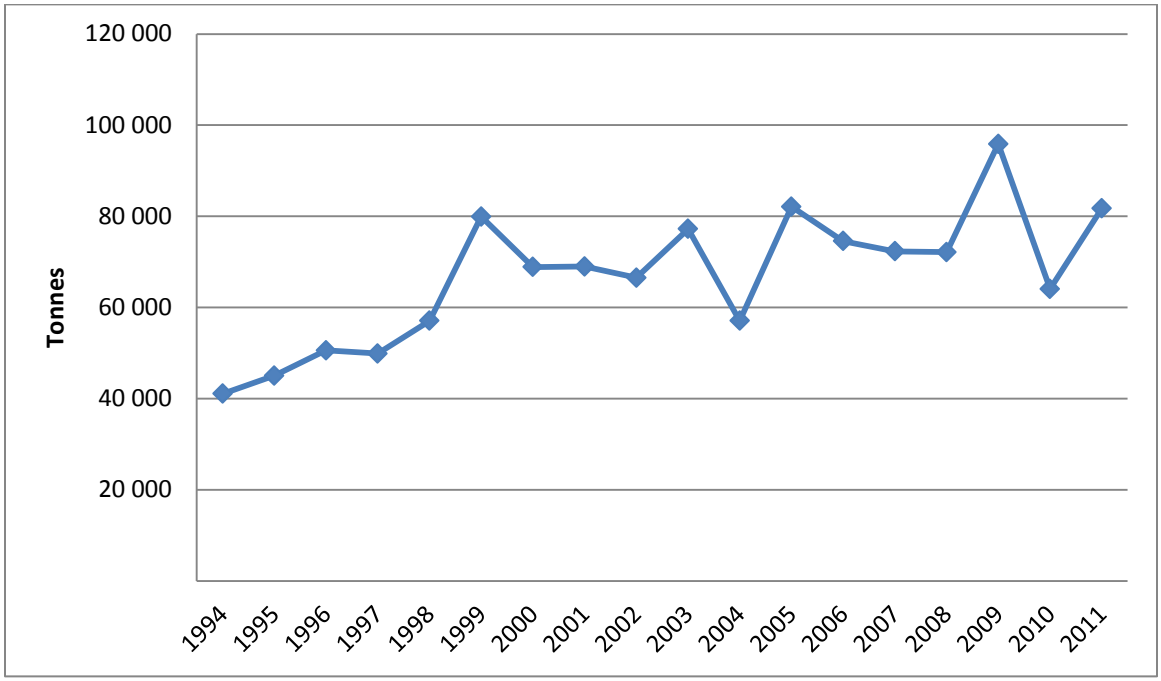

Figure 3.1 Total avocado productions from 1994 – 2011

Source: DAFF (2012)

In Figure 3.1 above the total production of avocado is inconsistent but has shown good trends in the past seven years, with an average value of more than seventy thousand tons. Quantities of avocados in tonnes produced in South Africa from 1994 to 2011 have varied a lot and changed over time. As outlined above by Figure 3.1, in 1994 the total production was constant up until 1999, in 2000 the graph started to decrease. The curve drops until 2002 and increase over a season. In the year 2004 the graph reached the lowest tonnage over ten years and went further to record the highest output in 2009,

it ends with a positive growth from 2010 to 2011 which has motivated the study. In conclusion it has been seen that total production of avocados in South Africa for the past 18 years has been fluctuating.

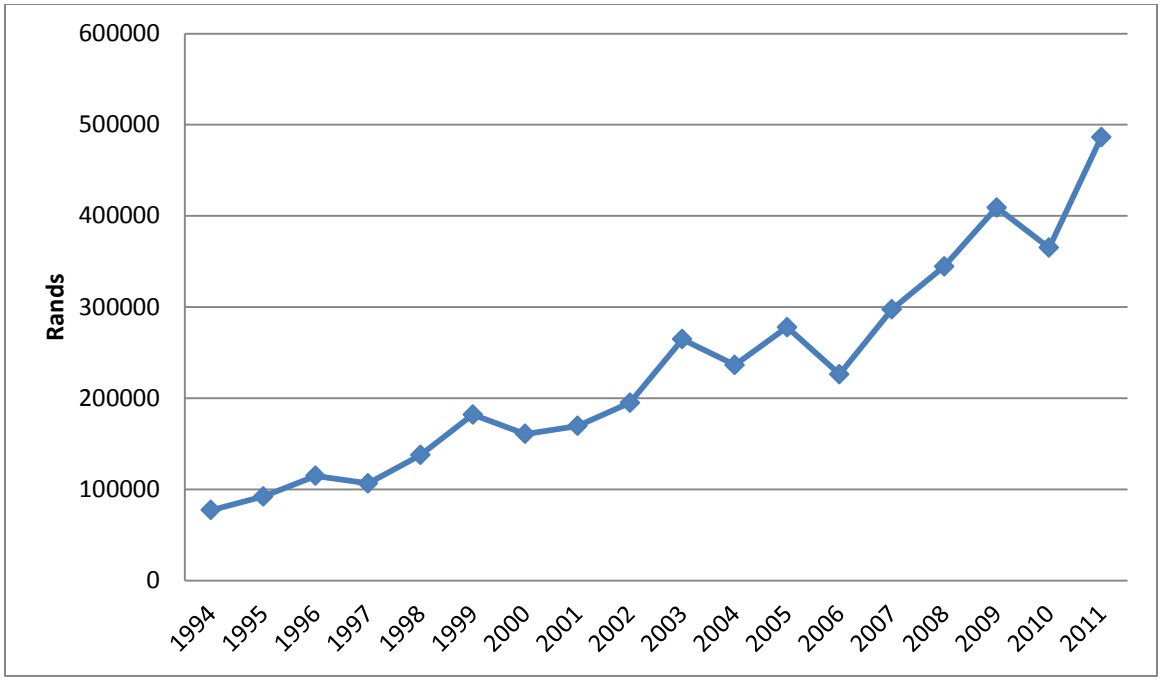

Figure 3.2 Gross Value of productions for avocados, 1994 – 2011

Source: DAFF (2012)

In Figure 3.2, there has been a general increase in the Gross Value of Production (GVP) of avocados since 1994 and again in 1997. This can be attributed to the marketing policy of 1996 which seeks to promote agricultural exports and increase market access. In a nutshell the graph shows positive strives through-out. This is encouraging, particularly when one takes into account the major decrease in GVP that

was experienced in 2006 production season. From that year the GVP increased through 2008 and 2009 up until it dropped in 2010 and reached the highest value last year.

3.1.2 Avocado production per province

In South Africa, Limpopo and Mpumalanga provinces in the North East of the country are the leading producers of avocados, with few commercial avocado orchards in KwaZulu-Natal province where the conditions are cooler due to the more southerly latitude. As already indicated above, due to climatic variability between the growing regions, most of the major cultivars are available over an extended period during the season. SAAGA (2011) reported that growth in plantings has slowed since 2003 with total area planted to commercial avocado orchards remaining stable at around 12 000 ha.

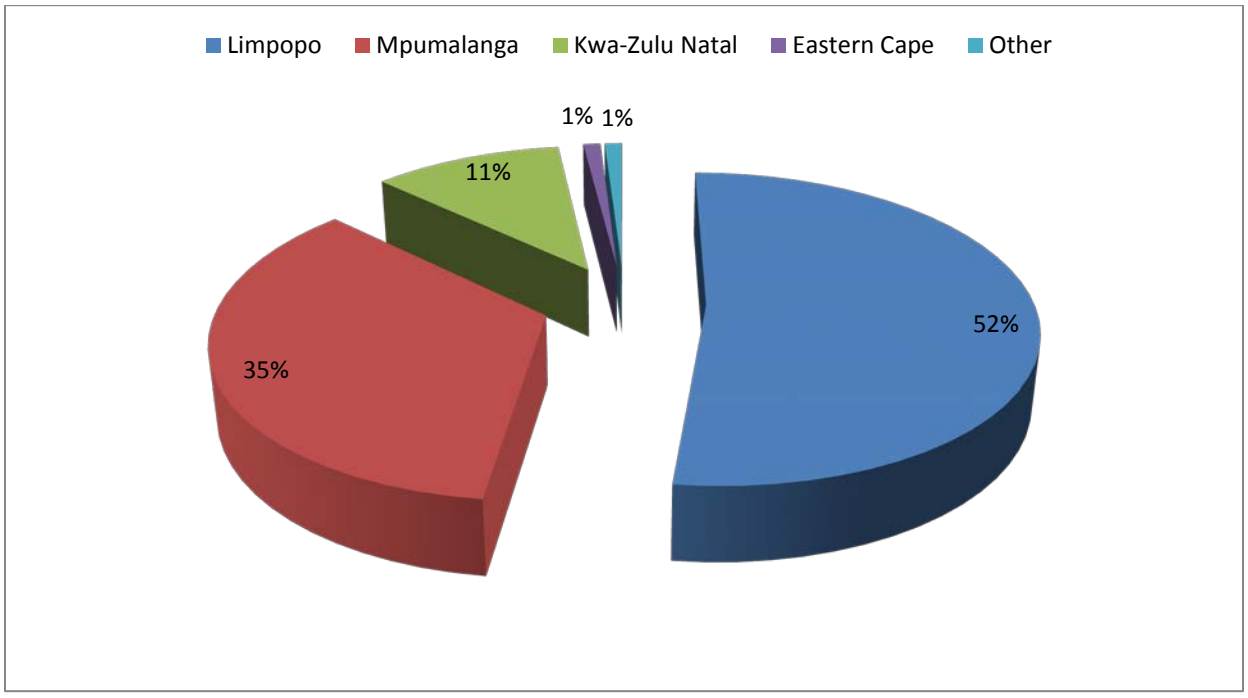

Figure 3.3: Avocado production per provinces

Source: South African Avocado Growers Association (2011).

Figure 3.3 reflects that Limpopo Province was the leading producer of avocados in South Africa. The province accounted for 52% of national avocado production in 2011. Most of the avocado plantings in Limpopo were found in the Soutpansberg, Northern, Central and Southern Letaba as well as Hoedspruit regions. The second largest producer of avocados is Mpumalanga with 35%. Kwa-Zulu Natal is the third largest producer of mangoes with 11%. Most of the avocado plantings in Kwa-Zulu Natal are found in Pongola. Eastern Cape and other provinces feature intermittently but usually registered minimal production at 1% each.

3.1.3 Avocado exports in South Africa

The South African avocado industry is export-orientated. From 2009 to 2011 quantities of avocados exported has increased. The quantity exported during 2010 was 10% higher than the quantity exported in 2009 (DAFF, 2011). This market has been fairly volatile for the past decade. The volatility can be pointed to the strengthening and weakening of the Rand against the Euro, the British Pound and the United States of America's (USA) Dollar. The witnessed decrease over the years was primarily due to quality problems that the producers experienced as a result of severe droughts.

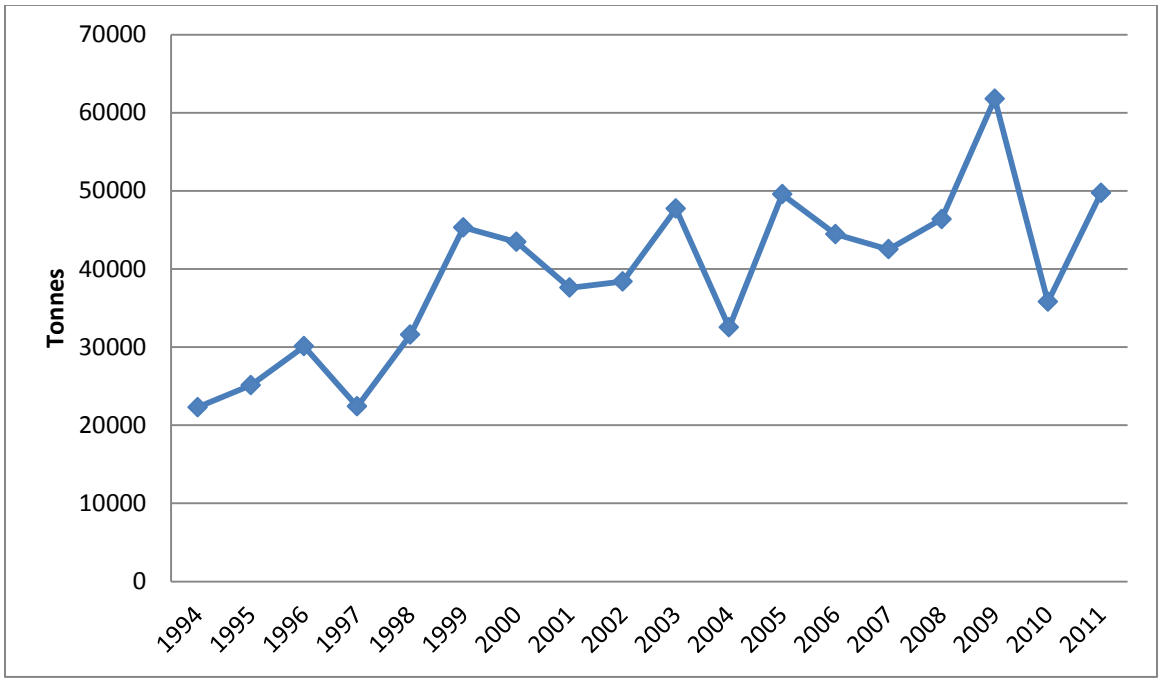

Figure 3.4: Avocado exports in South Africa from 1994 - 2011

Source: DAFF (2012)

3.1.4 Avocado market intelligence

Competitiveness creates superior value for customers and improved profits for the stakeholders in the value chain. The driving force in sustaining a competitive position is productivity that is output efficiency in relation to specific inputs with regard to human, capital and natural resources. In 2010 South African avocado exports represented 3.07% of world exports and its ranking on the world exports was position eight (DAFF, 2011).

South African avocado exports are growing faster than the world imports. This positive growth can be regarded as gains in declining markets and should be seen as a great achievement that comes after efforts of liberalizing the agricultural export market. In countries such as Angola and Spain, South African avocado exports have declined faster than the world imports this is due to the expansion and transformation of other sectors of the economy while agriculture is lagging behind.

3.1.5 Avocado value chain analysis

Avocado value chain in South Africa exhibits special attention due to high sensitivity of the produce to harsh conditions, diseases and the picking standard set by international market. Harvested avocados go to cooling storage, where they go to exports and are destined for international market or the fresh fruit market or sent to retailers after the packing house in order to be sold to retailers or it may enter the processing industry and be obtained for ease of transportation in international trade and for cosmetic use. Retailers either sell for fresh consumption to the local market where it can be sold straight to consumers. There is an increasing competition in this sector, with

restructuring and changes in the marketing chain, in a context of globalization. The chain is schematically elaborated by Figure 3.5 on the next page.

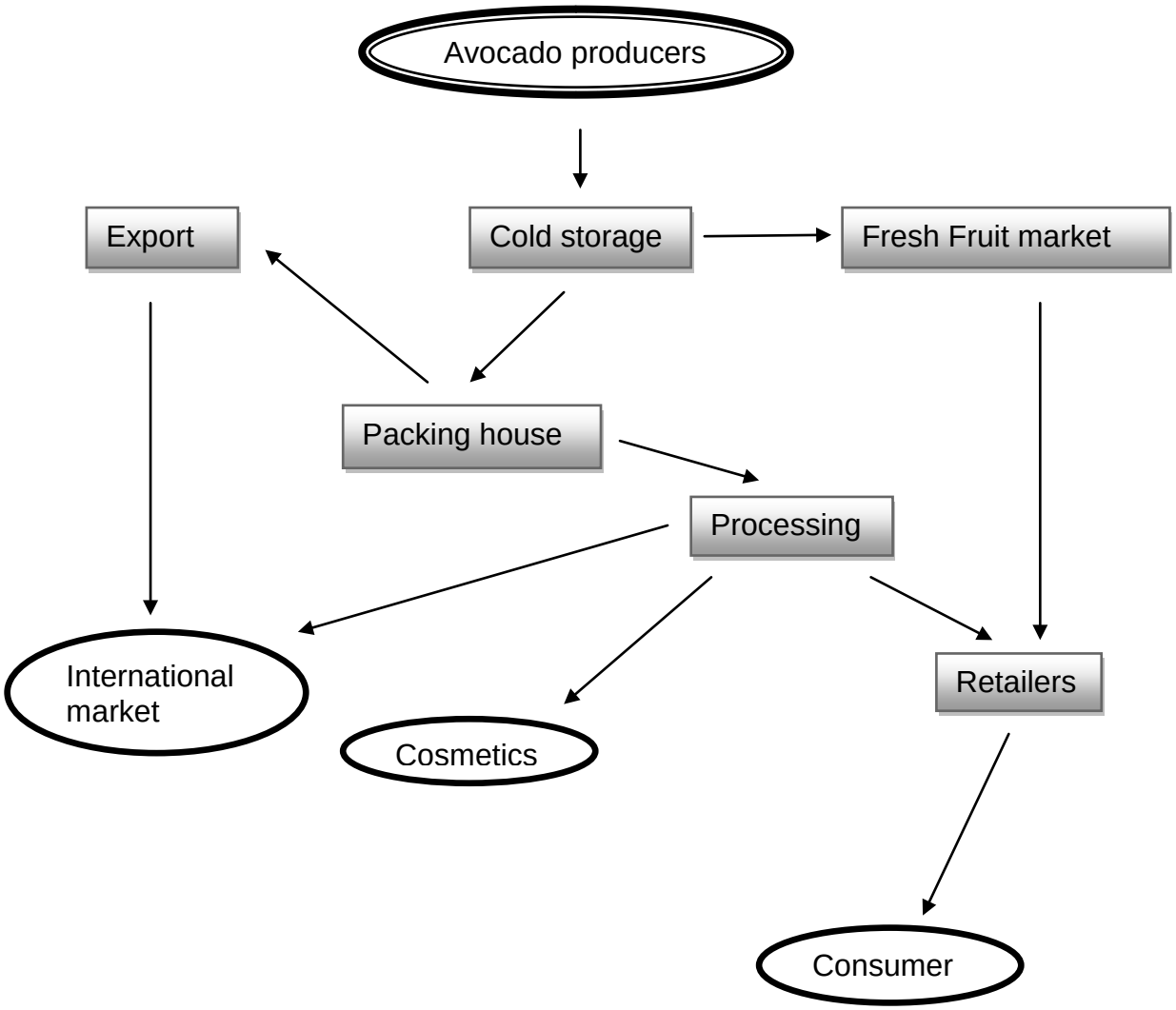

Figure 3.5: Avocado value chain analysis

Source: own analysis

3.2 Apple background in South Africa

3.2.1 Apple production status in South Africa

Apples are one of the important fruits grown in South Africa, taking into consideration their foreign exchange earnings. Annually, it contributes approximately 65% of the total income for deciduous fruits (DAFF, 2010). The market is export oriented with half of its produce absorbed by the export market. Most, if not all of these produce are destined for northern hemisphere countries during their harsh and spring seasons. Various export agencies mediate this exportation on the basis of delivery sales on behalf of producers. Like most fruit industries it operates in a deregulated environment where prices are determined by the market forces of demand and supply.

