Socio-economic implication of Citrus Black Spot on South African citrus exports to the European Union Market

By

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DECLARATION

I, Xolisiwe Yolanda Potelwa, declare that the thesis/dissertation, hereby submitted for the degree MSc Agric (Agricultural Economics) at the University of Pretoria is my own work and that I have not previously submitted it for a degree at this or any other tertiary institution.

SIGNATURE: ....

DATE: ....

DEDICATION

To my son, Kwazi Silindile Potelwa, and my half-brother, Toto Potelwa.

ACKNOWLEDGEMENT

ABSTRACT

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The Trade and Development Cooperation Agreement (TDCA) played an important role through increasing South African citrus exports into the EU market. Since the signing of the agreement, South Africa's citrus exports had improved significantly. The citrus industry played an important role in South Africa's growth in exports to the EU market. For more than a century, the European market has been a traditional market for South African citrus exports. In 2013, citrus fruits exported to the EU market accounted for about 40 % of citrus exports. Despite the importance of the EU market to the South African citrus industry, this market is threatened by the reoccurrence of Citrus Black Spot (CBS) on their exports. Kotze (1981) defined CBS as a fungal disease that affects the development of citrus fruit.

CBS has not been detected in some regions in the world, including Europe, Central America and the Caribbean. At present, the European Commission has adopted stringent measures to protect its markets against importing fruits that are affected with CBS (NAPOZA, 2013). South African citrus exports are still permitted into the EU market, but should not exceed five allowable interceptions. In 2013, the EU threatened a full ban on South African citrus imports, should the fruit inspections capture more than five interceptions of infected fruit. The South

African citrus industry and the DAFF have introduced initiatives to comply with the European Commission's CBS phytosanitary requirements; however this had resulted into additional costs to export to the EU. The cost of complying with the latest CBS phytosanitary requirements have anticipated to increase and to impact on the citrus industry as the CBS phytosanitary measures gradually become more stringent and more difficult to comply with. The overall industry compliance costs are currently not known, and this information gap has motivated the commissioning of this study.

The objective of the study was to evaluate the economic implication of complying with CBS phytosanitary requirements on South Africa's citrus exports to the EU, as well as the consideration of alternative markets. The SMART partial equilibrium model was used to evaluate the implication of CBS phytosanitary requirements on South Africa's citrus exports. To determine the cost of compliance, risk management data was used to calculate the change in risk management between 2013 and 2014 that was sourced from the CGA's abridged financial report on the money spent in mitigating CBS. It was assumed that was money spent on orchard spraying and inspection of citrus fruits. Therefore, the cost of compliance had increased by 390 % between 2013 and 2014; from R1,1 million in 2013 to R5,6 million in 2014. The cost increase is assumed to add an extra trade cost to exporters and was used to shock the SMART partial equilibrium as an NTM equivalent. The Market Attractiveness Index was used to determine the alternative market for South African citrus exports in case of the closure of the EU market to South Africa.

The study was based on three scenarios that determine the impact of CBS on citrus exports. These assumptions were that (i) South African exporters comply fully with EU phytosanitary requirements; (ii) failure to comply would result in a total ban of imports of citrus from South Africa; and (iii) imports from citrus producing areas that are not affected by CBS will be permitted (partial ban) to the EU market. Amongst the mentioned scenarios compliance in accordance of the EU was implemented, the rest were not given to fact South Africa wanted to retained their traditional market. The results of the study were based on these three a scenarios. Therefore, the results showed that the South African citrus industry had lost about $88 million in export earnings as a result of compliance, $263 million when subjected to a partial ban; and $323 million under a total ban. The EU felt the losses in welfare to the tune of $1.5 million, which illustrates that EU consumers will not benefit in terms supply decrease from South Africa. In a nutshell, the South African citrus industry has suffered a loss in terms of export

earnings into the EU market due to CBS requirements. The MAI was used to determine the alternative markets indicated that Russia, Hong Kong and the UAE are the most attractive export markets for the South African citrus industry, given its economic and political landscape. Despite that fact, the study could not determine a reliable cost for compliance in terms of CBS in the country. It is recommended that citrus fruit affected by CBS should considered to be directed for processing. Furthermore, is recommended that is a need for a framework that deals with international standards and makes sound policies that also provides training on how to produce fruit to international standards.

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LIST OF ABBREVIATIONS AND ACRONYMS

BFAP Bureau for Food and Agricultural Policy

CBS Citrus Black Spot

CGA Citrus Growers' Association

CRI Citrus Research International

DAFF Department of Agriculture, Forestry and Fisheries

EC European Commission

EFSA European Food Safety Authority

EFTA European Free Trade Association

EPAs Economic Partnership Agreements

EU European Union

FMD Foot and Mouth Disease

FTAs Free Trade Agreements

GATT General Agreements on Tariff and Trade

GDP Gross Domestic Product

GEM General Equilibrium Model

GTA Global Trade Atlas

HACCP	Hazard Analysis and Critical Control Point
ICM	Integrated Crop Management
IPPC	International Plant Protection Convention
ITC	International Trade Centre
MAI	Market Attractiveness Index
MRLs	Maximum Residue Levels
NFPMs	National Fresh Produce Markets
NTBs	Non-tariff Barriers
NTMs	Non-tariff Measures
OECD	Organisation of Economic Cooperation and Development
OIE	World Organisation for Animal Health.
PPCEB	Perishable Product Control Export Board
PRA	Pest Risk Assessment
PU	Production Unit
PTAs	Preferential Trade Agreements
RTAs	Regional Trade Agreements

RVF	Rift Valley Fever
SADC	Southern African Development Community
SPS	Sanitary and Phytosanitary Measures
TBT	Technical Barriers to Trade
TDCAs	Trade Development and Cooperation Agreements
UNCTAD	United Nations Conference on Trade and Development
USDA	United States Department of Agriculture
WITS	World Integrated Trade Solution
WTO	World Trade Organisation

CHAPTER ONE
INTRODUCTION

1.1   BACKGROUND

The success of the World Trade Organisation (WTO) in negotiating the General Agreement on Tariff and Trade (GATT) for the reduction/removal of tariffs and sanctions among trading countries had improved trade among the nations. The Uruguay round of negotiations began in 1986, concluded in 1994 and came into effect in 1995. The aim of the removal of tariffs and sanctions was to ensure that import and export markets remained acceptable for traders. As a result, South Africa liberalised its trade policy in its commitment to contribute to GATT. This trade policy reformation was aimed at creating access for South African markets to global markets. The country reduced its tariffs to new low levels and has since entered into various trade agreements (Edwards, Cassim, & Seventer, 2009). The trade agreements included free trade agreements (FTAs), preferential trade agreements (PTAs) and Regional Trade Agreements (RTAs) with the European Union (EU) and the Southern African Development Community (SADC) as well as modest trade agreements with MERCOSUR and European Free Trade Association (EFTA) states.

Of the listed South African trade agreements, an agreement between South Africa and the EU, known as a Trade Development and Cooperation Agreement (TDCA) played an important role in advancing South Africa's access to the EU and its economic integration into the global market. For example, since this deal South Africa has increased agricultural trade to the EU market, with citrus being the primary fruit exported to this market. This industry not only plays a role in export earnings but also contributes to agriculture GDP through increased export earnings and employment. The citrus industry generated about R11,5 billion revenue in citrus exported globally in 2014 (Department of Agriculture, Forestry and Fisheries, 2015 and Trademap, 2015). The citrus industry offers employment opportunities, particularly to the disadvantaged communities (Philp, 2006). It is estimated that the citrus industry contributes approximately 100 000 labour jobs, equivalent to about 15 % of agricultural employment (Bureau for Food and Agricultural Policy, 2012). The EU has been South Africa's largest market, accounting for an average of 38,5 % of South Africa's citrus exports between 2010 and 2014 (Trademap, 2015).

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Despite the importance of the EU to South Africa, the South African citrus fruit industry has been dealing with the reoccurrence of citrus black spot (CBS). Truter (2010), defined CBS as "a fungal disease that affects the development of citrus fruit". It results in a spotty citrus fruit, but it does not affect the fruit inside or the edible portion of the fruit. Carstens, *et.al* (2012), and Halueendo (2008), argued that CBS had gained economic relevance in recent years through phytosanitary restrictions in determining market access.

The disease is prevalent in several countries around the world that include South Africa, Brazil, China and Australia, but not in Europe, Central America and the Caribbean Region. The disease originates from the regions with warm, wet or humid climates with summer rainfall. In South Africa, CBS was first discovered in 1929 after the importation of buds from Australia (Baayen, *et.al*, 2002). Currently this disease is known to occur in areas such as Limpopo, the Eastern Cape, KwaZulu-Natal, Mpumalanga, and Northwest (Truter, 2010). Limpopo and the Eastern Cape produce and export large volumes of citrus fruit to the EU market (CGA, 2014). The reoccurrence of CBS disease and failure to control it has serious repercussions on South African citrus export earnings.

The EU Commission introduced CBS Phytosanitary regulations in 1992 under the EU Plant Health Regime. This regulation of plant health aims to protect crops, fruits, vegetables, flowers, ornamentals and forests from harmful pests and diseases (harmful organisms) by preventing their introduction into the EU or their spread within the EU (European Commision, 2000). This regulation had implications for its main importers, including South Africa, in accessing the EU market. Its main importers raised their concerns, stating that the regulations were not technically justified. The concerns were based on the fact that WTO SPS agreement measures should be based on scientific principles (see Appendix D for stipulation of WTO SPS agreement) (National Plant Protection Organisation of South Africa (NPPOZA), 2013). South Africa, as the major supplier of citrus into this market, conducted studies to prove that CBS cannot spread in the EU. For example, a study by Paul, van Jaarsveld, Korsten & Hattingh (2005), presented technical justification that EU's cold temperatures do not allow for the germination of the CBS disease.

The European Food Safety Authority (EFSA) report in 2008 did not agree with South Africa's findings that its climate is unsuitable for CBS. Furthermore, the EU indicated that South Africa

did not provide sufficient evidence to demonstrate that infested citrus fruit is an unlikely pathway for CBS. Therefore, CBS can be transferred to a suitable host and distributed in a susceptible host if EU climatic conditions would not prevent the establishment of the CBS pathogen (NPPOZA, 2013). Regardless of their opinion, the Pest Risk Assessment (PRA) conducted by South Africa and the United States of America reported that citrus fruit is not a realistic pathway for CBS to enter, establish, spread and have significant economic impact within the PRA area (EU). This has resulted in South Africa having lodged a complaint at the International Plant Protection Convention (IPPC) in view of relieving themselves from the enforcement of the current EU phytosanitary regulation. This is in line with SPS agreements that state the exporting country has a right to report its dissatisfaction about the importing countries' treatment (inspections) to the Dispute Settlement Body of the WTO (see Appendix D). However, there has been no progress on the dispute due to delays of inclusion of the third party such CBS affected countries (Brazil and Australia) (NPPOZA, 2013).

Regardless of the meeting and the discussion held between the EU and South Africa, the EU has strengthened its level of protection. The EU has benchmarked CBS interception for each consignment to a maximum of five. However, the EU has noted an increasing interception since 2009, above the allowable maximum, namely approximately 31 by the end of the 2012 season. The EU sent a letter to South Africa, indicating that South Africa should minimise its interceptions to the maximum allowance of five. In 2012 and 2013, the EU detected about 31 and 36 interceptions respectively. The detection of CBS interceptions has raised interest from various stakeholders and the media. For instance, the *Business Day*, on 28 November 2013, reported that due to the recurring detection exceeding the allowable maximum of five interceptions, the EU threatened to ban citrus imports from South Africa. Magwaza (2014), noted that the Citrus Growers' Association (CGA) has reported that more citrus growers withdrew their produce destined for the EU, cultivated in suspect orchards. In addition, he further reported that by April 2014, over 1 100 orchards had been withdrawn as a proactive measure to reduce the likelihood of interceptions, compared with the 102 orchards withdrawn during 2013.

1.2   PROBLEM STATEMENT

Citrus Black Spot has not yet appeared in Europe, Central America and the Caribbean regions (Carstens et al., 2012). In order to safeguard itself against the occurrence of CBS, the EU requires its major suppliers of citrus, including South Africa, not to exceed five interceptions of CBS-infected fruits in their exports (NPPOZA, 2013). Strict regulations were imposed against South Africa in order to curb the exceeding of the allowable maximum CBS interception in 2013 (NPPOZA, 2013). It was difficult for South Africa to comply with these regulations as approximately 82 % of citrus producing regions that currently export a large volume to the EU, are affected by the CBS disease. For example, in 2013 the EU market has recorded 36 interceptions of CBS from South Africa's exports, bearing in mind the allowable interception of 5.

The failure to comply with the CBS phytosanitary requirements could lead to the EU imposing an import ban on South Africa's citrus. It has been reported that the EU CBS phytosanitary measures had already affected producers negatively due to the additional costs of compliance. Therefore, the essence of the problem lies in the implication of CBS compliance on citrus export revenue and the additional cost of doing business with the EU. Agri-Trade (2014), reported the results of compliance: South African citrus exporters incurred a cost increase of R1 million to R5 million between 2013 and 2014.

The additional cost is the result of the CBS Risk Management System (RMS) to prevent the occurrence of CBS in consignments sent to the EU. The system was developed by the DAFF and CGA to achieve compliance goals of CBS EU phytosanitary requirements. Control measures (including registration of orchards and fields, mandatory spraying regimes and inspections, pre- and post-harvesting) are carried out to minimise CBS as an aspect of the RMS. Implications of the RMS on citrus industry earnings are not known. It is imperative to understand the impact of the additional compliance measures in order to establish the relevance of the EU as a traditional market. This study intends to evaluate the impact (effects) of complying with EU CBS phytosanitary measures on the economic welfare of the South African citrus industry and to consider alternative markets.

1.3   STUDY OBJECTIVES

The main objectives of this study are to evaluate the economic impacts of complying with CBS phytosanitary requirements set by the EU and to consider alternative markets.

The specific objectives of the study are to:
- evaluate the implications of complying with CBS phytosanitary requirements on South African citrus export revenue;
- evaluate the effects of CBS phytosanitary requirements on trade volumes for South Africa's citrus exports;
- evaluate the welfare effects; and
- identify alternative export markets for South African citrus growers.

1.4   METHODOLOGY

The study will use two methodologies: a SMART partial equilibrium model of the World Integrated Trade Solutions (WITS) approach; and the Market Attractiveness index of the International Trade Centre (ITC). The WITS smart model will be used to estimate the impact of CBS on citrus exports from South Africa to the EU. The CBS phytosanitary regulations in this study are defined as constituting Non-Tariff Measures (NTMs). NTMs will be used interchangeably with Non- Tariff Barriers (NTBs) in this study as they have the same meaning. Therefore, to evaluate the effects of NTMs, the model incorporates NTMs tariff equivalence that would restrict trade at the same level as a tariff. The NTMs tariff equivalence was obtained through calculating the cost difference in the money invested in the RMS between 2013 and 2014. Therefore, NTMs tariff equivalence would be used to shock a SMART partial equilibrium model to measure an effect of CBS on the economic welfare of the South African Citrus Industry.

The model will further provide estimations on the:
- (i)   change in South Africa's citrus export revenue;
- (ii)   change in EU citrus import demand,
- (iii)   effects of trade creation and trade diversion. Trade creation is important for this study because it provides an increased demand for imports if tariff or non-tariff measures are reduced or eliminated, whereas trade diversion has welfare-reducing

effects on the demand for imports resulting from substitution effects of the same goods (however this study focus on increase of tariff or NTMs); and

(iv)   economic welfare effects.

Lastly, the ITC attractiveness model is used to identify alternative markets for South Africa's citrus exports. The ITC Model is also called the Market Attractiveness Index (MAI). This model uses ITC data on trade, including market share, percentage growth, tariff and competition to determine market attractiveness. Each indicator is a score between 0 and 5 and is used to make an informed decision about the attractiveness of a market.

1.5   JUSTIFICATION OF THE STUDY

The study will provide important information for stakeholders like producers, policy makers and the industry in general. Producers are most affected by CBS due to the additional cost of compliance. Therefore, the study will establish awareness of producers of international trade standards and the implication of non-compliance. Furthermore, Ntombela & Kleynhans (2010), gives consideration to the expansion to an alternative market. Diversifying to alternative markets will also reduce the risk of dependence on the EU market. Also, diversification will enhance future growth and improve the citrus industry's competitiveness in the world. Hence, estimating the costs of compliance will inform producers whether to continue with the EU market or to diversify to alternative market destinations. The industry has spent excessive amounts of money in mitigating the spread of CBS in South African citrus destined for the EU market. Furthermore, the citrus industry has established scientific facts in a quest to convince the European Commission that there is minimal risk of the spread of the disease to EU countries. Therefore, the study will recommend to policy makers to make informed decisions about international trade standards and the decision to comply with general trade regulations. The industry had established a number of research studies on the epidemiology and risk of CBS on South African citrus exports. Therefore, this study will recommend to researchers to develop a framework of combating the risk of international requirements.

1.6   OUTLINE OF DISSERTATION

This study comprises seven chapters. After the introductory chapter, Chapter 2 provides an overview of the citrus industry in South Africa in terms of its characteristics, the challenges

faced by the sector, and the EU demand for citrus products. Chapter 3 draws from a wide range of studies and experiences, in South Africa and internationally, with the aim of reviewing the literature on methods of measuring the impact of Non-tariff Measures on international trade as well as on the alternative market. Chapter 4 presents the conceptual frameworks for this study and the method employed in this study to analyse the impact of CBS on South African exports for the alternative market. Chapter 5 presents the results and discussions of the impacts of CBS on South African citrus exports. Chapter 6 further reviews an analysis of the alternative markets for South African citrus exports and Chapter 7, the final chapter of the dissertation, deals with the conclusion and recommendations.

CHAPTER TWO

SOUTH AFRICAN CITRUS INDUSTRY AND EU DEMAND

2.1   INTRODUCTION

This chapter provides an overview of the citrus fruit industry in South Africa and the EU's demand for citrus. It is important to understand the structure and size of the industry in order to determine the extent of the impact of CBS on the industry. The data used in this chapter shows the contribution the industry makes to the agricultural gross domestic product, production trends, export trends and potential job opportunities by the industry.

