



Accountable Grant for “Agrifood Standards - Ensuring Compliance Increases Trade for Developing Countries”

Accountable Grant Number: AG 5233

MIS code: 729-623-052-CA-002

**REPORT OF IMPACT ASSESSMENT OF SANITARY AND
PHYTOSANITARY (SPS) MEASURES**

***A Case Study of the Impact of Citrus Black
Spot on the Citrus Industries in South Africa
and Swaziland***

U. Kleih and D. Cassidy

March 2010

Table of Contents

ACKNOWLEDGEMENTS	4
Summary	5
Background	8
Causal Chain Analysis	9
Why carry out impact assessment using Causal Chain Analysis?	9
CCA Tools	9
Citrus Production in South Africa.....	12
Citrus Black Spot	15
The South African SPS System (Plant Health)	17
Swaziland’s SPS System.....	21
SADC.....	21
History of CBS related Notifications and Positions	23
Trade and Development Impacts of CBS on South Africa’s Citrus Industry	27
Trade Impacts	27
Economic Impacts	29
Social Impacts	31
Environmental Impacts	31
Institutional Impacts	32
Flanking Measures	32
Annex 1: People and Organizations Met	35
Annex 2: Literature and websites	37
Annex 3: Main Export Markets for SA Citrus (2008).....	39
Annex 4: Price Trends by Market – South African Citrus (R/kg)	40
Annex 5: Gross Margin Analysis.....	41

Abbreviations

APHIS	Animal and Plant Health Inspection Service / USDA
APIS	Directorate Agricultural Product Inspection Services of the Department of Agriculture, Forestry and Fisheries
ARC	Agricultural Research Council
ASEC	Agrifood Standards – Ensuring Compliance Increases Trade for Developing Countries
CBS	Citrus black spot - disease caused by the fungus <i>G. citricarpa</i> (all strains pathogenic to Citrus)
CCA	Causal Chain Analysis
CGA	Citrus Growers Association of Southern Africa
CRI	Citrus Research International of South Africa
DAFF	Department of Agriculture, Forestry and Fisheries
DIP	Delivered in Port
DPH	Directorate Plant Health of the Department of Agriculture, Forestry and Fisheries
EFSA	European Food Safety Authority
EU	European Union
FAS	Foreign Agricultural Service
FBO	Food Business Operator
FPEF	Fresh Produce Exporters' Forum
FVO	Food and Veterinary Office of the European Commission
GM	Gross Margin
GMO	Genetically Modified Organisms
Grapefruit	<i>Citrus paradise</i>
Ha	Hectare
IPPC	International Plant Protection Convention
ISPM	International Standard for Phytosanitary Measures
Lemon	<i>Citrus limon</i>
ME	Middle East
NRI	Natural Resources Institute, University of Greenwich, UK
NPPO	National Plant Protection Organisation
NPPPIIS	National Plant and Plant Product Inspection Services, APIS
Orange	<i>Citrus sinensis</i> – sweet orange – includes the Navel and Valencia varieties
PCR	Polymerase chain reaction
PHC	Pack-house Code
PPECB	Perishable Products Export Control Board
PU	Production Unit - equivalent to 'place of production'
PUC	Production Unit Code
SA	Republic of South Africa
SADC	Southern African Development Community
Soft citrus/easy peelers	Mandarin and Clementine (<i>Citrus reticulata</i>), Satsuma (<i>Citrus unshiu</i>) and Naartjie (<i>Citrus nobilis</i>)
SOP	Standard Operating Procedures

T	Metric tonne
UAE	United Arab Emirates
USA	United States of America
UK	United Kingdom
USDA	United States Department of Agriculture
ZAR	South African Rand

Exchange rates

Pound Sterling 1 = ZAR (South African Rand) 10.89

USD 1 = ZAR 7.23

(Exchange Bureau, Pretoria, mid-March 2010)

ACKNOWLEDGEMENTS

The authors would like to thank all the public and private sector stakeholders who have contributed to this study in one way or another. In particular, thanks are due to the officials of DAFF (DPH, APIS), CGA, CRI, ARC, University of Pretoria, Swazi NPPO, TechnoServe, and citrus growers, processors, and traders, who have been consulted during the course of the fieldwork.

Summary

The “Agrifoods Standards – Ensuring Compliance Increases Trade for Developing Countries programme” (ASEC)¹ developed from the realisation that compliance with internationally agreed norms for sanitary and phytosanitary (SPS) measures is a pre-requisite for ensuring free movement of agro-food exports from developing countries in a global market. The overall objective of the ASEC programme is to ensure that developing country international trade is maintained or increased. This might be achieved by improved understanding and mechanisms for raising the level at which developing countries participate in the process of standard setting and improve their capacity to meet international standards.

In light of this, this case study intends to improve the understanding of the notification process and assess the impact of Citrus Black Spot (i.e. *Guignardia citricarpa* Kiely) and related interceptions during export and subsequent notifications. This follows a Causal Chain Analysis (CCA) approach whereby the following steps are analysed:

- (a) Study of baseline scenario;
- (b) Changes in trade measures (i.e. SPS notification and its origins);
- (c) Prediction of initial outcome (e.g. changes in trade flows as a result of potential or actual interceptions);
- (d) Prediction of longer-term effects (e.g. changes in production, processing, and marketing systems) and resulting economic, social, environmental, and process/institutional impacts;
- (e) Analysis of flanking measures required (i.e. measures to prevent, mitigate, or enhance the aforementioned economic, social, environmental, and process/institutional impacts).

It is envisaged to include the case study in a ‘toolbox’ enabling the rapid assessment of a range of potential impacts on trade as well as identification of required mitigating measures, thereby strengthening the negotiating position of affected countries.

South Africa is the world’s second largest exporter of citrus. Citrus Black Spot (CBS) and related notifications and trade negotiations must be seen in this context. CBS, which is caused by the fungus *G. citricarpa*, is a leaf-spotting and fruit-blemishing disease that can affect most commercially grown citrus species and cultivars.

The presence of CBS in South Africa became an issue for citrus growers targeting the EU market, when in 1997 the European Communities issued a notification listing third countries and areas recognized as being free of *G. citricarpa* – citrus black spot. As a result, given the EU’s specific quarantine pest profile for which it requires the application of phytosanitary measures, citrus exports from South Africa risk being intercepted if CBS is discovered during inspections on arrival in Europe. Despite an ensuing lengthy correspondence including a pest risk assessment by South Africa in 2000 and subsequent submission of scientific research results, the EFSA Panel on Plant Health did not agree with South Africa’s position that the climate of the EU is unsuitable for the establishment of *G. citricarpa*, and that *G. citricarpa* is unable to survive transport, storage and existing pest management procedures.

¹ The ASEC Programme is supported by the UK Department for International Development (DFID) and managed by the Natural Resources Institute (NRI) of the University of Greenwich, UK.

In addition, the FVO team visiting the country in mid-2009 concluded that South Africa has established a system of official controls for citrus exported to the EU that is generally in line with relevant International Standards for Phytosanitary Measures. The FVO team, however, identified a number of weaknesses in the official checks in respect to fruit originating outside of the pest free areas and that there was, therefore, a continued risk of potential introduction of CBS into the EU on such fruit. As a consequence of the FVO mission's recommendations, as of August 2009 South Africa's NPPO is applying a strengthened CBS risk management system. Nevertheless numerous stakeholders belonging to the NPPO and the citrus industry appear unconvinced of the EU's arguments and there remains the possibility that South Africa will seek a dispute settlement through the IPPC.

South Africa is a signatory member of the WTO Agreement on the Application of Sanitary and Phytosanitary Measures (i.e. SPS Agreement), which sets out the basic rules for agricultural trade, and subscribes to the principles of equal market access and international co-operation in protecting human, animal, and plant health. As a consequence of its history in agricultural exports the country has a mature SPS system in place. The fact that the National Notification Authority (Directorate of International Trade) and the three contact points covering plant health, animal health, and food safety and quality assurance, form all part of DAFF reduces communication obstacles. On the other hand it was indicated that the link between NPPO and Directorate of International Trade could be closer.

Trade diversion is one of the consequences of CBS and potential as well as 'real' interceptions. In particular, the following strategies have been highlighted by producers:

- If a consignment is intercepted in the EU (e.g. Rotterdam) this is likely to lead to onward shipments to countries such as Russia. Prices may be lower and logistics costs higher in the latter but at least not the entire consignment is lost due to destruction.
- In order to avoid interceptions, citrus shipments would be sent to less sensitive markets (e.g. Middle East, non-EU Eastern European countries) if a consignment was in danger of being intercepted on arrival in the EU.
- Fruit considered not fit for export would be sold on the local fresh fruit market or used for processing (e.g. juice, jams, canned fruit).