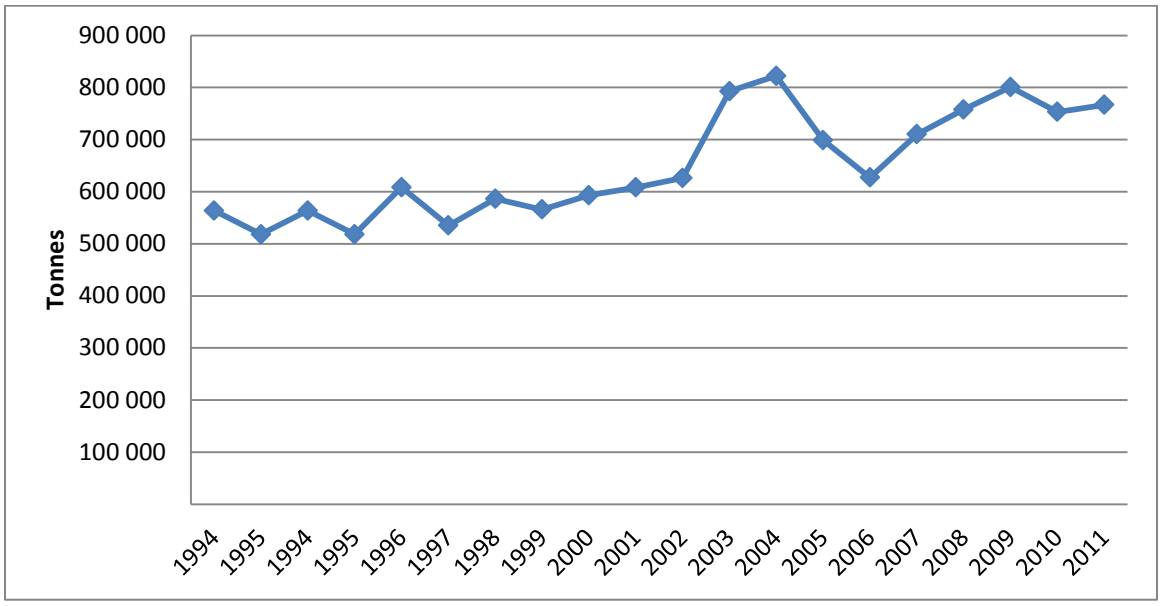

Figure 3.6 Total apple production from 1994 – 2011

Source: DAFF (2012)

In the Figure 3.6 above the total production of apples is in a similar margin and does not show any consistency. This implies that tons of apples produced in South Africa from 1994 to 2011 do not vary a lot hence don't have a wholesale change over time. The graph starts in 1994 where the total production was fluctuating up until 2000, in that year the graph started to increase and reached its peak in 2005. The graph started to decrease up until it reached 2007, where it started to increase and nearly reach the peak in 2009. In the past two years it has shown positive trends which motivated the study and gave hope to the potential of increasing exports in the coming seasons.

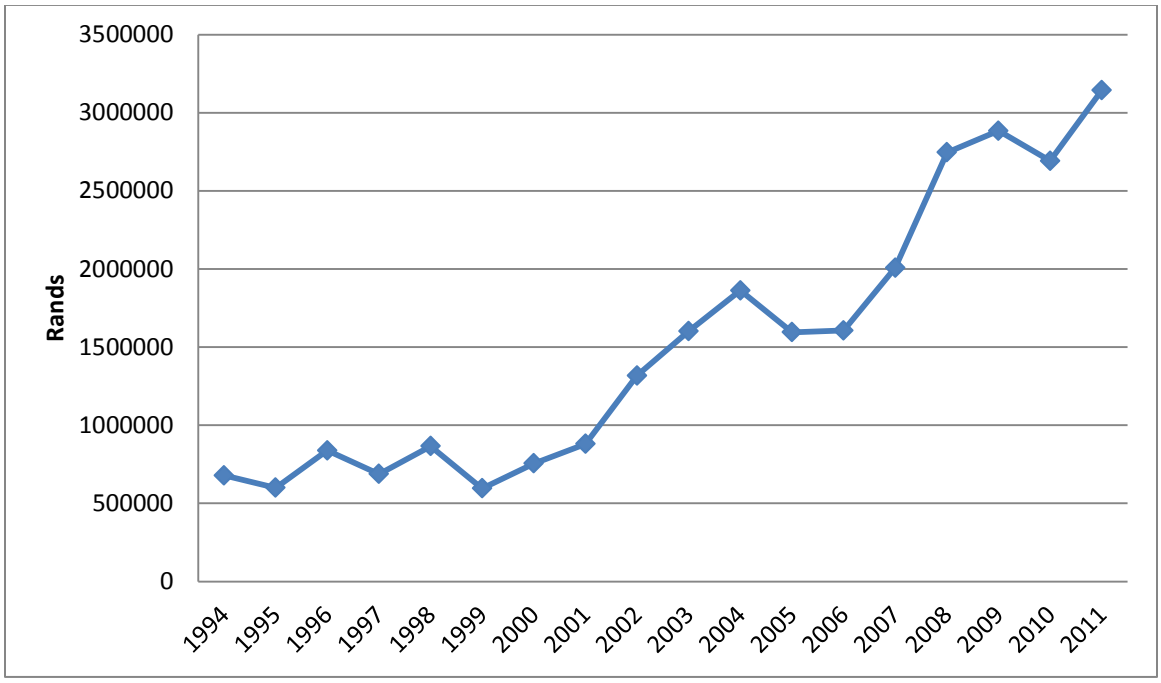

Figure 3.7 Gross Value of production for apple, 1994 – 2011

Source: DAFF (2012)

As shown by Figure 3.7, there has been a general increase in the GVP of apples since 1999, until 2004 where it decreased and then appreciated from 2007. Ever since 2007 it has been growing which is encouraging, particularly when one takes into account the major decrease in GVP that was experienced during the 1999 production season. From that year the GVP increased through 2006 until it reached the highest rands in 2011.

3.2.2 Apple production per province.

The apple producing regions are mainly situated in the Western and Eastern Cape Provinces of South Africa. The Western Cape Province is the leading producer as it yields more than half of the produce in South Africa, with Eastern Cape, Mpumalanga and other provinces contributing the remaining percentages. Differences in average temperatures between the major apple growing regions give rise to differences in harvesting times. Fruits produced in the higher lying regions are harvested later than fruit produced in the lower lying ones.

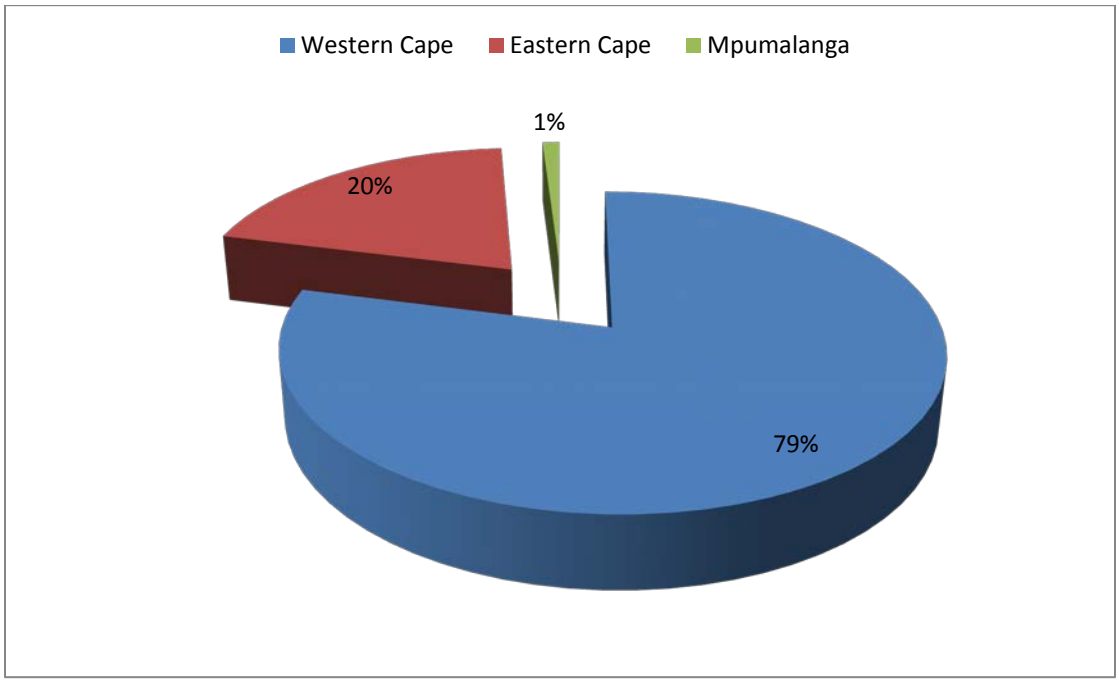

Figure 3.8: Apple production per provinces

Source: South African Apple and Pears Producers Association (2011)

In the Figure 3.8 above, Western Cape Province is the leading producer of apples in South Africa. It accounted for 79% of national apple production. Most of the apple plantings in Western Cape are found in the Ceres, Groenland and Villiersdorp. The second largest producer of apples is Eastern Cape with 20%. Most of the apple plantings in Eastern Cape are found in Langkloof Oos area. Mpumalanga is the third largest producer of apples with 1%.

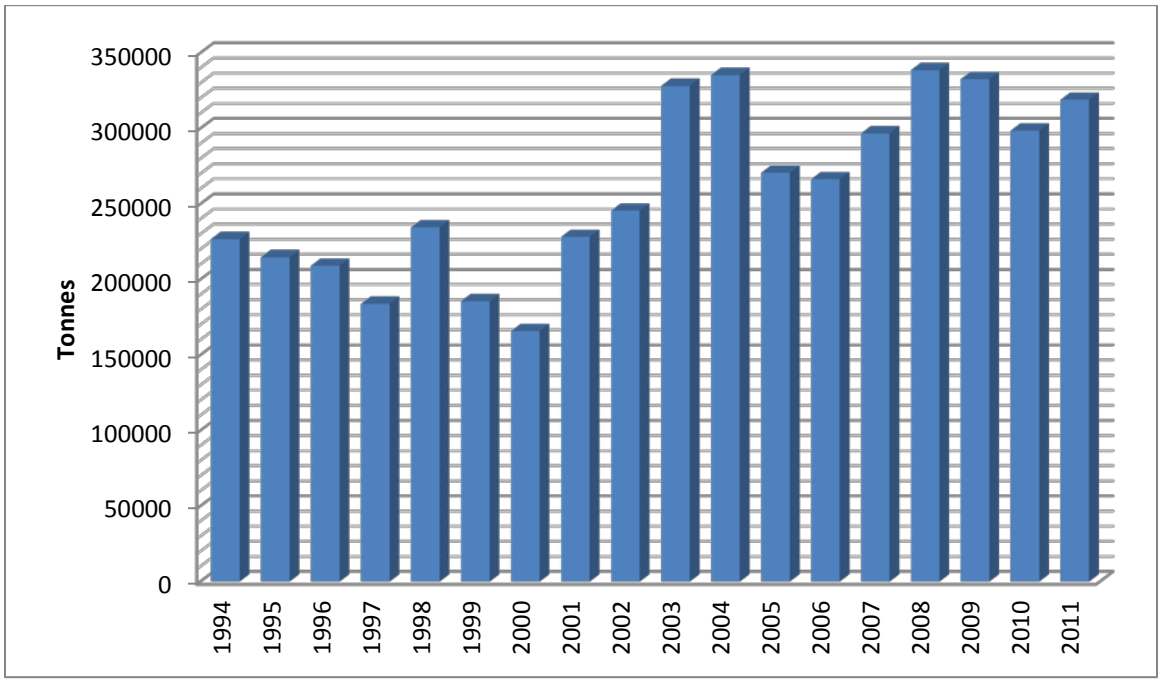

Figure 3.9: Apple exports in South Africa

Source: DAFF (2012)

South Africa is a relatively small apple grower in terms of global hectares but a major volume exporter in global terms (DAFF, 2011). Apples sold in the export market generate more revenue than those sold in the local market. Most of the apple exports are destined for the European and Asian markets. It is important to note that apple exports have been decreasing over the last three years. Figure 3.9 starts from 1994 with a marginal decrease until it reaches 1998, where it increased and decimally decreased until it reached low value in the year 2000. The graph peaked from 2001 and reaches its peak in 2004 and decreased until it peaked again in 2009 and then drops and pick in the last three years.

3.2.3 Apple market intelligence

South African apple exports are growing faster than the world imports in Bangladesh, Russia, Benin and Cameroon markets, this performance can be regarded as gains in dynamic markets. Subsequently, South African apple exports are growing while other apple buyers are reducing their demands. South Africa was the fourth largest producer of apples in the southern hemisphere after Chile, Argentina and Brazil. The majority of these countries export to the European market. Since supply and demand are the main price determining factors in free market it is obvious that apple prices are determined by such factors. This, combined with the strengthening of the Rand, has the potential to threaten the profitability of local apple producers.

South Africa's main competitors from the southern hemisphere in the EU market are Chile, New Zealand and Argentina. Chile is by far the largest apple exporter from the southern hemisphere. Argentina exports primarily within the South American markets. While Brazil exports apples primarily to the EU countries. The main markets for fruit employ various measures for both tariff and non-tariff to protect the domestic industries. Exporters must be aware of all the barriers that they may encounter when trying to get their produce on foreign shelves. This market at times combines both tariffs and quotas to allow imports from a particular region to attract higher tariffs (DAFF, 2012).

3.2.4 Apple Value Chain analysis

Apple value chain in South Africa is interesting due to high sensitivity of the produce to harsh conditions and the standard set by the international market. Harvested apples go through three channels, exports that are packed and destined for international market,

or cold storage were it can be stored and sent to either the fresh fruit market or sent to retailers when the demand is high, or may be sold at fresh fruit markets in order to be sold to retailers, or it may enter the processing industry in order to obtain juice for ease of transportation in international trade. With retailers, the fruit is either sold for fresh consumption or it can be sent to the local market where it can be sold straight to consumers. Due to globalisation there is increasing competition in this sector regarding restructuring and changes in the marketing chain. Figure 3.10 on the next page showed the schematic elaboration of such approach

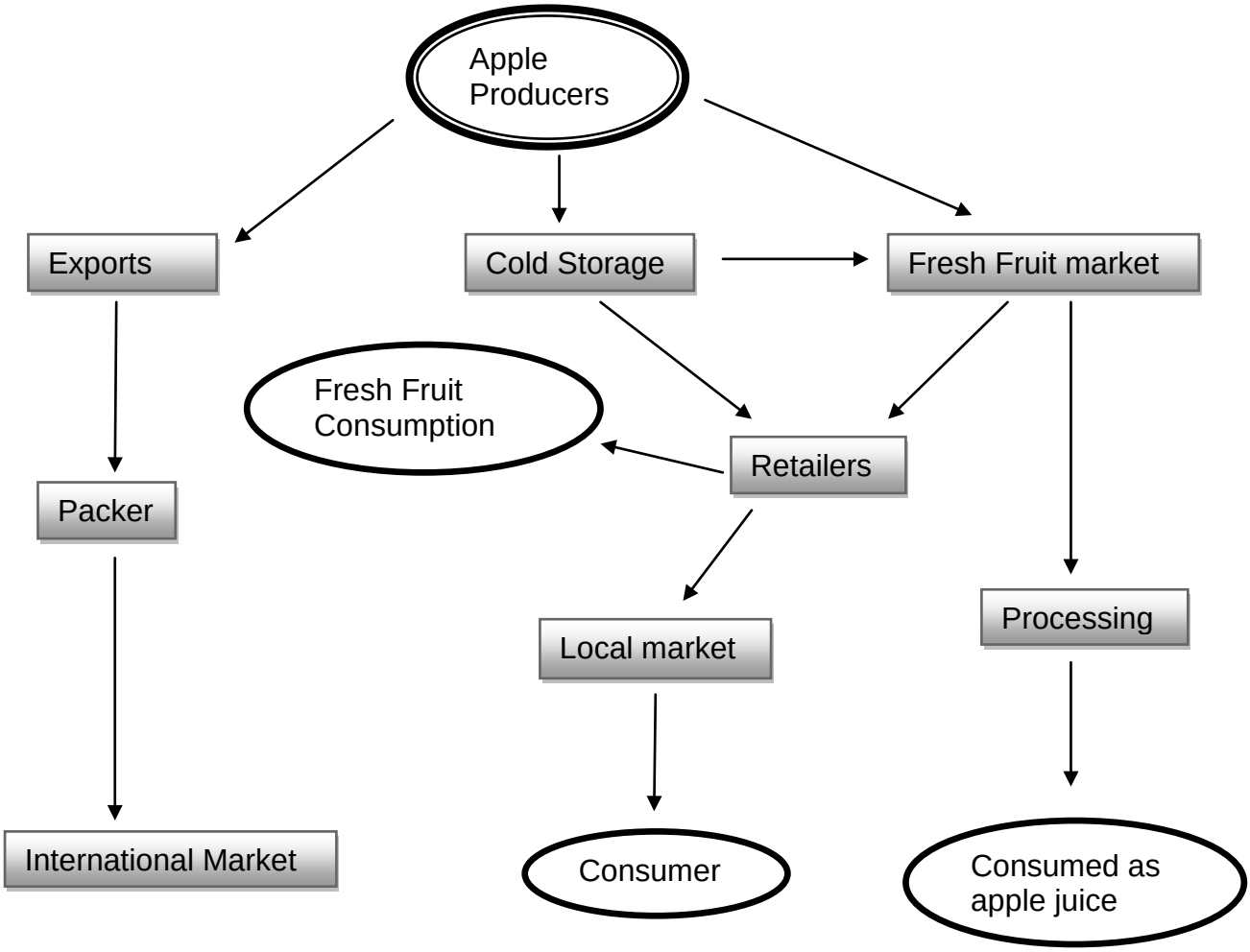

Figure 3.10: Apple value chain analysis

Source: own analysis

3.3 Mango production in South Africa.

3.3.1 Mango production status in South Africa

Mango is a tropical fruit that grows well in the subtropical areas. Compared to citrus and bananas, mangoes are the third most important and popular fruit in South Africa. The mango industry operates in a deregulated environment where prices are determined by

market forces of demand and supply. Mangoes are grown over a wide area in South Africa. However, the main production areas are in the Limpopo Province with the Letsitele valley, Hoedspruit/Phalaborwa, Lower Letaba and the Ofcolaco areas accounting for the majority of total production in South Africa. In Mpumalanga the Malelane region is the most important mango-production area.

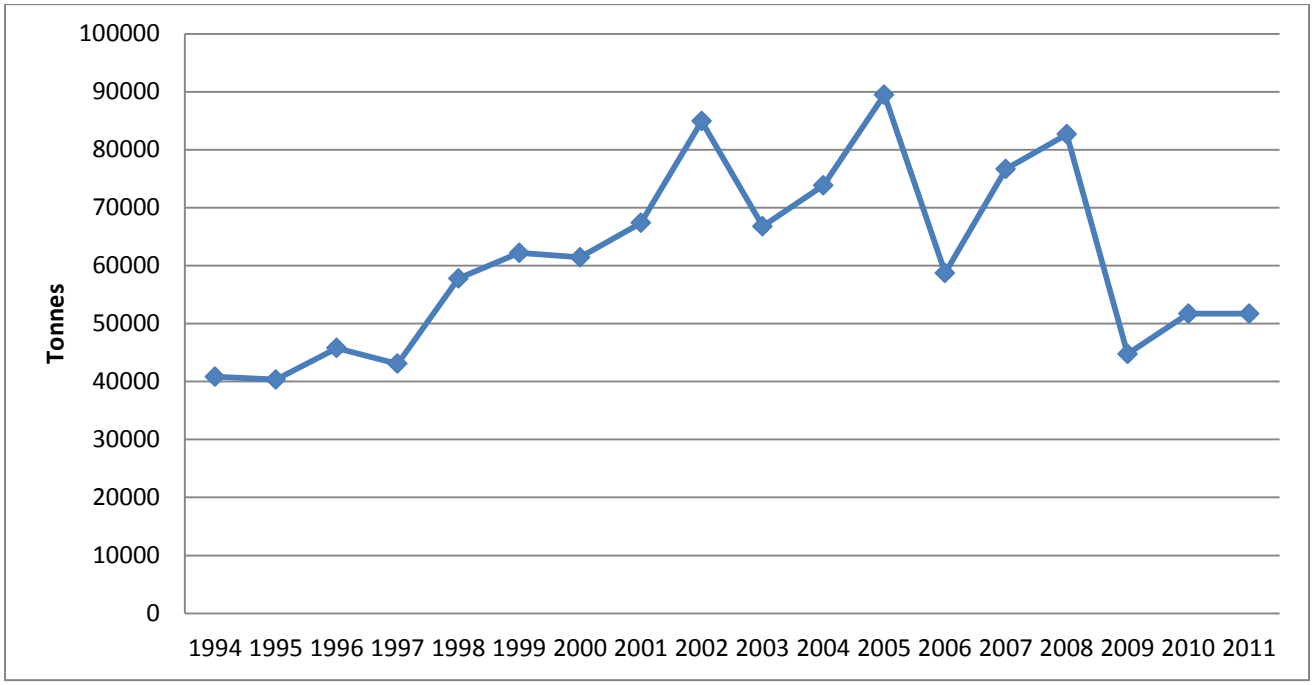

Figure 3.11 Total mango production from 1994 – 2011

Source: DAFF (2012)

In Figure 3.11 above the total production of mangoes is fluctuating and not showing any consistency. This means that the quantity of mangoes produced in South Africa from 1994 to 2011 have varied a lot and changed over time. The graph starts in 1994 were the total production was constant until 1995, in 1996 the graph started to increase. This can be viewed as a positive feature considering the agricultural policies which were

introduced in 1996 to trigger production growth to help produce for both the local and international markets.