2.2   INDUSTRY STRUCTURE

The organisational structure and coordination mechanisms of the South African citrus fruit industry are shown in Figure 1 below. The industry comprises about 1 400 citrus fruit producers throughout South Africa, Zimbabwe and Swaziland, with predominantly South African producers. The Citrus Growers' Association is a body that is responsible for providing marketing and technical support to farmers. Organisations such as the Fresh Produce Exporters Forum, Citrus Research International, Agricultural Research Council, Citrus Academy, Perishable Products Exporters Control Boards and the Department of Agriculture, Forestry and Fisheries provide support to the citrus industry.
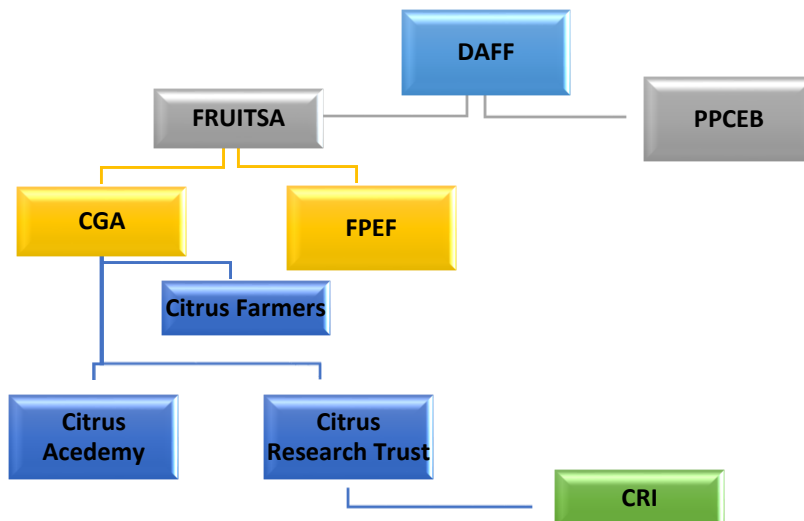
Figure 1: Citrus industry structure

 [Source: Adopted from Ndou (2012) and DAFF (2012)]

The Department of Agriculture, Forestry and Fisheries is responsible for regulating and executing the policy on the basis of production, exchange and distribution. The DAFF ensures that the policies are implemented through private and public entities. For example, the PPECB, which provides quality inspection, handling, storage and maintenance of cold chain services to the perishable produce industries, is mandated under the DAFF. Therefore, this institution provides food safety, quality and guarantee services to encourage and create confidence in South African agricultural products that are internationally preferred (NDA, 2003).

The Citrus Research Trust is also responsible for the coordination of funding distribution in support of identified research proposals. The CRI is the sub-body of the CRT, responsible for executing research and development in the citrus industry. The institution collaborates with various universities in the country on research and development in the industry. The CRI also works with the Citrus Academy in providing bursary funding. The Citrus Academy aims to support previously disadvantaged learners to access higher education and provides skills and knowledge development among producers on citrus pest monitoring, which is in collaboration with the CRI and CGA .

The Fresh Produce Exporters Forum (FPEF) has, as its primary role, the provision of leadership and services to its members and the international buying community (FPEF portal). This body ensures that only competent and reliable marketing agents and grower-exporters are part of the forum. The marketing campaigns carried out by the FPEF are geared towards creating awareness and differentiation of South African products among consumers.

2.3   SIZE OF THE INDUSTRY

In terms of value, the citrus fruit industry is the third-largest horticultural subsector, following deciduous fruits and vegetables (DAFF, 2012) with an average annual growth of 5% between 2001 and 2014. This citrus industry is the largest exporter in agriculture, with an average contribution of about 10,25% per annum of all agricultural exports. Table 1 below presents the nominal gross value and real gross value of citrus production from 2001 to 2014, with 2010 as the base year. In 2014, the industry contributed an estimated gross value of about R10,2 billion to the total gross value of South African agricultural production (Quantec, 2014). The citrus fruit industry has been improving over the years, thanks to a number of factors such as the improvement of cultivars, expansion of land under production and investment in

educational campaigns and roadshow promotions. Furthermore, the industry is labour intensive as it employs an estimated 100 000 people, 60 % of which work on farms and 40 % in pack houses, processing plants, transport and other services (DAFF, 2012). It is further estimated that the industry is a source of livelihood to more than one million households (DAFF, 2012).

Table 1: Gross value of citrus production

Period	Nominal gross value production in R' million	Real GVP (R' million)	% of citrus in agriculture GDP	% of citrus in agriculture exports
2001	1531	2939	2,9	8,5
2002	2527	4323	3,7	8,4
2003	2756	4458	3,8	10,7
2004	3520	5343	4,8	12,9
2005	3663	5273	5,1	11,9
2006	2425	3285	3,1	12,9
2007	2956	3679	3,2	14,3
2008	4578	5235	3,7	11,9
2009	5837	6208	4,3	11,3
2010	4593	4593	3,4	11
2011	6463	6060	4,5	10,3
2012	7734	6873	4,6	10
2013	8110	6801	4,3	10,25
2014	10218	8098	5,6	11,09

[Source: Quantec, 2014]

In a nutshell, the citrus industry contributes an average share of approximately 5 % in the agricultural sector. Furthermore, their income earnings are generated from foreign markets and support employment for every tonne exported in the global market. This industry encounters a number of challenges, among which CBS occurrence, which this study intends to measure the impact of on South Africa's exports earnings.

2.3.1 Production of citrus fruit

Citrus fruit is produced in six different provinces across the country, including Limpopo, the Western Cape, Mpumalanga, Eastern Cape, KwaZulu-Natal, the Free State and Northern Cape. About 64 202 hectares of South Africa's land is utilised for citrus fruit production. The diverse climatic conditions, ranging from winter rainfall in the south of the country to summer rainfall in the north, allow farmers to produce a variety of citrus fruits, including oranges, lemons, soft

citrus and grapefruit. This diversity also allows growers to produce fruit with different attributes, such as quality and taste, which meet different consumer preferences (CGA, 2014).

Figure 2 below shows the fluctuation in the production of citrus fruits between 2001 and 2014. The country produced a total of 2,5 million tonnes of citrus, with oranges being the most produced citrus variety in 2014. Oranges accounted for a total production of 1,78 million tonnes, followed by grapefruit (417 thousand tonnes) and limes and lemons (329 thousand tonnes). The production of citrus fruit has been showing a positive trend. The producers are faced with challenges such as the occurrence of pests and diseases, e.g. CBS (CGA, 2014). The country's climatic conditions with summer rainfall and warmth allow for the occurrence of CBS. About 80 % of citrus production occurs in the CBS-affected areas in the country (CGA, 2014). Carstens et al. (2012) did however report that the Western and Northern Cape areas are not affected by CBS.
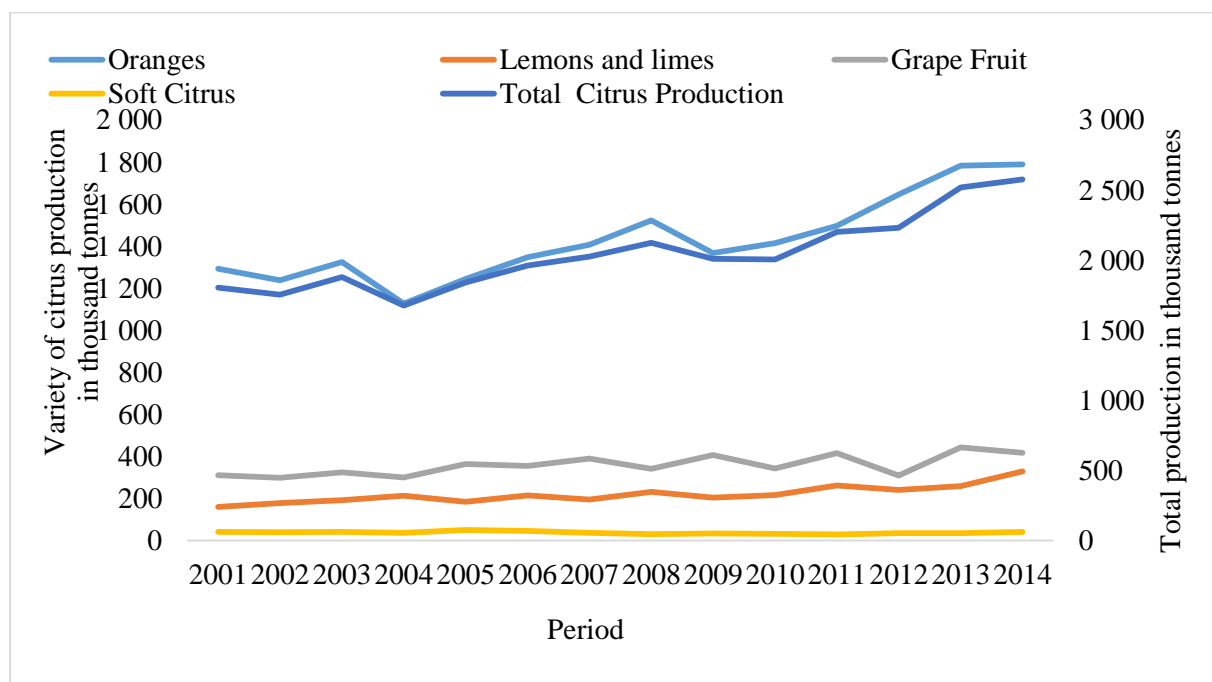
Figure 2: South African citrus production between 2001 and 2014, in tonnes
[Source: CGA, 2014]

In summary, the differing climatic conditions allow South African producers to produce a variety of citrus fruit of high quality. South Africa's climatic conditions do however pose a threat to the production of citrus fruit through the occurrence of pests and diseases (Ndou, 2012). About 80 % of citrus fruit originates from the CBS-affected areas and the remaining from non-affected areas which include the Western Cape, Northern Cape and Free State.

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2.4   MARKET STRUCTURE

Figure 3 below depicts the distribution of South African citrus fruit. About 70 % of South African citrus is exported to the global market and the remainder is sold on the local market (6 %) or processed (16 %). Locally, citrus products are sold at National Fresh Produce Markets (NFPMs), informal markets and processors (DAFF, 2012).
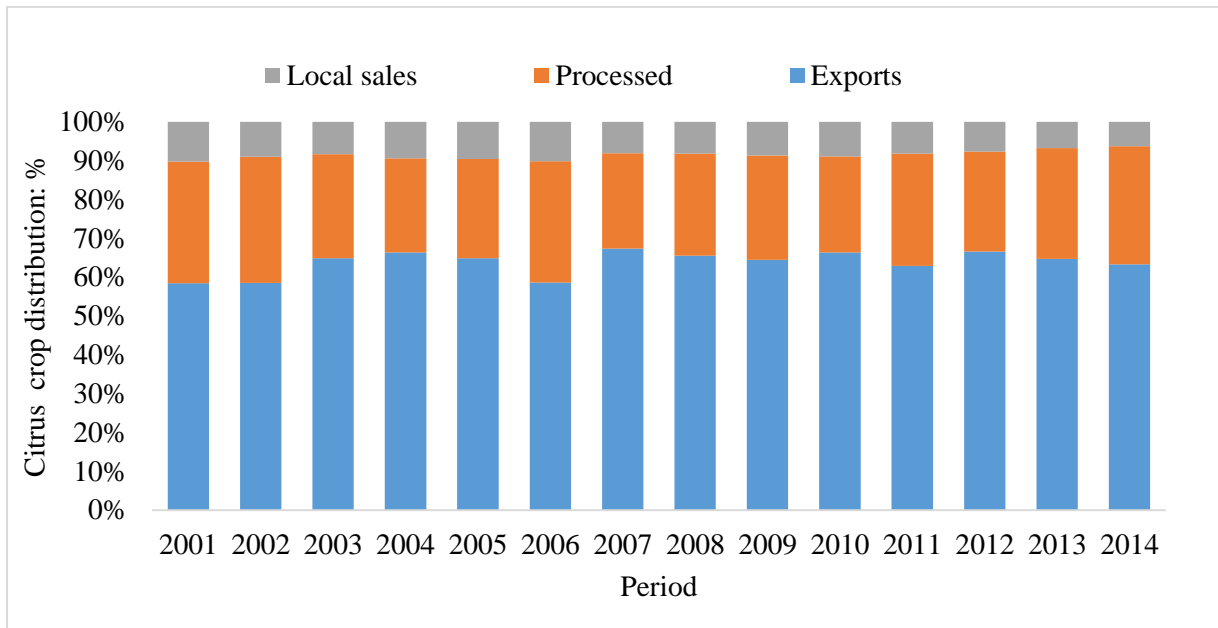
Figure 3: Citrus crop distribution
[Source: (DAFF, 2015)]

2.4.1   Citrus fruit export performance

The country was ranked among the top three exporters (in terms of rand value) on the world market in 2014. In 2014, South Africa exported citrus to the value of about R11,6 billion, compared with R6,6 billion in 2010. The positive growth in exports is attributed to factors such as the exchange rate and the expansion of land under cultivation (Rubio, 2013 & CGA, 2014). In 2014, oranges was the leading exported product with a total of R6,4 billion (Trademap, 2015). Lemons and limes collectively was the second-most exported citrus, with a total value of R2,4 billion, followed by soft citrus with a total value of R1,5 billion in 2014. All citrus products showed a positive growth performance of an average 45 % on the global market between 2010 and 2014. Over the years, South African citrus exports have shown a positive growth trend despite the country currently being faced with CBS phytosanitary requirements to access the EU market.

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Table 2: South African citrus products exported to the global market

Citrus fruit product	Values in R' million			Growth values (%)	
	2010	2013	2014	2010–2014	2013–2014
Total citrus	**6 687**	**9 342**	**11 625**	**74**	**24**
Oranges	4 440	5 662	6 451	45	14
Lemons and limes	807	1 244	2 447	203	97
Soft citrus	664	1 215	1 595	140	31
Grapefruit	742	1 204	1 076	45	–11
Citrus fruit dry	34	18	57	67	212

[Source: (Trademap, 2015)]

The EU has been the largest market with a total of R4,3 billion worth of imports from South Africa in 2014. The second-largest destination was the Middle East with a total of R1,9 billion and BRIC with R1,2 billion in 2014 (see Figure 4 below). Since 2012, the export of citrus fruit to the Middle East and BRIC markets has been increasing. This is mainly due to the fact that the country's citrus exporters have been working on diversifying the market in view of a possible closure of the EU market, should South Africa fail to comply with EU regulations.
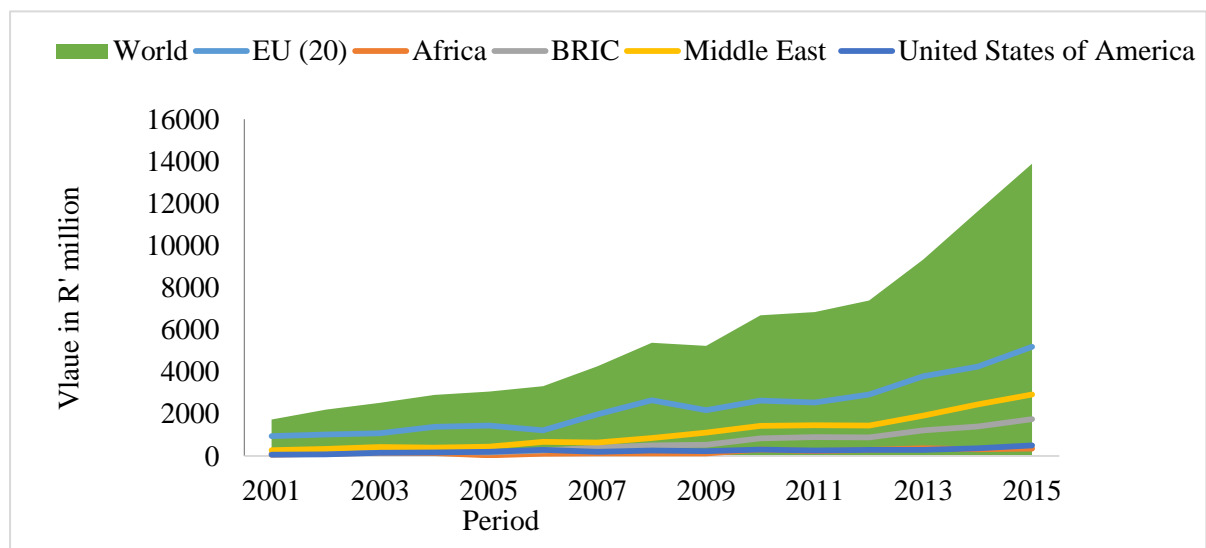
Figure 4: Leading importers of South African citrus fruit

[Source: (Trademap, 2015)]

In summary, South Africa's growth in the export of citrus has been increasingly towards the BRIC and Middle East, which growth was fuelled by aims to diversify to another market on the world scene. Although South Africa is faced with stringent CBS requirements, citrus exports have also been increasing to the EU market since 2012. The increase of market growth was driven by consumers' need for citrus fruit in their daily diets.

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2.5   EU DEMAND FOR CITRUS FROM THE WORLD

Globally, the EU market is ranked among the largest producers of a variety of citrus fruits with a total of 10,3 million tonnes in 2014. Of this total produced, the EU exported approximately 8 % and processed about 15 % into juice and dried fruit. Their local consumption exceeds their production, leaving them with a shortfall of about 18 % that needs to be imported to meet consumers' needs. On a global scale, between 2010 and 2014, the EU imported, on average, approximately 1,9 million tonnes (about 44,1 %) of the world's citrus on a yearly basis (see table 3).

Table 3: EU citrus product distribution in 000' tonnes

Period	Production	Consumption	Processing	Exports	Imports
2010	10 553	10 366	1 795	628	2 236
2011	10 906	9 810	2 229	770	1 903
2012	10 488	10 023	1 664	772	1 971
2013	10 105	9 631	1 624	818	1 968
2014	10 105	10 349	2 088	816	1 920

[Source: United States Department of Agriculture, 2015]

Figure 5 presents the main suppliers of EU citrus exporters from the world. In 2014, Spain was the largest supplier with a total of about R35 billion (equivalent to 47% of the EU's imports) in 2014. Furthermore, Spain is the largest producer in the EU and the world, which makes it difficult for their competitors such as South Africa, Argentina and Brazil, mostly due to factors such as food safety standards, regulations and the cost of transport. Regardless of these factors, South Africa has managed to be ranked second in terms of exporters, followed by the Netherlands and Germany.
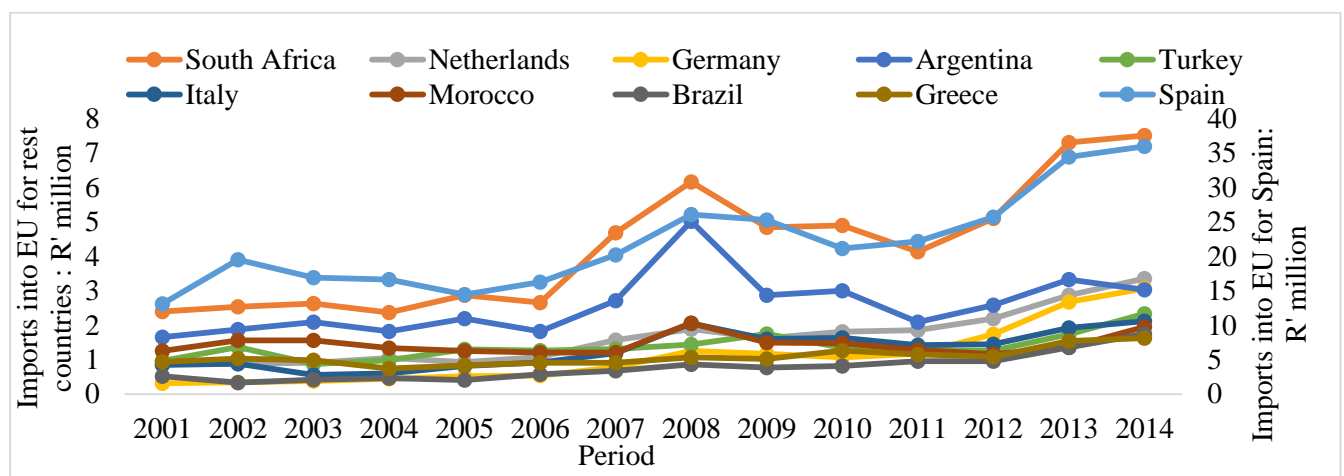
Figure 5: Exporters of citrus fruit to the EU

[Source: (Trademap, 2015)]

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In a nutshell, the EU market is the largest importer in the world with an import share of 44,1 % in 2014. This is an important market, given the variety of citrus fruits in demand from the global market. This is however a difficult market to access, due to CBS phytosanitary requirements which will be explained in the following section.