At enterprise level, the impacts of CBS are as follows:

- Increased spraying regime required in order to minimise risk of interceptions in sensitive markets;
- Replacement of old trees that are more likely to be affected by CBS;
- Orchard hygiene in the form of leaf litter removal;
- More intensive grading required in pack houses in order to sort out blemished fruit;
- Lower margins as a result of fruit diverted onto other markets, and/or increased production (e.g. spraying) and pack house costs. For example, by reducing exports by 10% and diverting fruit onto the processing, local and regional markets growers see a nearly 27% drop in gross margin and if CBS sensitive markets cannot be accessed the loss in gross margin increases to 45%.

As for social effects, it appears as if CBS is actually contributing to employment in that a relatively small number of extra labourers are being employed for grading in pack houses. Given that farms and estates are trying to reduce labour inputs it is likely that the impact at production level (e.g. leaf litter control, and spraying) is insignificant.

In view of the need for an intensive spray management, small citrus farms have difficulties in controlling CBS. In particular, those farms lacking access to extension services are likely to suffer a larger impact in that their marketing options will be limited. This is likely to include emerging farmers who have started or taken over citrus production as a result of the transformation process. The latter therefore need continued support coordinated by the extensions services, CGA/Citrus Academy and the Fresh Produce Exporters Forum (FPEF).

Intensive spraying can lead to extra pressure on the environment. Although some chemicals are not persistent and are quickly broken down in the soil, there is a significant weight of evidence that copper based fungicides have a long-term impact on a wide range of soil biota.

As for institutional impact, CBS has led to a coordinated response from the industry and the public sector. In particular, a close link has been established between the private sector and NPPO, involving growers (represented through a strong association), research bodies (e.g. CRI, Universities), and DPH and inspection agencies. As for the functioning of the SPS Coordination Committee it appears as if the link between the Directorate of International Trade and the NPPO plus private sector stakeholders could be strengthened.

The NPPO of Swaziland appears to be constrained by a lack of resources. For example, the SPS system apparently heavily relies on only a few individuals. As a result, the planned recruitment drive is highly necessary. In addition, legal updates of the SPS System are equally justified (e.g. Plant Health Protection Bill).

SPS issues are only partly covered at SADC Secretariat level, giving the impression of a fragmented approach. Although some gaps are being filled, more efforts are required, starting with improved communication. For example, a SPS desk and dedicated web page are required to assist NPPOs operating in SADC countries.

Background

The “**Agrifoods Standards – Ensuring Compliance Increases Trade for Developing Countries programme**” (ASEC), which is supported by the UK Department for International Development (DFID) and managed by the Natural Resources Institute (NRI) of the University of Greenwich, has components dealing with public standards (Theme A), private sector standards (Theme B), and livestock standards (Theme C). One of the issues identified in this context relates to notifications of sanitary and phytosanitary (SPS) measures by individual countries, and interaction by countries at the notification stage. An important aspect of this is a good understanding of the impacts of a SPS notification on trade and key development indicators (economic, social, environmental and institutional).

The objectives of this case study are the following:

- (a) Provide an overview of the South African SPS system, with emphasis on the National Plant Protection Organisation (NPPO);
- (b) Demonstrate the functioning of the South African SPS system, using the case of Citrus Black Spot (CBS) and related notifications by the EU and USA;
- (c) Draw comparisons with SPS system in Swaziland and how SPS issues are dealt with at SADC level.

Citrus (in particular Valencia and Navel oranges, Star Ruby grapefruit, lemon/limes and soft citrus such as Clementines and Mandarins) are amongst South Africa’s main export products. The country is the world’s 12th largest producer of citrus, with a planted area of 58,598 hectares and an estimated annual production of 2.27 million tonnes (CGA, 2009; FVO, 2009). The biggest crop is oranges, accounting for approximately 1.525 million tonnes. The remainder includes 173,000 tonnes of soft citrus, 341,000 tonnes of grapefruit and 230,000 tonnes of lemons.

South Africa is the world’s second largest exporter of citrus. Citrus Black Spot (CBS) and related notifications and trade negotiations must be seen in this context. CBS, which is caused by the fungus *Guignardia citricarpa* Kiely, is a leaf-spotting and fruit-blemishing disease affecting all commercially grown citrus species and cultivars except for sour orange and Tahiti limes. Due to the external blemishes, black spot affected citrus fruit is unsuitable for the fresh market. Severe infections may cause premature fruit drop, especially in years favourable for disease development and when fruit remains on the trees past peak maturity.

Causal Chain Analysis

Why carry out impact assessment using Causal Chain Analysis?

Sustainability impact assessments (SIA) of SPS measures can be conducted for the following reasons:

- (a) to understand potential implications of a SPS notification on trade and on social, economic, environmental and institutional development across the complete value chain;
- (b) To prepare a response to a notification;
- (c) To assess the impact a trade measure has had, and
- (d) To analyse lessons learnt.

Both, (a) and (b) fall under the category of ex-ante assessments, whilst (c) and (d) represent ex-post assessments.

The sustainability impact assessment is based on the principles of an integrated approach that assesses economic, social, environmental, and process implications; use of a causal chain analysis (CCA); consultation and stakeholder participation; assessment of significance of impact; and identification of flanking (prevention, mitigation and enhancement) measures. CCA is used at several points in the overall SIA, namely for scoping (after initial screening), the full assessment, for prevention, mitigation and enhancement measures, and for ex-post monitoring and evaluation of outcomes.

The key components of the SIA methodology are:

Development and use of indicators of impact, especially second tier indicators that are specific to fruit exports;

Causal Chain Analysis (CCA) using pre and post (equilibrium) adjustment scenarios;

Identification and implementation of case studies;

Development and use of prevention, mitigating and enhancement measures to interact with initial CCA outcomes.

CCA Tools

CCA uses a cause and effect relationship. The tools range from qualitative to quantitative methods, but the emphasis is on qualitative methods to obtain results within a short time-frame. This will involve such methods as

- desk studies of primary and secondary data;
- analysis of trade data, including prediction of trade flows, and changes of relative prices;
- participatory appraisals, key informant interviews, and focus group discussions.