The graph drops in 1997 and increases significantly, until 2002 where it starts dropping until the year 2003. In the year 2005 the graph reaches the peak in the production cycle of the study and then starts to drop. In conclusion it has been seen that the total production of mango in South Africa for the past 17 years has been fluctuating.

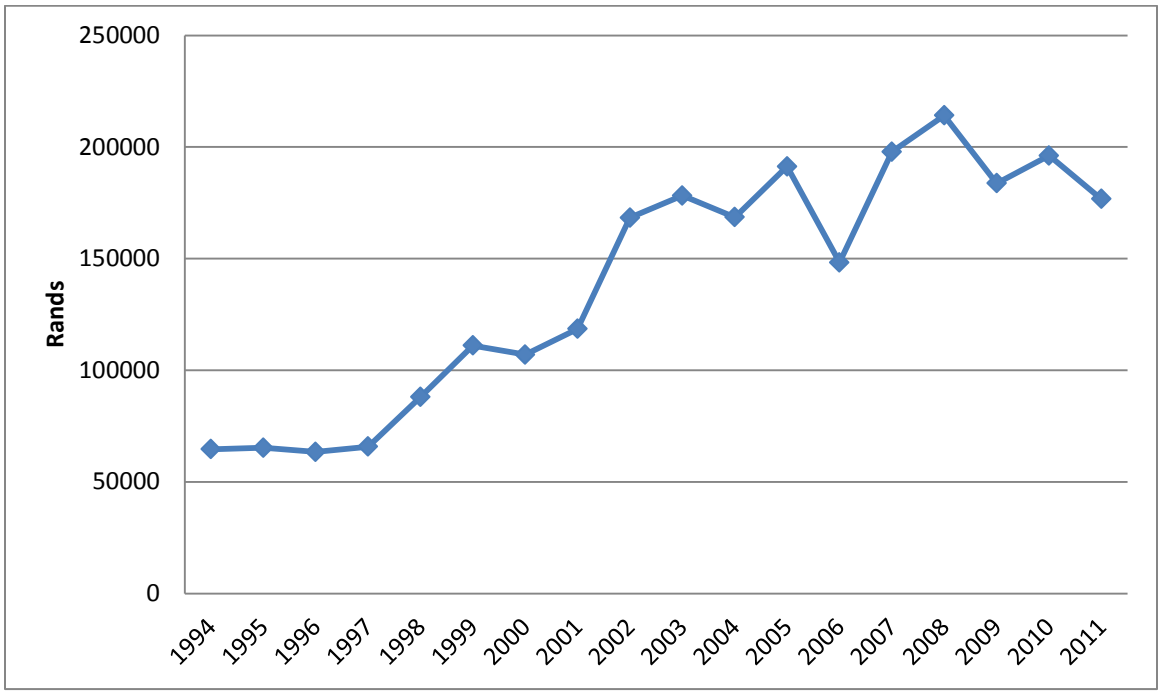

Figure 3.12 Gross Value of production for mango, 1994 - 2011

Source: DAFF (2012)

As shown by Figure 3.12, there has been a general increase in the GVP of mangoes since 1994 with an increase between 2007 and 2008. This is encouraging, particularly when one takes into account the major decrease in GVP that was experienced during

the 2006 production season. From that year the GVP increased from the year 2007 until it reached the highest currency in 2008. The graph ends up falling in the last two years.

3.3.2 Mango production per province.

The mango producing regions are mainly situated in the North East part of South Africa. The elevation of mango growing areas varies from 300 to 950 meters above sea level with annual rainfall in the major growing areas varying from 300 to 1000mm. Flowering during winter (June to August) is normally intense, which indicates that winter conditions are adequately inductive for flowering. Differences in average temperatures between the major mango growing regions give rise to differences in harvesting times. Fruit produced in the higher lying areas are harvested later than fruit produced in the lower lying areas. The difference in the time of harvest for a specific cultivar may be as long as 3 to 6 weeks.

In the Figure 3.13 below, Limpopo Province is the leading producer of mango in South Africa. It accounted for 66% of national mango production in 2008. Most of the mango plantings in Limpopo are found in the Soutpansberg, Northern, Central and Southern Letaba as well as Hoedspruit regions. The second largest producer of mangoes in 2008 was Mpumalanga with 26%. Most of the mango plantings in Mpumalanga are found in Onderberg areas of Malelane and Komatipoort. Kwa-Zulu Natal was the third largest producer of mangoes with 6%. Most of the mango plantings in Kwa-Zulu Natal are found in Pongola. Highlights of the mango exports in Figure 3.13 were that the four provinces Limpopo, Gauteng, Mpumalanga and Western Cape were consistently the

top mango exporting provinces of South Africa over the last decade. Other provinces featured intermittently but usually registered minimal trade (DAFF, 2011).

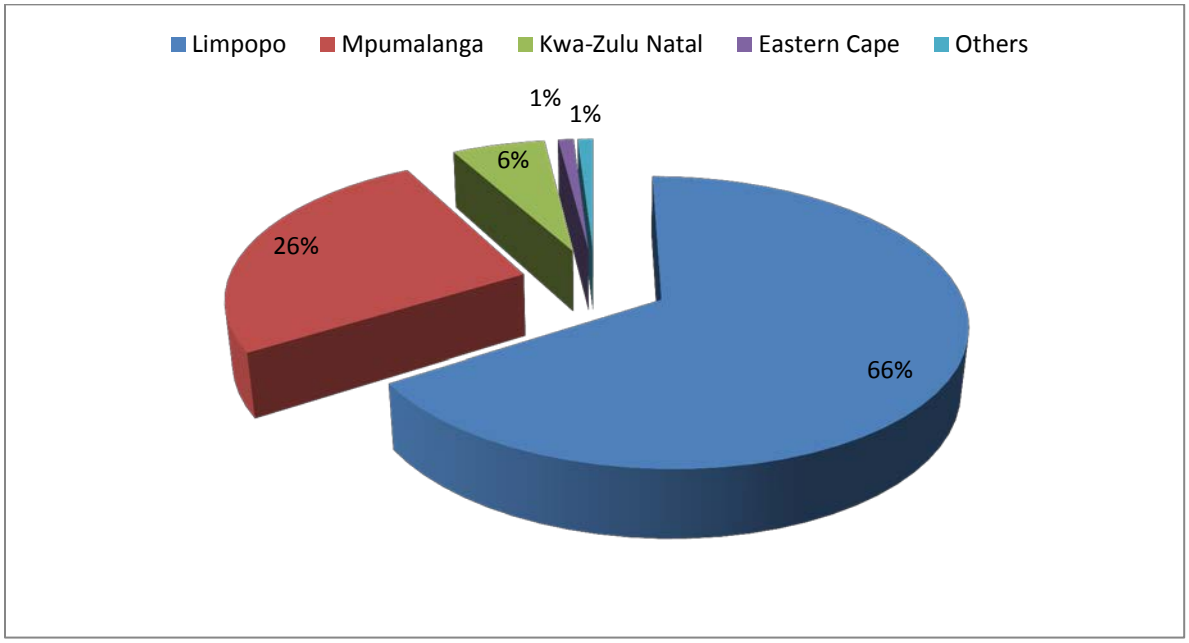

Figure 3.13: Mango production per provinces

Source: South African Mango Growers Association (2011)

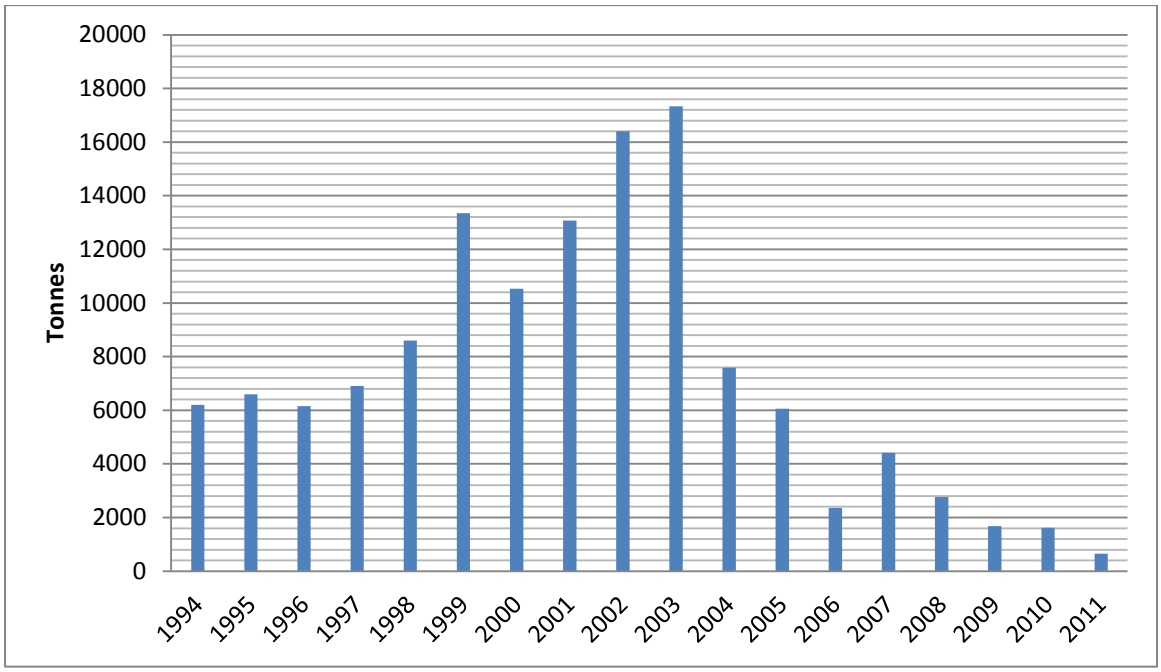

Figure 3.14: Mango exports in South Africa from 1994 - 2011

Source: DAFF (2012)

The declining prices of mango – both fresh and processed – means that export revenue growth potential becomes limited as the market becomes flooded with fierce competition from Mexico, Brazil, Philippines, etc. who have cost and economy of scale advantages over South Africa. Export destinations for South African mangoes in 2008 are shown in Figure 3.14. The volume of mangoes used for the production of dried fruit has been fairly stable for the past decade. There was a 14% decrease in mango volumes supplied for dried fruit production in 2007/08. Generally, the processing sector has the potential to grow but that will also depend on the reliability of mango supply in the future. In 2001, 2002 and 2003 the mango exports from South Africa sky rocketed. It is very disappointing to note that in the past seven years exports have been decreasing.

3.3.3 Mango market intelligence

Competitiveness is described as an industry's capacity to create superior value for its customers and improved profits for the stakeholders in the value chain. The driving force in sustaining a competitive position is productivity that is output efficient in relation to specific inputs with regards to human, capital and natural resources. In 2008 South African mango exports represented 77% of world exports and its ranking on the world exports was number 23. This reflected a growth in demand for South African mangoes in 2008.

South African mango exports are growing while the world imports are declining in Italy, USA and Oman markets (DAFF, 2012). South Africa's performance in these markets can be regarded as gains in declining markets and should be viewed as achievement in adversity. South African mango exports have declined faster than the world imports in France, Singapore, Australia, and Switzerland markets. South Africa's performance into those markets can be regarded as loss in declining markets. South African mango exports have declined while the world imports have improved in Belgium, UK, Germany, Spain, and the Netherlands markets. These are dynamic markets and South African performance should be regarded as an underachievement.

3.3.4 Domestic market for mango

In South Africa the mango market relies heavily on the processing industry since it absorbs the majority of the produce. In 2008, 73% of mangoes produced were processed whereas exports and local fresh sales absorbed 4% and 23% respectively (NDA, 2009). Fresh fruit sold in the domestic market accounted for 23% of the total

production. This fruit is sold directly to Fresh Produce Markets, through retailers, chain stores and informal markets. Very few quantities are sold directly to hawkers who buy mangoes directly from pack houses in their trucks.

3.3.5 Mango exports

In terms of mango growing, South Africa is relatively small compared to other mango exporters in the international market. In Figure 3.15 there has been an overall decline in mango exports since 2003/2004 season. This is primarily due to a serious drought that was experienced at the time (NDA, 2009). Furthermore, there has been a general trend by the producers to shift away from the export markets as the producers are now selling their produce directly to the supermarkets at a fixed price. This decline in the price of mangoes means that exports revenue growth potential becomes limited as the market becomes flooded with fierce competition from Mexico, Brazil and other countries that export large volumes of mangoes.

The 2008 export destinations for South African mangoes are shown in Figure 3.15 below. In 2008, the largest proportion of the South Africa mango was exported to the United Arab Emirates (20%). The Middle East region constituted roughly 28% of the South African mango exports. The EU and the rest of Europe constituted roughly 41% of the South African mango exports in 2008. Ghana is also an important market for South African mango exports. In 2008 the country absorbed 15% of the South African mango exports (NDA, 2008). The other percentage (15%) goes to the Netherlands, and others distributed among other EU countries.

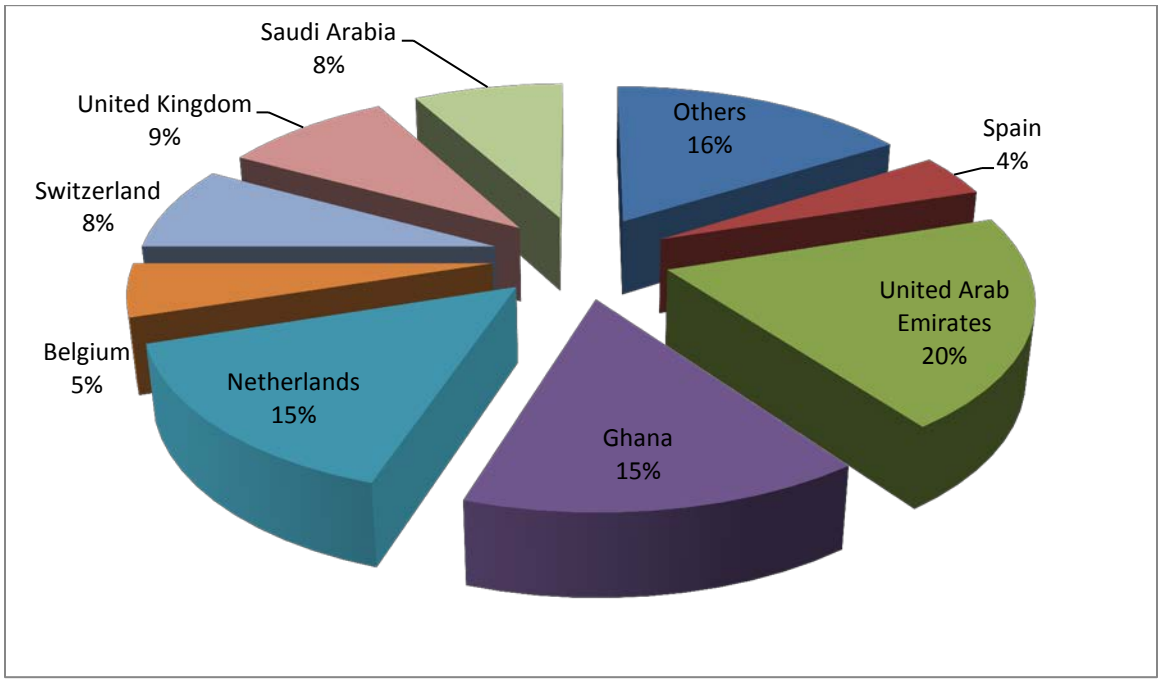

Figure 3.15: Mango exports destination in 2008

Source: South African Mango Growers Association (2011)

Among African counties Ghana dominates the list with 15%, this is due to the country's climatic conditions and the love that the Africans have on the crop. While breaking down the EU countries, Netherlands leads the chart with 15% and the remaining percentages are claimed by Switzerland, Belgium and Spain.

3.3.6 Mango Value Chain analysis

In the mango value chain, harvested fruit may be sold at local market, the fresh fruit market, in order to be consumed fresh, or it may enter the exports for processing industry where juice is extracted in order to ease transportation in international trade and other by-products. Mangoes in both the fresh market and exports can be processed for Achaar for domestic and also the export market. There is an increasing competition

in this sector, with restructuring and changes in the marketing chain, in a context of globalization. The mango market is increasingly consumer driven.

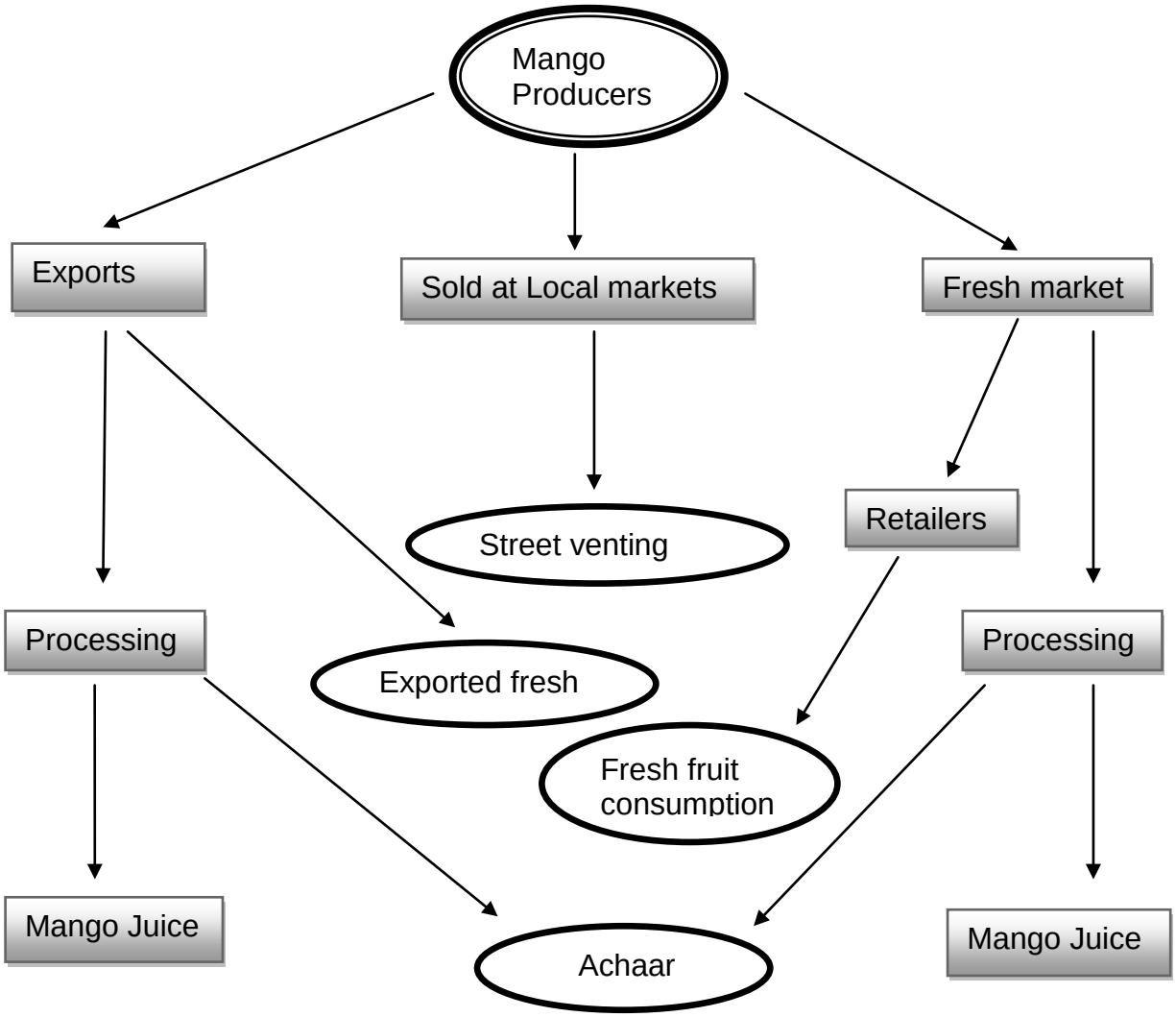

Figure 3.16: Mango value chain analysis

Source: Own analysis

3.4 Orange production in South Africa.

3.4.1 Orange production status in South Africa

Oranges are a tropical fruit and fall among a group of citrus, tropical fruits that are grown all over the republic. Many productions are mainly in Limpopo, Western Cape, Mpumalanga, KwaZulu-Natal and Eastern Cape. The Western Cape and Eastern Cape are considered the cooler citrus growing areas and produce navel oranges and lemons. In Limpopo, Mpumalanga and Kwa-Zulu Natal the conditions are warmer, with oranges and grapefruit produced there.