2.6 EU MARKET REQUIREMENTS FOR IMPORTED FOOD PRODUCTS

The European Commission ensures that EU countries receive the safest food from the world. They ensure that their importers comply with their food safety requirements. Therefore, exporters to the EU are required to follow EU food safety regulations to supply food in that market (European Commission, 2014). This study focuses on the implication CBS has on South Africa's exports to the EU market. The EU has imposed phytosanitary regulations on South African citrus exports destined for their market. The regulations are listed in the European Commission phytosanitary directive established by the European Parliamentary Commission, number 29 of 2000 (European Commission, 2000). The document states that the country of origin should comply with the following:

Exports are to be:
- accompanied by plant health certificates issued by exporting authorities;
- subjected to phytosanitary inspection at the point of entry into the EU;
- imported into the EU market by an importer registered in the official register of the EU country; and
- made known to the customs office at the point of entry before its arrival in the country.

The EU market laid down the above regulations to prevent the introduction of organisms harmful to plants and plant products in the EU. These regulations are harmonised in accordance with a WTO SPS agreement created to protect human, animal and plant health (see Appendix D). The SPS agreement allows countries to establish their own standards. However, their standards should be based on scientific evidence and applied only to the extent it protects human, animal and plant life or health (WTO, 1995).

In the case of South Africa, the EU conducts phytosanitary inspections to ensure that citrus fruit is free from CBS. The EU's allowable CBS interception per consignment is a maximum

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of five per imported consignment. Since 2010, there has been a notable increase in the number of interceptions detected by the EU of CBS-affected citrus imports from South Africa. This has raised concerns in the European market due to fear of the spread of CBS. Nevertheless, studies have indicated that CBS cannot spread in the EU because of their cold climatic conditions, which is evident from a study conducted by Paul, Van Jaarsveld, Korsten & Hattingh (2005). Despite the evidence the South African citrus industry provided, it should still comply with the EU phytosanitary requirements. The country had established initiatives for complying with CBS requirements to minimise chances of CBS occurrence during transit. The detailed compliance initiatives are explained in the following subsection.

2.7   SOUTH AFRICA'S COMPLIANCE INITIATIVES

The industry has various programmes used to control the reoccurrence of CBS in citrus growing regions and these are still widely used. The control measures include a quarantine programme, orchard sanitation, the use of chemical control and a spraying programme (Truter, 2010; Halueendo, 2008; Kotze, 1981). Recently, the DAFF has established a programme, called Risk Management System, to ensure the management of citrus fruits harvested. The programme ensures that the growers are aware of export requirements and that they are provided with training on phytosanitary requirements.

The programme also ensures that growers implement compliance initiatives for CBS requirements, which include spraying programmes, inspections, pack house audits and pre-inspections to avoid the occurrence of CBS (DAFF, 2013). The spraying programmes are used by producers to mitigate the occurrence of this disease in the production areas. Inspections and pack house audits are undertaken to identify CBS-affected fruits for sending to non-sensitive markets. The Perishable Product Export Control Board (PPECB) has played an important role in ensuring that the industry complies with the CBS initiative implemented by the industry. This body has played a very important role in ensuring that consignments destined for the EU market are free from CBS. PPECB has done this through ensuring that market requirements are maintained in accordance with their standards (DAFF, 2013).

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Table 4:Citrus inspected from CBS-affected/non-affected regions from SA to world

| Year | Exports in tonnes | | | |
	CBS-affected regions	Share (%)	CBS-free regions	Share (%)
2008	1 156 534	83	235 711	17
2009	1 084 835	84	204 934	16
2010	1 210 901	83	253 711	17
2011	1 176 329	83	241 083	17
2012	1 222 006	82	266 616	18

[Source: CGA, 2014 and author's calculations]

Table 2.4 above indicates citrus fruit that were inspected and passed for export from affected and non-affected citrus-producing regions in South Africa between 2008 and 2012. It is important to note that large volumes that were destined for export markets came from the CBS-affected areas that include the Limpopo and Eastern Cape provinces. Citrus fruits that are not affected by CBS are directed to countries that are sensitive to CBS, such as EU countries, while consignments from CBS-affected regions are destined to export markets not sensitive to CBS (DAFF, 2013). In 2012, about 1,2 million tonnes of citrus products were passed for export from CBS-affected regions while only 266 thousand tonnes were passed for export from CBS-free regions. It is important to note that the volume of citrus passed for export had increased from CBS-affected regions between 2009 and 2012.

2.8   SUMMARY

This chapter highlighted the importance of the citrus industry in South Africa and the contribution it makes in the agricultural sector's income. The prospective importance of citrus in the development of rural livelihoods is demonstrated by the enormous contribution of horticulture at a macroeconomic level. The industry is estimated to account for 100 000 jobs and production has been increasing. Citrus fruits are largely produced in the Limpopo and Eastern Cape provinces, which are areas affected by CBS.

South Africa exports about 70 % of its citrus production and the EU absorbs more than one-third of this. The EU has been South Africa's traditional market with a share of 38,9 % in 2014. Despite the importance of the EU market, South Africa is faced with EU phytosanitary requirements in accessing the market. The inspection of consignments revealed more than five interceptions in imports entering the EU market. Therefore, the EU has tightened its CBS

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requirements as EU countries are not plagued by CBS. This is difficult for South African exporters because the bulk of South African citrus exports are sourced from CBS-affected regions. Furthermore, this makes it difficult for exporters to comply with EU CBS phytosanitary requirements due to extra costs in doing business with the EU market.

CHAPTER THREE
LITERATURE REVIEW

3.1   INTRODUCTION

Carstens et al. (2012) have reported that eliminating CBS is an important phytosanitary requirement for securing citrus import permission into the EU market. Carstens et al. (2012) have also argued that the EU is applying strict CBS measures in a protectionist manner to discourage imports from developing countries, as CBS does not pose health and safety problems for EU consumers. Carstens et al. (2012) further argue that the EU's CBS measures are scientifically unjustifiable and simply implemented to discourage trade, as CBS does not affect the internal part of the fruit.

Therefore, CBS regulations in this study are considered to be NTMs. The application of NTMs is aimed at safeguarding the safety of imported commodities, safeguarding national security and revenue loss and protecting home industries and consumers (Okumu & Nyokori, 2010). The reviewed literature reported that NTMs have a negative impact on trade through the distortion of trade flows. Therefore, the impact of NTMs on agricultural trade is normally evaluated in quantitative terms, such as the impact on trade revenues, welfare effects, global prices and the distortion of trade flows in the global market (Bheghin & Bereau, 2001).

The aim of this chapter is to review some of the methods that have previously been applied in estimating the economic implication of NTMs in the global market, as well as to review some of the approaches in identifying the alternative markets in case of the closure of the EU market to South Africa. This chapter further highlights the established limitations and advantages of each method. It starts by presenting several definitions of the concepts under discussion, after which several approaches for estimating economic implications of NTMs and approaches for selecting the alternative markets are explored. Subsequently, the chapter highlights some of the findings from past international studies to get a better understanding of the impact of NTMs; it also presents evaluations of a phytosanitary measure, as well as literature identifying the alternative markets.

3.2   DEFINITIONS

NTMs have subsequently become prevalent globally after the reduction in tariffs allowed by the WTO. NTMs are known as "policy measures, other than ordinary customs, tariffs, that can have potentially economic effects on the international trade in goods, changing quantities traded or prices or both" (UNCTAD, 2012). NTMs include technical measures (SPS measures, TBTs and pre-shipment inspection), non-technical measures, hard measures (quantitative restrictions, import licensing, voluntary restraint arrangements) and threat measures (anti-dumping and safeguards).

The emergence of NTMs and their potential impact on international trade was officially noticed by the WTO in its Uruguay round of talks that concluded in 1994. In this round, the initial GATT was expanded to administer SPS measures as well as issues pertaining to technical barriers to trade (TBT). SPS measures are defined as a set of rules, decrees, regulations and procedures that are applied to protect human, animal and plant life or health from risks arising from plant pests, additives, residues, contaminants, toxins or disease-causing organisms in food, beverages or foodstuffs, and from diseases carried by animals within the territory of a country (WTO, 1995). Since then, SPS measures have increasingly become a major barrier to international trade. Recently, a study conducted by Nicita & Gourdan (2013), suggested that NTMs have been widely used, to some degree, as substitutes for tariffs in order to continue protecting key economic sectors in spite of the tariff liberalisation of the last decade.

3.3   APPROACHES FOR ESTIMATING NTMs IN TRADE

Several approaches are used to measure the impacts NTMs have on the agricultural trade on the global market. The methods used include a price wedge, an inventory-based approach, a survey-based approach, a gravity approach and a partial equilibrium-based approach. These approaches examine different perspectives, depending on the purpose of the application in the country of interest. For example, the price wedge approach examines price differences to determine the impact of introduced NTMs whereas the inventory approach examines source information on regulation reported at the borders. The following subsections will further demonstrate the limitations and advantages of these approaches that quantify the impacts of NTMs in trade.

3.3.1　Price wedge method

A price wedge approach uses price comparison to measure the introduction of NTMs. This method can be expressed as measuring a tariff equivalent (Fuggazza, 2012). The tariff equivalent is estimated by calculating the price wedge between the imported product and the comparable product in the domestic market. The domestic price of the product can be compared with the reference price, such as the cost of insurance and freight (CIF) price of an imported product, as paid by the domestic importer to the foreign exporter, inclusive of transport costs, but exclusive of tariffs (Beghin & Bureau, 2001).

Although this method allows for the easy calculation of a tariff equivalent, it is clouded by the serious conceptual and data problems that are likely to arise in the estimation and interpretation of tariff equivalents. In addition, the price comparison indirectly assumes perfect substitution between imported and domestic goods, and the price difference does not convey information about how the NTMs operate in practice (Fuggazza, 2012). To address the limitations associated with the assumption of perfect substitution, various authors have adopted an extended price wedge method that assumes imperfect substitution on the demand side and differences in factor endowments on the supply side. Nimenya, Frahan and Ndimara (2008) used an extended price wedge method to estimate the impact of technical barriers to trade on African exports destined for European markets. The authors concluded that the frequent negative value of the tariff equivalent suggests that the marginal costs should not be included in the price gap. This method estimated the tariff equivalent of NTMs through the price difference between exporter and importer; it however, doesn't consider the preparation cost in order to comply with the NTMs introduced. Furthermore, it mainly considers an estimation of the tariff equivalent of NTMs at the demand side (importer) without considering the implication of the supply (exporter). In a nutshell, this method doesn't meet the requirements to answer the question of the study, given their assumption in estimating the tariff equivalent.

3.3.2　Inventory-based methods

Inventory-based methods can be used, both from a quantitative and qualitative standpoint, to assess the importance of domestic regulations as trade barriers (Bheghin & Bereau, 2001). Three sources of information can be used: (i) data on regulations; (ii) data on frequency of detentions; and (iii) data on complaints from the industry against discriminatory regulatory

practices and notifications to international bodies about such practices. These methods use the frequency index and coverage ratio as the simplest aggregate indicators of the use and incidence of NTMs (Fuggazza, 2012). A frequency index is expressed as a share (weighted terms, based on either imports or production) of total tariff lines containing one or more NTM. The coverage ratio is the percentage of imports affected by one or more NTM to total imports.

However, this approach suffers from an endogeneity problem (Fuggazza, 2012). In addition, Disdier, Fontagne and Mimouni (2007), have reported that this approach has two limiting factors. First, the method does not give any direct information about the possible impact of price and quantity produced, consumed or traded. Second, it does not give indications of the preventative effects which NTMs may have on exporters' decisions on pricing and quantity. Regardless of its limitations, the frequency measures can be used as dummy variables in a gravity equation to identify effects of NTMs on trade. Nicita and Gourdon (2013) used frequency indices and coverage ratios to investigate the use of NTMs in some 26 countries. The authors discovered that the use of NTMs is extensive and increasing, especially with regard to technical measures. This approach was not considered for use in this study due to its said endogeneity problem and the fact that it doesn't provide an impact on price and quantity which limits effects of NTMs on trade.

3.3.3 Gravity approach

Gravity equation techniques are used to estimate the home bias – or border effect – in trade, part of which is reflected in national regulations that hamper trade (Beghin & Bureau, 2001). A distinctive method is to evaluate the residuals in economic regressions of trade flows on various determinants of trade. The principles of this approach rely on the "Newton Law of Universal Gravitation" formula, which holds that the attractive force Fij between two objects i and j is given by $Fij = G*(Mi*Mj)/Dij$ where Mi and Mj are the masses; Dij is the distance between the two objects; and G is a gravitational constant. Likewise, economists have found that the equation performs well in explaining trade flows between countries.

The gravity model has an outstanding advantage over other similar methods in that it requires a relatively limited amount of data; hence it is beneficial for application where data is limited and expensive to acquire (Gebrehiwet, 2004). One distinct limitation of this method is that it

looks at trade flows that result in trade distortion since the demand and the supply side of the impacts are not captured in the model (Gebrehiwet, Kirsten and Ngqangweni, 2007).

Gebrehiwet et al. (2007) used a gravity method to estimate the impact of NTMs barriers on SADC agricultural exports to OECD countries. The authors concluded that the NTMs restrict the trade flows between the two countries as the result of NTMs barriers. Furthermore, a study conducted by Scheepers, Jooste and Alemu (2007), which used a gravity model to determine the impact of maximum residue limits (MRLs) on avocado exports to the European market, also drew the same conclusions. The MRLs are maximum concentrations of pesticide residue likely to be found in or on foodstuffs after the application of pesticides on plants. In view of this study, this method only focuses on the trade flows resulting from trade distortion, since the demand and supply sides of the impacts are not captured in the model. Furthermore, this method doesn't quantify the impact of NTMs (Beghin & Bureau, 2001), which is why the method was not considered for this study.

3.3.4 Risk assessment approach

Risk assessment approaches, combined with scientific knowledge, can contribute to gauging a subset of NTMs, especially safety and SPS standards and regulations (Bheghin, 2006). These methods can contribute when evaluating the welfare impacts and the possible protectionism effects of the types of NTMs under study. The main advantage of this approach is that it provides an economic criterion to gauge the desirability of an NTM and its likely protectionist nature, if the externalities are small and if costs significantly surpass the benefits in expected terms. Furthermore, this method not only measures the cost and benefits of the NTMs, it also demonstrates the implication of not having a measure in place (Fuggazza, 2012). Despite the advantages associated with risk-based assessment methods, this method is clouded by the partial knowledge of health, environmental and other risks associated with trade and their economic significance (Bheghin, 2006).

Breakers, Mourits, Werf, & Lansink (2007) applied a risk-based approach using a bio-economic model to quantify the costs and benefits of controlling plant quarantine diseases, specifically brown rot of potato, in the Dutch potato production chain. The results revealed that the average annual cost of the control policy was €7,7 million. It also revealed that, due to the

potential long-term effects of a strategy, conclusions on the cost-effectiveness of the strategy depended on the length of the period over which the strategy was observed. This approach won't be suitable for this study, given the fact that it requires detailed information to assist in analysing cost-benefits associated with the presence of NTMs.

3.3.5   Sectoral or multi-market approach

Sectoral or multi-market approaches are determined by employing partial and general equilibrium models. Both these models rely on economic representations of supply and demand. Both equilibrium models are often used to assess the effects of the policy on equilibrium, such as changes in price, quantity and welfare (Beghin & Bureau, 2001). The main advantage of partial equilibrium models is that they provide more quantitative results at industry and country level.

A general equilibrium model (GEM) is most applicable to answer questions that need a high level of aggregation. One distinct advantage of GEMs is that they are more precise because they can capture a wide range of economic linkages across sectors (Rich, Miller & Winter, 2005). Furthermore, a GEM is more sophisticated and less restrictive in terms of the range of assumptions incorporated, but they do have some shortcomings relative to partial equilibrium models. GEMs also require a huge amount of data and processing power, meaning that data is often aggregated across product and country groups. The huge data demands also mean that the data availability often lags several years. For a case of partial equilibrium, the data set is smaller which allows for greater disaggregation of data by country and product (Spence, 2013).

Both models can offer a perspective through estimating the introduction of CBS regulations for the South African citrus industry. It should be noted that both models estimate the effects of policy changes at both country and industry level, although GEM looks across sectors. This study will use a Single Market Partial Equilibrium Simulation Tool (SMART) offered as part of the World Integrated Trade Solution (WITS) platform of the World Bank. The partial equilibrium model provides the impact on trade, revenue and welfare effects through the adoption of the tariff equivalence as a result of the new regulations.

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There are various studies that have used the partial equilibrium model to measure the effect of the policy change. This includes a study conducted by Calvin & Krissof (1998), which used a combination of a price wedge method with a partial equilibrium model to determine the impact of the phytosanitary barriers to US apple exports to Japan by calculating the tariff-rate equivalents. The authors studied the trade and welfare effects of removing phytosanitary barriers and tariffs under two assumptions regarding the transmission of the bacterial disease 'fire blight'. The authors established that the disease losses required to eliminate the gains to trade were estimated to be much larger than those experienced in other countries.

The study conducted by Spence (2013) also argued that a SMART partial equilibrium model allows for greater disaggregation of the trade effects described above to identify the exporting economies benefiting most from the trade creation and diversion. However, most of the studies that used a SMART partial equilibrium model were to assess the impact of trade liberalisation. For example, Karingi, Lang, Oulmane, Perez, Jallab and Hammouda (2005), used a SMART partial equilibrium model to measure the impact of economic partnership between the Economic Community of West African States and the EU. The model is designed in such a way that it can adopt the implications of exchange rates and other policy changes, such as NTMs on international trade.

Therefore, a SMART partial equilibrium model will analyse the welfare effects, revenue effects, trade volumes for this study. Furthermore, a research study done by Calvin and Krissoff (1998) on US apple exports to Japan is used as reference for the application of the chosen model. The SMART partial equilibrium approach was considered because of its strength to analyse policy shocks at industry level. The effect of the policy changes is shown through changes in price, quantity and welfare. Lastly, a partial equilibrium model also incorporates the estimation of NTMs in the same way as tariffs and focusses on a single sector and wide effects of the rest of the economy for this study.

3.4   TECHNIQUES IN DETERMINING STRATEGIC MARKETS

International trade literature has highlighted two broad approaches for market selection methods, namely a qualitative and a quantitative approach. The qualitative approach looks at the rigorous and systematic gathering and analysis of literature on one or a handful of potential

country markets whereas the quantitative approach looks at analysing large amounts of secondary statistical data about many or all foreign markets. The most widely used approach is the quantitative approach, due to statistical provision to validate market selection. This approach comprises various methods which include Green and Allaway's shift-share model, Russow and Okoroafo's global screening model, the ITC's multiple criteria methods, and decision support model. The subsections below will further demonstrate the limitations and advantages of these methods in selecting the alternative markets.