Figure 1: Stages in Sustainability Impact Assessment

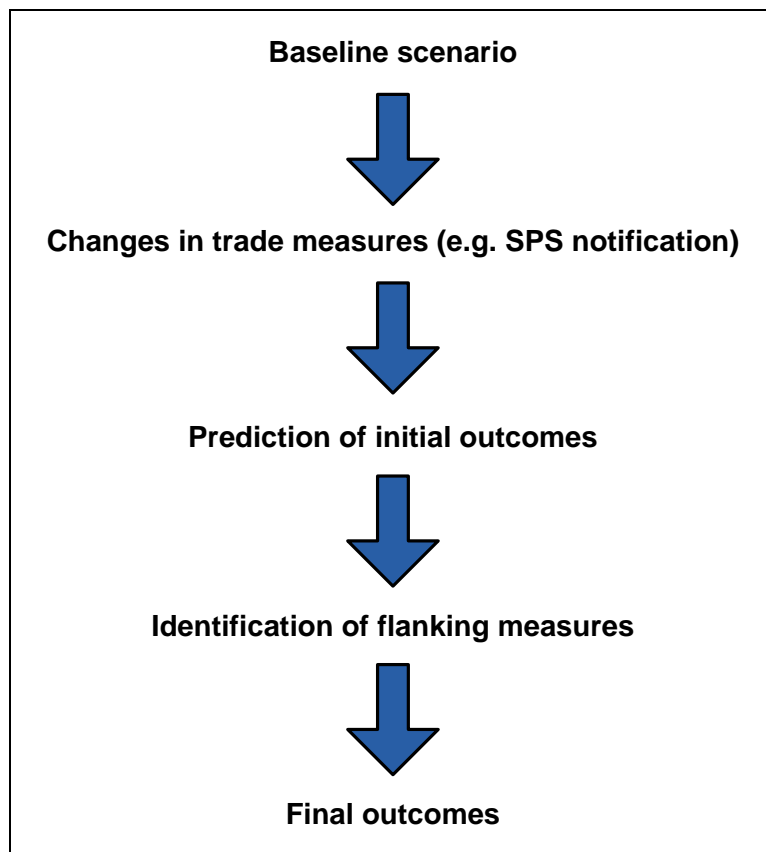


Figure 2: Schematic representation of CCA

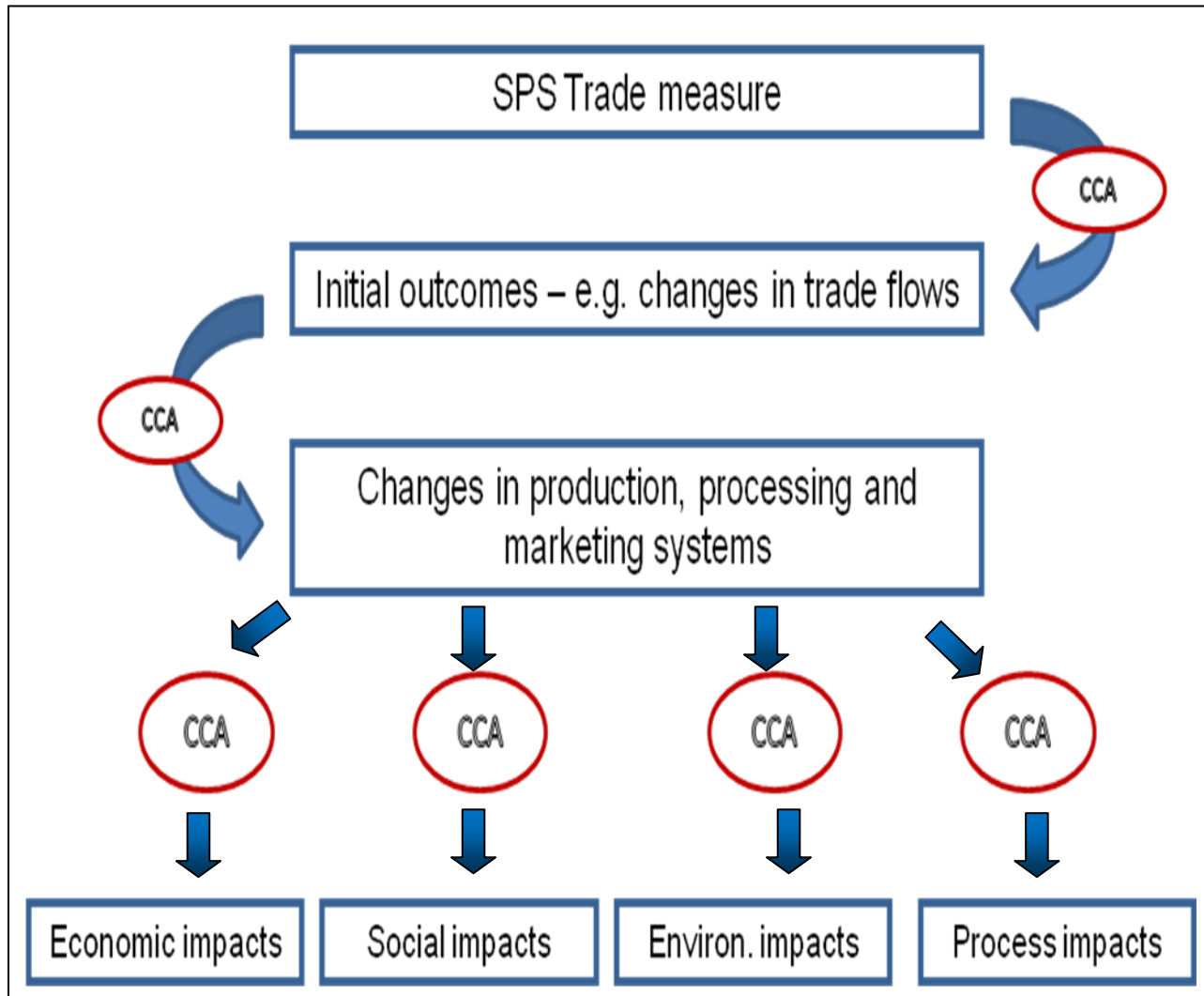


Table 1: Sustainability indicators for assessing the impact of SPS notifications

Sustainability dimension	Core indicators	Second tier indicators
Economic	Real income	Levels of production, trade, income levels of different stakeholder groups, enterprise profitability (e.g. margins), govt. revenues (licence fees, taxes, etc);
	Employment	Levels of employment in production and post-harvest industries;
	Fixed capital formation	Size and type of farms, equipment, etc
Social	Poverty	Indebtedness, nutrition data, female headed households, livelihoods and development, migration;
	Health and education	Primary health care, primary education levels, especially in citrus growing communities;
	Equity	Income distribution, asset ownership (land, processing facilities); gender distribution – income and assets
Environmental	Natural resources	Availability and quality of land
	Environmental quality	Pollution as a result of chemical use in production;
	Biodiversity	Change in endangered species; change in protected areas;
Process	Consistency	Domestic policies and commitment
	Institutional capacity	Capacity of SPS system; Interaction between public and private sectors; Interaction with regional and international SPS related organisations. .

Source: Adapted from Kleih et al (2006)

Citrus Production in South Africa

Citrus is a major agricultural crop in South Africa, and a significant source of foreign exchange for the country. Table 2 shows production areas per province, including Swaziland, and area planted per citrus group.

Broadly, citrus producers can be categorized into large-scale estates and small- to medium sized farms. Estates tend to produce on several hundred and in some cases over 1,000 hectares, whilst small- to medium sized producers grow citrus in units of up to approximately 100 hectares. Estates are likely to have their own pack houses, whilst farms are often organized in cooperatives which operate pack-houses.

Table 2: Area planted per citrus group and production areas

Area planted per citrus group		Production areas	
Citrus variety	Area (ha)	Province /country	Area (ha)
Valencia	24,186	Limpopo	19,079
Navel	14,497	Eastern Cape	11,762
Grapefruit	9,166	Mpumalanga	11,207
Soft citrus	5,033	Western Cape	9,829
Lemons & limes	4,426	Kwazulu-Natal	3,865
Mid-season oranges	138	Swaziland	2,098
Pomelos	137	Northern Cape	706
		North West	50
Total	58,596	Total	58,596

Source: CGA, Key Industry Statistics 2009, Preliminary estimates.

Figure 3 provides details of the South African citrus production (2.27 million tonnes) and its utilization in 2008. In particular, South Africa is amongst the world's leading exporters of oranges and grapefruit. Given that most of the orange exports by EU countries (e.g. Spain) constitute intra-EU trade, South Africa is the world's largest supplier of oranges ahead of countries such as Egypt, USA, Turkey and Morocco (USDA, FAS January 2010).²

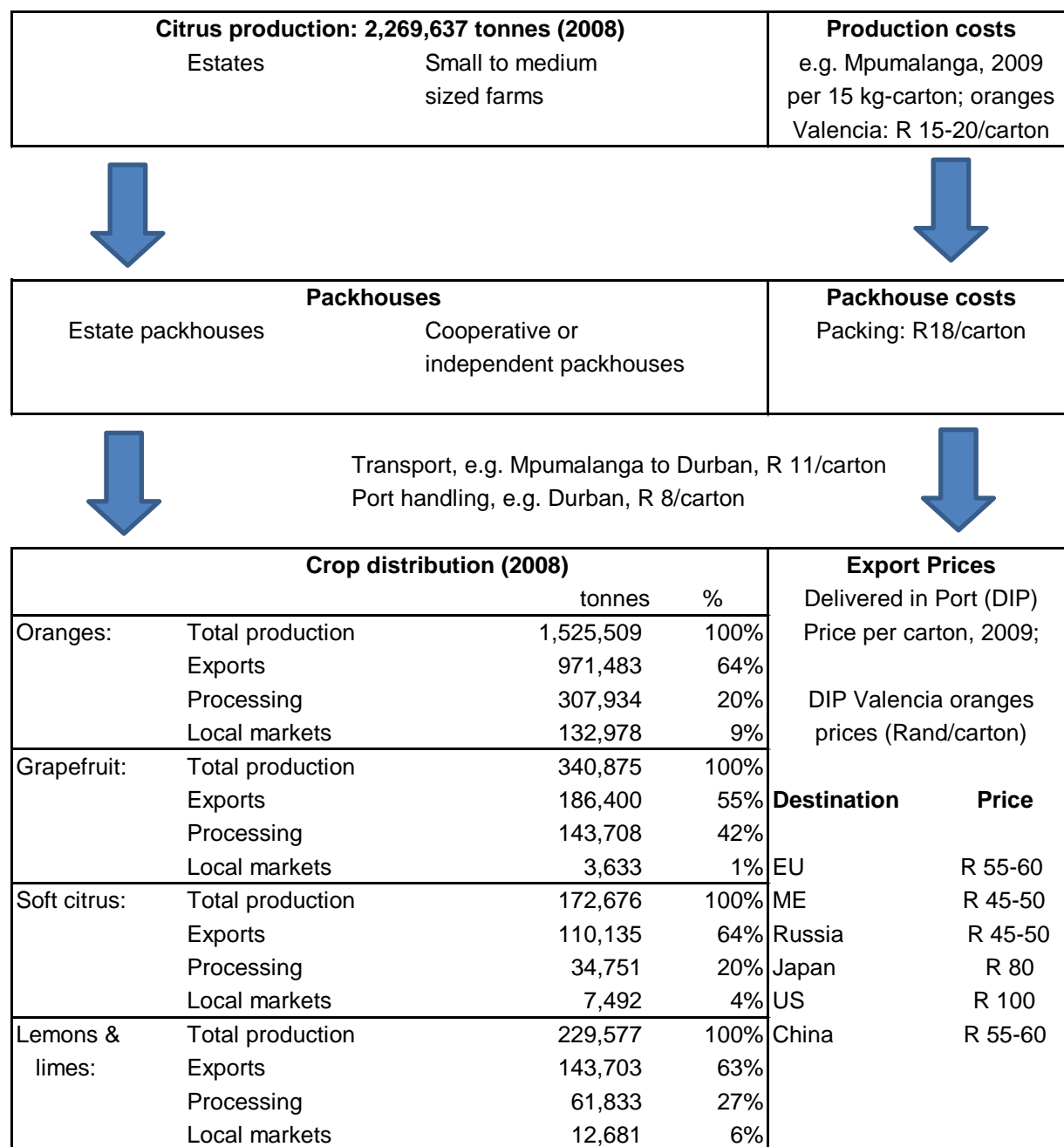
Industry participants tend to express prices in South African Rand (ZAR) per 15-kg carton of fruit as shown in Figure 3. Export fruit fetches by far the highest price (R 3.4/kg of oranges in 2008), compared to the local fresh fruit markets (R 1.4/kg), and fruit destined for processing (R 0.42/kg).³