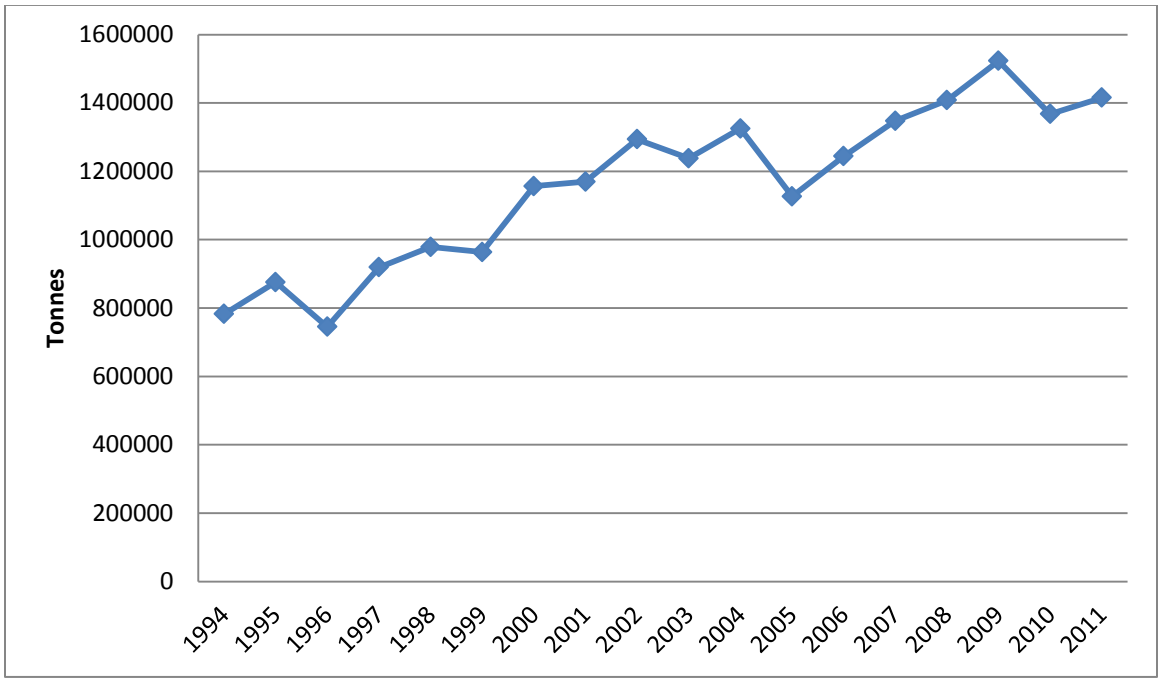

Figure 3.17 Orange production from 1994 – 2011

Source: DAFF (2012)

In the Figure 3.17 above the total production of oranges fluctuates and is not consistent at all. This means that quantities of oranges produced in South Africa from 1994 to 2011 have varied a lot and changed over time. The graph starts in 1994 where the total production increased until the year 1995 and thereafter decreased to its lowest value the following year. In 1996 it started to increase. This can be viewed as a good thing looking at the agricultural policies that were introduced in 1996 to trigger production growth to help produce for both the local and international markets.

The graph drops and rises significantly until 2005 where it started dropping. In the year 2009 the graph reached the highest tons in the production cycle of the study and then started to drop in the past few years. In conclusion it has been seen that the total production of oranges in South Africa for the past 17 years has been fluctuating.

3.4.2 Orange production per province.

The orange producing regions are mainly situated in Limpopo, Mpumalanga, Kwa-Zulu Natal and Eastern Cape. In Figure 3.18 below, Limpopo province contributed 49% of all Valencia oranges planted in 2010. The Eastern Cape Province contributed 33% of all Navel oranges planted in 2010. The production areas for Valencia oranges were good in 2010 where most of them were planted in the Limpopo province (49%). Limpopo is followed by Mpumalanga at 20% and the Eastern Cape at 14%. The Eastern Cape Province is the leading grower of navel oranges that are at 34%. Second is the Western Cape Province at 26%, followed by Mpumalanga at 20%.

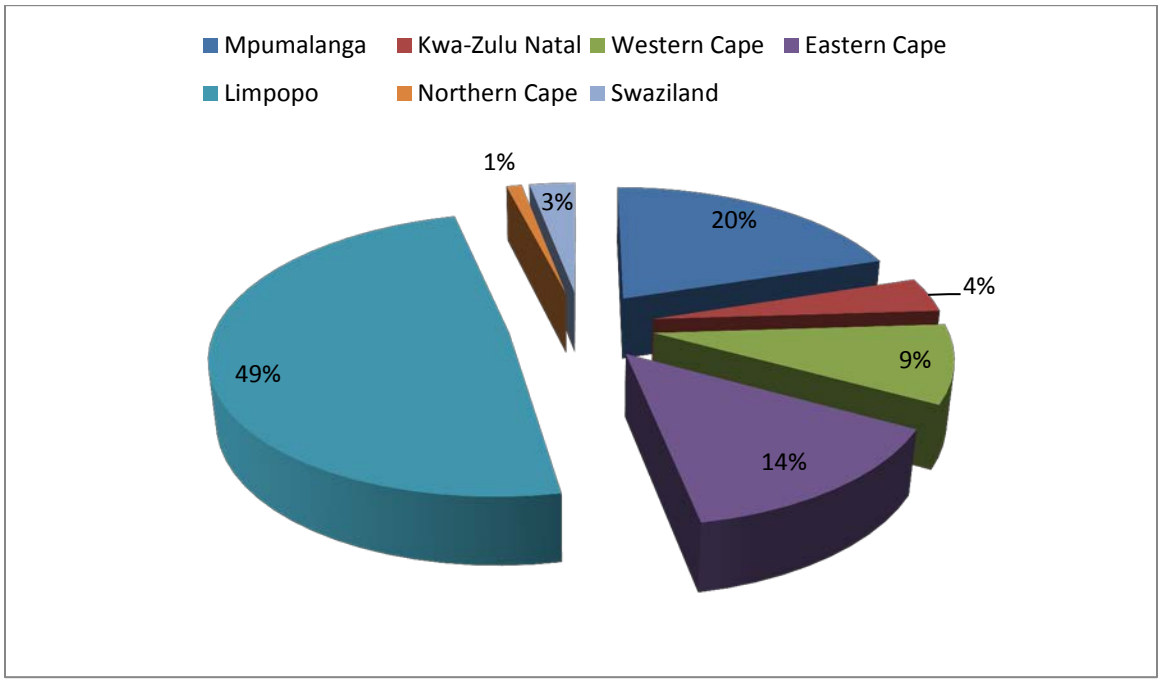

Figure 3.18: Valencia orange production per province

Source: Citrus Growers Association (2011)

Presented in Figure 3.19 below is the year 2012's production for navel oranges per province. The Eastern Cape Province is the leading grower of navel oranges at 34%. Second is the Western Cape Province at 26%, followed by Mpumalanga at 20%. Limpopo is at 12%, with Kwa-Zulu Natal, Northern Cape and other provinces constituting the remaining 8%.

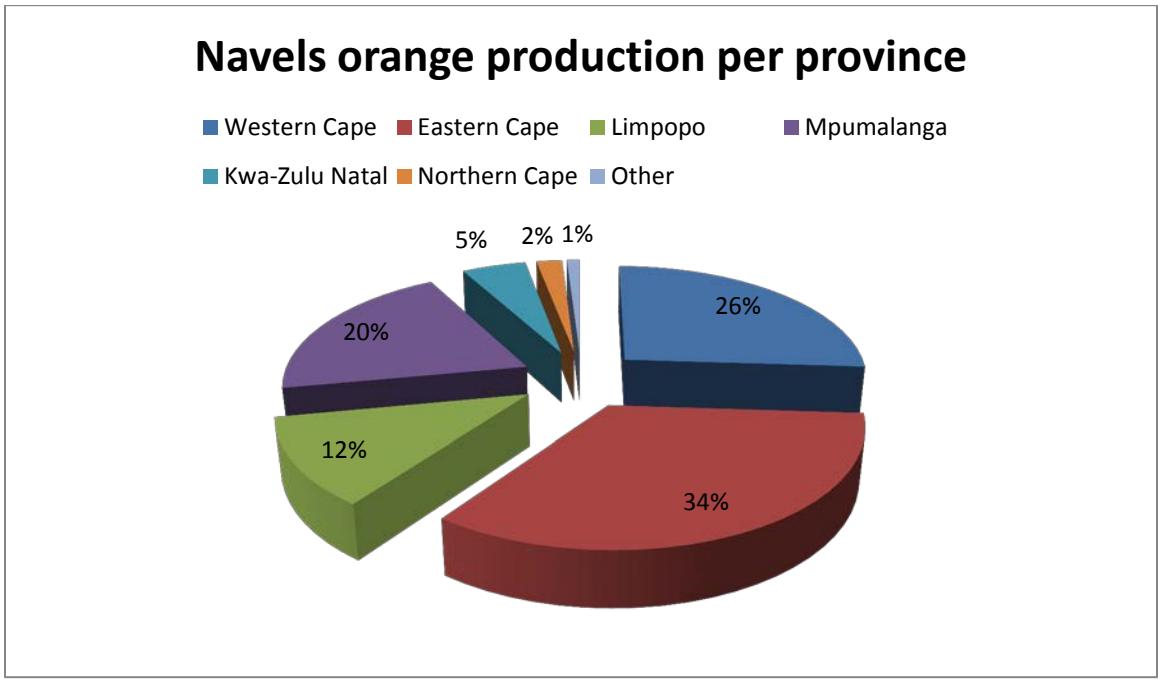

Figure 3.19: Navels orange production per provinces

Source: Citrus Growers Association (2011)

3.4.3 Orange market intelligence

Orange production in South Africa is mainly aimed at the export market. In South Africa, orange produce is sold through different marketing channels such as National Fresh Produce Markets (NFPMs), informal markets (street hawkers), and directly to processors for juice making and dried fruit production. The fruit is also sold directly to wholesalers and retailers through signed contracts. In 2010 South African orange exports represented 13.34% of world exports and its ranking on the world exports was number two. These South African orange exports are growing faster than the world imports in Portugal, Bangladesh, Kuwait, Malaysia, and Oman markets. South Africa's performance in those markets can be regarded as gains in dynamic markets. South

African orange exports have declined faster than world imports in Spain and Hong Kong markets. South Africa's performance into those markets can be regarded as losses in declining markets. South African orange exports are declining while the world imports are growing in Iran, Ukraine and the United Arab Emirates markets. South Africa's performance in those markets can be regarded as losses in dynamic markets and should be viewed as an underachievement.

3.4.4 Orange exports

Exports of South African oranges to various regions of the world over the past decade was totalling 1 109 127 tons and worth R4.4 billion in 2009 (DAFF, 2010). During the last decade most of South Africa's exports of oranges went to the European and Asian markets. In 2010 exports to Europe accounted for 54% of total South African orange exports while those to Asia accounted for 35%. South African exports of oranges to Europe have been relatively stable over the past decade, remaining at over 400 thousand tons annually.

Exports of oranges by South Africa to America and Africa have been relatively insignificant. Due to the relative importance of South African orange exports the European and Asian markets are further analysed below. In Europe the bulk of South African exports of oranges go to the European Union. Seventy three percentages of all South African exports of oranges to Europe in 2010 were absorbed by the European Union. The EU was followed by Eastern Europe at 26% while the remaining 1% went to Northern, Southern and Western Europe. The South African orange exports to the

European Union and Eastern Europe increased by 10% and 40% respectively between 2009 and 2010.

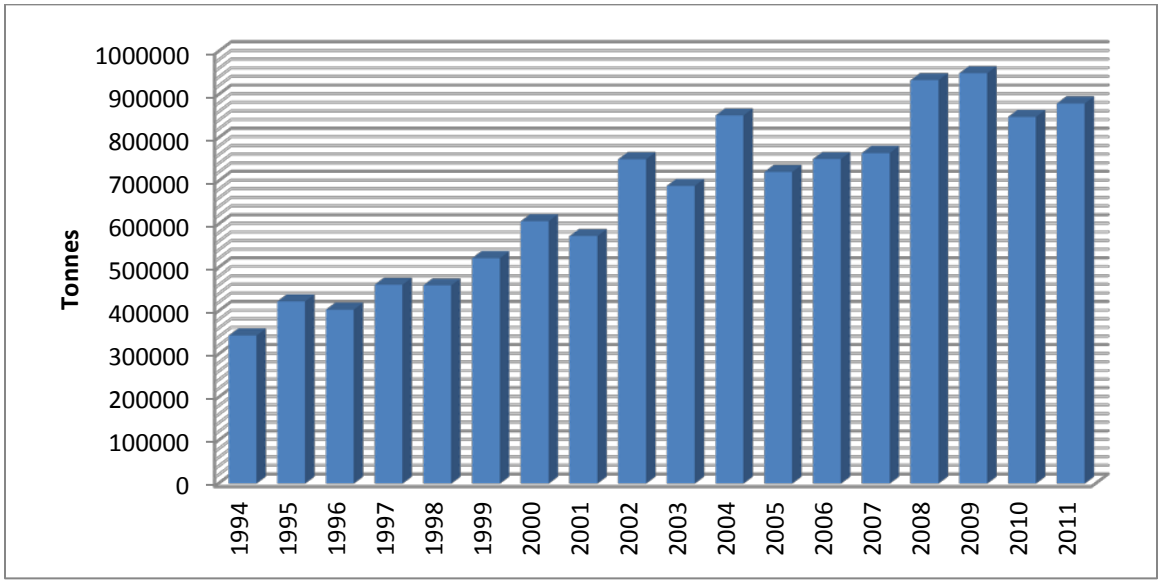

Figure 3.20: Orange exports by South Africa from 1994 - 2011

Source: DAFF (2012)

The graph starts in 1994 with a marginal increase until it reaches 2002, were it decreased in the next season and in the following year. Thereafter, from 2005 to 2007 exports of oranges have been poor compared to average exports in the years shown by the graph. The orange exports reached their peak in 2009 and have decreased since then.

3.4.5 Orange Value Chain analysis

This analysis of the orange marketing value chain is simplified because numerous interconnections were omitted and the size, levels of control and importance of each of

the links and flows could not possibly be shown in a single diagram. In the orange value chain, harvested fruit may go to the fresh fruit market, in order to be consumed fresh, or squeezed freshly at home to be consumed as juice, or it may enter the processing industry, in order for juice to be obtained to allow easy transportation in international trade and other by-products. Globalization had led to increased competition in this sector resulting in restructuring and other changes in the marketing chain. The market is increasingly consumer driven.

The following discussion will focus on the main segments of the orange value chain namely: domestic and export markets, processing industry, global retail chains and consumers. The orange value chain is presented in Figure 3.21 below.

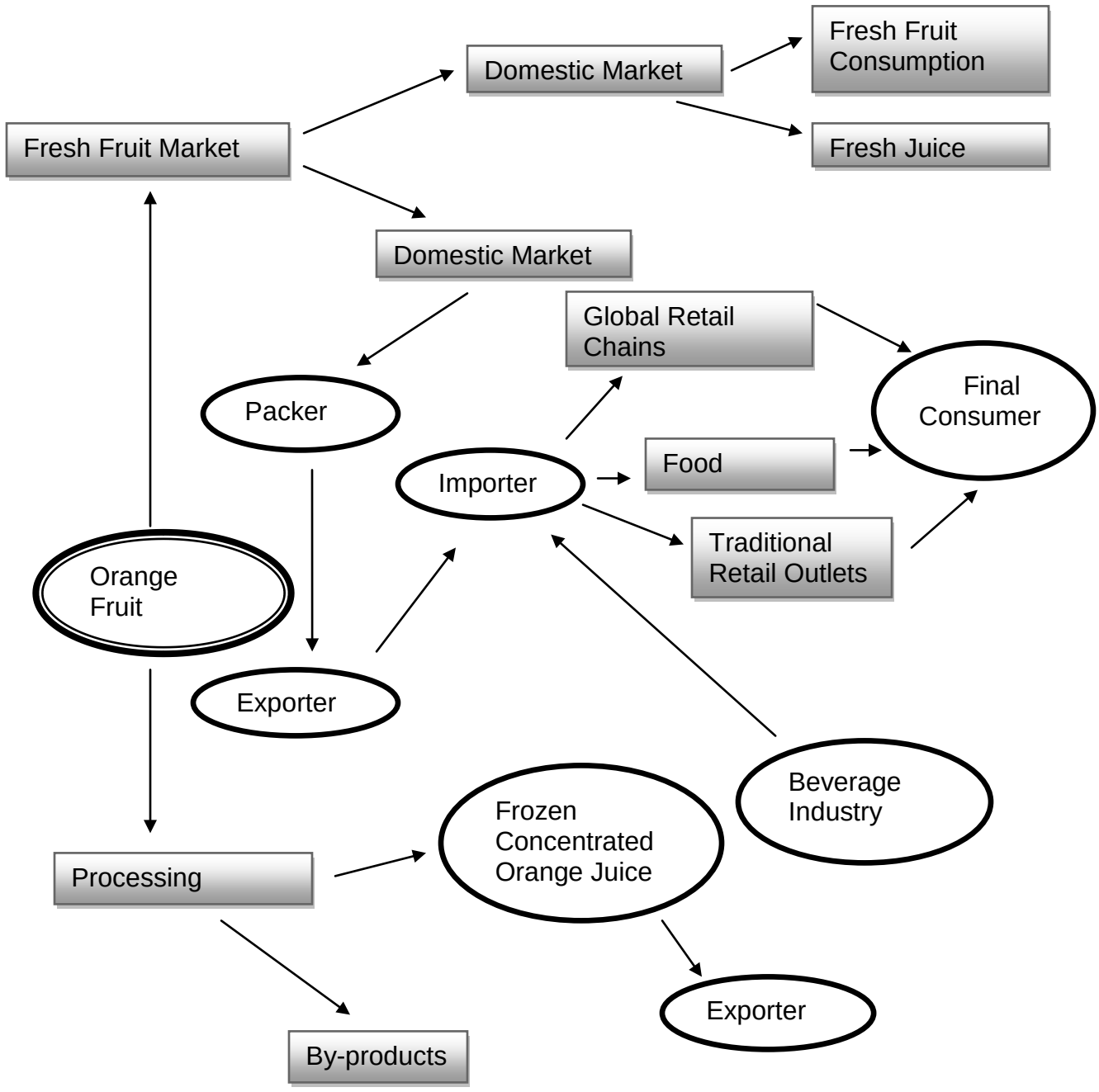

Figure 3.21: Orange value chain market analysis

Source: UNCTAD Secretariat (1991)

3.5 Summary

South Africa is not a big wholesale producer of avocados, apples, mangoes and oranges in the globe but exports more volumes of these produce. This is due to favourable climatic conditions and the seasons of production which differ with those of global competitors. Limpopo province is the leading avocado, mango and orange producing province with most of the plantations scattered across the province while a fair share of apples are produced in the Western Cape. In the past five years exports of these produce were fluctuating while production was also increasing. Value chain analysis shows that these produce have the potential to be processed and earn more foreign value at its tertiary stage.

CHAPTER FOUR

RESEARCH METHODOLOGY

4.1 Introduction

This chapter starts by making an overview of the Two-Staged Least Square model, both the growth and volatility models. It also goes further to describe the study area and analytical technique used to analyse the time series secondary data for the variables that were considered to analyse the impact that avocado, apple, mango and orange exports have on the agriculture's share of GDP in South Africa. It further elaborates on purposes of descriptive analysis and discriminant analysis presented subsequently. A brief definition of the variables used was presented in this chapter.