3.4.1   Green and Allaway's shift-share model

The shift-share analysis is the approach used to select markets for export opportunities in the global market. This approach identifies growth discrepancies based on the changes that have occurred in market shares over time. In most cases, the trend analysis can be expressed in growth in terms of absolute or percentage changes in the variable of interest (Green & Allaway, 1985). This approach requires three clear specifications over the time period of growth comparisons, the countries included in the analysis and variables that will be used for measuring growth (Ahmad & Mak, Not Dated). The calculation used in the shift-share is intended to measure the percentage net shift which is relative to the positive growth of market share over the period of analysis or loss for the market share. The net shift is therefore the difference between a market's actual performance and the performance growth rate that is equal to the average growth of the entire group of markets included in the analysis (Green & Allaway, 1985). However, the weakness of this approach is that it mainly focusses on import measures, uses historical data to predict the future and identifies the relative opportunities only. Herschede (1991) conducted a study that used a shift-share approach to assess the Japanese competition among ASEAN, China and East Asian newly industrialised countries (NICs). The results of the study presented that ASEAN exports have suffered the most from the recent entrance of China into the Japanese market. This approach was not selected for this study to identify the export opportunities for citrus, due to the fact that the approach is limited to import shares, nothing beyond.

3.4.2   The ITC's multiple criteria method

This model was developed by the ITC to assist developing countries in unlocking export opportunities. This model is mainly based on both quantitative and qualitative analysis. The

qualitative aspect is based on the relevant literature review and information collected through a survey based on an ITC questionnaire and interviews with enterprises and business associations whereas the quantitative aspect focuses on calculating the indices on trade statistics and market access on information from Trade Map and Market Access Map (ITC, 2005). To facilitate the decision for export potential and lucrative markets, the ITC's model is based on the three indexes which are the trade competitiveness index, the export potential index and market attractiveness index.

First, the trade competitiveness index looks at a country's performance in terms of production factors (capital, land, labour and infrastructure) and the business environment, legal framework and market efficiency. Second, the export potential index looks at indicators like export performance, world demand, domestic supply conditions and socioeconomic factors. Third, the market attractiveness index looks at market demand through indicators like market size, market dynamisms (growth differential), expected GDP growth and market access conditions (Steenkamp, Rossouw, Viviers and Cuyvers, 2009). According to the ITC (2014), an initial assessment of markets is used, but assessing the fit-for-export product requires a more detailed evaluation. Furthermore, a composite indicator is formed when individual indicators are compiled into a single index, on the basis of an underlying model of the multi-dimensional concept that is being measured (OECD Glossary of Statistics, 2014).

Through identifying the sectors with the highest trade competitiveness index and export potential, attractive markets can be identified by calculating the market attractiveness index for all possible importing countries (ITC, 2014). This index was used for this study in identifying alternative/attractive markets for South African citrus exports into the world. Furthermore, this index is a tool aimed at supporting the selection of the most attractive markets from an export perspective. The index was a focus due to the fact that the South African citrus industry has been presented as one of the sectors in agriculture with the highest potential of exporting to the world, given the fact that quality and quantity meet world demands. The market attractiveness index was used to identify lucrative markets due to the fact that the EU's stricter CBS phytosanitary regulation may result in market closure for South African citrus.

Various studies used this approach to determine the lucrative market into the world. This includes Freudenberg (2006) and ITC (2005) through assessing the export potential for

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Thailand and Vietnam. The study conducted by Kapuya and Sihlobo (2014) employed this approach by looking at a strategic market for South African maize. Lastly, the Bureau for Food and Agricultural Policy (BFAP) used this approach in order to determine possible high export potential markets for citrus exports (BFAP, 2014), which is something this study will expand upon.

3.4.3   Russow and Okoroafo's global screening model

The global screening model is a process for identifying potential markets for export opportunities. The screening model has identified three criteria that include market size and growth, factors of production and economic development. The variables used to measure market size and growth include domestic production, imports, exports, shift-share of domestic production, shift-share of imports and shift-share of exports for the product of interest. Second, the cost and availability of factors of production were captured by gross fixed capital formation, money supply, total international reserves, total population, unemployment rate, average hourly wages in manufacturing, country/area and population density.

The level of economic development was measured by gross domestic product, gross domestic product per capita, agriculture as a percentage of GDP, the contribution of manufacturing industries as a percentage of GDP, construction as a percentage of GDP, wholesale and retail trade as a percentage of GDP and transportation and communication as a percentage of GDP (Russow and Okoroafo, 1996). Russow (1989) used the global screening model to identify an existing product-specific market potential using macroeconomic and demographic factors. The findings indicated it was consistent and accurate in 90 % of cases across the product. Furthermore, he discovered that it is useful to use market size, population and economic development to identify the potential markets. The method was not considered for use in this study due to fact that economic development statistics will be problematic.

3.4.4   Decision support model

The decision support model (DSM) is a framework that was developed by Cuyvers in identifying countries and products where opportunities for successful exporting exist (Cuyvers, 1995). This approach assumes that all world markets are potentials for the exporting countries

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to penetrate through a screening procedure. Cuyvers based the analytical framework of the model on the proposed model of Walvoord (1983) for international research. The information of the markets is fed through four screening filters that can identify export opportunities and delete some from the list:

The first filter looks at political and commercial risk, as well as general economic indicators to assess the lack of potential. This is a starting point which eliminates 240 countries in the world.

The second filter, more specific when it comes to the different product groups in the remaining countries, is applied to identify market potential for the product-country combination. This filter eliminates countries that do not show demand potential.

The third filter focusses on examining trade restrictions and trade barriers for possible export opportunities. This filter gives an opportunity to eliminate countries that create trade distortion in the market.

Lastly, Filter 4 identifies realistic export opportunities which came out of the previous filter, according to parameters which are relevant to assess the strengths and weaknesses of the exporting country in the respective foreign markets. Grater, Steenkamp, Viviers & Cuyvers (2014), used a DSM to investigate the realistic export opportunities for service and product sectors in the international market.

The study further highlighted that export promotion agencies in South Africa could use the results of both models to develop strategic plans aimed at boosting product and service exports for lucrative markets. Cuyvers (2004) also used this model to identify export opportunities for Thailand.

The author discovers, by using all the four filters, that the country needs to upgrade its export products and devote much more attention to non-price competition factors such as quality, delivery, after-sales service and branding to penetrate the actual world market. The method was not considered for this study, due to the fact that it is similar to this study when selecting the export opportunities for the selected model.

3.5   SUMMARY

This chapter summarised various methods that have been used to estimate the economic implications of NTMs and alternative markets. First, the prospective importance of these methods demonstrated how to quantify the impact of NTMs on trade. The studies reviewed were diverse in methods, coverage and scope of analysis. It is also noted that all these methods for the estimation of economic implications have intrinsic restrictions and, as such, usually lead to a mix of approaches being used. Even though numerous quantitative studies on impacts of NTMs have been conducted in several international regions, very few of these studies were conducted in South Africa's fruit industry. Furthermore, these methods are mostly used to determine the impact of multi-sectors. Therefore, the method used for this study is a partial equilibrium approach because it measures the welfare effects of NTMs for a single sector. The partial equilibrium model also provides an estimate of the trade, revenue and welfare effects through adopting the tariff equivalence of the new regulations through equating supply and to obtain the new price.

Second, with the potential importance of the methods presented, the ITC's market attractiveness index and a multiple criteria method were selected to highlight realistic export opportunities for citrus in the world. This method was chosen based on the fact that South Africa's citrus industry has shown its competitiveness and potential to participate in the international market. Furthermore, data, like market size, growth, GDP and tariff advantage, is already available for the use of the composite indicators in determining an attractive market.

CHAPTER FOUR
METHODOLOGY

4.1   INTRODUCTION

The SMART partial equilibrium model was selected to answer the question of implications of CBS on South Africa's citrus export to the EU. This model is a computer-based program known as the World Integrated Trade Solution (WITS). Lastly, the ITC multiple criteria model was used to identify the alternative markets, as discussed in Chapter 1. This chapter commences by describing the conceptual basis of the model, data variables and data sources, as well as the empirical analysis applied. Three scenarios are applied to evaluate the potential impact of CBS on South African citrus exports, namely (i) South African exporters comply fully with EU phytosanitary requirements; (ii) only citrus from CBS-free producing areas is allowed in the EU market (partial ban); and (iii) a total ban on all citrus from South Africa due to failure to comply.

The first scenario is preferred for this study, based on the fact that the country has trade agreements (known as TDCAs) and has signed an Economic Partnership Agreement (EPA) with the EU in September 2016 as preferential market access for Botswana, Lesotho, Mozambique, Namibia, South Africa and Swaziland. These agreements allow duty-free entry to the EU and have been reported to increase South African trade over the years. Therefore, if South Africa doesn't utilise this opportunity, it will have negative implications on South Africa's citrus export earnings. This market has been South Africa's traditional market for decades. Therefore, it is important to utilise the agreements in place for benefits of economic welfare in the long run and to avoid the cost of seeking new markets.

The second scenario will be applied by South Africa temporarily, should the DAFF resume the dispute lodged through the IPPC. The dispute was lodged due to the fact that the EU did not provide sufficient scientific justification for the regulation. This will have an implication for the South African citrus industry in way that have to seek an alternative market in the short term, and the costs involved in looking for new markets as well as benefits to CBS-free producers.

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The third scenario will be unlikely, given valid agreements between the EU and South Africa. Should this scenario realise, it can create lengthy and prolonged legal and political battles between South Africa and the EU, in which case South Africa will also have to look for a new market that can absorb the 37% that is currently destined for and exported to the EU market. South Africa can flood the market with citrus, which will force producers to drop prices to clear the over-supply in the market. Therefore, each scenario has different implications on citrus exports and the section below will define a theoretical framework NTMs have on trade.

4.2   THEORETICAL FRAMEWORK OF ESTIMATING NTMs

As indicated in the previous section, the SMART partial equilibrium model was used. This model is conceptually based on the partial equilibrium theory. The SMART partial equilibrium model was developed by the UNCTAD to measure the impact of trade liberalisation. The presentation of the model outlined below draws broadly from work done by Laird & Yeats, 1986. The model is designed in a way that is able to adopt the changes in policy, i.e. an increase in tariff and the effect of NTMs on international trade.

4.2.1   Diagrammatic illustration of the model

In order to inform the discussion on the extent to which NTMs affect trade, this study estimates the level of trade foregone due to phytosanitary measures instituted by the EU. The EU is the world's largest importer of citrus fruit (44.1 %). According to literature, the EU has an influence on the world market in terms of trade due to its huge demand for imports from the world (Krugman & Obsfeld, 2003). The method identifies that phytosanitary measures can adjust relative prices between the world and domestic markets, thus adding a trade cost between potential traders. The SMART partial equilibrium framework will be used to determine the implication of policy shocks through analysing the impact of world price changes. The SMART equilibrium framework depends on the assumption of Armington that applies in this case, which assumes that *export elasticities are infinite*, that is, *export supplies are perfectly elastic*, which implies that world prices of each variety of products are given; full transmission of price changes when tariff and non-tariff distortions (ad valorem equivalents) are reduced or eliminated. This study assumes that price elastic is with upward-sloping export supply functions which entail the quantity effect as presented in figure 6. Although the model is not

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consistent with the price due that the study will look on the trade total effects as the results introduction of CBS phytosanitary requirements on South Africa's exports.
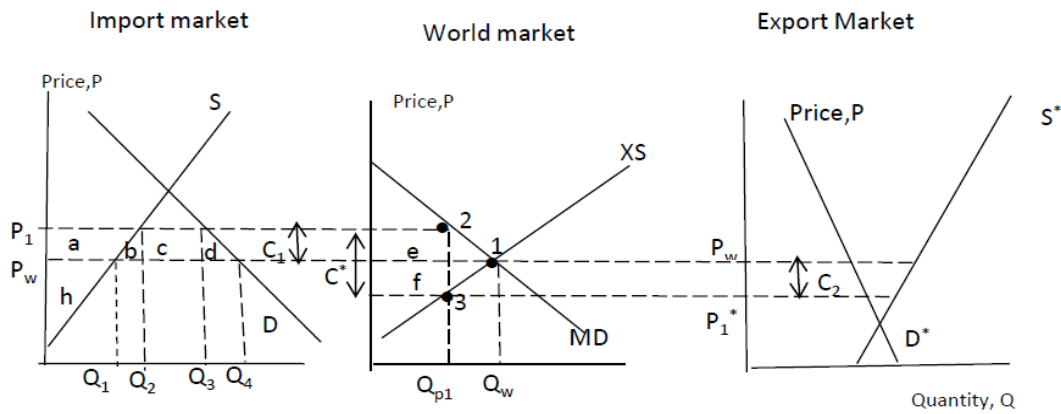
Figure 6: Partial equilibrium of the effects of CBS on the global economy, SA and EU
[Source: Adapted from Krugman and Obestfeld, 2003]

Without the non-tariff barrier, foreign producers are able to supply their exports at "Q_w" in the world market, given the world price denoted by "P_w". The world price includes standard tariffs imposed on the imported goods and cost, insurance and freight (CIF) of the imported goods. At the given world price, the importing country's total consumption is at "Q_4" and production is at Q_1 and imports will be the difference between "Q_4" and "Q_1", which is denoted by $Q_w = Q_4 - Q_1$. The importing country's change consumer surplus is shown on the left-hand panel through area "a + b + c + d" and change producers' surplus is shown through the area "a". In the case of the NTMs, CBS phytosanitary requirements act as a technical barrier, similar to the tariff. Therefore, the technical barrier adds an extra cost of delivering fresh citrus to the EU market. As the result of the technical barrier, the government will gain by area "c" due to the extra cost paid by South Africa when exporting to the EU. The technical barrier will reflect by price increase from P_w to P_1 in the left-hand panel.

The change of policy that is shown through the relative price from P_w to P_1 is the price increase as the result of the incidence of the non-tariff barrier. The SMART equilibrium framework

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presents that policy shock will have effects on trade flows, which are shown through trade creation and diversion effects. The incidence of the non-tariff barrier results in price changes on the quality of products imported; from P_w to P_1. Therefore, importers will replace their current suppliers with suppliers that sell at a lower price. In this case, the import demand of South Africa will decrease from Q_4 -Q_1 to Q_3 -Q_2, showing the implication of the incidence of the non-tariff barrier.

The consumers will face a new equilibrium at P_1 and will not be able to buy at Q_w due to the price increase of the imported product. Therefore, consumers will be worse off through losing area "– (a + b + c + d)" resulting from a price increase that is inclusive of compliance costs of foreign producers. A ban on imports will motivate producers to increase their supply to bridge the local consumption through the expansion of the local production that is denoted by area "a".

Since $C^* = P_w - P_1^*$, the importing country will increase its benefits by the sum of the areas "e" and "f" in the middle panel. Adding the three effects (producer surplus, consumer surplus and government benefits) together, shows that the net economic effect of importers is "f – b – d". The areas "b" and "d" represent deadweight losses caused by less efficient production and consumption. The remaining excess supply of foreign exporters would be considered for alternative markets.

In the context of the South African citrus industry, the CBS phytosanitary requirement necessitates full compliance which increases the cost of production. This study however used a mechanism of supply and demand to determine the impact of the phytosanitary regulation on the global market. The supply-demand mechanism does not reflect properties of phytosanitary requirements; however, it illustrates the implication associated with compliance with phytosanitary requirements. The graphical representation is an alternative way of capturing the effects of phytosanitary requirements through supply and demand responses.

4.2.2 Estimation of tariff equivalence for CBS

The Citrus Growers' Association and DAFF have been working together through the establishment of the risk management system for CBS in South Africa. The involvement of

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both CGA and DAFF is to ensure that CGA is free from CBS by complying with the EU requirements. Compliance with the international phytosanitary measures requires that exporters or foreign suppliers must ensure that they comply with given measures (Shafaeddin, 2007). The compliance of CBS in South Africa is done throughout the value chain. This indicates the compliance cost of CBS in the country; which is accrued at each and every point, starting at the Production Unit (PU) right through to the port. The growers in CBS-affected areas are under the spraying programme, which comes with additional costs for producers. The growers were requested to follow the spraying programme after the inception of EU CBS phytosanitary requirements. The spraying is a chemical control programme that is applied by growers to manage the spread of diseases and pests. The programme is recommended as a standard procedure to ensure that citrus fruit is free from CBS. The use of the spraying programme varies with citrus crop variety and region. The spraying is recommended after spring rainfall in October, the first 28 days and during the susceptibility period (between the end of December and February) (CRI, 2014).

The DAFF has the responsibility to inspect each and every PU in the citrus growers' affected region to confirm the absence of CBS. Furthermore, the inspection is done at every point of the value chain (PU, pack house, at the point, before it boards the vessel) with the assistance from PPCEB. These compliance initiatives have increased the money spent on risk management for market access by industry. The increased money is due to costs of spraying that are attributed to the intensive use of the spraying programme among producers (DAFF, 2015) and money spent for inspection along the value chain. Therefore, actual cost involved in compliance with CBS eradication involves orchard spraying and inspection throughout the citrus value chain and is augmented as the tariff equivalent of the non-tariff barrier. Calvin & Krissoff (1998) indicated that it is difficult to estimate the actual cost of compliance due to the regulation because it involves specific inspection in growing regions as well as quarantine treatments of a product to be ready for the export market.

In most cases of estimating the tariff-equivalent of NTMs, the price comparison between the domestic price of the importing country and the price of the imported product is used (Calvin & Krissof, 1998). For this study, the difference of cost compliance between 2013 and 2014 is used to estimate the tariff equivalent. The tariff equivalent technical barrier is assumed to be the tariff rate that would restrict trade at the same level as the tariff (Calvin & Krissof, 1998).

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To determine CBS compliance cost, risk management data was used to calculate the change in risk management between 2013 and 2014 that was sourced from CGA. The information presented a CGA-abridged financial report on the money spent in mitigating CBS (see Appendix A). This indicates a change in risk management cost results due to the increased use of orchard spraying and inspection for citrus fruit.

Avarage change Risk management

$$= \frac{Base\ year\ value_{2014} - Previous\ year\ value\ _{2013}}{Previous\ year\ value\ _{2012}} \times 100$$

$$= \frac{5\ 617\ 653 - 1\ 146\ 075}{1\ 146\ 075} X\ 100 = 390\ \%$$

It has been noted that the overall cost of complying with CBS measures in citrus production in the country has increased by 390%, from R1,1 million in 2013 to R5,6 million in 2014 (see the above equation and Appendix A). The compliance cost showed a significant increase that was attributed to the intensive use of spraying programmes to minimise the reoccurrence of CBS and ad-hoc inspection programme that was put in place throughout the value chain. The spraying programme is expensive at the start of the season (October) and farmers are required to spray trees in December and February. This minimises the chance of the CBS after the fruit is harvested. The change of the cost of compliance will be adopted as NTMs equivalence in the SMART partial equilibrium model, in assuming that CBS phytosanitary requirements add an extra trade cost to exporters. Through shocking the SMART equilibrium model by cost of compliance, the effects of CBS can be estimated.

4.2.3 Mathematical exposition of the model

The theoretical consideration of the partial equilibrium has fully elaborated on the development of the partial equilibrium model based on Laird and Yeats (1986) methodology, data and uses. Thus, the model has the advantage of estimating the welfare impact of the introduction of NTMs. The global free market partial equilibrium model is expressed as follows:

$M_{ijk} = X_{ijk}$ .... (1)

where the import function is expressed as:

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$M_{ijk} = F (Yi_j, Pi_j, Pi_k)$ .... (2)

and the export function is expressed as:

$X_{ijk} = F (P_{ijk})$ .... (3)

where:

- o M represents the value of imports,
- o X represents the value of exports,
- o P represents the price,
- o Y represents national income,
- o *i* represents commodity,
- o *j* represents importing country, and finally,
- o *k* is the exporting country.