In 2008, the main export destinations for oranges were: Northern Europe (29%), Middle East (20%), Southern Europe (12%), Russia (11%), UK (8%), Far East (7%), USA (4%) and other markets (6%).

² Source: Citrus – World Markets and Trade (January 2010), USDA/FAS

³ Source: CGA, Key Industry Statistics, 2009

Figure 3: Citrus Value Chain in South Africa



Source of crop distribution data: CGA, Key Industry Statistics, 2009; based on DoA/PPECB data

Source of price data: Trade interviews in Mpumalanga, March 2010.

NB: Export data represent consignments that have been inspected and passed for export

Local market data is based on sales on the 20 major fresh produce markets

Citrus Black Spot

Citrus black spot (CBS), caused by the fungus *Guignardia citricarpa* Kiely, is a leaf-spotting and fruit-blemishing disease affecting *Citrus*, *Poncirus*, *Fortunella* spp. and their hybrids. Except for sour orange and Tahiti limes, all commercially grown citrus species and cultivars are affected by the disease. Lemon is particularly susceptible and thus, in an unaffected area, the disease usually first appears on this species.

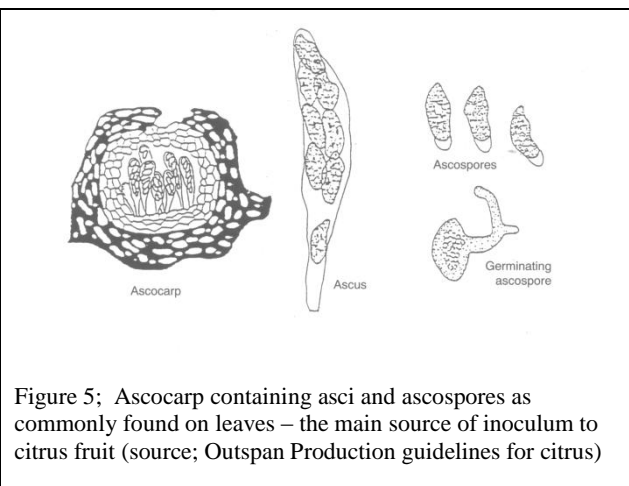
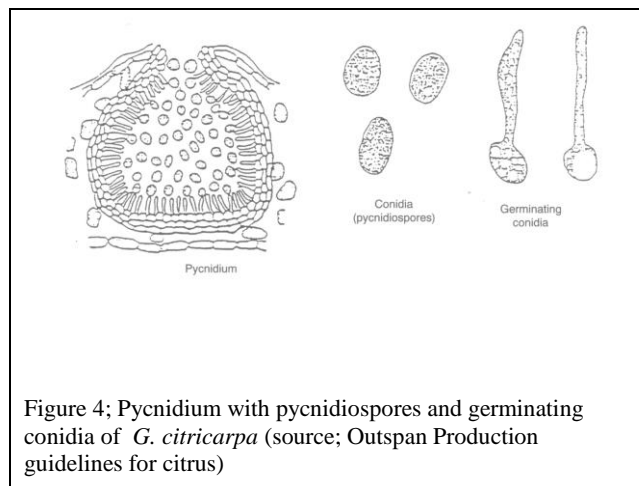
CBS is present in citrus-producing areas in Asia, Oceania, Africa and South America, but it has never established in Europe, North America, Central America and the Caribbean region.

The pathogen is widely distributed throughout southern Africa though not in the winter rainfall region of South Africa (the Northern Cape and much of the Western Cape). The disease is severe only in the hot, humid, low-lying regions of the Transvaal and Natal but also occurs in the Eastern Cape on lemons and sometimes on Valencia oranges.

Due to the external blemishes, CBS symptomatic citrus fruit is unsuitable for the fresh market but can be processed. Severe infections may cause premature fruit drop, especially in years favourable for disease development and when fruit is held on the trees past peak maturity. In addition, asymptomatic fruit at harvest may still develop symptoms during transport or in storage.

Symptoms

Infected leaves seldom show symptoms of the disease. Leaf symptoms, when present, are small necrotic spots with a gray center surrounded by a dark brown ring and a yellow halo. Leaf spots appear more commonly on lemons than on other cultivars. Symptoms are extremely variable and can be difficult to identify. The most reliable diagnostic criterion is the presence of pycnidia (Figure 4), but they are not always present.



Causal Organism

The teleomorph (sexual part of the life cycle) is *G. citricarpa* and is the commonly used name for CBS.

Disease Cycle and Epidemiology

The disease cycle is influenced by the availability of inoculum, climatic conditions, the growth cycle of the citrus tree, and the age of the fruit. Pycnidiospores formed on dead leaves on the ground can reach the susceptible fruit only by the splashing of raindrops, and they are not considered an important source of inoculum. However, pycnidia can be a significant source of inoculum if out-of-season fruit or late-hanging fruit with lesions remain on trees after bloom and fruit-set. Ascospores from dead leaves on the orchard floor provide the main source of inoculum. The critical period for infection starts at fruit-set and lasts for 4-5 months. First symptoms do not appear until more than 6 months after fruit-set.

Control

It is recommended to make every effort to exclude black spot from countries or regions where the disease has not been observed (e.g. use of trees from nurseries in areas free of the disease to establish new orchards). According to South African sources, ascocarps of the pathogen have never been found on fruit, and the pycnidiospores are not airborne. Therefore, disease spread from country to country is unlikely through the movement of infected fruit. Protectant fungicides such as copper fungicides or mancozeb are used to control black spot and spray applications have to be carefully timed. Spore trapping in conjunction with rainfall and temperature records have been used successfully in South Africa to determine the time and intensity of ascospore releases. Where black spot is potentially severe, up to five sprays may be required during the 4-5 months of rind susceptibility. Protective fungicides are supplemented by newer systemic fungicides including benzimidazoles and newer fungicides known as strobilurins (which is a chemical group discovered in 1977 and are based on fungal exudates that inhibit other fungi). Both systemic fungicidal groups suffer from the development of fungal resistance and have to be used with care.

Figure 6: Citrus Black Spot



Source: CRI website

The South African SPS System (Plant Health)

South Africa is a signatory member of the WTO Agreement on the Application of Sanitary and Phytosanitary Measures (SPS Agreement), which sets out the basic rules for agricultural trade, and subscribes to the principles of equal market access and international co-operation in protecting human, animal, and plant health (Theyse, no date).

In implementing the SPS Agreement, and as part of “transparency” obligations, Members are required to identify a *single* central government authority which is responsible for the notification requirements of the SPS Agreement, the National Notification Authority (NNA). In addition, Members are required to establish a National Enquiry Point (NEP) responsible for answering questions from other Members about SPS measures and related issues (Jennings, 2009).