4.2 Overview of two-staged least squares system, growth and volatility analysis model.

4.2.1 Two - Stage Least Square System

A number of empirical studies have been conducted on export led-growth in developed countries, with very few empirical studies done in the recent past to investigate the export led-growth hypothesis for African countries. The few studies that exist include the works of Jung and Marshall (1985) and Ukpolo (1994). These studies brought the relationship between export and growth to the fore of academic discussion, this literature is still very limited and the empirical results remain inconclusive. Guided by the aim of the study, which was to analyse the link between agricultural exports and agriculture's share of GDP in South Africa from 1994 to 2011. The focus was to improve the quality of the results by using more appropriate econometric techniques that have

not been used by other researchers in the region (i.e. in the African context): Two-Stage Least Squares (2SLS), Growth rate and Volatility models.

The Two-Stage Least Squares was used to reduce the assumption that the explanatory variables (agricultural exports) are exogenous and for its ability to correct both the simultaneity bias (endogeneity problem) and the bias coming from the correlation between the country specific effects and the repressors. The 2SLS regression assumes that agricultural export variable is endogenous hence it is instrumented by lagging. To use the 2SLS endogenous variables are correlated with the random variables, which only happen when it is not possible to solve a least squares problem in each equation. Two-stage least squares must obtain a set of variables, called proxy variables, which are close to the endogenous variables. The proxy variables are highly correlated to the exogenous variables but are not correlated to the error terms. It is documented that the 2SLS estimator can perform poorly in fixed samples when there are weak or many instruments. One aspect of this poor accuracy is due to finite sample bias. When the instruments are weak, the 2SLS estimator is biased in the direction of the Ordinary Least Squares (OLS) estimator; as elaborated by Bound *et al.* (1995), Staiger and Stock (1997) and (Stock *et al.,* 2002).

4.2.2 Growth and Volatility Analysis model

This model was used to forecast the absolute magnitude of returns and may also be used to predict quartiles. The said model can also be used to determine the rate at which the general level of production of an economy is growing. The impact of volatility on economic growth has weighed more interest in recent years. Most aspects of this

notion have received both theoretical and empirical attention, with empirical research focused primarily on cross-country volatility and setting this issue in the global context.

This model is well suited for developing world's due to two reasons. Firstly it's the fact that developing countries have small economies, for which the type of small open economy model that underlies our analytical framework is adequate representation. Second, due to the degree of risk experienced by most developed economies this is really quite small. Not surprisingly, risks of such small magnitude have only small effects on equilibrium growth rates, a characteristic our numerical simulations bear out. This is a manifestation of the equity premium puzzle in the international growth context, where it has been shown that in order for risk to have significant effects implausibly high degrees of risk aversion must be assumed.

4.3 Study Area

The study of the impact analysis of the linkage between avocado, apple, mango and orange exports on the agriculture's share of Gross Domestic Products was conducted in South Africa. South Africa occupies the southern most tip of Africa with a coastline of about 3 000 km^2. The country has boundaries with Namibia, Botswana and Zimbabwe, while Mozambique and Swaziland lies to the north-east. Completely enclosed by South African territory in the south-east is the kingdom of Lesotho. To the west, south and east, South Africa borders on the Atlantic and Indian oceans. South Africa has generally temperate climates which vary from the extreme desert to the lush subtropical climate. From the east, the land quickly rises over a mountainous escarpment towards the interior plateau known as the Highveld. Even though South Africa is classified as semi-

arid, there is considerable variation in climate as well as topography. South Africa is divided into nine provinces. Amongst the nine provinces Limpopo is the leading producer of avocado, apple, mango and orange with most of the plantations in Tzaneen and Makhado, while the Western Cape is the major producer of apple.

South Africa is a nation of over 51-million people of diverse origins, cultures, languages and beliefs. According to the 2011 census from Statistics South Africa, the country's population stands at some 51.8-million, up from the census 2007 count of 47.9-million. Nine of the country's 11 official languages are African, reflecting a variety of ethnic groupings which nonetheless have a great deal in common in terms of background, culture and descent (StatsSA, 2011).

4.4 Data set

The study used the secondary time series data that were obtained from Department of Agriculture, Fishery and Forestry Statistical Directorate and Statistics South Africa. The study used a sample size of 17 years (1994 – 2011) of avocado, apple, mango and orange exports in South Africa. Data was broken into four sub sectors i.e. Agricultural exports, Agricultural Economic Growth, Net Factor Income and Real Capital Income. Agricultural exports covered avocado, apple, mango and orange exports. These exports were expressed physically in monetary values and tonnes. Agriculture GDP, NFI and INV were expressed in percentage. The data were lagged at two, to avoid stationary using the Augmented Dickey-Fuller test. This test was run independently from the

models used to analyse objectives in order to show the ability of secondary time series data to address objectives of the study.

4.5 Analytical technique

The study used the Two-stage Least Square and the Growth and Volatility Analysis model to determine the relationship between avocado, apple, mango and orange exports and agriculture's share of Gross Domestic Products in South Africa from 1994 to 2011 and to evaluate the growth rate and volatility on the trends analysis of avocado, apple, mango and orange exports respectively. The Statistical Package for Social Sciences (SPSS) 20.0 was used to analyse.

The 2SLS model assumes that agricultural economic growth is simultaneously determined along with avocado, apple, mango and orange exports. As proposed by Davidson and McKinnon (1981), the J-test was used in the process of model selection, and only statistically significant variables were included in the two stage least square system equation. This assures that the model is specifically tailored to suit the South African agricultural economic growth. The two stage least squares systems approach was used to estimate the equations in this study to avoid simultaneity bias. The selected model for this study has a system of two simultaneous equations determining agricultural economic growth and avocado, apple, mango and orange exports of South Africa.

The equations also check for the possibility of export shortages due to binding availability of foreign exchange through the inclusion of income remittances from abroad

in the export equation, which has not been addressed in much of the existing studies carried out using different analytical models. Each equation was estimated using the Ordinary Least Squares method, which evaluates each equation separately. While this method is highly susceptible to simultaneity bias, OLS can be a very effective tool for small samples since it minimizes the variance and is less susceptible to estimation errors including misspecifications (Pesaran and Deaton, 1978). The study also used the growth and volatility model to analyse the economic growth trends.

4.5.1 The Two-Stage Least Squares system

The system is necessary because it has two simultaneous equations determining agricultural Gross Domestic Product and apple, avocado, mango and orange exports. The equations also check for the possibility of export shortages due to binding availability of foreign exchange through the inclusion of income remittances from abroad in the export equation and will be used to predict a categorical dependent variable on the basis of continuous and categorical independent variables. Each equation was also estimated using the ordinary least square method, which evaluates each equation separately. While this method is highly susceptible to simultaneity bias, Ordinary Least Square can be a very effective tool for small samples since it minimises the variance and is less susceptible to estimation errors including misspecification (Pesaran and Deaton, 1978). This model looked at objective one and two (iv) determine correlations between avocado, apple, mango and orange exports and agriculture's share of Gross Domestic Products and (iii) investigate the contribution of avocado, apple, mango and orange exports and agriculture's share of Gross Domestic Products.

General models

Avocado, apple, mango and orange exports equation:

$\log (Xa)_t = \beta_1 \log (\beta_1)_t + \beta_2 \log (\beta_2)_{t-1} + \beta_3 \log (\beta_3)_{t-2} + U$ 1

Agricultural economic growth equation:

$\log (AGE)_t = \beta_1 \log (\beta_1)_t + \beta_2 \log (\beta_2)_{t-1} + \beta_3 \log (\beta_3)_{t-2} + U$ 2

Specific models

Avocado, apple, mango and orange exports equation:

$\log (Xa)_{t-1} = 0 + AGE \log(AGE)_t + NFI \log(NFI)_{t-1} + INV \log(INV)_{t-2} + U$ 3

Agricultural economic growth equation:

$\log (AGE)_{t-2} = 0 + Xa \log(Xa)_{t-2} + NFI \log(NFI)_{t-2} + INV \log(INV)_{t-2} + U$ 4

where, Xa is avocado, apple, mango and orange export to be measured in tonnes, AGE is Agricultural Economic Growth to be measured in percentages, NFI is the Net Factor Income measured in Rand, INV is the Real Capital Investments to be measured in Rand, t is the time factor and U is the disturbance term.

4.5.2 Growth and Volatility Analysis model

The growth and volatility analysis model was used to analyse the data for this study. The model determined the rate at which the general level exports trends of agricultural economy is growing. The model used two different approaches to (i) determine the growth rate of avocado, apple, mango and orange exports and (ii) determine the volatility of avocado, apple, mango and orange exports. The avocado, apple, mango and orange exports growth rate was calculated using the following model.

The expression of the model:

$$r = \left[\frac{Pi}{(Po)\frac{1}{5}} - 1\right] \times 100$$

where, r is avocado, apple, mango and orange exports growth rate, to be measured in percentage, Pi is the end of period (2011), to be measured in years and Po is the beginning of period (1994), to be measured in years.

Volatility was measured using the standard deviation or variance between return from avocado, apple, mango and orange market index over a period from 1994 - 2011. The volatility and stability determined the coefficient of variation for the avocado, apple, mango and orange exports industry statistical series.

The formula for the coefficient of variation was as follows:

$$V = \frac{\sigma}{\mu} = \frac{\sum\left(\chi - \frac{\mu}{N}\right)}{\mu}$$

where , V is the Coefficient of variation, σ is standard deviation, μ is the mean, χ is observation in years and N is the number of years.

Volatility is a key concept in the macroeconomic sector of finance. Volatility is measured by a standard deviation or variance of returns and is often used as a crude measure of the total risk of financial assets. Many value-at–risk models for measuring market risk require the estimation or forecast of volatility. There is a negative relationship between

growth and volatility. Volatility as measured by term of trade shocks is harmful for growth. The potentially detrimental causal effect of volatility on growth is larger in countries with lower financial development, which may have important implications for welfare and policy (Aghion *et al.,* 2005).

4.6 Summary

The aim of this chapter was to describe the background of econometric models, explain the analytical methods used for data analyses and the research method followed in this study. The main research techniques used were the Two-Stage Least Squares system approach and the growth and volatility analysis model. The research techniques were chosen based on the fact that the aim of the study is to analyse the link between avocado, apple, mango and orange exports on the agriculture's share of GDP in South Africa, from 1994 to 2011. The models are run separately for each variable and are compared later.

CHAPTER FIVE

RESULTS OF DESCRIPTIVE ANALYSIS

5.1 Introduction

The aim of this chapter is to present the results of the descriptive analysis. The reason for using descriptive statistics is to describe the basic features of data in the study and also to provide simple summaries of the variables and measures. Descriptive analysis employs the use of the means, frequencies and standard deviation for the key variables. As explained in Chapter three, the study uses the timed series secondary data collected from a sample of 17 years in South Africa by Statistics S.A and the Department of Agriculture, Fishery and Forestry Statistical Directorate. The data collected covered information on agriculture's share of GDP, avocado, apple, mango and orange exports; Net Factor Income and Real Capital Investments. The results are presented in both graphic and tabular form and also interpreted individually.

5.2 Descriptive analysis of the Two Staged Least Squared System

5.2.1 Net Factor Income

The Net Factor Income (NFI) plays a significant role in analysing the impact of avocado, apple, mango and orange exports on the agriculture's share of GDP in South Africa. This accounts for the difference between income earned by farmers as a result of agricultural exports from foreign countries and income earned by farmers in the local market. The factor incomes are reckoned in terms of factor incomes of foreign currency and the monetary value earned by the country. As a significant factor in the South

African agricultural economy, it is important to determine the effect of income remittances on South African agricultural economic development.

The Net Factor Income allows farmers to import pesticides, fertilisers and other agricultural inputs which can be used to produce quality marketable produce; it may also result in increased demand for mangoes while increasing investment in the agricultural sector. Increased demand provides incentives for producers to increase their production and the resulting increased supply may increase avocado, apple, mango and orange exports.

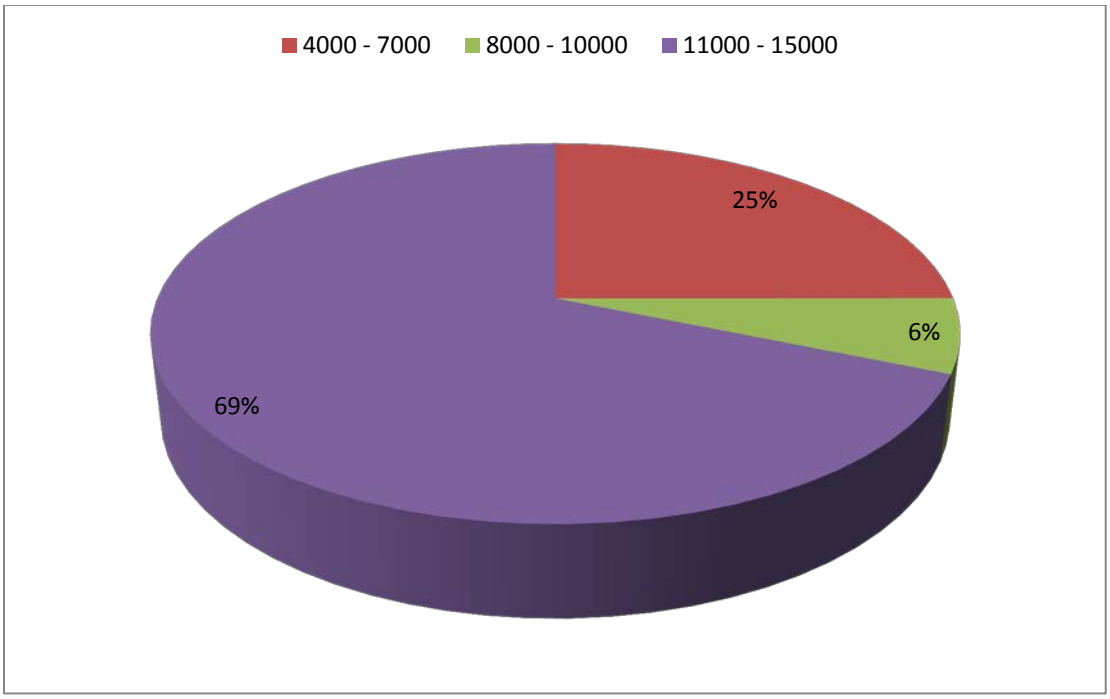

Figure 5.1 Net Factor Income

Source: Descriptive statistics

Figure 5.1 revealed that the net factor income over R 11 000 but less than R 15 000 amounts for 69% over 17 years. This gives a holistic view that the Net Factor Income has been good hence agricultural GDP. Secondly a category of average R 4 000 – R 7 000 poses 25 % and act as a balance in our analysis. The other group of R 8 000 – R 10 000 lie on 6% and with the category of R 1 000 – R 3 000 with no percentage at all. The result gives an overview of the analysis and the balance that the other categories will have on the highest.

5.2.2 Avocado, Apple, Mango and Orange exports

Exports of processed agricultural products are expanding rapidly, driven by demographic, social and economic trends. South Africa like any developing country has rapidly become its own best markets for agricultural exports. South African exports and imports of agricultural products grew significantly from 1996 to 2005. On average exports of agricultural products grew on a compounded basis, whilst agricultural imports are lagging behind. The growth in exports to various markets measured over years indicates the increasing importance of non-traditional trade partners to South African agricultural exporters (DAFF, 2012).

Agricultural exports can play a significant role in analysing the impact of agriculture's share of GDP in South Africa. This can lead to the change in the quantity of produce exported to the overseas market hence it can contest an economic decision within the local market for those products. Over the years the world agricultural exports and South African agricultural exports grew per annum. This is due to the export oriented

agricultural sector and an instant demand of agricultural produce due to climate change and higher competition which improved the quality produced.

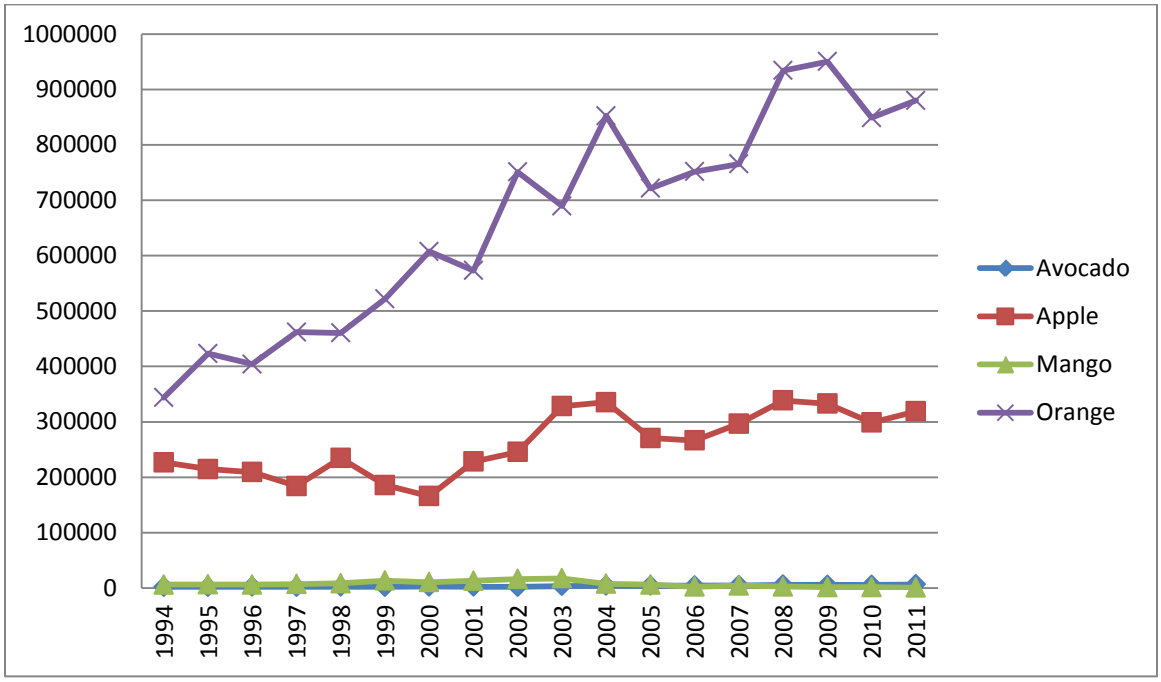

Figure 5.2 Avocado, apple, mango and orange exports

Source: DAFF 2012 Statistics

Figure 5.2 above shows the exports of agricultural products considered for this study. The graph starts in 1994 with both mango and avocado exports lagging behind apple and orange exports. The volume of avocado and mango does not change throughout, a factor which economists can attribute it to the fair competition that these produce face in the global market. The favourite climatic conditions that favours both apple and orange production in the country and its value chain analysis that help process them contribute to this higher volume of exports. Throughout the curve, the volume of oranges exported is far higher than any other product. This can help improve the other produce if they can

be given the necessary support. Such as subsidising the exports tariffs that agricultural exports face in the international market. Orange and apple share good trends while avocado and mango are struggling.

5.2.3 Real Capital Investment

It is widely documented that the decision to invest is a real option and that many insights from the theory of financial options apply to real investment decisions. One primary difference between real and financial options is the ability to vary the capital intensity of the investment, i.e., the capacity or output level (Capozza and Li, 1996). Recently there have been wide classes of investments; some include any investment decision that involves fixed amounts of either land or human capital and would include decisions to farm with field crops or an animals, all land development decisions whether residential or commercial.

Generally, previous literature notes a number of factors that influence economic growth where specification bias or spurious regression will result if the relationship between exports and economic growth is being tested (Shah and Sun, 1998). Real Capital Investments play a significant role in analysing the link between avocado, apple, mango and orange exports on agriculture's share of GDP in South Africa. Per capita real investment adds up the money spent on farming enterprise or personal capital improvements. Examples of the agricultural expenses in this category would be production costs incurred to produce fruits to be exported.