In a free trade, global equilibrium, global price is equal to the price of the exporting country (k) and the price of the importing country (j). A change in price might result in disequilibrium, i.e. the introduction of tariff (T_{ijk}) or non-tariff measures ($NTMs_{ijk}$). The price will change by the amount equivalent to the ad valorem of any NTMs applied to the goods. The equilibrium world price equation is expressed as follows:

$$P_{ijk} = P_{ikj}(1 + T_{ijk})$$ .... (4)

Equation 4 will be used to adapt NTMs to show a price change that results from CBS as an equivalent to the ad valorem of any NTMs. Hence, disequilibrium will be the result of the increased cost of compliance with CBS as shown in equation 5:

$$P_{ijk} = P_{ikj}(1 + NTMs_{ijk})$$ .... (5)

The exporters generate their income through the world price represented by equation 4 or 5, given with the importers' market conditions. Therefore, export revenues (R_{ijk}) for the exporting country (k) from all the export suppliers are expressed as follows:

$R_{ikj} = X_{ikj}. P_{ikj}$ .... (6)

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The price decrease associated with assumed full transmission of price changes when tariff or non-tariff barriers are reduced or eliminated, which increase the import demand of commodities i from country k to country j. This is also known as trade creation; therefore, equations one to five are assisting in writing the trade creation effect. A total differential is derived from equation 5, domestic price with respect to non-tariff barrier and foreign price:

$$\partial P_{ijk} = P_{ijk}.\partial NTMs_{ijk} + (1 + NTMs_{ijk})\partial P_{ikj} \dots\dots\dots\dots (7)$$

In simple terms, equation 7 indicates the price elasticity of import demand (ε_m) with respect to domestic price. In this study, the price elasticity of import demand means the change in the supply of imports from country k will have effects on the price of an imported commodity i. By rearranging equation 7, the simple elasticity of demand for imports is expressed as follows:

$$\frac{\partial M_{ijk}}{M_{ijk}} = \varepsilon_m \left(\frac{\partial P_{ijk}}{P_{ijk}}\right)\dots\dots\dots\dots (8)$$

In order to obtain elasticity of export supply ε_X, equations 5 and 7 are substituted in equation (8):

$$\frac{\partial M_{ijk}}{M_{ijk}} = \varepsilon_m \frac{\partial NTMs_{ijk}}{(1+tNTMs_{ijk})} + \frac{\partial P_{ijk}}{P_{ijk}}\dots\dots\dots\dots (9)$$

Similarly, equation 9 can be written as elasticity of export supply with respect to export price, as follows:

$$\frac{\partial P_{ikj}}{P_{ikj}} = \frac{\partial X_{ikj}}{X_{ikj}} \Big/ \varepsilon_X \dots\dots\dots\dots (10)$$

In the free trade, equilibrium is assumed that supply of commodity "i" from country k is equal to the import demand of country j. Therefore, it is assumed that the price elasticity export supply of country k is equal to price elasticity demand of imports of country j. Therefore, the expression of equation 3 can be expressed as follows;

$$\frac{\partial M_{ijk}}{M_{ijk}} = \frac{\partial X_{ikj}}{X_{ikj}} \dots\dots\dots\dots (11)$$

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Substituting equation 11 into 10 and the results into 8 produces the expression that can be used to compute trade creation. The expression of trade creation effects can be written as follows:

$$TC = P_{ijk}.\,\varepsilon_m.\,M_{ijk}.\frac{\partial P_{ijk}}{P_{ijk}} \dotfill (12)$$

Trade diversion (TD) occurs when importers substitute the same goods with goods from other exporting countries owing to increased prices from their main exporters (Jammes & Olarreaga, 2005). This study assumes that the elasticity of substitution between alternative suppliers is not known; therefore, this study used a formula developed by Baldwin and Murray (1986) to compute trade diversion. The expression of trade diversion can be written as follows:

$$TD_{ijk} = TC_{ijk}.\left(Mn_{ij}\big/V_{ij}\right) \dotfill (13)$$

Total trade effect is obtained through summing trade creation and trade diversion, as well as summing all the imported products and group their supply sources. However, if the elasticity of supply is infinite, there is no price effect. Otherwise, the price effect can be obtained by substituting equation 11 into 10 as follows:

$$\frac{\partial P_{ikj}}{P_{ikj}} = \left(dt_{ijk}/\left(1 + t_{ijk}\right)\right).\left(Em/(Em - Ex)\right) \dotfill (14)$$

Estimating the revenue effect equation is used for the exporting country. Consequently, an increase in revenue means an increase in exports. The effect of revenue change is obtained through the total differential of equation 6 with respect to export price and volume of exports:

$$dR_{ikj} = P_{ikj}.\,d_{ikj} + X_{ikj}.\,dP_{ikj} \dotfill (15)$$

Equation 15 represents the change in citrus export revenue as a result of the introduction of CBS phytosanitary measures. In most cases, the welfare effect arises from benefits of consumer effect in the importing country as a result of elimination or reduction of tariff or an incidence

of non-tariff barrier. Thus, the welfare effect is estimated by the increase of imports multiplied by the elimination of tariff or incidence of non-tariff barrier. Therefore, the welfare effect is expressed as follows

$$W_{ijk} = 0{,}5\big(dt_{ijk}.dM_{ijk}\big)\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (16)$$

Given the mathematic model that will be used for this study to determine the implication of CBS on South Africa's citrus exports to the EU, 195 % (the results a change in policy brings) will be used to shock equation 5 to determine changes in terms of trade volumes into the EU market, as well exports earnings. In case of the closure of the EU market in failing to adhere to EU regulations, South Africa will have to consider the alternative market. The method to search for the new market is explained in the following section.

4.3   MARKET ATTRACTIVENESS INDEX

In identifying the most attractive market for citrus exports in the world, an International Trade Centre (ITC) market attractiveness index (MAI) is used. The MAI is a tool aimed at supporting the selection of the most attractive markets from the export perspective. According to ITC (2014), an initial assessment of markets is required, but assessing the fit-for-export product requires a more detailed evaluation. Furthermore, a composite indicator is formed when individual indicators are compiled into a single index, on the basis of an underlying model of the multidimensional concept that is being measured (OECD Glossary of Statistics, 2014).
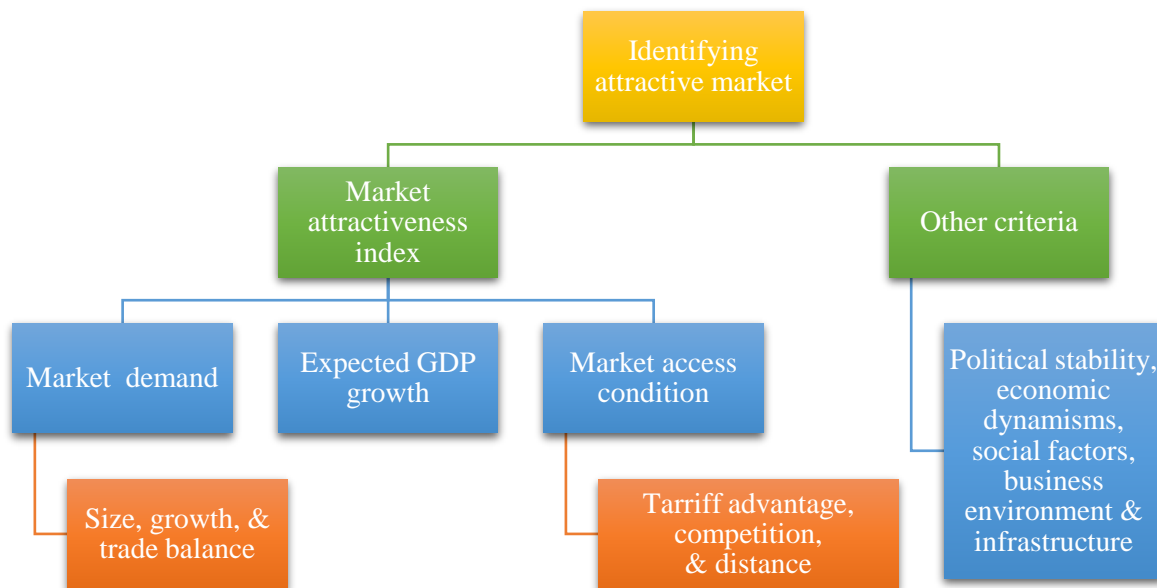
Figure 7: Deciding market approach in selecting attractive market

In selecting the alternative market for export products, demand and market conditions are considered in this model, given the distance between two countries and their economic masses. Figure 7 above depicts all the trade indicators used to construct the ITC attractiveness model and to generate the final rankings of the attractive market. These indicators are all weighted and standardised to ensure comparability and are then combined to get the composite score (ITC, 2014). Each trade indicator, as presented in figure 4.2, is assigned a score on a scale of one to five. For the detailing of the scoring for each indicator, see Appendix B.

4.4   DATA

The study employs secondary data on production, imports and exports for both the European and South African market. The model contains the trade data of countries that have trade agreements, which include OECD countries, European countries, SADC countries and American countries, Asia and the rest of the world. This model will be shocked by NTMs which is the change complying with CBS phytosanitary requirements that are set by the European market.

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4.5   SUMMARY

The objective of the study is to determine the impact of CBS compliance on South African citrus exports to the EU. The study assumes that South Africa complies with EU phytosanitary requirements. The scenarios considered assume that South Africa will be subjected to two forms of import ban (total and partial bans). The study uses the SMART partial equilibrium model in combination with the ITC attractiveness model to assess the impact of CBS on South African exports.

The chapter discussed the theoretical framework of the SMART partial equilibrium model. It also justified the choice of the model applied. In addition, the mathematical model was described. Subsequently, the mathematical model adopted the cost of compliance of CBS as an NTMs tariff equivalent. Lastly, the study applied the ITC attractiveness model to identify potential export markets for South African citrus exports.

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CHAPTER FIVE
THE IMPACT ON SOUTH AFRICAN EXPORTS AND WELFARE EFFECTS

5.1   INTRODUCTION

This chapter is to present the results based on the three objectives which are: (i) to evaluate implications of complying with CBS phytosanitary requirements on South African citrus export revenue; (ii) to evaluate the effects of CBS phytosanitary requirements on trade volumes for citrus fruit imports; and (iii) to determine the economic welfare of the industry. A SMART partial equilibrium model was used to answer the objectives. The cost of compliance (also referred to as an NTM equivalent) that was determined as a change in risk management for market access in the EU was 390%. This NTM equivalent was used to shock the model to determine the impact of export revenue, trade volumes and the economic welfare effect on all the citrus products at HS 6-digit level. This section starts by presenting the results of the scenario of complying with CBS phytosanitary requirements. Thereafter, the results of a partial and total ban on South African citrus exports onto the EU market are presented.

5.2   IMPACT OF COMPLYING WITH CBS REQUIREMENTS ON SOUTH AFRICAN TOTAL CITRUS EXPORTS

This section presents the results of the first scenario, which answers three objectives, namely the effect on South African citrus export earnings; volumes; and the economic welfare effect. Therefore, Table 5.1 shows impacts of CBS on South African citrus export revenue to the EU market associated with the cost of compliance with CBS requirements in the country. The results show that South Africa's citrus exports to the EU market have decreased by 14 %. This is a clear indication that CBS phytosanitary requirements have a negative effect on South African citrus export revenue. Soft citrus , dry citrus and lemons have experienced the most significant losses of all, namely 30.8%, 26,6 % and 22.9 % respectively. Grapefruit and oranges have showed less of a decrease, namely 10,6 % and 14,6 % respectively. It has been noted that in terms of value, the EU sources large volumes of oranges, followed by grapefruit and soft citrus from South Africa. This is the main reason why South Africa's exports of dry citrus and lemons felt significant export losses in terms of the demand by the EU (see Table 5).

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Table 5: The effects of CBS requirements on SA's citrus exports to the EU market

Product variety	Value in $' 000 in 2014		% change in exports
	Exports before CBS requirements	Exports after CBS requirements	
Grapefruit	102 458	97 705	-4,6
Oranges	380 691	339 346	-10,9
Soft citrus	33 687	25 973	-22,9
Dry citrus	329	241	-26,6
Lemons	110 904	76 794	-30,8
Total citrus	**628069**	**540059**	**-14,0**

[Source: WITS model and author's own calculations]

Table 6 below indicates the change in export of the main suppliers of exports to the EU market. The main aim of this table is to indicate whether major suppliers of citrus to the EU are affected by CBS or not. As presented in Chapter 2, South Africa's major competitors in the EU include China, Brazil, Argentina and the United States. These markets have a comparative advantage, given the distance to the EU. All markets reviewed, that are also regarded as competitors of South Africa, have shown an increase in exports to the EU market. Peru e topped the list in terms of the export growth to this market, namely 6%, followed by Morocco and Zimbabwe with 5.6 % and 4,5 % respectively. The largest competitors, which include Brazil, the USA and Argentina, have also shown increases in terms of export growth in this market, but not as much Zimbabwe, Peru and Morocco. This is an indication that the decline in South Africa's exports to the EU market is taken up by its competitors. This represents a trade diversion effect in that the EU diverts to alternative exporters to source their imports. However, a decline in South Africa's citrus exports is attributed to its high dependency on the EU market, given the fact that it exports more than one-third of citrus crops to the EU.

Table 6:The effects of CBS requirements on main suppliers of EU imports

| Main suppliers | Value in $' 000 in 2014 | | % change in exports |
	Exports before CBS requirements	Exports after CBS requirements	
South Africa	628 069	540 059	-14,0%
Mexico	86 060	86 883	1,0%
China	78 600	79 494	1,1%
Brazil	101883	103 317	1,4%
Argentina	297 015	302 587	1,9%
United States	48 974	49 902	1,9%
Chile	12 936	13 222	2,2%
Turkey	180 289	184 424	2,3%
Zimbabwe	29 096	30 403	4,5%
Morocco	129 635	137 091	5,8%
Peru	64 562	68 441	6,0%

[Source: WITS model and author's own calculations]

As indicated in Chapter 2, South Africa is ranked as a large supplier of citrus exports into the EU market. Therefore, Table 7 below indicates the effects of CBS requirements on EU citrus imports from the rest of the world. However, the EU demand for imports from the world has decreased by $44 million – from $2,03 billion to $1,9 billion – post enforcement for compliance with CBS requirements. Although CBS phytosanitary regulations were introduced to protect the EU against the spread of CBS in the EU, they have also affected EU in terms of an import supply from South Africa. Theoretically, a decline in import demand will benefit the EU producers through the price increase, supply of producers as well quantity supplied into the local market. Furthermore, the increased cost compliance will be exclusive to the EU's consumers of citrus imports through price. Due to the higher price, consumers would be unwilling to purchase at increased prices, hence, the demand for citrus imports showed a decrease to the tune of $1,5 million in 2014.

Table 7 : The effects of CBS requirements on the EU's demand of citrus from the world

| Product variety | Value in $' 000 | | % change in imports |
	Imports before CBS requirements	Imports after CBS requirements	
Citrus dry	6 593	6 564	0%
Lemons and limes	550 462	547 410	-0,6%
Grapefruit	331 558	329 344	-0,7%
Soft citrus	727 979	703 397	-3,4%
Oranges	417 480	402 659	-3,5%
Total citrus	2 034 072	1 989 374	-2,2%

[Source: WITS model and author's own calculations]

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Table 8 addresses the objective of how the implication of CBS requirements affected trade volumes. In determining the trade volumes, trade creation and trade diversion effects were viewed in this section. Therefore, trade creation is traditionally viewed as a positive development for the consumer as it represents the additional supply that consumers can afford, although the increase in consumption can still leave local producers worse off. In this study, trade creation is a negative effect with a value of $38 million. This means consumers did not benefit from the introduction of CBS requirements on South African exporters into the EU. Table 8 shows the trade creation of the importing of citrus fruit into the EU market did not occur. The trade diversion is viewed as a negative effect on trade in that trade is diverted to more efficient exporters to the loss of less efficient exporters, given the results of CBS requirements. On the other hand, trade diversion did not occur for South African citrus exports with the net effect of $43 million after an introduction of the CBS requirements. The ponegative sign of trade diversion effects for all net citrus exports from South Africa with all the variety of citrus fruit, where trade diversions didn't occur.

Therefore, column 2 below represents the total effects of the summing of trade creation and diversion as an impact on trade volumes into the EU market. South Africa will consequently lose the trade volume for all citrus products, with a total net effect of $88 million. As presented in Table 5.4, oranges will demand a large share (47 %) in terms of trade volume that will be lost in market share into the EU market. Soft citrus was second-largest with a share of 38,8 %, followed by grapefruit and lemon with a share of 8,8 % and 5.4 % respectively. This is an indication that an introduction of the regulation (CBS requirements) has an implication on South Africa's citrus import demand.

Table 8: Impact of CBS on trade diversion and trade creation

Product	Total effect in $' 000	% of total trade effects	Trade creation effect in $' 000	Trade diversion effect in $' 000
Oranges	-41 345	47,0%	-24 583	-16 763
Soft citrus	-34 110	38,8%	-14 821	-19 289
Lemons	-4 753	5,4%	-2 214	-2 539
Grapefruit	-7 714	8,8%	-3 052	-4 662
Citrus (dry)	-87	0,1%	-30	-58
Net effect of citrus	-88 010	100,0%	-44 699	-43 311

[*Source: WITS model and author's own calculations*]

Table 9 addresses the third objective of this study, namely evaluating the economic welfare impact. Economic welfare effects refer to the benefits of the consumers of the EU market. Therefore, the introduction of the CBS phytosanitary requirements will have a negative impact on those consumers. The results of the economic welfare effects are presented by a positive sign. Therefore, Table 5.5 below shows the welfare effects of the CBS EU phytosanitary requirements for EU importers. The EU importers lost a total of $1,5 million in citrus imports from South Africa as a result of increased prices. As a result of the decreased demand for South African citrus by the EU, other suppliers have an opportunity to increase their imports into this market as well the local producers of citrus (see table 5.2).

Table 9: Impact of CBS on economic welfare for European Union

Product	Welfare effects in $' 000
Oranges	-653
Mandarins	-675
Grapefruit	-29
Lemons	-206
Citrus (fresh)	-1,2
Total citrus	-1 564

[Source: WITS model Author's own calculations]

In summary, results indicate that South Africa has suffered a significant loss of $74 million in exports as the result of the CBS phytosanitary requirements. In the case of the EU market, the consumers suffered as a consequence of the new regulation, equal to a loss of 1,9 % in citrus import demand. This moved the EU to divert to other suppliers, including Brazil, Argentina, Zimbabwe and Peru. In a nutshell, the South African market had lost its market share in the EU market.