According to the WTO SPS Information Management System, the Director of International Trade of the Department of Agriculture, Forestry and Fisheries (DAFF) represents both the NNA and NEP. De facto, South Africa has three SPS enquiry points, namely the Directorate of Plant Health, the Directorate of Animal Health, and the Directorate of Food Safety and Quality Assurance. All three are within DAFF, although there are overlaps with the Department of Health as far as food safety and quality assurance are concerned.

The fact that the SPS enquiry points and the National Notification Authority are all based in DAFF is advantageous in that it avoids cross-departmental communication hurdles. Nevertheless, some stakeholders commented that the link between NNA and NEPs could be strengthened. On-going organizational changes at DAFF and staff shortages were mentioned as possible reasons for infrequent meetings of the SPS Coordination Committee, and a link between NNA and NEPs that could be stronger (e.g. infrequent participation of International Trade staff in citrus related working groups).

Given that the focus of this study is on plant health matters, the following sections will concentrate on the elements and functioning of the National Plant Protection Organisation (NPPO). The NPPO of South Africa consists of the Directorate of Plant Health (DPH) and the Agricultural Product Inspection Services (APIS), within DAFF.

The DPH acts as the national plant protection contact point for South Africa. It is responsible for policy development within the NPPO and ensures compliance with international plant health obligations and responsibilities. The DPH is divided into the following sub-directorates:

- Plant Health International Standards and Contact Point;
- Import and Export Protocols;
- Plant Health Pest Risk Analysis and Plant Health Import Permits;
- Plant Health Quarantine and Diagnostic Services;
- Plant Health Early Warning System;
- Plant Health National Policies, Norms and Standards;
- National Plant Health Promotion and Communication Programmes.

APIS is responsible for phytosanitary certification at points of entry/exit. It is divided into two sub directorates:

- Port of Entry Point Control (responsible for point of entry controls and the issue of phytosanitary certificates;

- National Plant and Plant Product Inspection Services (mainly responsible for the quality assurance of agricultural and liquor products, genetic resources related to GMOs and plant propagating material, including seeds for planting. This includes some import controls and the certification of regulated articles intended for export, including the issue of phytosanitary certificates and international certificates.

APIS may carry out on-farm verification where notifications of non-compliance were received in order to determine and address the reasons for non-compliance.

PPECB (Perishable Products Export Control Board) is a parastatal body working closely with DAFF, which is responsible for performing quality assurance inspections and the certification for fresh produce, including citrus fruits, for export from South Africa.

Responsibility for the pre-export phytosanitary check has been formally delegated to the PPECB by the NPPO. The PPECB carries out the official phytosanitary inspections at the pack-houses at the same time as the quality assurance check, which the PPECB carries out for all fresh produce exported from South Africa.

CGA (Citrus Growers Association) was created following the deregulation of the South African marketing system in 1997 when growers were concerned that certain functions previously carried out by the Citrus Board could be discontinued or downsized. The CGA represents citrus grower interests through representation to industry stakeholders – including government, exporters, research institutions and suppliers to the citrus industry. The CGA represents the interests of the producers of export citrus. In total approximately 1400 growers throughout Southern Africa (including Zimbabwe and Swaziland) are members of the Association. The growers are organised into eighteen regions (<http://www.cga.co.za>).

CGA is funded by an escalating levy which was 32 ZA cents per 15-kg carton in 2008, 38 cents in 2009, 39 cents in 2010, 40 cents in 2011, and 41 cents in 2012.

CRI (Citrus Research International) provides research and technical support to the citrus industry, with the objective of maximising the long-term global competitiveness of the South African citrus industry through the development, support, co-ordination and provision of Research and Technical services. CRI also coordinates all research conducted in support of the industry. Citrus Research International and partners in the CRI Group, all use funds from the Citrus Growers Association levy to conduct research for the citrus industry in southern Africa (<http://www.citrusres.com>).

CRI includes a number of Divisions, including Research, Technical, Citrus Improvement Scheme and Cultivar Development. CRI also has an Extension Division, which provides technical information and advice directly to producers through monthly study groups in each region. These groups provide growers, pack houses and exporters with pest and disease management guidelines and other relevant information.

While the CEO of CRI is based at the University of Stellenbosch, the main research infrastructure is located in Nelspruit, Mpumalanga.

Other research bodies. The University of Pretoria, Department of Microbiology and Plant Pathology, has been active in CBS related research and a number of PhD theses have been

produced on the subject. The issue of lack of funding was raised. To some degree, the Agricultural Research Council also carries out research on CBS. Both organisations have participated in expert working groups on CBS.

Forums and committees

The NPPO holds various meetings and forums together with CGA, CRI, and other stakeholders to discuss issues regarding the phytosanitary requirements for the export of citrus fruit from South Africa to overseas markets.

The following forums have been established to discuss relevant issues:

- Market Access Working Group for Fresh Fruit: This meeting is held once every two months between DAFF, PPECB, CRI, CGA, FPEF and other fruit industry representatives to discuss phytosanitary issues and other matters that are of importance for the access of new markets and maintenance of current export programmes.
- Annual citrus export coordinating meeting, which is held immediately after the end of the South African citrus season. This is attended by representatives from DAFF, pack house managers, PPECB, CRI, CGA, FPEF and other stakeholders. Any problems encountered during the season are highlighted and discussed with the aim of correcting and planning in order to improve compliance during the coming season.
- The Fresh Produce Exporters' Forum (FPEF) is a non-profit industry organization and its membership is voluntary and open to all companies that export fresh fruit from South Africa. Strict accreditation and admittance criteria were established to ensure that only competent and reliable marketing agents and grower-exporters are admitted to the Forum.
- Ad-hoc working groups such as the CBS Expert Working Group, which has been set up to prepare responses to the European Commission in relation to notifications and subsequent communications.

In sum, the NPPO has established good communication with all stakeholders involved in the export process. Stakeholders have commented that the forums are necessary for priority setting in the industry.

Table 3 summarises the main elements of the South African SPS system (Plant Health) highlighting key institutions involved and issues encountered.

Table 3: Overview of the South African SPS System (Plant Health)

SPS-System Function	Organization / Issues
National Notification Authority	<p>Directorate of International Trade, DAFF</p> <p>SPS Coordination Committee is not meeting regularly, due to changes in the DAFF structure; more communication is required; for example, Directorate of International Trade have only limited involvement in the Market Access Working Group. Similarly, the Department of Trade and Industry (DTI) get invitations but rarely attend.</p>
National Contact Point	<p>Directorate of Plant Health (DPH);</p> <p>It is one of three national enquiry points; ensures compliance with international plant health obligations and responsibilities; it has three sub-directorates; Good interaction with the private sector (e.g. CGA, CRI), and other Government directorates (e.g. APIS) dealing with plant health issues;</p>
Committees	<p>There are several forums and committees (e.g. Market Access Working Group; Citrus Working Group; Cold Chain Forum) bringing together private and public sector players. If required, some ad-hoc technical committees have been formed depending on circumstances.</p> <p>Working groups and committees play an important role in setting priorities; involvement of Directorate of International Trade at DAFF, or Department of Trade and Industry could be strengthened.</p>
Implementation of SPS matters	<p>APIS (Agricultural Product Inspection Services)</p> <p>PPECB (Perishable Products Export Control Board)</p> <p>There may be an issue of overlap of functions between the two organizations.</p>

Swaziland's SPS System

Swaziland's SPS system is mainly based in the Ministry of Agriculture, in that the Principal Secretary of the MoA represents the National Notification Authority, whilst the country has three enquiry points (i.e. Plant Health, Animal Health and Food Safety). Although the latter also draws on the Ministry of Agriculture, the main contact point is based in the Ministry of Health.

There is a SPS Coordination Committee which, amongst others, includes the Ministry of Agriculture (includes Plant Health, Animal Health and Food Safety Departments), Ministry of Health, Ministry of Trade, Federation of Employers, and Swaziland Standards Authority. Apparently, meetings are not held on a regular basis. Also, the role of the Swaziland Standards Authority in the SPS system is not always clear.

Due to lack of resources, Swaziland's NPPO appears to be relatively weak, as a result of which it is currently based within the research system. It is expected that a major recruitment drive will alleviate some of the constraints. Also, the Plant Control Act of 1981 is under review. With assistance from the FAO a new Plant Health Protection Bill is currently being elaborated.

Given the geographic location of Swaziland, their exporters rely on South Africa and Mozambique for access to the sea (i.e. mainly Maputo or Durban). As a consequence, both Swazi and South African inspectors are present in pack houses of citrus estates in Swaziland. Overall, the stakeholders concerned seem to be happy with this arrangement.