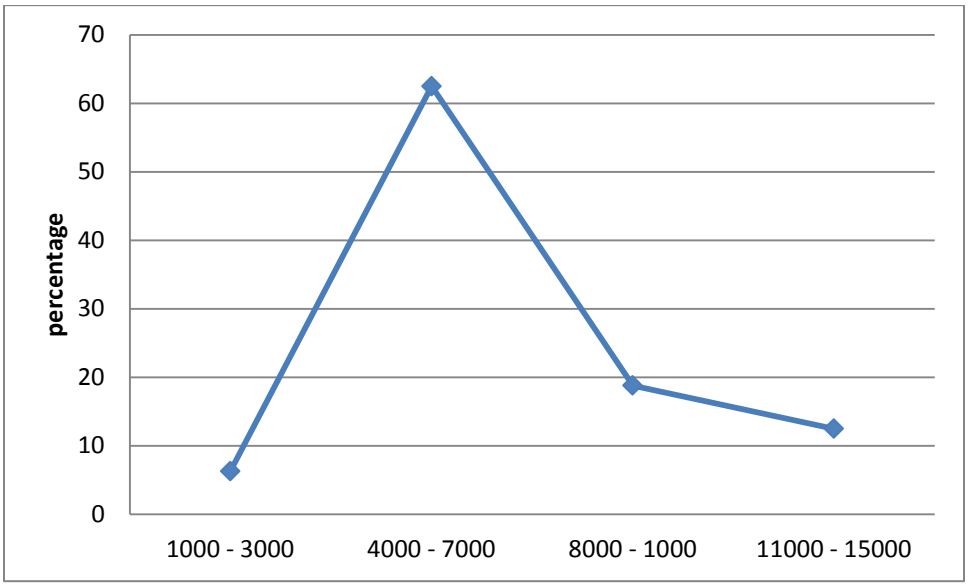

Figure 5.3 Real Capital Investments

Source: Descriptive statistics

Figure 5.3 begins at the first category with the lowest percentage which is 6.3% and eventually reaches its peak in the second category, where it amounts to 62.5%. In the third categories the Real Capital Investments decreases to 18.8%. This can be a result of an increase in the interest rate which reduces the present value of investing in the long-run and thus lowers the critical values of mango exports in South Africa. To conclude the discussion of Figure 5.3, in the third category the graph reflects a halt at 12.5%. This shows that farmers are more reluctant to invest in their farms, which in the long run can be affected by the land reform programme.

5.3 Descriptive analysis of the Growth and Volatility Analysis model

5.3.1 Avocado, apple, mango and orange exports in South Africa

Table 5.1 Descriptive analyses of avocado, apple, mango and orange exports in South Africa

Variable	Mean (Value)	Standard Deviation (%)	Min (Value)	Max (Value)
Avocado exports	8	0.195	1	3
Apple exports	7	0.233	1	3
Mango exports	2	0.730	1	3
Orange exports	6	0.157	1	3

Source: Descriptive statistics

Once the relationship between agricultural exports and agriculture's share of GDP in South Africa have been examined, whatever its nature, it is going to be very essential to ask necessary determinants of export supply are. In theory exports are determined by the principle of demand and supply, and according to that theory the demand for avocado, apple, mango and orange exports in South Africa would be a function of overall earnings over seventeen years.

The above table shows the descriptive results of agricultural exports, namely: avocados, apples, mangoes and oranges. Avocado exports were at 8% with a standard deviation of 0.195%, this implies that avocado exports have good growth rate and are not volatile. The same notion can be shared for apple, mango and orange exports too, with 7%, 2%

and 6% and 0.233%, 0.730% and 0.157% respectively. The standard deviation for each variable is very small, which simply elaborates that agricultural exports (avocado, apple, mango and orange) in South Africa are not volatile and had good growth rates.

Agricultural exports have been considered the main channel through which openness increases the economic growth performance. The main question regarding the exports-growth issue is whether causality goes from exports to economic growth. The establishment of the direction of this causal relationship has important implications for economic policy strategies. If causality flows from exports to growth then the implementation of export promotion policies is a proper strategy for a country to grow. This causality between export growth and economic growth has long been an area in international and development economics receiving a great deal of research attention. Relying on basic economic theory, one can suggest that exports growth contribute to economic growth first through what is known as the foreign trade multiplier effect (Rifat, 2012).

5.4 Summary

The descriptive analyses in this chapter has shown the different percentages in the three variables i.e. the Net Factor Income, Real Capital Investment and avocado, apple, mango and orange exports in South Africa. These results affirmed that the trends of avocado, apple, mango and orange production in South Africa have been increasing leading to an increase of the overall exports in the agricultural field. The net factor income has reached the highest percentage when compared with the other graphs; this

shows that lately an increase in the export of mangoes has resulted in an increase in the overall earning of foreign currency.

This shows that apart from the sector's immediate economic contribution it also has encouraged indirect linkages within macroeconomic elements and other parts of the economy. This also showed that the exports of avocados, apples, mangoes and oranges in the republic of South Africa helps farmers earn much needed foreign currency which in the short and long-run can be invested in labour, machinery, chemicals and infrastructure. Figure 5.1 and Figure 5.3 stroked zero per cent once in the frequencies, the Net Factor Income on Figure 5.1 was zero per cent in category one meaning that the income remittances which range from R1000 – R3000 was not earned hence showing a great deal of their high earnings. The study went on to describe the analysis for the exponential model in Table 5.1 where it found that the variable has the minimum opportunity of 1 and a maximum of 3.

CHAPTER SIX

RESULTS OF EMPIRICAL ANALYSIS

6.1 Introduction

The secondary time series data collected from Statistic South Africa and Department of Agricultural, Fishery and Forestry Statistical Directorate was analysed. The computer package (SPSS 20.0) was used to estimate the correlations, coefficients, intercepts, standard error of estimates, significant and the adjusted Pseudo R-square. The Augmented Dickey-Fuller test was used to check for stationarity. The intercept analyse the impact of avocado, apple, mango and orange exports on the agriculture's share of Gross Domestic Product in South Africa over a period of 17 years. Two Staged Ordinary Least Squares was used to analyse the first model of Two-Staged Least Square System approach and to give a precise analyses for the first two hypotheses. The study went on to use the growth and volatility analysis model to address the last two hypotheses.

6.2 Correlation of agricultural GDP and agricultural exports

Table 6.1 Correlation matrix of agricultural GDP and agricultural exports

Variables	**Correlation Co-efficient**	**Significance(2-tailed)**
Avocado	- 0.558**	0.001
GDP	**1.000**	**1.000**
Apple	- 0.399**	0.023
GDP	**1.000**	**1.000**
Mango	0.452*	0.010
GDP	**1.000**	**1.000**
Orange	- 0.739***	0.000

*, **, *** Correlation is significant at 1%, 5% and 10% levels (2-tailed)

Avocado

Table 6.1 shows that the direction of association that exists between avocado and agriculture's share of GDP was significant at 10%. This implies a linear correlation between these variables such that when avocado exports increase the agricultural GDP will also increase or decrease thus supporting the export-led growth hypothesis. Avocado exports have a negative coefficient which implies that the avocado exports of the above produce have a negative influence on the agricultural GDP of South Africa.

Apple

Due to higher volumes of apple exports across the borders, the share of apple exports towards agricultural GDP differs with the avocado's contribution. This is because of a

significant correlation between apple exports and the agriculture's share of GDP; hence the export-led growth notion still holds water. These variables were significant at 5%, which implied that when apple exports increase a decrease in agriculture's share of GDP is witnessed.

Mango

A very low quantity of mango exports goes over South African borders as a result mango exports make a limited contribution to the GDP. Table 6.1 above shows the direction of association that exists between mango exports and agriculture's share of GDP which was significant at 10%. An increase in the mango exports will trigger an increase in agricultural GDP and this goes to support the export-led growth hypothesis.

Orange

Orange exports attract most markets in international trade. In a season, higher volumes of oranges are exported across the borders; the share of orange exports towards agricultural GDP contribution was positive. This is because of a significant correlation between orange exports and the agriculture's share of GDP like other three produce. This triggers the export-led growth hypothesis. Orange exports were significant at 10%, which implies that when orange exports increase the agriculture's share of GDP will decrease.

6.3 Augmented Dickey-Fuller test

The Dickey-Fuller test is one of the most commonly used tests for time series data stationarity. It uses a null hypothesis that assumes a unit root. The test statistic shows

that the time series data have a unit root. If a series has a unit root, it is non-stationary, so the mean and variance are changing over time. Classical estimation theory does not apply. However, least-squares estimation is still consistent. The test works by lagging the series and rejecting and accepting the null hypothesis. If the hypothesis is rejected the series is stationary and the opposite will be the case.

Table 6.2 Unit root test for Agricultural exports

ADF Test Statistic	1.468174	1%	Critical Value*	-2.7275
Lags 2		5%	Critical Value	-1.9642
		10%	Critical Value	-1.6269

*MacKinnon critical values for rejection of hypothesis of a unit root.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EXPORTS(-1)	0.100402	0.068385	1.468174	0.1642
D(EXPORTS(-1))	-0.330970	0.285063	-1.161041	0.2650
R-squared	0.051093	Mean dependent var.		18268.75
Adjusted R-squared	-0.016686	S.D. dependent var.		53585.57
S.E. of regression	54030.79	Akaike info criterion		24.74896
Sum squared resid	4.09E+10	Schwarz criterion		24.84554
Log likelihood	-195.9917	Durbin-Watson stat		2.119193

*, **, *** represent significance at 1%, 5% and 10% respectively

The constant and the coefficient of EXPORTS are significant, t ratio less than 2 in absolute values and P-values less than t ratio. Here the P-value gives the probability that the hypothesis (unit root test in EXPORTS) is not true. It is conventional to reject the hypothesis if the P-value is less than 0.05. The ADF statistic value is 1.468174 and

associated one-sided probability value is 0.1642. ADF was lagged at 3 to minimise bias and avoid suffering the power of the model, which happens when the lag value is too small or large respectively.

Table 6.3 Unit root test for Agricultural GDP

ADF Test Statistic	-1.361641	1% Critical Value*		-2.7275
Lags 2		5% Critical Value		-1.9642
		10% Critical Value		-1.6269
*MacKinnon critical values for rejection of hypothesis of a unit root.				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
GDP(-1)	-0.037313	0.027403	-1.361641	0.1948
D(GDP(-1))	-0.182657	0.235019	-0.777199	0.4500
R-squared	0.060197	Mean dependent var.		-0.093750
Adjusted R-squared	-0.006932	S.D. dependent var.		0.354906
S.E. of regression	0.356134	Akaike info criterion		0.889449
Sum squared resid	1.775640	Schwarz criterion		0.986023
Log likelihood	-5.115593	Durbin-Watson stat		1.841337

*, **, *** represent significance at 1%, 5% and 10% respectively

The constant and the coefficient of GDP are significant, t ratio less than 2 in absolute values and P-values less than t ratio. Here the P-value gives the probability that the hypothesis (unit root test in GDP) is not true. It is conventional to reject the hypothesis if the P-value is less than 0.05. The ADF statistic value is 1.361641 and associated one-sided probability value is 0.1948. ADF was lagged at 3 to minimise bias and avoid suffering the power of the model, which happens when the lag value is too small or large respectively.

6.4 Results of Empirical Analysis for the Two-Staged Ordinary Least squares

6.4.1 The Agricultural GDP equation results

Table 6.4 Empirical results of agricultural GDP equation

Variables	Co-efficient	Standard Error	Wald statistics	**Significance**
Xa	0.463**	0.422	1.095	**0.040**
NFI	0.742	0.633	1.172	**0.266**
INV	-0.032***	0.745	-0.043	**0.007**
Constant	-0.038	0.190	0.199	**0.846**
- 2 Log likelihood		**12.39**		
Pseudo R square		**35%**		
% cases correctly predicted		**95.0%**		
Chi – square		**20.50**		

*, **, *** represent significance at 1%, 5% and 10% respectively

Source: Data analysis

6.4.2 Analysis of results for Agricultural GDP equation

Agricultural exports

Table 6.4 shows that agricultural exports are significant at 5% level, this implies that when the exports increase the agricultural GDP will also increase hence supporting the export-led growth hypothesis. Agricultural exports have a positive coefficient which implies that the exports of the above produce have a positive influence on the agricultural GDP of South Africa. In most recent studies agricultural export was found to be a factor that matters most to the agricultural GDP all over the world.

This is mainly due to the findings that most academics have shared either using the bi-directional Granger-causality between the total value of exports and agricultural GDP in the long-run. Although this is the case in the long-run, a different scenario occurs in the short-run where there is no short run causality among the variables. These suggest the sensitivity of agricultural GDP with respect to the short run in the exports of avocados, apples, mangoes and oranges in South Africa. These short results will further open the ways of research in terms of relationship among the agricultural GDP and avocados, apples, mangoes and oranges or any agricultural products in South Africa.

Net Factor Income

High income remains one of the major benefits that are crucial in the agricultural sector as it goes towards betterment of rural development, poverty alleviation and income generation of all three spheres of the agricultural sector in South Africa. There is a positive relationship between the net factor income and the agricultural GDP of South Africa. Table 6.4 above shows that this variable does not appear to be significant at any level. The implication of an increase in net factor income is that there will be an increase in the exports of mangoes from South Africa which also leads to an increase in the agricultural GDP. Apple, avocado, mango and orange farmers desire results that earn them the much needed foreign currency and to the economist, on the other hand, it would be the law of demand. Conversely; when the farmer is not exposed to international trade, which heightens exports, the possibilities of farming for exports and international trade are very slim.

Real Capital Investments

The term capital investment has two usages in farm business language. Firstly, it refers to money used by a farm business to purchase fixed assets, such as land, machinery, or buildings which can be used in the long term. Secondly, capital investment refers to money invested in a farm business with the understanding that the money will be used to purchase fixed assets, rather than used to cover the farm business day to day operational expenses. Table 6.4 above shows that this variable is significant at 10% and has a negative coefficient which means that money invested by farmers exporting apple, avocado, mango and orange in South Africa have a negative influence on the agricultural GDP. This is a result of lack of other funds which can be used to export more products in the future and also a result of different investment decisions that may be taken.

6.4.3 The agricultural exports equation results

Table 6.5 Empirical results of agricultural exports equation

Variables	Co-efficient	Standard Error	Wald statistics	**Significance**
GDE	0.215**	0.191	1.124	**0.030**
NFI	-0.002	0.276	-0.006	**0.995**
INV	0.237***	0.266	0.890	**0.000**
Constant	0.771	0.787	0.980	**0.346**
- 2 Log likelihood		**18.463**		
Pseudo R square		**41.6%**		
% cases correctly predicted		**51.4%**		
Chi – square		**6.62**		

*, **, *** represent significance at 1%, 5% and 10% respectively

Source: Data analysis

6.4.4 Analysis of results for agricultural exports equation

Agricultural GDP of South Africa

Increasing GDP is one of the major targets of almost every economy (Shombe, 2008). There are many ways which can be used to achieve economic growth, and to mention one, exports have received a notable attention in recent studies. Table 6.5 shows that the agricultural GDP of South Africa is significant at 5% level. This implies that an increase in the agricultural GDP results from an increase of agricultural exports in South Africa hence leading to the export-led growth hypothesis the agricultural GDP of South

Africa have a positive coefficient and it means that the country's agricultural GDP can somewhat benefit from the exports of avocados, apples, mangoes and oranges.

Net Factor Income

There is a negative relationship between the net factor income and the apple, avocado, mango and orange exports in South Africa. Table 6.5 above shows that this variable does not appear to be significant at any level. This implies that if the net factor income increases there will be a decrease in the exports of mangoes in South Africa hence a decline in the agricultural GDP. This will be a result of excessive spending of farmers that export apple, avocado, mangoes and orange in respect to other international markets which lead to a negative balance of payments hence a negative GDP.

Real Capital Investments

Most authors who find a positive relationship between exports instability and economic growth opine that if we assume risk-averse behaviour, uncertainty about export earnings can lead to a reduction in consumption and in turn, an increase in saving and investment and thus economic growth (Sinha, 1999). Table 6.5 above shows that this variable is significant at 10% and have a positive coefficient which means that money invested by farmers exporting mangoes in South Africa have a positive influence on the agricultural GDP. These will be results of much needed interest and other benefits that are earned from other investments (physical and monetary from these exports).

6.5 Results of Empirical Analysis for the Growth and Volatility analysis model

Table 6.6 Avocado exports Growth Rate and Volatility

Variables	Growth rate (%)	Volatility (%)
Exports(Volume)	0.10	0.36
Exports (Value)	0.21	0.57

Source: Data analysis

The table above shows the calculated growth rate and the coefficient of variation (Volatility) on avocado exports from 1994 to 2011. The export volume of avocados experienced a positive growth rate of 10%, which means there was an increase in the exports of avocados. This increase results from a positive demand of avocados in many foreign markets which earn higher foreign currency that can be used elsewhere in farming. The positive outcome is important to the study in a way that it can be used to encourage farmers to export more. It again shows the volatility of 36% (0.36) which was positively related to the growth rate of avocado exports. This result shows volatility of export volume, which does not favour the growth rate of the volume of avocados sold abroad. Measures such as exports taxes and non-tariff barriers have influenced this negative relationship between growth rate and volatility.

The value of avocado export shows a positive growth of 21%, which shows that avocados are valued abroad than locally due to demand in foreign market. The export value of avocados also shows the higher volatility of 57%, which was related to the growth rate of the avocado export rate. The increased volatility had a negative impact

on avocado exports. Measures such as domestic policies that support exports influenced the extent to which avocados were demanded abroad.

Table 6.7 Apple exports Growth Rate and Volatility

Variable	Growth rate (%)	Volatility (%)
Exports (Volume)	0.49	0.22
Exports (Value)	0.22	0.15

Source: Data analysis

The export volume of apples has a positive growth rate of 0.49, which means there was an increase in the exports of apples. This may be a result of higher demand for apples in foreign markets. The positive outcome is important to the study in a way that it can be used to encourage farmers to export more. It again shows the volatility of 22% (0.22) which was positively related to the growth rate of apple exports. This result show a high volatility of export volume, which does not favour the growth rate of the volume of apples exported. Measures such as export taxes and non-tariff barriers have influenced this positive relationship between growth rate and volatility.

The value of apple export shows a positive growth of 0.22, which shows that apple are valued more abroad than locally due to a higher demand in the foreign market. The export value of apples also shows the volatility of 15%, which is positively related to the growth rate of apple export rate. The increased volatility did not have a negative impact on apple exports.

Table 6.8 Mango exports Growth Rate and Volatility

Variable	Growth rate (%)	Volatility (%)
Exports (Volume)	- 0.26	0.14
Exports (Value)	- 0.25	0.24

Source: Data analysis

The export volume of mangoes has a negative growth rate of -0.26, which means there was a decrease in the exports of mangoes. This leads to fewer volumes of mangoes exported to foreign markets and sold locally for less returns. The negative outcome is important to the study because it can be used to encourage farmers to export more. It again shows the volatility of 14% (0.14) which is positively related to the growth rate of mango exports. This result shows a high volatility of export volume, which favours the growth rate of the volume of mangoes exported. Measures such as export taxes and non-tariff barriers have influenced this negative relationship between growth rate and volatility.

The value of mango export shows a negative growth of - 0.25%, which shows that mangoes are not valued more abroad than locally due to a lower demand in the foreign market and other mango exporters. The export value of mango also shows the volatility of 24%, which is positively related to the growth rate of mango export rate. The increased volatility had negative impact on apple exports. Measures such as domestic policies that support exports influenced the extent to which mangoes were demanded abroad.

Table 6.9 Orange exports Growth Rate and Volatility

Variable	Growth rate (%)	Volatility (%)
Exports (Volume)	0.51	0.17
Exports (Value)	0.30	0.64

Source: Data analysis

The export volume of oranges has the highest positive growth rate of 0.51, which means there is an increase in the exports of orange. The positive outcome is important to the study as it can be used to encourage farmers to export and earn more returns. It again shows the volatility of 17% (0.17) which is positively related to the growth rate of orange exports. This result shows a lower volatility of export volume, which favours the growth rate of the volume of oranges exported. Measures such as export taxes and non-tariff barriers have influenced this positive relationship between growth rate and volatility. It is expected that when there are no trade barriers due to trade liberalisation, exports tend to increase hence the market does not became more volatile due to higher volumes of exports.

The value of orange export shows a positive growth rate of 0.30, which shows that oranges are valued more abroad than locally due to a higher demand in those foreign markets. The export value of oranges also shows the volatility of 64% (0.64), which is positively related to the growth rate of orange export rate. The increased volatility had negative impact on orange exports. Measures such as domestic policies that support exports influenced the extent to which orange were demanded abroad.