5.3 IMPACT OF PARTIAL BAN ON SOUTH AFRICAN CITRUS EXPORTS

This section covers the impact of the partial ban on South African exports in case the EU decides to source citrus from the non-affected regions in South Africa. This is to determine how much South Africa would have lost if the EU market only sourced from the CBS-free regions, such as the Northern and Western Cape. Carstens et al. (2012) reported that CBS had not been detected on citrus in areas that included the Western and Northern Cape. To avoid

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CBS interception at EU borders, South African exporters should source citrus fruit destined for the EU from the abovementioned provinces. In this scenario, about 17 % of exports are sourced from CBS-free regions in the country. In estimating the loss in citrus exports, the EU total exports are multiplied by the percentage share of exports from the CBS-free regions. Furthermore, South Africa's losses in exports are calculated by subtracting the total EU exports from EU exports from the CBS-free region.

Table 10: Potential loss of citrus exports

Variables	2008	2009	2010	2011	2012	2013	2014
World	**0,421**	**0,391**	**0,489**	**0,534**	**0,556**	**0,699**	**0,872**
EU 27 (R' billion)	0,203	0,165	0,195	0,203	0,218	0,278	0,323
Rest of the world (R' billion)	0,218	0,226	0,293	0,323	0,331	0,421	0,549
CBS affected areas (%)	83	84	83	83	82	83	83
CBS-free areas (%)	17	16	17	17	18	17	17
EU exports from CBS-free regions (R' billion)	0,038	0,026	0,033	0,035	0,040	0,048	0,054
Loss in SA exports (R' billion)	0,165	0,135	0,158	0,165	0,180	0,233	0,263

[*Source: ITC 2014 and author's own calculations*]

Table 10 above indicates some possible losses in South African citrus exports if the EU decides to source citrus from CBS-free regions. South Africa is estimated to have supplied about $540 million citrus exports from non-affected regions in 2014, equivalent to a 17 % share of the EU market. It's worth to note that the bottom row represents the loss of citrus exports and the rows above it indicate the derivation of the loss of citrus to the world. Therefore, South Africa would have lost export revenue to the tune of $263 million, equivalent to one-third of South Africa's citrus exports to the global market. This indicates that zone-specific exports have an implication for South Africa's citrus industry in terms of export earnings.

5.4   IMPACT OF TOTAL BAN ON SOUTH AFRICAN CITRUS EXPORTS

This section covers the impact of the total ban on South Africa exports in case the EU decides to stop citrus exports from South Africa as the result of CBS reoccurrence. The EU market has indicated that, if it detects more than the allowable maximum of five CBS interceptions in South African exports, it will completely ban citrus imports from South Africa. Although several scholars, such as Paul, Van Jaarsveld, Korsten and Hattingh (2005) have argued that it is not possible for CBS to spread into the EU market due to the cold EU temperatures, the EU

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market has however indicated it will ban South Africa's citrus if they detect a CBS interception that exceeds the allowable maximum. This is to ensure the prevention of the spread of CBS in the EU region.

Table 11: Export losses for non-compliance

	2008	2009	2010	2011	2012	2013	2014
The world (R' billion)	**0,421**	**0,391**	**0,489**	**0,534**	**0,549**	**0,699**	**0,872**
Exports to the EU (R' billion)	0,195	0,165	0,195	0,203	0,218	0,278	0,323
Rest of the world (R' billion)	0,218	0,241	0,293	0,323	0,331	0,421	0,549
Loss in South Africa's exports	**0,195**	**0,165**	**0,195**	**0,203**	**0,218**	**0,278**	**0,323**

[Source: ITC and author's own calculations]

Table 11 above indicates the loss of citrus exports as the result of a total ban. South Africa is estimated to lose about \$323 million in exports as represented by the last row in 2014, which is equivalent to 37 %. This highlights the point that the dependence on the EU market will result in a significant loss of income earnings for the South African citrus industry. The export earnings will also have implications on employment due to the fact that this industry is regarded as one of the higher employing industries in the country.

5.5   SUMMARY

The results of this study are based on the three scenarios, namely that South Africa complies with EU phytosanitary requirements; South Africa being subjected to a total ban; and South Africa being subjected to a partial ban, should it not comply. In the case of the first scenario, the South African citrus trade invested money to comply with EU CBS requirements, which increased by 195 % between 2013 and 2014. This scenario covers the three objectives of this study, although the first objective is covered in all the scenarios. First, South African citrus exporters have suffered significant losses of \$88 million, equivalent to 14 %. This is an indication that exporters and producers have incurred costs to comply with CBS requirements which have resulted in a decrease in their profit margins.

Furthermore, based on the second scenario of this study, if South African citrus exporters do not comply, the EU will source from CBS-free regions. Thus, South African exporters would lose about \$263 million in export earnings. Lastly, if South African citrus were to be subjected

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to a total ban, exporters would lose about $323 million in export earnings, due to their dependency on the EU market.

The second objective of this study evaluated the impact of CBS phytosanitary requirements on trade volumes. The results showed that South Africa will lose exports to the value of $88 million into this market regardless of the positive effects of a trade diversion of $43 million. Lastly, the results of the economic welfare effects showed negative results of $1,5 million which illustrates that South Africa did not benefit from exporting to the EU market.

In a nutshell, the South Africa citrus industry has suffered a loss in terms of export earnings into the EU market due to CBS requirements. The results confirm the hypothesis of the study that CBS phytosanitary requirements resulted in a negative effect on South African citrus exports to the EU. To be specific, first compliance with CBS phytosanitary requirements had increased the cost of trade with the EU market and had reduced South Africa's export earnings. Second, compliance will result in a decreased demand for citrus imports from South Africa. Third, compliance had resulted in a negative impact on the economic welfare effect.

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CHAPTER SIX
ASSESSING THE ALTERNATIVE MARKETS FOR
SOUTH AFRICAN CITRUS EXPORTS IN THE WORLD MARKET

6.1   INTRODUCTION

In the case of the closure of the EU market to South Africa, South African citrus exporters will need to consider an alternative market or diversify to other markets on the global scene. The Citrus Growers' Association, in 2014, indicated that citrus exports to Russia, China and the Middle East had been increasing significantly in the preceding five years. . The Market Attractiveness Index (MAI) was used to select the attractive markets within Africa and Asia. The two continents were considered due to the fact that they are growing markets in the world in terms of income, population and domestic demand. The two continents were considered as they have shown growth in terms of imports from a global perspective between 2010 and 2014. This chapter presents the attractive markets for South African citrus exports and the markets that South Africa should target in terms of its exports. The targeted markets were analysed based on their economic, political, social and technological factors, as well as other factors that play an important role in attracting exports.

6.2   SOUTH AFRICA'S POTENTIAL MARKETS FOR CITRUS

To determine the alternative markets for South African citrus exports, MAI was used as the tool to select the markets. This tool was discussed in Chapter 4, which indicated the uses of this tool in scoring indicators that include market share, market growth and market conditions as presented in Chapter 4. The scales presented in Appendix B was used to score all the market indicators presented in Table 6.1 as South Africa's potential market, except for the EU. The markets selected were the top importers of citrus fruit from Asia and Africa suppliers between 2010 and 2014. Table 12 shows that South Africa has an opportunity to export to Algeria, Angola, China, Iraq and Hong Kong due to their increasing demand for imports from world suppliers. In the selected markets, South Africa will be faced with tariffs that range from 0 % to 50 %. South Africa is allowed free market access in the UAE, Canada, Hong Kong and Saudi Arabia. All the potential markets were screened based on the highest scoring, as shown in Appendix B and Table 12 , in order to select the markets that South Africa should explore for

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its citrus exports. Given the markets presented, South African citrus exporters need to maintain their traditional markets (e.g EU) and explore the other markets for the purpose of sustainability.

Russia, the UAE, Hong Kong and China are the markets that scored the highest points in the results of the MIA-based methodology presented in Chapter 4. In terms of scoring, Hong Kong, China and Russia scored 17 points and the United Arab Emirates . Therefore, these markets, according to the MAI results, present greater opportunities for South Africa's exports, as presented in Appendix B. It would then be ideal if the South African citrus industry were to focus on Hong Kong, China, Russia and the UAE. It has been noted that South Africa has been increasing its exports into these markets. For example, South Africa's exports to Russia have increased by 28 % between 2010 and 2014. Furthermore, the three selected markets, in terms of the market indicators selected for the MAI model, have an advantage in growth demand and tariff advantage for South African exports (see Table 12). However, the Russian market imposes an estimated tariff of about 3,8 % on South African exports. Regardless of this 3,8 % tariff in the Russian market, Chadwick (2014) has argued that Russia presents an opportunity for South African citrus exports since entry requirements, such as phytosanitary regulations, are not factors for exports to Russia.

Table 12: Leading importers of citrus fruit in Africa and Asia between 2010 and 2014

	2014 Imports in $'000	2010-2014 Growth (%)	2014 Share (%)	2014 Average distance of suppliers (km)	2014 Concen-tration of supplying countries	2014 Tariff imposed on SA (%)
World	*14 174 333*	*4*	*100,0*	*4 384*	*0,11*	*-*
Russia	**1 474 301**	**4**	**10,4**	**4 901**	**0,15**	**3,80**
USA	860 465	9	6,1	5 475	0,26	0,20
Canada	531 128	4	3,7	5 360	0,23	0,00
HK, China	**380 877**	**11**	**2,7**	**10 491**	**0,30**	**0,00**
Japan	339 746	–6	2,4	10 837	0,45	16,53
Ukraine	319 061	9	2,3	2 461	0,30	0,00
Iraq	253 218	17	1,8	1 161	0,73	-
Saudi Arabia	252 628	–5	1,8	3 542	0,25	0,00
UAE	**241 245**	**10**	**1,7**	**5 390**	**0,26**	**0,00**
China	230 188	18	1,6	10 346	0,37	11,52
Algeria	21 725	49	0,2	861	0,88	30,0
Angola	-	28	0,1	-	0,28	50,0

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In summary, to eliminate the risk of dependency on the EU market, the industry should focus on the markets selected, which include Russia, Hong Kong and the United Arab Emirates. Exploring new markets might however be costly, due to consumer requirements in terms of quality, sugar content, taste, size, brix and institutional arrangements. This requires farmers to change production techniques in order to serve the needs of new markets. Other factors, such as political, economic, technological and other market requirements, are explained in the following sections in order to indicate the relevance of the selected markets.

6.3 FACTORS THAT WILL INFLUENCE SOUTH AFRICA TO PENETRATE RUSSIA, HONG KONG AND THE UNITED ARAB EMIRATES

Given the EU's situation of stricter market regulations, the region has been stagnant in terms of income growth. Recently, it has been noted that the Asian and African markets have been improving in terms of income growth and population. In 2014, it was reported that these emerging markets contributed 5,1 % growth in comparison with the 2 % of the EU market (United Nations, 2014). The growth was mainly due to higher consumption, rising incomes and improved infrastructure investment, as well as rising population growth (African Economic Outlook, 2014). However, the United Arab Emirates, Hong Kong and Russia are located on the continents where growth has been noted in recent years. Each of the respective markets is described below for its strength for the purpose of South Africa's citrus exports.

6.3.1 United Arab Emirates

i Description of the UAE

The UAE is located in the Middle East, with an estimated population of 5,7 million. About 70 % of its population is Muslim (Central Intelligence Agency, 2015). This religious group influences the consumption of citrus through the use of lemons on religious occasions, especially during Ramadan. The UAE is one of the growing economies in Asia, measured in terms of purchasing power parity. The UAE has as an open economy with a high per capita income of about $65 000 in 2014. The GDP growth improved from 1,6 % in 2010 to 5,2 % in 2013 (World Bank, 2014). The growth in income is mainly attributable to the transformation

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of economic sectors in the country, infrastructure and the trade surplus over the last 30 years (CIA, 2015).

ii   Overview of the citrus sector in the UAE

The United Arab Emirates is reported to produce lemons under the prevailing conditions of its climate and soils. In 2013, it was estimated that about 2 500 tonnes of lemons were produced (FAOSTAT, 2010). It has been noted that the local production does not meet the demands of the market, which is estimated to be about 251 thousand tonnes annually (USDA, 2014). Both imports and consumption have been rising, given that consumers buy the fruit for religious purposes and also to squeeze out the juice. Furthermore, as the country's income improves, citrus fruit consumption also increases, representing market potential for exporting countries.
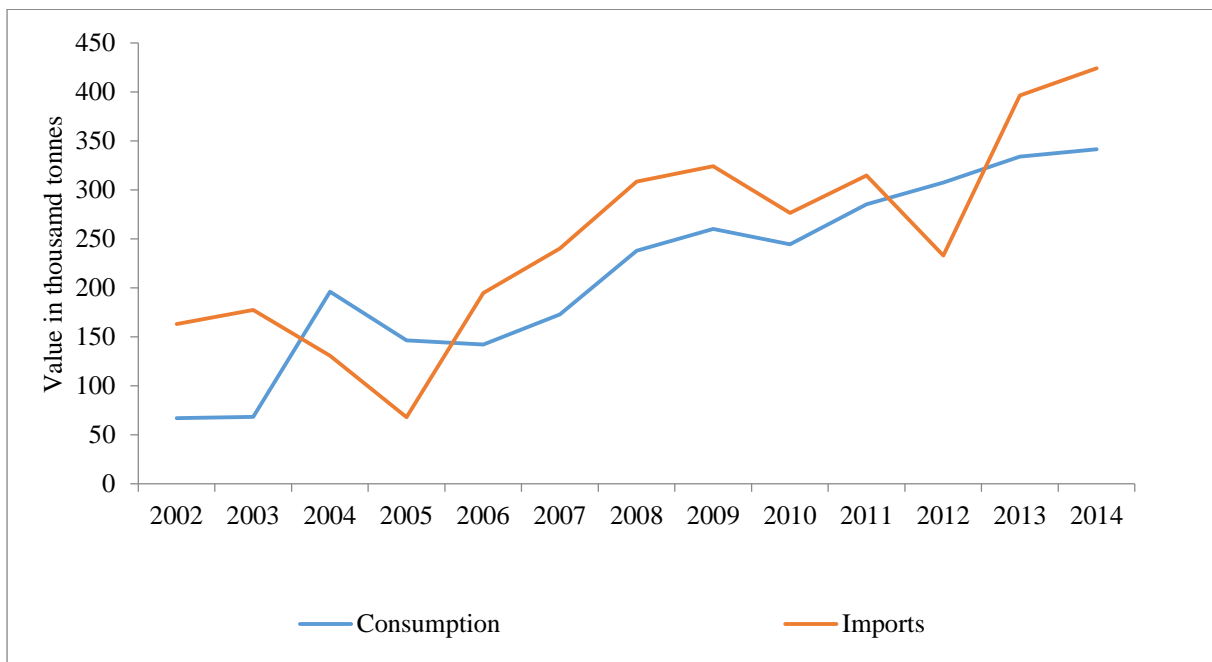
Figure 8: UAE consumption and import growth (2002–2014)
[Source: FAOSTAT, 2014 and USDA, 2014]

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iii   Competition and consumers in the United Arab Emirates

South Africa is faced with competitors in this market, given the tariff advantages and the distance of its competitors. Table 13 below depicts UAE suppliers and South Africa's competitors for this market. South Africa is the largest supplier in this market, followed by Egypt, Pakistan, Spain and Turkey, which are the main competitors in this market. It can be noted that three of these countries are located closer to this market, thus giving them an advantage in terms of distance. South Africa will be able to keep this market, given the fact that it is located in the southern hemisphere, which gives it an edge in that it can supply this market when its competitors are in the off-season.

Table 13: UAE main suppliers of citrus imports

Country	Value in $' 000	Share (%)	Growth (% p.a.) 2010–2014	Estimated tariff (%)	Distance to market (km)
Total imports	**241 245**	**100,0**	**10**	**0**	**-**
South Africa	110 363	45,7	8	0	10 158
Egypt	36 698	15,2	5	0	5 800
Pakistan	21 509	8,9	25	0	1 028
Spain	21 062	8,7	47	0	11 227
Turkey	14 018	5,8	97	0	7 762
China	7 995	3,3	-	0	10 853
India	7 717	3,2	6	0	2 295
Australia	6 834	2,8	9	0	14 170
Brazil	6 745	2,8	39	0	17 575
Argentina	1 563	0,6	–1	0	17 129

[Source: ITC, Trademap, 2014]

Consumers in the United Arab Emirates are becoming increasingly health conscious and are also vigilant about the food safety of fruits and vegetables. The United Arab Emirates prefers quality produced fresh fruit and vegetables that are able to meet their needs. Furthermore, consumers in this market buy citrus for squeezing out homemade juices and they also use citrus for display, which requires well-coloured citrus. Therefore, the consumers also prefer different varieties of citrus with good appearance and favourable juicing characteristics (AUSTRADE, 2014).

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iv Distribution channels to the UAE

In terms of logistic links, the United Arab Emirates is not difficult to access due to the numerous shipping links between Pakistan and the UAE and this market has three ports of entry. It also boasts the largest hub for imports and exports in the world, namely Dubai's Port of Jebel Ali (AUSTRADE, 2014). This modern port is recognised as the world's largest man-made port. It has been reported that the UAE is the gateway to countries in the Middle East, which include Qatar, Oman, Saudi Arabia and other neighbouring countries (North Africa) (TDAP, not dated, and AUSTRADE, 2014). About 40 % of imports are sent by trucks and railway to the neighbouring countries and 60 % is used for consumption in the UAE. The fruit at the port is distributed within the country by distributors to the foodservice, retail and wholesale markets (Wiersinga, Snels, Admiraal, 2008).

v Market access and barriers in the United Arab Emirates

In this market, which has a growing population, consumers are rapidly becoming health and environmentally conscious and are starting to show high preferences for food products that promote and offer health benefits. The consumers also show great appreciation for high-quality products, as they are prepared to pay more for imported, high-quality products than for domestic, marginal-quality products. In meeting the consumers' demands, importers have to provide health certificates indicating that the fruit is fit for human consumption (AUSTRADE, 2014). The imported food and locally produced food are subject to food safety regulations and labelling requirements so as to ensure that no food offered for consumption is harmful to consumers. The UAE, however, does not apply environmental regulations to imported food products in packaging and also applies a zero tariff rate (USDA, 2010).

vi Reasons to focus on the UAE

It has been noted that the UAE is one of the growing markets in terms of income and population. This country serves as the gateway to countries located in the Middle East, South East Asia and North Africa. This market presents lucrative market opportunities in terms of demand for citrus owing to the religious uses of lemons for Ramadan and the quality of produce that consumers demand from their importers. South Africa is able to serve this market because

of the quality and safety of South African produce intended for the export market. The weakness of the UAE lies in its size, compared with the EU; it does however serve as an entry point to expand into the Middle East and North Africa.

Regardless of the growing income and population in the UAE market in recent years, it has been noted that this market imposes a zero tariff on its importers. Although consumers are mindful of the quality and safety of the food products of their interest, there is no indication of any CBS regulations being applied to imported citrus. Lastly, this market does not apply environmental regulations concerning the labelling of its fruit imports, which renders it less costly to supply this market.