SADC

Lack of compliance with WTO/SPS measures by SADC Member States, has been identified as one of the most important constraints to regional agri-products trade and access to international markets (<http://www.sadc.int/fanr/> March 2010). For example, the lack of compliance limits the access to preferential lucrative markets offered by the EU or the US (under AGOA) for targeted agricultural products. At the same time, it is recognised that agricultural trade is important for economic growth and poverty reduction. Also, compliance with harmonized SPS measures is expected to lead to improved food safety and food security for consumers in the SADC region.

As yet, SADC Member States do not have harmonised and fully enforced regulations on SPS measures (e.g. on Maximum Residue Levels). In addition, there is a lack of participation by SADC Member States in the activities of SPS standard setting organizations (i.e. OIE, IPPC and Codex Alimentarius Commission), both in terms of numbers and effectiveness.

It is recognised that access to international markets for agricultural products requires capacity building and benchmarking of SPS systems. As a consequence, several projects and programmes have been initiated in the region, such as:

- The Food Safety Capacity Building on Residue Control (FSCBRC) project has been designed by SADC with the overall purpose to harmonize food safety control regulations, guidelines and procedures through institutional strengthening in the SADC region in order to meet international requirements. As for achievements, amongst other things, as

part of the FSCBRC project a harmonized SPS protocol for food safety has been drafted for the SADC region.

- Other programmes in the SADC region, amongst other things, focus on Foot and Mouth Disease (FMD), promotion of regional integration in the livestock sector, and support for standards, quality assurance, accreditation and metrology. Similarly, at COMESA level, regional integration support programmes include components of capacity building to develop SPS legal frameworks, put in place a regional sub-committee on SPS measures, and establish regional reference laboratories (Source: Overview of SPS Needs and Assistance in Mozambique, Siem Reap, 2008).

As for issues and challenges, the following transpires:

- Whilst the projects and programmes have seen achievements in some areas, substantial work remains to be done in others (e.g. establishment of SPS Desk, and improved communication including creation of a dedicated SPS website for the SADC region);
- Effective SPS measures are difficult to coordinate and implement in the region in face of specific threats such as *Bactrocera invadens*;
- In some countries in the region there is the possibility of political interference as far as SPS and other coordinated measures are concerned;
- Whilst some projects and programmes in the SADC and COMESA regions complement each other, there is also the danger of overlap and duplication of efforts.

History of CBS related Notifications and Positions

European Union

CBS has come to the fore during the second half of the 1990s when the EU issued a notification, listing third countries and areas recognized as being free of the disease. Given that CBS exists in parts of South Africa, and the fact that in accordance with European phytosanitary legislation the import of citrus into the EU is banned if the fungus is present on citrus fruits, the latter's citrus exports faced the possibility of interception in the importing European countries.

Table 4 provides a timeline of the communication and responses between the European Union and South Africa relating to *G. citricarpa*.

Table 4: Timeline of communication between South Africa and the European Union regarding *G. citricarpa* (Citrus Black Spot)

1997	Notification by the European Community (G/SPS/N/EEC/46) in 1997, which, amongst other things, listed third countries and areas recognized as being free of <i>G. citricarpa</i> (all strains pathogenic to citrus) – citrus black spot.
2000	The European Commission (SANCO E.1) received in June 2000 from the national plant protection organisation of South Africa a document titled "Citrus Black Spot: Pest Risk Assessment document for the review of current phytosanitary regulations pertaining to the export of fresh citrus fruit from the Republic of South Africa to the EU". In the document it was argued that the citrus growing areas in the Community do not have a climate suitable for an establishment of <i>G. citricarpa</i> . Moreover, the introduction of <i>G. citricarpa</i> leading to its establishment through the import of citrus fruit into so far uninfected areas is considered to be a very unlikely pathway.
2001	The European Commission sent a response to the South African authorities in December 2001.
2002 – 2004	South African authorities responded by providing three additional documents – general response in September 2002; additional data on mapping the potential distribution of CBS in December 2003 and, finally, further data on research of potential transmission of CBS from fruit to leaf litter in July 2004.
2006	These documents were discussed in June 2006 and a report was sent to South Africa in November 2006.
2007	In September 2007, the European Commission received a response from South Africa, supported by recent scientific papers, making the case that the combination of sequential hurdles (with, in their view, progressively decreasing feasibility of cumulative effect) precludes any realistic risk of <i>G. citricarpa</i> becoming established in Europe, and that the sum of these hurdles represents an unlikely situation. South Africa also expressed its view that the exchange of information so far between the EC and the South African authorities has provided adequate scientific basis to support their position and to conclude that, in accordance with the IPPC principle of "minimum impact", the current level of EU regulation is unduly restrictive and needs revision.

2008	<p>EFSA (European Food Safety Authority) response based on the scientific opinion of the Panel on Plant Health (Question No EFSA-Q-2008-299), which was published in December 2008 (<i>The EFSA Journal</i> (2008) 925, 1-108).</p> <p>Selected findings: The EFSA Panel on Plant Health did not agree with South Africa's position that the climate of the EU is unsuitable for the establishment of <i>G. citricarpa</i>.</p> <p>Also, the Panel considered that <i>G. citricarpa</i> is able to survive transport, storage and existing pest management procedures, and may be transferred to suitable hosts by means of splash dispersal from citrus black spot infected citrus fruit and peel.</p>
2009	<p>FVO mission to South Africa in 2009. Mission report states that "South Africa has established a system of official controls for citrus exported to the EU that is in line with relevant International Standards for Phytosanitary Measures. The surveys and measures to maintain the pest free areas for CBS are also in line with the relevant International Standard".</p> <p>However, according to the report, "there are a number of weaknesses in the official checks that are carried out for <i>Citrus</i> fruit intended for export to the EU, which means that the EU's import requirements with respect to CBS are not currently being fully complied with, in respect to fruit originating outside of the pest free areas. There is therefore a continued risk of potential introduction of CBS on such fruit."</p> <p>As a result of the FVO mission, as of 23 August 2009 South Africa's NPPO is applying a strengthened CBS risk management system, which ensures immediate exclusion of intercepted citrus fruit types from production units where CBS has been detected; the subsequently refined and streamlined system for application in 2010 provides for immediate exclusion of intercepted fields of production. For details see Response of the Competent Authorities of South Africa to the recommendations of Mission report ref. DG(SANCO)/2009-8184-MR.</p>
2010	<p>Although South Africa's NPPO is applying a strengthened CBS risk management system, the country's citrus growers and NPPO stakeholders appear to disagree with the FVO report findings, and there is the possibility that South Africa will seek a dispute settlement through the IPPC. While dispute settlements provided by IPPC are not binding, the process and results will likely have significant weight if the issue is taken to the World Trade Organization (WTO) under the SPS Agreement (https://www.ippc.int).</p> <p>Although it has not been openly expressed, South African stakeholders appear to harbour a suspicion that the EU is using CBS as a pretext to protect European citrus producers from competition.</p>

Source: EFSA (2008), FVO (2009), Response of the Competent Authorities of South Africa to the recommendations of Mission report ref. DG(SANCO)/2009-8184- MR; and field survey in March 2010.

CBS related interceptions of South African citrus on arrival in the European Union have rapidly increased between 2006 and 2008 (i.e. from 22 to 78 interceptions). However, as illustrated in Table 5, due to efforts by the South African growers and NPPO, the notifications have sharply dropped in 2009. The bulk of the interceptions have taken place in the Netherlands which is also the largest market for South African citrus in the EU. At the same time, it is worth noting that substantial quantities of citrus are re-exported from the Netherlands to other parts of Europe.

Table 5: Number of CBS related interceptions of South African citrus in the EU

Year	Number of interceptions
2006	22
2007	42
2008	78
2009	13

The decline of CBS related interceptions in the EU in 2009 was due to improved CBS risk management in South Africa. According to Zaheer (2009), the following countries represent CBS sensitive markets: EU, India, Iran, Japan, Reunion. The discovery of one or more CBS lesions on one or more fruit within an inspection unit (i.e. pallet) during inland PPECB inspections constitutes an interception. A strike occurs when an interception arises in 2 or more inspection units (pallets) per inspection lot (10 pallets) irrespective of the listed target country.

A production unit (PU) is disqualified from the CBS sensitive programmes as soon as 2 strikes are accumulated in any one window of evaluation (i.e. 10 consecutively inspected Inspection Lots). Disqualification results in the termination of any further acceptance of fruit from the specific variety⁴, under the disqualified production unit code. Disqualification remains effective for the remainder of the season, unless the production unit code is re-instated onto the programmes before that time. Furthermore, a disqualified production unit will have to apply to DAFF for re-instatement onto these programmes.

Official notification of an interception and positive identification by EU, Iran, India, Reunion or Japanese regulatory authorities during phytosanitary inspection at the port of arrival will lead to disqualification of the relevant production unit code/s.