6.6 Conclusion

The study used the empirical results obtained from all models; Two-Staged Least Squares system approach and the Growth and Volatility models. The empirical results Empirical results drawn from the 2SLS for agricultural exports equation revealed that agricultural economic growth in South Africa was significant with a positive coefficient. While a negative relationship between the Net Factor Income (NFI) and the agricultural exports in South Africa was noticed. Real Capital Investments had a significant positive coefficient. Consequently, results from agricultural economic growth equation revealed that agricultural exports were significant with a positive correlation. A relationship between NFI and agricultural GDP was also witnessed. Like other variables, Real Capital Investment was significant but negatively correlated. The results of growth rate and volatility models showed positive trends.

Furthermore, results showed that the quantity of agricultural exports was positively related to agricultural economic growth. Another point of interest was that while these exports were positive and significantly related, the magnitude of its coefficient is smaller than the coefficients of Real Capital Investments. It is in this framework that the positive correlation exists between agriculture economic growth and agricultural exports. In general it was witnessed that agricultural exports were not volatile and showed good growth trends.

CHAPTER SEVEN

SUMMARY OF KEY FINDING AND POLICY RECOMMENDATIONS

7.1 Introduction

This chapter reviews the key findings of the study, draws some policy recommendations from the empirical results and also lays forward recommendations for further research and policy implication in the sector of agricultural exports and trade in South Africa. This chapter is presented in five sections. The study is summarised in section 7.2. Summary 7.3 presents the key findings of the study and section 7.4 presents the conclusions drawn from the key findings. Section 7.5 presents the policy recommendations and the last section 7.6 presents recommendations for future studies.

7.2 Summary

Chapter one provides a brief background of the South African agriculture industry, the concept of agriculture's share of GDP and avocado, apple, mango and orange exports and discussed the problem statement, the motivation and the objective and then derived the hypotheses of the study. The general objective of the study was to analyse the link between avocado, apple, mango and orange exports to agriculture's share of Gross Domestic Product in South Africa. The first was to determine the growth rate (trends) of avocado, apple, mango and orange exports. The second specific objective was to determine the volatility of avocado, apple, mango and orange exports. The third specific objective was to investigate the contribution of avocado, apple, mango and orange

exports and the agriculture's share of in Gross Domestic Product South Africa. The last specific objective was to determine the correlation between avocado, apple, mango and orange exports and agriculture's share of in Gross Domestic Product South Africa. The research hypotheses of this study were as follows; the first was that there is positive growth rate (trends) of avocado, apple, mango and orange exports. The second hypothesis was that there is volatility on avocado, apple, mango and orange exports. The third was that there is contribution of avocado, apple, mango and orange exports on the agriculture's share of in Gross Domestic Product South Africa. The last was that there is correlation between avocado, apple, mango and orange exports and the agriculture's share of in Gross Domestic Product South Africa.

Chapter two reviewed the theoretical and empirical literature on agricultural exports and agricultural GDP of South Africa. Agricultural exports and agricultural growth, agriculture and export–led growth and agricultural trade policy reform in South Africa were discussed. The general hypothesis out of this discussion was that these factors contribute to agricultural exports in South Africa hence affecting agriculture's share of GDP. This hypothesis was tested by analysing variables that matter the most using the Two-Staged Least Square System Approach and Growth and Volatility Analysis Model. Chapter three looked at the Value Chain Analyses of avocado, apple, mango and orange in the republic and their market intelligence.

Chapter four reviewed the methodologies used in the study for the analysis. Descriptive statistics was used to analyse the impact analysis of the linkage between agricultural exports and the agriculture's share of GDP in South Africa. While empirical analysis

was used as the main technique to analyse the factors that matter most to avocado, apple, mango and orange exports and the agriculture's share of GDP in South Africa to address objective of this study. Then results of the descriptive analysis were reported in chapter five. Chapter six reported the findings of the empirical analysis and the factors that are of utmost importance to agricultural exports and agriculture GDP in South Africa.

7.3 Key Findings

As indicated in chapter one, the objectives of this paper were fourfold. The equations for agricultural exports and agricultural GDP were analysed using the Two-Staged Least Square System Approach and the Growth and Volatility Analysis Model later analysed both trends and volatility on apple, avocado, mango and orange exports. Each model utilised the data from 1994 through to 2011, and the results were reported in chapter six. Findings from this study do not differ most from previous studies and this goes well with empirical literature.

The relationship between agricultural GDP and apple, avocado, mango and orange exports in South Africa was demonstrated by the estimated parameter for the independent agricultural exports variable in the GDP equation and by the estimated parameter for GDP growth in the agricultural exports. In the Two-Staged Least Square System Approach which estimated the agricultural GDP, it was found that agricultural export was positive and statistically significant at a level of five percentages. According to this model, a five percentage increase in agricultural exports would ultimately result in

an increase of 46% in the agricultural GDP. It further estimates the Net Factor Income and Real Capital Investment for this model; the NFI was positive but not significant at any level. In the meantime the Real Capital Investment was negative and significant at 10%.

With these said, hypotheses which state that there was contribution of avocado, apple, mango and orange exports and the agriculture's share of in Gross Domestic Product South Africa and correlation between avocado, apple, mango and orange exports and the agriculture's share of Gross Domestic Product in South Africa were then not reject. These finding showed that the study dwell much with previous literature. The study also looked at correlation matrixes in order to help deal with the correlation between apple, avocado, mango and orange exports and agricultural GDP.

This relationship between agricultural exports and agricultural GDP can also be examined in a variety of ways. In this quest the agricultural exports equation was drawn into the study. This equation helped to analyse the link between agricultural exports and the agriculture's share of GDP in South Africa. The estimation of two among all three variables was positive and significant at one and five percentages while the other variable was negative and not significant at any level. The positive estimates for the agricultural GDP and the Real Capital Investments which were significant at 10% and 1% and positive coefficients respectively. The consistent positive relation suggests that the positive externalities generated by avocado, apple, mango and orange exports on the agricultural GDP increase when the share of avocado, apple, mango and orange exports increases also helped on not rejecting these two hypotheses.

The NFI was negative and not consistent with prior expectations; however the coefficients were very small, implying that an increase in income remittance on agricultural GDP as a result of agricultural exports being negative will result in a direct role that was determined in the agricultural GDP equation. These outcomes draw serious conclusion. In responding to the last two hypotheses, it was found that agricultural exports in South Africa were influenced by other factors over the past 17 years. With the possible factor been higher rate of interest which makes it difficult for farmers to loan money to improve their exports.

The results of empirical analyses for the growth and volatility showed different growth trends and volatility from 1994 to 2011 defined in exports volume and value. The study found that apple, avocado, mango and orange exports had positive growth trends and lower volatility percentages, which negatively affect the growth rate. The positive outcome between growth rate and volatility was important because it showed the potential of apple, avocado, mango and orange exports has on the international market. When a proportion of these exports increased, more produce were demanded hence triggering the export-led growth. Surprisingly, mango exports showed negative growth rate and volatility due to less volumes of exported mangoes which are sold for less prices at the local market.

Little if not known studies have been conducted that investigated volatility and growth rate using one or few produce. These findings concur with findings of previous literature on volatility and growth. The study found inverse relationship between exports volumes and exports values, although it is known that exports volumes does not only contribute

to volatility in a negative way it also contributes in a positive way due to the dynamic in agricultural exports market. It was evident to see mango which had a negative growth rate with a higher export volume of growth rate and a higher exports value.

7.4 Conclusion

The primary purpose of the study was to analyse the link between avocado, apple, mango and orange exports on the agriculture's share of GDP in South Africa. The first hypothesis was there are growth rate of avocado, apple, mango and orange exports. Like the first two hypotheses it is also not rejected. The second hypothesis was there are volatility on avocado, apple, mango and orange exports. This hypothesis was also not rejected. The third hypothesis was there is contribution of avocado, apple, mango and orange exports on the agriculture's share of Gross Domestic Product. Like the first one, the second hypothesis is also not rejected. The fourth hypothesis was there is correlation between avocado, apple, mango and orange exports and agriculture's share of Gross Domestic Product. This hypothesis is not rejected based on empirical results.

The findings of this study provide support for all four hypotheses, which were accepted. The information of this nature is important for the analysis of agricultural economic development strategies in South Africa. The timing of this information is critical as South African policy makers now face major economic reforms in a quest for a more export oriented and stable agricultural economic development. As the South African government is under pressure to alter the UK Citrus ban, historical land claims and

agricultural policies, understanding the impact of agricultural export for few quantities or exports on GDP growth will provide important information for policy analysis.

The results of this study show that the amounts of agricultural exports from South Africa are positively related to South African agricultural economic growth. Another point of interest in this study is that while avocado, apple, mango and orange exports were shown to have positive and significant relationships with the agricultural GDP, the magnitude of their coefficient is smaller than the coefficients of Real Capital Investments. This implies that agricultural GDP benefits more from an exports structure which is rich as a result of direct investments. The results of this study imply that the agricultural economy could benefit from shifting resources from the primary agricultural sector to the more advanced industrial sector in order to give rise to the desired agricultural economic growth, a matter that is not simple.

If this is the case, then the agriculture's share of GDP examined in this study is expected to be much dependent on the agricultural sector than can be seen from simply examining the coefficient of avocado, apple, mango and orange exports and other agricultural exports in the GDP growth equation. The relationship is important considering that South Africa is moving to restructuring its agricultural economy. The agricultural sector is of particular importance due to the traditionally heavy reliance placed upon this sector by developing world (Henneberry and Khan, 1989). The results of this study show the impact of agricultural exports, agriculture's share of GDP, real capital investments and the net factor income on the agricultural sector. In an area of research where much of the previous research analysed a group of nations and used

models based on economic generalisations, this study demonstrates the need to study the unique characteristics of a country to better understand the potential impact of policy decisions.

7.5 Policy Recommendation

Based on the empirical results of this study policy recommendations relating to agriculture in South Africa, agricultural exports, export-led growth, agricultural trade reform are discussed to help improve the role of agricultural exports on agricultural GDP of South Africa.

7.5.1 Agriculture in South Africa

South Africa has an essentially dual agricultural economy, comprising a well-developed commercial sector and a predominantly subsistence-oriented sector in the rural areas. Primary agriculture contributes about 2.6% to the Gross Domestic Product of South Africa and almost 9% of formal employment. However, there are strong backward and forward linkages into the economy, such that the agro-industrial sector is estimated to comprise 15% of GDP. For the past five years, agricultural exports have contributed on average approximately 8% of total South African exports.

According to (DAFF, 2011) Agri-business is a big business and there are close to 1 000 primary agricultural co-operatives and agri-business throughout the country, and 15 central co-operatives. After 1994, when the agriculture sector was deregulated, the structure of agri-business has changed substantially, with many co-operatives transforming themselves into private companies. The study then recommends that

much emphasis need to be broaden to the agricultural sector to aid it transform and compete with other sectors in the republic, which have moved from their primary to tertiary standards. Because, South Africa is a net exporter of agricultural products in Rand value and competes with other agricultural exporters. The largest exports groups are raw sugar, fresh grapes, citrus, nectarines, wine and deciduous fruits.

7.5.2 Exports-led growth

This hypothesis implies that not only are exports and economic growth highly correlated but that the former unidirectional causes the latter. Ever since the past decade it has been very difficult to determine the direction between the two and the causality from regression and correlation analysis. Therefore renewed emphasis should be placed on the role of internal factors or basic characteristics of an economy. It also has potential to let the economy flow from economic growth to export growth. If the causality flows from exports to growth then the implementation of exports promotion policies will be a proper strategy for a country to grow but if the causality takes the opposite direction then a certain degree of development may be a prerequisite for a country to increase its exports and, therefore, previous internal agricultural economic policies will need to be revised so that they can be necessary to expand agricultural exports. The study showed that unidirectional causality between agricultural exports and agricultural economic growth existed, which implies that agricultural economic growth benefits more from an exports structure which is rich due to direct investments opportunities.

The department of Agriculture and the private sector need to join hands and implement a mutual relationship to aid develop an agricultural economy which can be able to

export more than what it imports. This can be done through review of the export tariffs which poor and disadvantaged apple, avocado, mango and orange farmers bear. This can also be done by subsidising these farmers with capital so that they may manage to incur other costs such as transportation, risk mitigation strategies and tariffs. This can be done by providing free access for all market participants, thus promoting efficiency of apple, avocado, mango and orange produce, improving opportunities for their export earnings and enhancing the viability of the sector.

7.5.3 Agricultural trade reform in South Africa

The South African agricultural sector has gone through enormous social and economic transformation over the last 20 years; this is following the abolition of apartheid and fundamental reforms aimed at creating a more open, diverse and market-oriented economy. Partial agricultural trade reforms, mainly concerning domestic markets, were implemented during the 1980s and early 1990s. The overall results of reforms to date have been positive and at the verge of yielding good results, with a stronger and stable macro economy, better integration into the global agricultural trading system, and some progress in redressing past injustices through land reform programme. These reforms have made more land available and opened opportunities for emerging apple, avocado, mango and orange farmers, with a relatively low or no international export experience. Hence support programmes can be developed to better equip them with knowledge.

Changes in South African agriculture sector in the past decade have been shaped by substantial macroeconomic and social reforms implemented from 1994 after the apartheid regime, but reforms of agricultural policies were also initiated. These included

deregulation of the marketing of agricultural products for both the national and international interest; abolishing certain tax concessions favouring the sector; reductions in budgetary expenditure on the sector; unjustified land reform. The main developments in trade policies were the replacement of direct controls over imports by tariffs, which were set below the rates bound in the World Trade Organization, and the much needed elimination of state control over exports. This proceedings opportune most agricultural exporting farmers that's why the study suggest that apple, avocado, mango and orange farmers can benefit a lot if they can look at venturing into the international agricultural market aggressively.

Today, the opening of the agricultural sector placed South Africa among the world's leading exporters of agro-food products such as wine, fresh fruit and sugar. The country is also an important trader if not the leading in the African region. The beginning of the current decade witnessed particularly strong agricultural export growth and trade reform. Although the recent performance of South Africa's agricultural economy has been generally positive, both investment and output growth are still below par and this limits the necessary levels to reduce unemployment and to achieve a more equitable income distribution. It is recommended that apple, avocado, mango and orange farmers need to focus more on the export market and earn a much needed foreign currency to grow their venture.

7.6 Recommendation for Further Research

a) The primary purpose of the study was to analyse the link between avocado, apple, mango and orange exports on the agriculture's share of GDP in South Africa. Based on the fact that this study was focused on the whole country, there is a need for a similar study focusing on each province's contribution towards the national share. This will help track areas for development in the value chain analysis of apple, avocado, mango and orange exports and determine areas for special development from different provinces.

b) Based on the descriptive analyses of this study the investments opportunity in the agricultural sector is very limited. There are reasons related to that, which this study did not investigate, but this could be one of the important issues to investigate.

c) Despite the current government policies that aim at stabilizing agricultural economic growth, there is still a long way to meet the desired needs. Studies need to look at value chain analysis and the effect of agricultural employment.

d) Agricultural trade reform and the role of WTO on the agricultural sector of South Africa need to be investigated to help come up with renewed emphasis on the issue. This come to light of the citrus ban in the UK market, which government need to negotiate a way forward to reaffirm that elite market for citrus.

REFERENCES

ABOU-STAIT, R. 2005. Are exports the engine of economic growth? An application of co-integration and causality analysis for Egypt, 1977 - 2003. Economic Research Working Paper Series. Tunis: African Development Bank.

ABUAL-FOUL, B. 2004. Testing the export-led growth hypothesis: evidence from Jordan. Applied Economic Letter, 11: 393 – 396.

ACEMOGLU, D., JOHNSON, S., ROBINSON, J. and Y, THAICHAROEN. 2003. Institutional causes, macroeconomic symptoms: volatility, crises and growth. Journal of Monetary Economics, 50: 49 – 123.

AHMAD, J. and S, HANHIRUN. 1996. Co-integration and Causality between Exports and Economic Growth: Evidence from ASEAN Countries, the Canadian Journal of Economics, 29: 413 – 416.

AHMED, S. and R. P, MARTINI. 2000. Agricultural Policy Analysis in Pakistan: Illustrations in the use of the Policy Analysis Matrix, Centre for Management and Economic Research, Lahore University of Management Sciences, Working Paper No. 27: 1 – 28.

Al-YOUSIF. 1999. On the role of exports in the economic growth of Malaysia: A multivariate analysis. International Economic Journal, 13: 67 – 75.

AGHION, P., ANGELETOS, G. M., BANERJEE, A. and K, MANOVA. 2005. Volatility and Growth: Credit Constraints and Production-Enhancing Investment. Amsterdam.

ALAM, M. S. 1991. Trade orientation and macroeconomic performance in LDCs: An empirical study. Economic Development and Cultural Change, 839 – 848.

AMIRKHALKHALI, S. and A. A, Dar. 1995. A varying-coefficients model of export expansion, factor accumulation and economic growth: Evidence from cross-country, time series data. Economic Modelling, 12: 435 – 441.

ARNADE, C. and U, VASAVADA. 1995. Causality between productivity and exports in agriculture: Evidence from Asia and Latin America. Journal of Agricultural Economics, 46: 174 – 186.

AWOKUSE, T.O. 2008. Causality between exports, imports and economic growth. Evidence from transition economies. Economics Letters, 94: 389 – 495.

BAHMANI-OSKOOEE, M., MOHTAB, H., AND G, SHABSIGH. 1991. Exports, growth and causality in LDCs: A re-examination. Journal of Development Economics , 36: 405 – 415.

BAHMANI-OSKOOEE, M. and J, ALSE. 1993. Export growth and economic growth: an application of co-integration and error-correction modelling. Journal of Developing Areas, 27: 535 – 542.

BAILEY, M.J., TAVLAS, G.S. and M, ULAN. 1987. The Impact of Exchange Rate Volatility on Export Growth: Some Theoretical Considerations and Empirical Results, Journal of Policy Modelling; 9: 225 – 243.

BALASSA, B.1978. Exports and Economic Growth: Further Evidence, Journal of Development Economics, 5: 181 – 189.

BASHIR, Z. 2003. The Impacts of Economic Reforms and Trade Liberalization on Agricultural Export Performance in Pakistan, Pakistan- Development-Review, 42: 941 – 959.

BEJAN, M. 2006. Trade openness and output volatility. MPRA WP, 2759.

BEKAERT, G., HARVEY, C. and C, LUNDBLAD. 2006. Growth volatility and financial liberalization. Journal of International Money and Finance, 25: 370 – 403.

BHAGWITI, J. 1978. Anatomy and Consequences of Exchange Control Regimes: Liberalization Attempts and Consequences. Cambridge, MA: Ballinger.

BLUM, B., CLARO, S. and I, HORSTMANN. 2011. Occasional and perennial exporters. Mimeo.

BRADFORD, C. I. 1994. From Trade-Driven Growth to Growth-Driven Trade: Reappraising the East Asian Development Experience. Organization for Economic Co-operation and Development.

BOUND, J., JAEGER, D. A., and R.M, BAKER. 1995. Problems with instrumental variables estimation when the correlation between the instruments and the endogenous explanatory variable is weak. Journal of the American Statistical Association, 90: 443 – 450.

CAPOZZA, D.R., and Y, LI. 1996. Real Investment, Capital Intensity and Interest rates, University of Michigan Business School.

CHENERY, H. B. and A. M, STROUT. 1966. Foreign Assistance and Economic Development, American Economic Review, 4: 181 – 189.

CHOONG, C. K, Y, ZULKORNAIN and V. L, KHIM-SEN. 2003. "Export-led Growth Hypothesis in Malaysia: An Application of Two-Stage Least Square Technique." International Finance, EconWPA.

CHOW, P. C. Y. 1987. Causality between export growth and industrial performance: evidence from the NICs, Journal of Development Economics, 26: 55 – 63.

COLOMBATTO, E. 1990. An Analysis of Exports and Growth. Kyklos, 4: 579 – 589.

DAWSON, P. J. 2005. Agricultural exports and economic growth in less developed Countries, Agricultural Economics, 33: 145 – 152.

DAVIDSON, R. and J. G, MACKINNON. 1981. Several Tests for model specialization in the presence of alternative hypotheses, Econometrica, Econometric Society, 49: 781 – 793.