6.3.2   Russian Federation

i   Description of the market

Russia is located in the eastern part of Europe, with an estimated population of 142 million. This country comprises people with diverse cultures and ethnic diversity, with about 77 % of the population being Russian and 23 % comprising other ethnicities. In terms of religion, most adherents are Russian Orthodox and the second-largest group is Muslim, with the remainder being comprised of other Christian denominations (CIA, 2015). The Russian economy has not been stable in recent years, given the number of cyclical factors, such as oil prices, and the recapitalisation of banks (World Bank, 2014). In 2014, the country's economy showed a 0,6 % increase, which was less than the growth in its economy in 2013. As one of the emerging economies in the world market, its per capita income amounted to a total of $24 800 in 2014 (CIA, 2015). The country generates its income through the production of oil and natural gas and is known to be a top exporter of heavy metals such as steel and primary aluminium.

ii   Consumer preferences, consumption and competition for citrus products

Russia is known not to be a producer of citrus fruit on any significant scale, and is therefore entirely dependent on imports of oranges, grapefruits, mandarins, lemons and limes. The efficient production of fruit in this market is limited due to climate, and the lack of affordable capital for orchard replanting, new cultivation and storage technologies (IDAL, 2014). However, apples comprise the only fruit produced commercially in this country. The USDA

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(2012) reported that the Russian market was ranked as the third-largest importer of citrus fruit in the world market, after apples and pears.

The improved disposable income of Russian consumers has resulted in consumers eating more fruit and diversifying the types of fruit they consume. Furthermore, the variety of fruit in their baskets is attributed to a trend for healthy diets, and the growing population of this country raises the demand for fruit (EUROMONITOR, 2014). In 2010, the real disposable income of the Russian population increased by 10 % and expenditure on fruits products by 19 % (Russian Statistic Services, 2010). Even though there has been an improvement in expenditure on fruit products, Russian consumption of fruit is still lower than consumption levels in European countries, the United States, Japan and China (USDA, 2012).

Figure 9 below depicts the consumption levels and the import demands in the Russian market over the last 13 years, although the demand and levels of consumption of citrus have not been the same over the last 13 years. The growing demand for citrus imports was mainly attributed to fact that consumers are demanding more tangerines, oranges, grapefruit and limes due to their growing popularity and revitalised consumer spending.
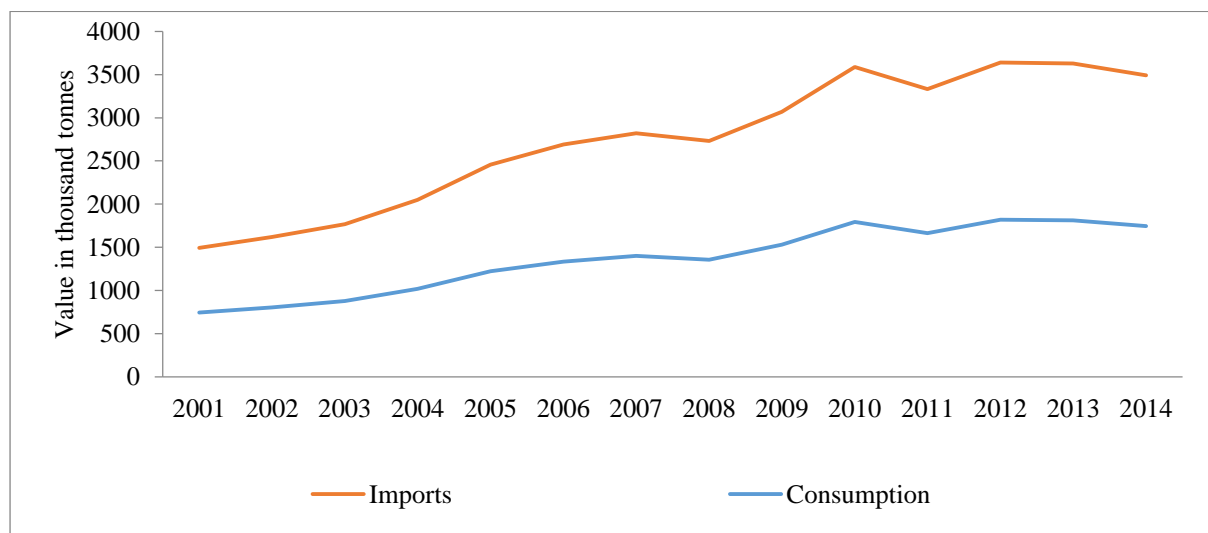
Figure 9 : Citrus imports and consumption trends in the Russian market
[Source: USDA, 2015]

This is a potential market for citrus producers in the world market, given its important growth of 4 % which is on par with the world market. Among the global importers, Russia is ranked

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in first place, given its share of 10,4 % in the world market. Table 6.3 below indicates the competitors to supply citrus fruit to Russia. It was reported that Turkey was ranked as the largest exporter of citrus fruit to the Russian market, given the advantage of its proximity to Russia. Morocco, Egypt, South Africa and China were among the top five exporters to this market, with shares of 16,3 %, 13,2 %, 11,9 % and 9,1 % respectively in 2014. South Africa has a great opportunity to export to this market due to the seasonal difference with its competitors.

Table 14:Russia's main suppliers of citrus fruit

Exporter	Value in $' 000	Share (%)	Growth (% p.a.) for 2010–2014	World exports share of partner country (%)	Estimated tariff (%)	Distance to the market (km)
World	**1 474 301**	**100,0**	**4**	**100,0**	**-**	**-**
Turkey	395 674	26,8	3	7,2	3,8	907
Morocco	240 346	16,3	2	2,9	3,8	5 004
Egypt	195 174	13,2	10	3,7	3,8	2 233
South Africa	176 011	11,9	4	8,3	3,8	12 593
China	134 868	9,1	12	9,1	3,8	1 777
Argentina	79 137	5,4	–6	2,0	3,8	13 599
Spain	72 403	4,9	4	29,6	5,0	2 289
Pakistan	69 079	4,7	–1	1,5	3,8	7 028
Israel	33 386	2,3	–2	1,6	5,0	2 501
Georgia	18 952	1,3	220	0,1	0,0	435

[Source: International Trade Centre, 2015]

iii Logistics and distribution in this market

Russia is regarded as the one of the largest countries without fully-formed infrastructure. This contributes towards the logistical challenges in this market. There are several seaports which connect via the European Union for gaining entry to Russia. The food entering through the seaports are distributed by Russian and Danish distributors to retailers and food services throughout the country. It is important to note that distribution channels vary significantly across the country.

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The importers of citrus fruit into this market have an opportunity to maximise their returns owing to the revolution of the Russian retail market. In 2010, the retail chains improved their assortment of fresh produce and quality as a result of better handling. Retailers offer fresh produce at different price points for various income levels, based on quality and packaging. Key retail outlets and hypermarkets continue to expand in big cities in the Russian provinces. Furthermore, it was reported that between 2010 and 2011 retail sales grew from about $250 billion to $300 billion. This is an indication that the retailers are becoming more popular in the Russian market (USDA, 2012).

iv   Market barriers in the Russian market

High tariff rates are imposed on Russian importers to protect local industries from import competition. At present, the Russian weighted average customs tariff rate is approximately 12,9 %; the weighted average tariff rate being about 25 % for agricultural products and around 10,4 % for non-agricultural goods. This country also ensures that Russian industries are fully protected from competition by using safeguarding measures, such as sanitary and phytosanitary measures, technical barriers to trade, licensing requirements, tariff rate quotas, import prohibition, testing certification, labelling and various other taxes (USDA, 2012). Russia is obligated, like all other WTO Members, to ensure that its SPS measures comply with the requirements of the SPS Agreement (i.e. they are based on scientific principles, not maintained without sufficient scientific evidence, and are only applied to the extent necessary to protect human, animal and plant life or health). In recent years, some of the NTB measures have been relaxed due to the increasing demand for food products such as fruit and vegetables(EUROMONITOR, 2014).

v   Why Russia over the EU market?

Russia is a neighbour to the EU countries and it is situated along the shipping routes from these countries. It has been noted that Russia has a large population with growing incomes. However, Russian income earnings do not present a greater opportunity due to instability in recent years. The variety within the population presents an opportunity to satisfy the increasing demand for a variety of citrus fruits from the world.

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Russia does not produce any citrus fruit and currently depends on imports for providing this fruit. The country currently imposes a low tariff of 3,8 % on South African imports, although South Africa increased its exports between 2010 and 2014. It has been reported that Russia has been sourcing about 4 500 tonnes in 2013 and 2014 and absorbed most of the citrus fruit rejected by the EU (CGA, 2014). Chadwick (2014), reported that Russia is not stricter on phytosanitary requirements than the EU market. Lastly, this country is part of BRICS which is the economical and politically partnership between Brazil, Russia, India, China and South Africa. This partnership is aimed at increasing industrialisation and at promoting fairness regarding agricultural policies.

6.3.3   Hong Kong, China

i   Description of the market

Hong Kong is located in East Asia, bordered by the South China Sea and China. This autonomous territory (being a Special Administrative Region of the People's Republic of China) is estimated to have a population of 7.1 million people as at 2015 and 95 % of its population is Chinese (CIA, 2015). The economy of Hong Kong has undergone a remarkable change in the past two decades. The economy had increased by 2,3 % in 2014, compared with the growth increase of 1,7 % in 2012. The growth in Hong Kong's GDP is mainly attributed to the rapid expansion of the services sector, which was estimated to have contributed about 83 % to the GDP during 2013 (Hong Kong Government, 2015). As one of the growing economies in Asia and in the world market, its per capita income amounted to a total of $54 800, ranked 17th in the world in 2014 (CIA, 2015). Although the economy has been on the rise, the domestic demand has been slow due to low consumption in the local market and weak spending by tourists (Wang, 2014).

ii   Consumption, consumer preference and competition in Hong Kong

Because of the results of limited agricultural production and rapid urbanisation, this territory depends on food imports for maximising its consumption levels (Chung, 2007). Currently, Hong Kong does not produce any citrus products and depends on imports from the Chinese market and also re-exports citrus from China to world markets. The consumption of citrus in

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this territory amounted to an average of about 260 thousand tonnes on a yearly basis (USDA, 2006).

The consumption of fruit in this market is driven by factors such as food safety, health consciousness, changing demographics and lifestyles. It has been noted that there has been a growing concern for food safety and hygiene in Hong Kong. Furthermore, the consumers have been demanding healthier, fresh and higher nutritional value food in products. Therefore, consumer preferences on fruit and vegetables have been on the rise in this market (USDA, 2006). The consumers' decisions are not influenced by prices and they are not loyal to branded products (Chung, 2007).

Figure 10 below indicates the consumption trends and import demands of this market (USDA, 2015). It is noteworthy that consumption and imports have shown an increasing trend between 2011 and 2014, with notable growth of about 37 % for consumption and 28 % for imports, respectively. These increasing demands for imports and consumption present an opportunity to focus on this market. Furthermore, consumers are paying prevailing prices, irrespective of how expensive the imported product is.
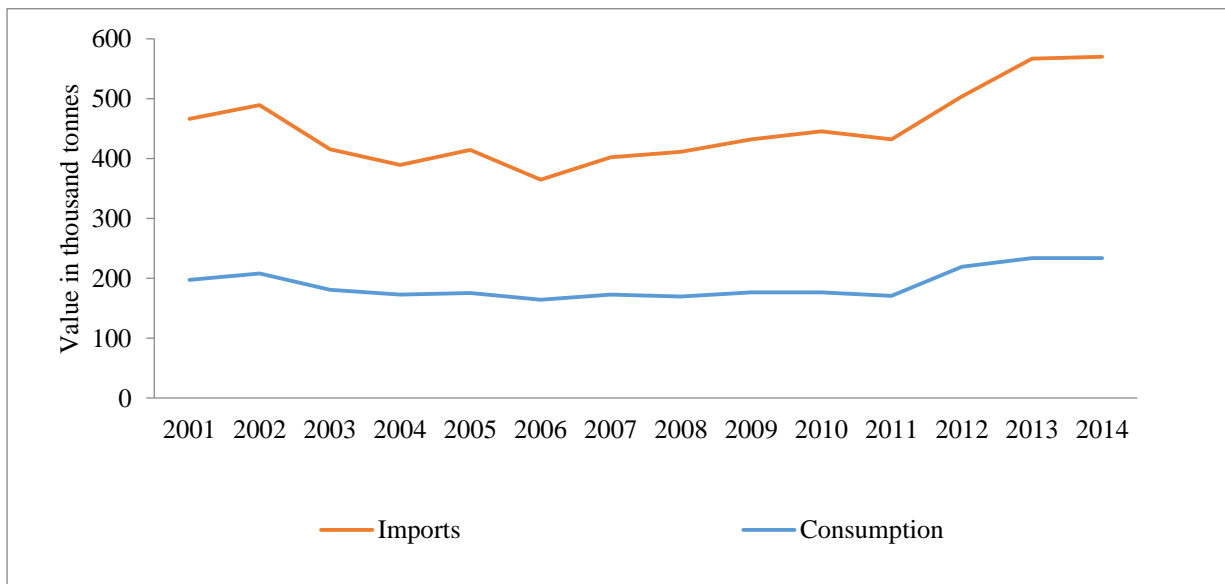

Figure 10 : Hong Kong imports and consumption trend
[Source: USDA, 2015]

In the world market, this market has shown that it has market potential due to its increasing import demand, which was above the world market of 4 % between 2010 and 2014. Export

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competitors for the Hong Kong market stand to gain through exporting their citrus due to its increasing demand. Exporters to Hong Kong include the USA as the largest supplier, at an estimated amount of $169 million in 2014. South Africa, Australia, China and Thailand were among the top five exporters to this market, with shares of 29,4 %, 8 %, 5,8 % and 2 % respectively (ITC, 2014).

It is important to note that all exporters to Hong Kong are faced with a zero tariff, which is advantageous to all export competitors. This is because of the Hong Kong principle of a free economy, in terms of which food products can be imported into Hong Kong with zero import tariffs, with the exception of cigarettes and alcoholic beverages (USDA, 2006). South Africa has an advantage in this market due to fact that most of the other supplying markets are located in the northern hemisphere. In the southern hemisphere, Australia is South Africa's only export competitor, but has an advantage over South Africa in terms of distance to this market.

Table 15: Main suppliers of citrus to Hong Kong

Exporter	Value in $' 000	Share (%)	Growth (% p.a.) for 2010–2014	World exports share of partner country (%)	Estimated tariff (%)	Distance to the market (km)
World	**380 877**	**100,0**	**11**	**100,0**	**-**	**-**
USA	169 725	44,6	5	7,8	0	8 983
South Africa	112 097	29,4	11	8,3	0	11 466
Australia	30 290	8,0	19	1,4	0	4 416
China	22 084	5,8	34	9,1	0	1 486
Thailand	7 496	2,0	–3	0,1	0	2 650
Egypt	6 951	1,8	163	3,7	0	11 403
Argentina	6 626	1,7	21	2,0	0	19 520
Turkey	4 065	1,1	64	7,2	0	13 400
Spain	3 227	0,8		29,6	0	15 500
Israel	3 181	0,8	24	1,6	0	12 227

[Source: International trade Centre, 2014]

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iii   Distribution channels and logistics in the Hong Kong market

The Hong Kong port serves as a gateway to China and this port has played an important role in this function. This port is regarded as a busiest port in the world market, given traffic congestion and lack of space, and regional competition among ports and urban centres simultaneously. Research Survey (2006) found that the internal distribution of fruit in Hong Kong is hampered by an over-burdened rail network, a poor highway road system and a lack of refrigerated truck transport. The products that come through the port to the Hong Kong market are distributed by import agents, directly to retail outlets, hotels and to China.

The retail sector in Hong Kong presents an opportunity for exporters, and in 2012 the net grocery retail sales amounted to a total of $10,3 billion, with expected growth (USDA, 2014). The retail sector is segmented into supermarket chains, speciality stores, traditional markets, family-owned stores and convenience stores. Traditional markets are where fresh food products are sold. However, there is a trend in Hong Kong to move away from traditional markets towards western-style supermarkets (USDA, 2006).

iv   Market barriers to entry

The results of consumer concerns for food safety in Hong Kong require its importers to comply with the local food laws and regulations (AUSTRADE, 2006). The food law was enacted in 2011 under the Food Safety Ordinance which provides safety control measures for food importers and distributors. The application of these regulations constituted by the Hong Kong government for imported fruit produced conventionally is also subject to the same regulation due to MRLs used. Furthermore, the importers of fruit into the Hong Kong market are required to comply with the packaging and labelling requirements of this market (USDA, 2013). The food laws and regulations applied in this market are focussed to ensure that (i) importers obtain health certificates; (ii) hygienic conditions are regulated; (iii) food is certified as being fit for human consumption; and (iv) consumers are assured that food does not contain toxins and that the spread of plant diseases in the market is prevented.

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v   Reason to export to the Hong Kong market

The Hong Kong market is a small market, but present features of the Far East market, which includes China. The improved incomes and urbanisation present great opportunities for exporting citrus fruit to this market. The consumers in this market are buying in large quantities, in comparison with EU consumers. Furthermore, this market presents a great opportunity in terms of its retail sector due to the growth that has been notable in recent years. The Hong Kong market is not stricter in terms of regulation of imports, as compared with the stricter regulations that are imposed by the EU on their importers.

As a further advantage, this market presents a lucrative market because it will be a gateway to Far East countries, and it has showed increasing demand for imports between 2010 and 2014 (ITC, 2014). South Africa stands to gain an opportunity over its competitors, due to the distance advantage in comparing with the competitors that include Australia, Brazil, Chile and Argentina. In comparison with the Australian export market as a competitor, South Africa has an advantage due to its capacity for production. Lastly, the Hong Kong market applies zero tariffs on imports.

6.4   SUMMARY

The MAI model has presented the Middle East and the Far East as showing a positive growth in demand, and as offering greater opportunity for exporting to, rather than to the EU market. South African citrus exporters have encountered difficulties in accessing the EU market due to EU phytosanitary regulations. It has been noted that South Africa's citrus export basket has been split across different markets in the world. Furthermore, South Africa's exports have been increasing to the UAE, Russia, China, Hong Kong and African countries for the purpose of market diversification.

These countries present greater opportunities due to their growing incomes and population, and to the evolution of retail facilities and the adequate infrastructure in these markets. Furthermore, their presentation is in line with the MAI model in that Russia, the UAE and Hong Kong have been chosen as lucrative markets for South Africa's citrus exporters. These three markets were chosen for consideration to diversify South Africa's exports due to the fact

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that they consume citrus for different purposes, e.g. for Ramadan in the Muslim community in the UAE. None of the three markets currently imposes stricter phytosanitary measures for CBS than the EU does. These markets have been on the rise in recent years with their improving incomes. The UAE in particular presents a greater opportunity as the gateway to accessing the countries located in South East Asia and North Africa. Exporting to these countries should optimise the export earnings of the South African citrus industry in the future.

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CHAPTER SEVEN
SUMMARY AND CONCLUSION

7.1   INTRODUCTION

This study has assessed the economic implications of CBS on South African citrus exports to the EU market. The study was motivated by the fact that South Africa has been exceeding the allowable CBS interceptions in the EU and the EU has threatened to ban South Africa's citrus exports. The specific objectives of the study are to evaluate the implication of compliance on South Africa's export earnings, trade volumes, as well as welfare effects of South Africa's exports. Should the EU market close for South Africa, South Africa will have to search for a new market. The last objective of the study is to identify an alternative market for South Africa citrus exports. This chapter presents the conclusion of the study and the follow-on recommendations. A brief summary of the study is outlined, after which the conclusions are discussed. The recommendations are specifically focussed on producers, policy makers and researchers.

7.2   SUMMARY

The South African citrus sector plays an important role in the economy through generating export earnings and supporting employment. The sector was estimated to have contributed about 4,5 % of the total agricultural GDP in 2014. Of the total citrus fruit produced, South Africa exports more than one-third of its citrus to the EU market. Despite the country's export share in the EU market, South African citrus exporters are currently faced with the challenge of a reoccurrence of CBS. CBS is a fungal disease that distorts the development of the citrus fruit.