Amongst other things, the response of the Competent Authorities of South Africa to the recommendations of Mission report ref. DG(SANCO)/2009-8184- MR (i.e. the FVO visit in mid-2009) states that:

The EU is considered a special export market for South Africa as it has a specific quarantine pest profile for which it requires the application of phytosanitary measures. It is therefore included in the NPPOZA's phytosanitary registration and approval process as well as its phytosanitary certification system which includes the following:

⁴ Varieties are evaluated independently and consist of (A) Grapefruit; (B) Navels, (C) Valencias (D) lemons and (E) easy-peelers.

- Training, verification and testing of APIS and PPECB inspectors on sampling, inspection, pest interception and identification as well as recordkeeping and traceability systems;
- Service level agreement and auditing procedures between the Perishable Products Export Control Board (PPECB) and Directorate Agricultural Products Inspection Services (DAPIS).

In accordance with Council Directive 2000/29/EC, the revised, strengthened and streamlined CBS risk management system to be applied in SA for Citrus exports to the EU in 2010, provides for immediate delisting of a field of production following one finding of CBS during official pre-export inspection of fruit from the implicated field of production. If a second field of production from the PU in question is intercepted for CBS during official pre-export inspections, that field of production is immediately delisted and this will result in incremental extension of such delisting first to Citrus type and then to all fields of production from the same PU[C] (i.e. delisting of the entire PU).

USA

The USA recognizes parts of South Africa as being free of CBS (i.e. Western Cape, Northern Cape, and Western parts of Free State). South Africa participates in an APHIS preclearance program for citrus intended for export to the United States. Only citrus from APHIS-approved pest-free areas is allowed to participate in the program. Since the beginning of the pre-clearance programme in the mid-1990s no CBS has been detected (APHIS, 2010). In case of detection, export of the host material to the United States would be suspended from the production area and APHIS would request South Africa to conduct an investigation.

In addition to the aforementioned areas, South Africa is seeking recognition of CBS-free status for some production units in Northern parts of Limpopo Province, which are considered a CBS low-prevalence area.

Trade and Development Impacts of CBS on South Africa's Citrus Industry

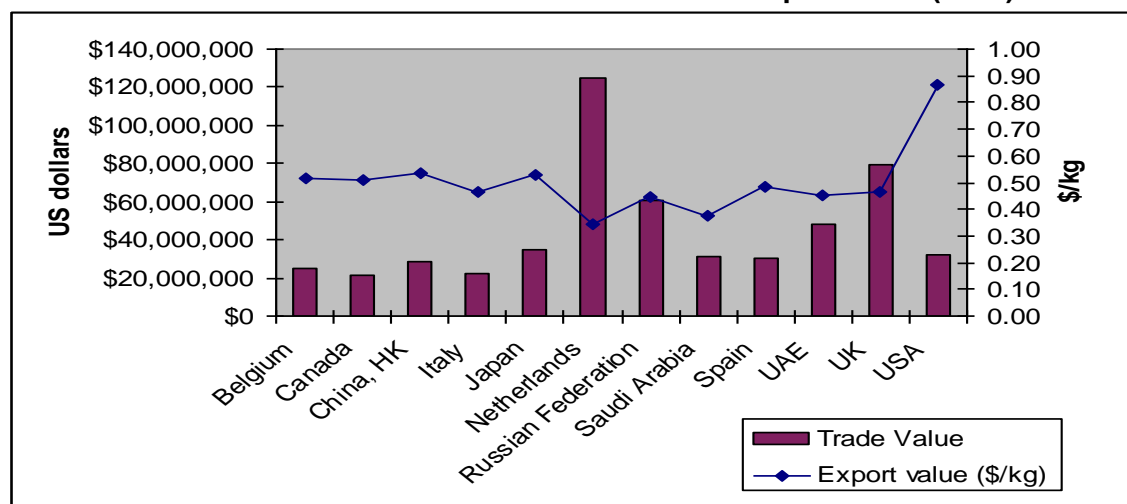
Trade Impacts

Trade diversion is one of the consequences of CBS and potential as well as 'real' interceptions. In particular, the following options have been highlighted by producers:

- If a consignment is intercepted in the EU (e.g. Rotterdam) this is likely to lead to onward shipments to countries such as Russia. Prices may be lower and logistics costs higher in the latter but at least not the entire consignment is lost due to destruction.
- In order to avoid interceptions, citrus shipments would be sent to less sensitive markets (e.g. Middle East, non-EU Eastern European countries) if a consignment was in danger of being intercepted on arrival in the EU.
- Fruit considered not fit for export would be sold on the local fresh fruit market or used for processing (e.g. juice, jams, canned fruit).

Each of the options is associated with an economic loss in that produce sent to less sensitive markets is likely to fetch lower prices. Also, additional handling and freight costs will be incurred if a consignment has to be redirected.

Figure 7: Main destinations for South African Citrus and export value (2008)



Source: <http://comtrade.un.org>

NB: Total export value in 2008 was USD 663 million.

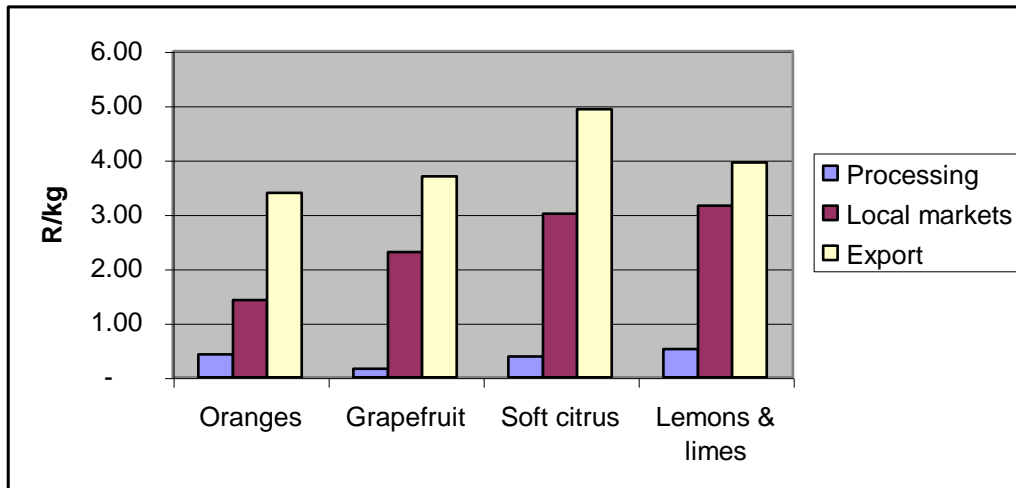
As for prices, the picture tends to be mixed. For example, whilst some exporters claim that citrus fruit sent to the Middle East tends to attract lower prices, others would state that prices are similar to the EU. At the same time, this is likely to be influenced by varieties and seasonality. Also, trading terms differ between different markets. Whilst trade diversion to destinations such as the Middle East may be an option to avoid interceptions, exporters also need to be careful not to oversupply this market since this could lead to price falls. As one grower stated it, “there is only so much one can send to Middle Eastern markets”.

According to data from the United Nations Commodity Trade Statistics Database, citrus exported to the EU in 2008 fetched free on board (FOB) export prices of USD 0.35/kg (Netherlands) to USD 0.52/kg (Belgium) amongst the major European destinations (see Table 7 and Annex 3 for details). Nonetheless, the Netherlands are by far the principal importer of South African citrus and represent their “bread-and-butter” market according to one grower. The average price of citrus (all types combined) exported by South Africa worldwide in 2008 was USD 0.44/kg. The price of citrus exported to the US is high. However, as explained above, only provinces declared CBS free by APHIS can export to this market.

The export market offers the highest prices compared to the other two outlets, i.e. local fresh fruit market and processing into products such as juice, jam, and canned fruit. A price comparison for 2008 shows that fresh fruit can fetch prices on the local market, which are of the order of 42% (oranges) to 80% (lemons and limes) of the export price. Local orange prices on South Africa’s main fresh fruit markets were 56% of export prices in 2006, and 45% in 2007. For grapefruit, soft citrus, and lemons & limes, this share of the export price has been about 60% to 70% in 2007 and 2008. At the same time, one must bear in mind that the local market can only absorb limited amounts of fresh fruit – i.e. less than 10% of the total production. In particular, only small amounts of grapefruit are consumed fresh in South Africa.

As for prices paid by processing industries in 2007 and 2008, these tended to be at most 13% of export prices. In particular, grapefruit producers have seen declining prices during this period. At the same time, some citrus growers (e.g. estates) have processing industries (e.g. juice production) integrated into their enterprises stating that this is more lucrative for their businesses than selling fruit on the local market.