DEPARTMENT OF AGRICULTURE. 2007. Economic Review of the South African Agriculture, Pretoria.

DEPARTMENT OF AGRICULTURE, FISHERY AND FORESTRY (DAFF). 2010. Abstract of Agriculture Statistics. Pretoria.

DEPARTMENT OF AGRICULTURE, FISHERY AND FORESTRY (DAFF). 2011. Abstract of Agriculture Statistics. Pretoria.

DEPARTMENT OF AGRICULTURE, FISHERY AND FORESTRY (DAFF). 2012. Abstract of Agriculture Statistics. Pretoria.

DEPARTMENT OF TRADE AND INDUSTRY (dti) .2007. Trade Statistics, http://www.thedti.gov.za/econdb/raportt/ rapmenu.html.

DUTT, S. D. and D, GHOSH. 1994. An empirical investigation of the export growth–economic growth relationship. Applied Economics Letters 1: 44 – 48.

EASTERLY, W., ISLAM, R. and J. STIGLITZ. 2001. Shaken and stirred: explaining growth volatility. In: Pleskovic, B., Stern, N. (Eds.), Annual World Bank Conference on Development Economics. World Bank. 191 – 211.

EASTERLY, W. R. 2007. Free Market and Economic Development. Presentation International Symposium, on the Poverty Reduction and Beyond Development Strategies for Low Income Countries.

EDWARDS, S. 1993. Openness, trade liberalization, and growth in developing countries, Journal of Economic Literature, 31: 1358 – 1393.

EKANAYAKE, E. M. 1999. Exports and economic growth in Asian developing countries: co-integration and error correction models. Journal of Economic Development, 24: 43 – 56.

ENGLE, R. F. and C. W. J, GRANGER. 1987. Co-integration and error correction: Representation, estimation and testing. Econometrica, 55: 251 – 276.

ESFAHANI, H.S. 1991. Exports, Imports, and Economic Growth in Semi-Industrialized Countries, Journal of Development Economics, 35: 93 – 116.

FOOD AND AGRICULTURAL ORGANISATION, INTERNATIONAL FUND FOR AGRICULTURE DEVELOPMENT, INTERNATIONAL FOOD POLICY RESEARCH INSTITUTE, INTERNATIONAL MONETARY FUND, ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT, UNITED NATIONS CONFERENCE ON TRADE AND DEVELOPMENT, WORLD FOOD PROGRAMME, WORLD BANK, and WORLD TRADE ORGANISATION. 2011. Price volatility in food and agricultural market: policy responses, Background Policy Report for the G20 Summit in Paris in November 2011, Rome.

FARIDI, M. Z. 2012. Contribution of Agricultural Exports to Economic Growth in Pakistan, Pakistan Journal of Commercial and Social Sciences, 6: 133 – 146.

FEDER, G. 1983. On export and economic growth, Journal of Development Economics, 12: 59 – 73.

FEI, J. C and G, RAINS. 1961. A Theory of Economic Development, American Economic Review, 51: 533 – 565.

FOSU, A. K.1996. Primary exports and economic growth in developing countries. World Economy 19: 465 – 475.

FRANKEL, J. and D, ROMER. 1999. Does trade cause growth? The American Economic Review: 89, 379 – 399.

GHAFOOR, A., MUSTAFA, K., ZAFAR, I. and K. MUSHTAQ. 2010. Determinants of mango exports from Pakistan. Journal of Agricultural Research, 48: 1 - 177.

GHARTEY, E. E. 1993. Casual Relationship between Exports and Economic Growth: Some Empirical Evidence in Taiwan, Japan and the US. Applied-Economics, 9: 1145 – 1152.

GHATAK, S., C, MILNER. and U, UKTULU. 1997. Exports, Export Composition and Growth: co-integration and Causality Evidence for Malaysia. Applied Economic Journal, 29: 213 – 223.

GONCLAVE, R. and J, RICHTERING. 1986. Export Performance and Output Growth in Developing Countries. UNCTAD Discussion Paper No. 17. Geneva.

GORTER, H., M. INGCO. and L, RUIZ. 2000, Export Subsidies and Domestic Support Measures: Issues and Suggestions for the New Multilateral Rules for the Next WTO Round, (World Bank, and Washington, DC).

GROSSMAN, G. and E, HELPMAN. 1990. Comparative advantage and long-run growth, American Economic Review, 80: 796 – 815.

HALEEM, U., MUSHTAG, K., ABBAS, A. and A. D. SHEIKH. 2005. Estimation of Export Supply Function for Citrus Fruit in Pakistan. The Pakistan Development Review, 44: 659 – 672.

HEITGER, B. 1987. Import Protection and Export Performance: Their Impact on Economic Growth, Weltwirtschaftliches Archiv, 123: 249 – 261.

HENNEBERRY, S. and D, KHAN. 1989. International Trade Policies, in Luther Tweeten. Agricultural Policy Analysis Tools for Economic Development, Boulder, 20: 322 – 354.

HENRIQUES, I. and P, SADORSKY. 1996. Export-led growth or growth-driven export? Canadian Journal of Economics 3: 440 – 555.

HERZER, D, F. N LEHMANND and B, SILIVERSTOVS. 2006. Export-led Growth in Chile: Assessing the Role of Exports Composition in productivity Growth. Developing Economics. 3: 306 – 328.

HICKS, J. 1950. The trade cycle (Oxford: Clarendon Press).

HOEKMAN, B., NG F. and M, OLARREAGA. 2001. Tariff Peaks in the Quad and Least Developed Country Exports, Seminar presented at the World Bank, Washington DC.

HOMMOND, R. and L, MCGOWEN. 1994. Ghana: The World Bank's Sham Showcase, in Kevin Danaher. Fifty Years is Enough, Boston: South End Press.

HUMPHRIES, H. and S, KNOWLES. 1998. Does Agriculture Contribute to Economic Growth? Some Empirical Evidence, Applied Economics Journal, 30: 775 – 781.

IMBS, J. 2004. Why the link between volatility and growth is both positive and negative. London Business School and CEPR.

IMBS, J. 2007. Growth and Volatility. Journal of Monetary Economics 54: 1848 – 1862.

INGCO, M. 1995. Agricultural Trade Liberalization in the Uruguay Round: One Step Forward One Step Back? Supplementary Paper for the Conference on Uruguay Round and Developing Countries. World Bank, Washington, DC.

ISLAM, M. N. 1998. Export expansion and economic growth: Testing for co-integration and causality. Applied Economics, 30: 415 – 425.

JATUPORN, C., CHIEN, L.H., SUKPRASERT, P. and S. THAIPAKDEE. 2011. Does a Long- Run Relationship exist between Agriculture and Economic growth in Thailand? International Journal of Economics and Finance, 3: 123 - 135.

JOHANSEN, S. 1988. Statistical analysis of co-integration vectors. Journal of Economic Dynamics and Control 12: 231 – 254.

JOHNSTON, B. F. and J. W, MELLOR. 1961. The role of agriculture in economic development, American Economic Review, 51: 566 – 593.

JORGENSON, D. G. 1961. The Development of a Dual Economy, Economic Journal, 71: 309 – 334.

JOSLING, T. 2006. Implication of Food Import Regulations and Market Access for Developing Countries, In Reforming Agricultural Trade for Developing Countries, 1: A. McCalla and J. Nash: World Bank.

JUNG, W. S. and P. J, MARSHALL. 1985. Exports, Growth and Causality in Development Countries. Journal of Development Economics, 18: 1 – 12.

KATIRCIOGLU, S.T. 2006. Causality between Agriculture and Economic Growth in a small nation under Political isolation: A case from North Cyprus. International Journal of Social Economics, 33: 331 – 343.

KAVOUSSI, M. R. 1984. Export expansion and economic growth: further empirical evidence, Journal of Development Economics, 14: 241 – 250.

KEONG, C. C. Y. Z. and K, LIEW. 1998. Export-led Growth Hypothesis in Malaysia: AN Application of Two-Stage Least Square Technique, Applied Economics, 1055 – 1065.

KHALAFALLA, K. Y. and A. J, WEBB. 2001. Export-led Growth and Structural Change: Evidence from Malaysia, Applied Economics, 33: 1703 – 1715.

KHAN, A. H., L. HASAN., and A. MALIK. 1995. Exports, Growth and Causality: An Application of Co-Integration and Error-correction Modeling, Pakistan Development Review, 11: 1 – 19.

KHAN, A. H. and N, SAQID. 1993. Exports and economic growth: The Pakistan experience. International Economic Journal, 7: 55 – 64.

KIRSTEN, J., EDWARDS L., and N, VINK. 2009. South Africa. In Anderson, Kym and William A. Masters (Eds.) Distortions to agricultural incentives in Africa. Washington, DC, The World Bank.

KÓNYA, L. 2006. Exports and growth: Granger causality analysis on OECE countries with a panel data approach. Economic Modelling, 23: 978 – 992.

KOREN, M. and S. TENREYRO. 2007. Volatility and development. Quarterly Journal of Economics, 122: 243 – 287.

KORTEN, A. 1994. Structural Adjustment and Costa Rican Agriculture, in Kevin Danaher. Fifty Years is Enough, Boston: South End Press.

KOSE, M.A., PRASAD, E. and M, TERRONES. 2003. Financial integration and macroeconomic volatility: IMF Working Paper, 03: 50.

KREBS, T., KRISHNA, P. and W, MALONEY. 2010. Trade policy, income risk and welfare. The Review of Economics and Statistics, 92: 467 – 481.

KRONER, K. F. and W. D, LASTRAPES. 1993. The Impact of Exchange Rate Volatility on International Trade: Reduced Form Estimates using the GARCH-in-mean Model. Journal of International Money and Finance, 12: 298 – 318.

KWA, A and S, BASSOUME. 2007. Exploring the linkages between agricultural exports and sustainable development. Ecofair trade dialogue [Discussion Paper] No. 2: 1 – 38.

KWAN, A. C. C. and J. A, COTSOMITIS. 1996. Economic Growth and Exogeneity: Taiwan 1953-88. The American Economist, 28: 467 – 471.

LAMFALUSSY, A. 1963. The United Kingdom and the six: An essay on economic growth in Western Europe (London: Macmillan).

LEE, J. W. 1993. International trade, distortion and long-run economic growth, International monetary fund staff paper, 40: 299 – 328.

LEVIN, A. and L. K, RAUT. 1997. Complementarities between exports and human capital in economic growth: Evidence from the semi-industrialized countries, Economic Development and Cultural Change, 46: 155 – 174.

LUISSIER, M. 1993. Impacts of exports on economic performance: A comparative study. African Journal of Economic, 21: 106 – 127.

MACKINNON, J. 1996. Numerical Distribution Functions for the Unit Root and Co-integration Tests. Journal of Applied Econometrics, 11: 601 – 618.

MAMUN. K.A and H.K, NATH. 2005. Export-led growth in Bangladesh: A time series analysis. Applied Economic Letter, 12: 361 – 364.

MANESCHIÖLD, P. 2008. A Note on the Export-Led Growth Hypothesis: A Time Series Approach, Cuadernos De Economía, 45: 293 – 302.

MARIN, D. 1992. Is the export-led growth hypothesis valid for industrialized countries. Review of Economics and Statistics, 74: 678 – 688.

MCCARVILLE, M. and E, NNADOZIE. 1995. Causality Tests of Export-led Growth: The case of Mexico Atlantic. Economic Journal, 23: 140 – 145.

MEMON, M. H, W.S, BAIG., and M, ALI. 2008. Causal Relationship between Exports and Agricultural GDP in Pakistan: Applied Economic Research Center, University of Karachi, paper No 11845.

MINISTRY OF AGRICULTURE AND LAND AFFAIRS (MALA). 1998. Agricultural policy in South Africa: A Discussion Document. Cape Town. CTP Book Printers.

NADEEM, M. 2007. Pakistan Agricultural Export Performance in the Light of Trade Liberalization and Economic Reforms. [Working Papers] 45854, University of Balochistan, Commerce Department.

NATIONAL DEPARTMENT OF AGRICULTURE (NDA). 2008. Abstract of Agriculture Statistics. Pretoria.

NATIONAL DEPARTMENT OF AGRICULTURE (NDA). 2009. Abstract of Agriculture Statistics. Pretoria.

NEWBERY, D. and J. STIGLITZ. 1984. Pareto inferior trade. The Review of Economic Studies, 51: 1 – 12.

NGUYEN, D. and G. SCHAUR. 2010 . Cost Linkage Transmit Volatility Across Markets. Economic Policy Research Unit, Institution of Economics. Working paper.

ORGANISATION FOR ECONOMIC CO-OPERATIVE AND DEVELOPMENT (OECD). 2006. OECD Review of Agricultural Policies: South Africa, ISNB 92-64-03679-2.

ORGANISATION FOR ECONOMIC CO-OPERATIVE AND DEVELOPMENT (OECD). 2006. Agricultural Policy Reform in South Africa. Policy Brief.

PENG, F. 1999. The Role of Foreign Trade in the China's Economy, Journal of International Trade, 14: 193.

PESARAN, M.H. and A.S, DEATON. 1978. Testing Non-nested Nonlinear Regression Models, Econometrica, 46: 677 – 694.

POCKET GUIDE TO SOUTH AFRICA 2009/2010 AGRICULTURE, FORESTRY AND FISHERIES.

QUANFA YANG. 1998. The Effect of China's Export on Economic Growth. World Economic and Polity, 8: 123.

RAM, R. 1987. Exports and Economic Growth in Developing Countries: Evidence from Time Series and Cross-Section Data, Economic Development and Cultural Change, 36: 51 – 72.

RAMEY, V. and G, RAMEY. 1995. Cross country evidence on the link between volatility and growth. American Economic Review, 85: 1138 – 1151.

RAZA, S. A., ALI, Y. and F. MEHBOOB. 2012. Role of Agriculture in Economic Growth of Pakistan. International Research Journal of Finance and economics, 83: 1450 - 2887.

RIEZMAN, R.G., SUMMERS. P.M. and C. H, WHITEMAN. 1996. The engine of growth or its handmaiden? A time series assessment of export-led growth. Empirical Economics, 21: 77 – 113.

RIFAT, B.T. 2012. Economic growth, exports and foreign direct investment in Least Developing Countries: A panel Granger causality analysis. Journal of Economic Modelling, 29: 868 – 878.

RHO, Y.W. and J, RODRIGUE. 2010. Marginal costs and firm level export dynamics. Mimeo.

RODRIK, D. 1998. Why do more open economies have bigger governments? Journal of Political Economy 106: 997 – 1032.

SANJUAN-LOPEZ A. I. and P. J, DAWSON. 2010. Agricultural Exports and Economic Growth in Developing Countries: A Panel Cointegration Approach. Journal of Agricultural Economics, 61: 565 – 583.

SCHULTZ, T. W. 1964. Transforming Traditional Agriculture. New Haven, CT: Yale University Press.

SENGUPTA, J. K. 1991. Rapid Growth in NICs in Asia: Tests of the New Growth Theory for Korea. Kyklos, 44: 561 – 579.

SHAH, J. and F, SUN.1998. Export-led growth hypothesis for Australia: An empirical reinvestigation. Applied Economics Letters 5: 423 – 428.

SHEEHEY, E. J. 1990. Exports and growth: A flawed framework. Journal of Development Studies, 27: 111 – 116.

SHIRAZI, N. S. and T. A. A, MANAP. 2004, Export and Economic Growth Nexus: The case of Pakistan, Pakistan Development Review, 43: 563 – 581.

SHOMBE, N. H. 2008. Causality Relationships between Total Exports with Agricultural and Manufacturing GDP in Tanzania, Institute of Developing Economies, Discussion Paper No.136.

SINHA, D. 1999. Exports Instability, Investment and Economic growth in Asian Countries: A Time Series Analysis, Economic Growth Center, Yale University. Center Discussion Paper No. 799.

SINGER, H. W., and H, GRAY. 1988. Trade policy and growth of developing countries: Some new data. World Development, 16: 395 – 403.

SODERBERY, A. 2010. The competitive effects of heterogeneous firms facing capacity constraints under international trade. Mimeo.

STATISTIC SOUTH AFRICA. 2011. Census, Otcober: 2011, Pretoria.

STATISTIC SOUTH AFRICA. 2007. Gross Domestic Product, Third Quarter: 2007, Pretoria.

STAIGER, D. and J.H, STOCK. 1997. Instrumental variables regression with weak instruments. Econometrica, 65: 557 – 586.

STIGLITZ, J. E. 2007. Making Globalization Work for Developing Countries, W.W Norton & Company, Inc.

STOCK, J.H., WRIGHT, J.H. and M, YOGO. 2002. A survey of weak instruments and weak identification in generalized method of moments. Journal of Business & Economic Statistics, 20: 518 – 529.

SVEDBERG, P. 1993. Trade Compression and Economic Decline in Sub-Saharan Africa, in Blomstrom and Lundahl (Ed.) Economic Crisis in Africa: Perspectives on Policy Responses. New York: Routlege, 12: 21 – 40.

THIRLWALL, A.P. 1979. The Balance of Payments Constraint as an Explanation of International Growth Rate Differences. Banca Nazionale del Lavoro Quarterly Review, January, 128: 45 – 53.

THORNTON, J. 1996. Cointegration, causality and export-led growth in Mexico, 1895 - 1992. Economics Letters.

THORNTON, J. 1997. Export and economic growth: Evidence from 19th century Europe. Economics Letters, 55: 235 – 240.

TIFFIN, R. and X, IRZ. 2006. Is Agriculture the engine of Growth, Agricultural Economics, International Association of Agricultural Economists, 35: 79 – 89.

TYLER, W. G. 1981. Growth and Export Expansion in Developing Countries: some Empirical evidence. Journal of Development Economics, 9: 121 – 130.

UKPOLO, V. 1994. Export Composition and Growth of Selected Low-Income African Countries: Evidence. From time-series data. Applied Economics Journal, 26: 445 – 449.

UNITED NATIONS. 2010. Department of Economic and Social Affairs, Population Division, World Population Prospects, The 2010 Revision. AfDB Statistic Department, Various domestic authorities and AfDB estimates.

VALDES, A. 2010. Assessing agriculture's contribution to development and the role of economy-wide policies on the sector.

VANNOORENBERGHE, G. 2012. Firm-level volatility and exports. Journal of International Economics, 86: 57 – 67.

WILBUR, W. L. and M.Z HAQUE. 1992. An Investigation of the Export Expansion Hypothesis. Journal of development studies, 38: 297 – 313.

XIAO PENG LIU. 2001. A Positive Analysis on Import-export Increase and Economic Growth. China Economic Issue, 4: 121.

XU, Z. 1996. On the causality between export growth and GDP growth: An empirical investigation. The Review of International Economics, 4: 172 – 184.

APPENDIX

Table 1. Secondary Time Series Data

Year	Avocado exports	Apple exports	Mango exports	Orange exports	Agricultural exports	Agricultural GDP	Real Capital Investment	Net Factor Income
1994	22 303	226 761	6200	119268	93 633	4.6	7037	32975
1995	25 121	214 796	6600	112018	89 634	3.9	7357	26402
1996	30 089	209 120	6156	164782	102 537	4.2	8954	32735
1997	22 396	183 957	6908	150145	90 852	4	7889	33012
1998	31 580	234 573	8603	140931	103 922	3.8	6881	31260
1999	45 312	185 678	13342	182876	106 802	3.5	6115	33193
2000	43 458	165 880	10532	196409	104 070	3.3	6087	34761
2001	37 598	228 199	13071	120221	99 772	3.5	6341	33630
2002	38 389	245 584	16406	212666	128 261	4.2	7619	35826
2003	47 712	328 151	17337	205861	149 765	3.4	7048	36070
2004	32 509	335 412	7584	226530	150 509	3.1	7343	36380
2005	49 557	270 651	6056	242513	142 194	2.7	6853	37402
2006	44 447	266 413	2355	158013	117 807	2.9	7774	35359
2007	42 501	296 776	4409	184343	132 007	3	8148	36610
2008	46 372	338 647	2759	283205	167 746	3	10198	40590
2009	61 771	332 684	1676	344358	185 122	2.9	8947	39290
2010	35 784	298 574	1616	323538	164 878	2.4	8632	45633
2011	49 714	318 993	657	404318	193 421	2.4	8975	46289