The EU detected more than five CBS interceptions in South African citrus exports between 2010 and 2013. This has raised EU concerns due to the absence of CBS in their countries. The EU has indicated that the failure to comply with the EU CBS requirements could lead to the imposing of a ban on South African citrus imports. The citrus industry and the DAFF have been working together to establishment the CBS-RMS to prevent the occurrence of the disease

during transit. This system was developed in view of achieving compliance with EU requirements to retain the EU as an export market for South African citrus.

The study is based on the hypothesis that compliance with EU requirements will increase the trading cost with the EU market and by retaining that market access, the citrus industry will suffer losses in export earnings and shrink the demand for South African citrus in the EU, due to the presence of CBS in their exports. As a result of CBS in citrus exports, the actual budget spent on CBS increased from R1 million in 2013 to R5 million in 2014, meaning the compliance initiative added significant costs to mitigate the occurrence of the disease in the value chain. In the literature study, methodologies examined for evaluating the economic losses attributable to NTMs ranged from qualitative to quantitative approaches as well as the approach of determining alternative markets. The application of these methods is aimed at broadly estimating the impact of the NTMs on international trade and depths. Although numerous quantitative studies on the impact of NTMs have been conducted in the country for the agricultural sector, very few have focussed on the welfare effects on the fruit industry. Due to this limitation, the study therefore used a partial equilibrium approach to determine the impact of CBS on South African exports to the EU market. The case of the alternative the market attractiveness index was chosen to determine a realistic market for South African citrus exports.

For the calculation of the tariff equivalent of NTMs, the money invested for CBS compliance between 2013 and 2014 was used for this study. The information was accessed through the CGA's annual report on the financial statements. The information was regarded as the overall additional cost of compliance used for CBS phytosanitary measures imposed by the EU. The costs of compliance increased 390 % between 2013 and 2014. This is an indication that the citrus industry has been incurring higher costs in an effort to comply with CBS requirements. The change in the cost of compliance will be adopted as the NTM equivalent in the SMART partial equilibrium model in assuming that CBS phytosanitary requirements add an extra trade cost to exporters.

The partial equilibrium method was useful to determine the level of protection in the EU as regards South African citrus exports. In this study, the WITS model was preferred for estimating such effects and the market attractiveness index was preferred to determine the realistic alternative market. The results of this study were based on three scenarios that included

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compliance with the EU phytosanitary requirements, a total ban and partial ban. Therefore, the results of the first objective showed that the South African citrus industry had lost about $88 million in export earnings in an effort to comply, $263 million under a partial ban and $323million under a total ban. The second objective of this study evaluated the impact of CBS phytosanitary requirements on trade volumes. The results showed that South Africa had experienced a loss in terms of trade volumes, which is indicated by a loss in net effect of $88 million. Lastly, the results of the economic welfare effect showed a negative result of $1,5 million, which is indicative of the fact that EU did not benefit from exporting to the EU market. In a nutshell, the South African citrus industry has suffered a loss in terms of export earnings into the EU market due to CBS requirements.

As a result of diversion, the EU will have to look for alternative markets for their imports to bridge their demand. The MAI was used to assess the alternative markets for South African citrus exports. The results of the MIA have shown that Russia, Hong Kong and the UAE are attractive markets for South African citrus, given their increasing demand, the concentration of competition and tariff advantages. These countries were further reviewed in terms of economic, political, social and technical levels, and results indicated that they present greater export opportunities as a result of their rising incomes and populations.

7.3   CONCLUSION

The study was conducted to determine the economic implications of CBS for the South African citrus industry. A partial equilibrium method was used to determine export earnings, trade effects (trade creation and diversion) and the welfare loss to the industry as the result of CBS requirements. The cost of complying with CBS requirements has increased from R1,14 million in 2013 to 5,6 million in 2014; an average rise of 390 %. The growth was adopted as the NTM equivalent in the SMART partial equilibrium model. The industry stands to lose an estimated $88 million, which is equivalent to 14 % of their exports to the EU market. The tightening of CBS phytosanitary restrictions by the EU has added extra costs for citrus producers and exporters. The study further considered two scenarios; one being a partial ban and the other a total ban on South African citrus exports. Both of these scenarios presented in the study also assumed the loss of about almost the same of the South Africa's citrus exports. For example, in the second scenario South Africa will lose about 30% of citrus exports whereas third scenario

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will lose about 37% of citrus exports. . In the face of a possible closure of the EU market for South Africa, the country should look at diversifying its market to avoid the risk of losing export revenue. The MAI has presented Russia, Hong Kong and the UAE are alternative markets, given their growing demands, tariff advantages, rising incomes and consumer preferences.

7.4   RECOMMENDATIONS

7.4.1   Recommendation to government and policy makers

The study indicates that the citrus industry has lost export earnings in its effort to comply with CBS requirements. This will have negative implications for citrus growers' profit margins due to additional costs of measures against CBS in orchards. The DAFF and CGA have been working together to ensure, through compliance initiatives, that CBS does not occur during transit. The citrus farmers incur the cost of compliance through intensive inspection and intensive spraying programmes. Therefore, it is clear that the farmers are experiencing financial strain in an effort to comply with CBS requirements that have resulted from the occurrence of this disease. The study therefore recommends that government should support farmers in the spraying programme for CBS. Furthermore, government should form a sound policy that enables proper dialogue with producers with regard to international standards.

7.4.2   Recommendation to producers

It has been noted that the export loss, as the results of compliance, had increased the cost of production among the producers. Therefore, this study recommends an awareness of international trade standards, such as GLOBALGAP or HACCP, that are in line with obligations of the SPS regulation (see Appendix C). Furthermore, the study presented the alternative markets that should be penetrated given their growth income and population. Therefore, the study recommends that the South African citrus producers focus on the suggested selected markets (Russia, UAE and Hong Kong). Lastly, since CBS is regarded as a cosmetic disease, it is also recommended that spotty citrus should be directed to processing.

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7.4.3   Recommendation to researchers

The scientific researchers have done an empirical work with regard to CBS in terms of climate adaptability and the spread thereof in a cold climate. IPPC commitments required scientific evidence that outlines an economic evaluation of CBS. Therefore, this study recommends that researchers should develop a framework of combating the risk of international requirements for agricultural products.

7.5   LIMITATION OF THE STUDY AND AREAS OF FURTHER RESEARCH

The study used the available data to estimate the cost of compliance with CBS requirements as an impact on South Africa's exports. The budget allocated in the RMS to deal with the effect of CBS on South Africa's citrus exports was calculated to have substantially increased by 390% in 2014 over the 2013 budget. The data was sourced from the financial statements presented in the annual reports of 2013 and 2014 (see Appendix A). Therefore, as a result of the limited data available to calculate the actual costs of compliance along the supply chain (pack house and ports), the full impact of CBS on citrus exports could not be determined. Hence, using the available data, the study endeavoured to estimate the economic impact of CBS compliance on citrus exported to the EU market. Moreover, determining the cost implications at all the points in the supply chain could play an important role in determining the actual cost of compliance with CBS regulations in the supply chain. This could assist in making relevant, sound policy decisions for the citrus sector.

This study was limited to examining the macro-level impacts of CBS and did not study the depths of perception among the producers concerning the introduction of CBS regulations. It is therefore recommended that future research should consider examining how citrus farmers perceive the introduction of the CBS regulations and their willingness to pay the extra costs of retaining the EU market as their traditional market.

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Appendix A: Abridged Financial Statements

	Actual	Budget	Actual	Budget	Actual	Budget
	2012/13	2013/14	2013/14	2014/15	2014/15	2015/16
Income	44 869 944	52 720 000	53 422 562	58 300 000	58 165 140	66 590 000
RSA levy	39 919 509	44 180 000	50 313 887	49 000 000	55 120 465	54 590 000
Swaziland/Zimbabwe levy	907 883	840 000	1 321 752	1 050 000	1 038 096	920 000
Draw from reserves	1 128 804	2 100 000	-	2 750 000	-	2 600 000
CBS provision (Draw from reserves)	-	4 000 000	-	4 000 000	-	6 500 000
Net property income	-	-	-	-	52 364	54 404
Interest	1 300 937	1 300 000	1 042 368	1 200 000	1 342 684	1 200 000
Dividends received – River Bioscience	300 042	300 000	300 042	300 000	300 042	300 000
Citrus Summit registration fees	-	-	-	-	189 489	-
Other income	1 321 769	-	444 513	-	12 200	50 000
Expenditure	44 869 944	52 765 483	49 334 329	58 271 800	55 374 042	66 200 268
Staff costs	3 554 677	3 692 841	3 786 852	4 088 300	4 150 985	4 794 908
Travel & Accommodation	300 749	319 500	309 065	309 500	259 128	310 000
Office – Rent & Equipment	326 250	294 000	290 326	214 000	470 411	50 000
Offices expenses	386 934	398 000	329 397	376 000	580 927	436 000
Board expenses	432 222	575 550	543 347	612 000	327 920	812 000
Services (accounting, legal & insurance)	98 388	200 000	326 288	340 000	396 130	445 000
Subscriptions	230 893	249 000	244 584	256 000	257 942	282 000
Communication	118 157	202 000	132 224	202 000	83 039	177 000
Market access	3 324 229	4 618 000	2 978 147	3 180 000	2 484 136	3 124 000
Market access – CBS	-	4 000 000	1 146 075	7 100 000	5 617 653	7 500 000
Research programmes – CRI	24 101 012	31 000 000	32 001 680	33 587 000	33 487 000	38 891 360

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	Actual 2012/13	Budget 2013/14	Actual 2013/14	Budget 2014/15	Actual 2014/15	Budget 2015/16
Research programmes – CRT	3 093 256	-	-	-	-	-
Transformation & Grower development	3 237 987	2 714 651	3 128 208	3 095 000	2 733 470	3 700 000
Transformation – citrus academy	1 925 000	2 100 000	2 100 000	2 300 000	2 300 000	2 500 000
Depreciation	29 539	32 000	23 301	32 000	47 743	32 000
Information	395 156	640 000	592 312	680 000	539 446	541 000
Citrus Summit expenses	-	-	-	-	189 489	-
Land reform	-	-	-	-	-	50 000
Regional capacity	-	-	-	-	-	670 000
Profit/Loss on asset disposal	-	-	-	-	5 681	-
Provision for doubtful debts	748 537	-	23 219	-	305 539	-
Leave pay provision	10 221	-	45 558	-	48 063	-
Infrastructure & Logistics	1 029 018	1 179 941	915 514	1 250 000	913 642	1 235 000
Market development	545 094	400 000	349 971	400 000	271 824	400 000
Fruit industry social compact	-	100 000	68 261	200 000	-	200 000
Citrus cultivar management company	2 500 000	-	-	-	-	-
General	41	45 483	-	50 000	-	50 000
Net surplus/loss for year	-	-	4 088 233	28 200	2 791 098	14 136

[Source: Citrus Growers' Association]

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Appendix B: Scaling of trade indicators

Score	Scale for Market Size (%)	Scale for Market Growth (%)	Scale for Competition (%)	Scale for Tariff Level (%)	Scale for Tariff Advantage (%)
5	Very large: superior to 25	Very fast: superior to 10	Highly diversified: below 0,05	Open: equal to 0	High tariff advantage: superior to 10
4	Large: between 15 and 25	Fast: between 5 and 10	Diversified: between 0,05 and 0,15	Very low: between 0 and 5	Small tariff advantage: between 1 and 10
3	Medium: between 8 and 15	Slow: between 0 and 5	Moderately concentrated: between 0,15 and 0,2	Low: between 5 and 10	No advantage: equal to 0
2	Small: between 2 % and 8	Stagnate – Slow decrease: between 0 and –5	Concentrated: between 0,2 and 0,3	Medium: between 10 and 20	Small tariff disadvantage: between 0 and –5
1	Very small: inferior to 2	Fast decrease: inferior to –5	Highly concentrated: above 0,3	High: superior to 20	High tariff disadvantage: below –5

Appendix C: Market scanning of the main largest importers in 2014

Importers	Share of imports (%)	Score	Annual growth in value between 2009 – 2013 (%)	Score	Concentration of supplying countries	Score	Tariff applied to South Africa	Score	Tariff applied to 1st supplier in importing country	Difference	Score	Final score	Ranking
		Market size			**Market growth**		**Competition**		**Market access – Tariff level**				
Russia	10,4	3	4	3	0,11	4	3,80	4	Turkey: 3,8	0,00	3	17	1
USA	6,1	2	9	4	0,26	2	0,20	4	Mexico: 0	–0,20	2	14	7
Canada	3,7	2	4	3	0,23	2	0,00	5	USA: 0	0,00	3	15	5
HK, China	2,7	2	11	5	0,30	2	0,00	5	USA: 0	0,00	3	17	2
Japan	2,4	2	–6	1	0,45	1	16,53	2	USA: 16,5	–0,02	2	8	13
Ukraine	2,3	2	9	4	0,30	2	0,00	5	Turkey: 0	0,00	3	16	4
Iraq	1,8	1	17	5	0,73	1		5		0,00	3	15	6
Saudi Arabia	1,8	1	–5	2	0,25	2	0,00	5	Egypt: 0	0,00	3	13	8
UAE	1,7	1	10	5	0,26	2	0,00	5	SA: 0	0,00	3	16	3
China	1,6	1	18	5	0,37	1	11,52	2	SA: 11,5	–0,02	2	11	10
Sweden	1,3	1	1	3	0,23	2	4,90	4	Spain: 0	–4,90	2	12	9
Algeria	0,2	1	49	5	0,88	1	30,00	1	Spain: 30	0,00	3	11	11
Angola	0,1	1	28	5	0,36	1	50,00	1	SA: 50	0,00	3	11	12

[Source, ITC, 2014]

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Appendix D: The International Institutional Framework of SPS Measures

The WTO SPS Agreement establishes international rules for the application of SPS measures in international trade of food and agricultural products. The Agreement explicitly recognises the right of countries to apply SPS measures to provide an Advance Loss of Profit (ALOP) for the life and health of humans, animals and plants, provided that such measures can be justified scientifically, are non-discriminatory and do not create unfair barriers to trade.

SPS measures are defined within the WTO SPS Agreement as any measure applied:

- to protect animal or plant life or health from risks arising from the entry, establishment or spread of pests, diseases, disease-carrying organisms or disease-causing organisms;

- to protect human or animal life or health from risks arising from additives, contaminants, toxins or disease-causing organism in foods, beverages or feedstuffs;

- to protect human life or health from risks arising from diseases carried by animals, plants or products thereof, or from entry, establishment or spread of pests; or

- to prevent or limit other damage from the entry, establishment or spread of pests.

The WTO SPS Agreement is underpinned by several key elements to ensure that its objectives are achieved. These are briefly described as follows:

Harmonisation

The governments of the members of WTO should base the application of SPS measures on international guidelines and recommendations that are used to protect human, animals and the plant life (WTO, 1995). Weiler and Feichtner (2011) argued that SPS can be trade-restrictive in nature; therefore SPS measures should be based on scientific justification for the level of SPS restriction. The draft framework developed by the DAFF in January 2014 further outlined that harmonisation of SPS measures applied by member countries should be formulated based on the recommendations made by international standard-setting bodies; the International Office of Epizootics (IOE), International Plant Protection Convection (IPPC) and Codex Alimentarius Commission (Codex) (WTO,1995). This encourages members to ensure that SPSs are based on standards supported by international bodies and scientifically justifiable before they are applied.

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Assessment of risk and determination of the appropriate level of SPS

The members shall ensure that the application of SPS measures are based on risk assessment for risk arising for human, animal and plant life. However, the risk assessment should be based on the scientific evidence that is applicable to the processes and the procedures of the production technique which include inspection, testing and sampling that will detect the disease and pest occurrence (WTO, 1995). Furthermore, risk assessment should be based on the recommendations made by international standard-setting bodies (DAFF, 2014). The recommendations made by international bodies are taken into account to avoid inconsistency, the arbitrary and unjustified scientific application for the purpose of protection that could impede trade. Weiler and Feichtner (2011) supported that governments are sometimes pressured to go beyond what is needed for health protection and to use sanitary and phytosanitary restrictions to shield domestic producers from economic competition. The risk assessment is taken into consideration due the economic factor that could implicate member countries when there is a risk involved that could resulted in trade barriers. These assist members to prepare a cost-benefit analysis of the introduction of trade barriers among them. Exporters' use of welfare analysis demonstrates an impact on consumers and producers and the social effect as the result of the introduction of SPS measures.

Adaptation conditions

The member countries should consider the difference in climate, the existence of pests or diseases and food standards before imposing SPS requirements on food, animals and plants originating from different countries. This is an indication that the application of SPS measures varies between different countries of origin. Therefore, WTO SPS agreements recognise SPS risk that does not correspond to national political boundaries and the appropriate level of adapting to the requirements on products from these areas (DAFF, 2014, Weiler and Feichtner 2011 and WTO, 1995). Therefore an agreement ensures that the unjustified use of SPS measures are in favour of domestic producers and foreign suppliers.

Transparency

Governments are obliged to publish all adopted SPS measures to enable other interested WTO members to become acquainted with them, prior to these measures coming into effect. This will assist members of the WTO to prepare for the impact these measures will bring on trade. The WTO has established a committee in the form of a forum to communicate information among the member governments for all aspects related to the implementation of SPS agreements. Therefore, it serves as a provision of necessary information that will assist exporters to respond according to the rights and obligations of SPS agreements (Weiler and Feichtner, 2011 and WTO, 1995).

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Control, inspection and approval of procedures

SPS agreements have provided for the control, inspection and approval of procedures to be established in order to approve the use of additives to curb contaminants in food, beverages and foodstuffs (WTO, 1995). Therefore, member countries should ensure that the procedures established by the WTO are implemented to ensure that the SPS measures of control and inspection are approved before being introduced to other parties.

Technical assistance

The WTO recognised a capacity that is provided on technical assistance to ensure that developing countries implement SPS requirements appropriately. The WTO encouraged all members to facilitate technical assistance to developing member states; either bilaterally or through relevant international organisations such as the OIE, IPPC or CODEX (WTO, 1995). Technical assistance may be beneficial among the developing countries because of a lack of sufficient resources to comply with the standards set by developed countries. This enables developing countries to adjust to SPS agreements to achieve the necessary level of protection and to able to comply with their standards.

Special and differential treatment

Establishing special treatment allows all member states to take into consideration the needs of developing countries. However, this allows an avoidance of SPS protection by developed countries and also enables developing countries to comply with SPS standards and to participate in the committee on SPS. The committee on SPS agreements also grants developing countries time to respond to standards that are established under the WTO (WTO, 1995).

Mechanisms of dispute settlement

Dispute settlement is the mechanism that occurs when one of the members violates SPS rules and regulations. The dispute settlement involves scientific and technical issues and the panel will require an expert for advice in consultation with the reporting partner. Ultimately, international bodies will have to be consulted to establish an appropriate and advisory technical group to resolve issues (WTO, 1995). A dispute arises when an exporter is not happy with the transparency applied in issues of SPS measures. The country is then allowed to report issues

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arising from non-compliance of one party. Therefore, dispute mechanisms are established to correct unjustifiably abused rules in trade.