Figure 8: Citrus prices in South Africa (2008)



Source: CGA (2009b), Key Industry Statistics

Economic Impacts

At enterprise level, the impacts of CBS are as follows:

- Increased spraying regime required in order to minimise risk of interceptions in sensitive markets;
- Replacement of old trees that are more likely to be affected by CBS;
- Orchard hygiene in the form of leave litter removal;
- More intensive grading required in pack houses in order to sort out blemished fruit;
- Lower margins as a result of fruit diverted onto other markets, and/or increased production and pack house costs.

As for disease control in citrus orchards it was reported that the risk of CBS related interceptions required growers to spray four to five times per season. Although spraying against CBS would always be required, growers stated that three sprayings per season were likely to be sufficient. In particular, CBS control requires full-cover spraying. According to growers, CBS related spraying due to the risk of interceptions is of the order of R3.2 per 15kg carton.

In particular, older citrus stands are prone to CBS infection. As a consequence, farmers and estate managers attempt to gradually replace older, diseased trees (e.g. 4% rotation, replacing trees every 25 years).

Orchard hygiene in the form of leave litter removal is a prerequisite to minimise the risk of CBS spread.

The information obtained from pack house operators was mixed as far as CBS related grading is concerned. For example, according to some operators a substantial number of additional workers is required for grading of citrus, whilst others stated that only a few extra workers will be employed in the pack houses. In addition, apparently pack house lines have to be put on a

lower speed during peak season in order to allow grading staff to sort out blemished fruit. This is likely to slow down the operations of citrus enterprises.

Both lost revenues due to market diversion as indicated in the previous section, and increased production and post-harvest costs lead to lower margins for citrus producers. Table 7 shows how margins decline if exports are reduced by 10% and if the CBS sensitive markets of the EU and Japan are excluded. In particular, margins drop significantly when the lucrative EU and Japanese markets cannot be accessed.

Effects of Price Variations on Gross Margin

An illustrative yield of 45 metric tonnes per hectare is used for the calculation of margins. Yields vary between 25 tonnes to 70 tonnes per annum – the lower yields being that of a 3-4 year old orchard and the higher yield that of a mature orchard of 10 years plus. Other factors such as weather and management do play a smaller part in influencing yield. Prices do play a significant part in influencing gross margin. The main effect within any one season is the geographical market that is (or can be) accessed (Table 6).

Table 6: Free on board (FOB) prices for citrus exports from South Africa in 2008 (US\$)

Japan, Korea, Iran	0.86
America	0.68
Asia (excluding Japan, Korea, Iran +Russia)	0.45
Russian Federation	0.44
Europe	0.42
Africa	0.25

As can be seen from Table 6 the highest values are attained by the Asian countries that require CBS free fruit followed by the USA. Although Europe also requires CBS free fruit average FOB values are, in fact, equivalent to those of the Russian Federation and the rest of Asia (which have no CBS freedom requirements).

Using the data from the GM budget, various scenarios have been constructed to illustrate the effect of diverting product to non CBS sensitive markets and/or processing (Table 7). Gross Income is based on the weighted price that was achieved by South African citrus exports in the 2008 season.

Table 7: Adjusted Gross Margins based on 2008 FOB values

	Normal season	10% less exports (1)	No EU/Japan/Iran/Korea exports
Gross Income per Hectare	R 93,150.00	R 81,450.36	R 73,588.50
Total Variable Costs	R 49,930.61	R 49,930.61	R 49,930.61
Gross Margins per Hectare	R 43,219.39	R 31,519.75	R 23,657.89

(1) Assuming exports are reduced by 10% (i.e. from 60% to 50% of total production) and equivalent is sold to processing industry

It is important to note that the North American market has been excluded from consideration because citrus exports from the provinces and countries considered in this model cannot export to those markets.⁵ By reducing exports by 10% and diverting fruit onto the processing, local and regional markets the grower sees a nearly 27% drop in GM and if CBS sensitive markets are excluded the loss in GM increases to 45%.

Social Impacts

Citrus production plays an important role in rural employment - i.e. it is estimated that well over 100,000 workers are employed if both production and post-harvest activities are included. Paradoxically, it appears as if CBS is actually contributing to employment in that a relatively small number of extra labourers are being employed in pack houses. It is difficult to judge as to the additional employment created as a consequence of CBS at production level (e.g. leaf litter control, and spraying). Given that farms and estates are trying to reduce labour inputs it is likely that the impact is insignificant.

It has been reported that growers are trying to increase their production units. For example, average farm sizes are of the order of 50 hectares and increasing, whilst smaller farms are tending to disappear. At the same time, the number of workers in citrus production (excluding post-harvest activities) is likely to decline from about 0.3 to 0.2 per hectare.

As indicated above, given the strict spray management regime required, small citrus farms have more difficulties to control CBS. In particular, those farms lacking access to extension are likely to suffer a larger impact in that their marketing options will be limited which is likely to include emerging farmers who have started citrus production as a result of the transformation process.

In light of this, initiatives by the CGA/Citrus Academy and the Fresh Produce Exporters Forum (FPEF) are important in this context. Such initiatives include efforts to overcome the shortage of skills and technical capacity which has been recognized as one of the major threats to the ability of the South African citrus industry to maintain its competitive edge in world markets. There has been an increasing participation in the industry by previously disadvantaged individuals through Black Economic Empowerment and land redistribution initiatives.

In order to assist emerging producers to export their product successfully overseas, the FPEF has added topics such as value chain training, and business management training to its courses. In addition, it uses commercial exporters as mentors to assist emerging farmers in developing their skills.

Environmental Impacts

Intensive spraying can lead to extra pressure on the environment. Mancozeb and strobilurins are commonly used to control CBS. Both these chemicals/chemical groups are not persistent and are quickly broken down in the soil. In addition their mammalian toxicity is low. However, unlike most other agricultural chemicals, a significant weight of evidence exists that copper based fungicides have a long-term impact on a wide range of soil biota. Effects can occur at

⁵ The Eastern Cape, Kwa-Zulu Natal, Mpumalanga and Limpopo in South Africa together with Swaziland and Mozambique. It is possible to export to Canada from this region but in terms of volumes this is not significant.

relatively low Cu concentrations and influence a number of soil processes including microflora and earthworms. In most soils, copper residues are likely to remain indefinitely, and will continue to influence the health of the soil.

Institutional Impacts

The sensitivity of the main citrus importing countries to CBS and other pests and diseases required a coordinated response from the industry and the public sector. In particular, a close link has been established between the private sector and NPPO, involving growers (represented through a strong association), research bodies (e.g. CRI, universities), and DPH and inspection agencies.

Various meetings and working groups have been formed on a permanent or ad-hoc basis as required in order to tackle the demands of the export markets, including CBS related interceptions and notifications.

Private sector funded research plays a strong role in this process in that research commissioned by the Citrus Research Trust and undertaken by CRI and other institutions is funded through levies collected from the citrus industry by CGA.

As for the functioning of the SPS Coordination Committee it appears as if the link between the Directorate International Trade and the NPPO plus private sector stakeholders could be strengthened. Such strengthening should result in more frequent meetings and a more active participation of the Directorate International Trade in citrus related working groups, which is also important if the citrus industry's interests are to be adequately taken into consideration during trade negotiations.

Flanking Measures

Table 8 provides an overview of measures put in place along the citrus value chain in order to minimize CBS related risks (e.g. interceptions at post-harvest level, or spreading of the disease). In particular, during recent years and following an increase of CBS related interceptions in the EU between 2006 and 2008, close collaboration between the NPPO and the private sector have led to an improved CBS risk management.

Following the FVO visit to South Africa in mid-2009 and their recommendations, further improvements have been made. At the same time, South African citrus industry stakeholders do not seem to agree with the EFSA Panel on Plant Health conclusion which rejected South Africa's claim that the climate of the EU is unsuitable for the establishment of *G. citricarpa*, and also considered that *G. citricarpa* is able to survive transport, storage and existing pest management procedures. As a consequence, there is the possibility that South Africa will seek a dispute settlement through the IPPC. While dispute settlements provided by IPPC are not binding, the process and results will likely have significant weight if the issue is taken to the World Trade Organization (WTO) under the SPS Agreement (<https://www.ippc.int>).

As indicated above, one of the areas where more resources appear to be required refers to the link between Directorate of International Trade (i.e. to be called Chief Directorate of International Relations and Trade under the new DAFF strategic plan 2010/11), the NPPO and members of the private sector. Restructuring of DAFF and possibly lack of resources may have affected the

interaction between this directorate and the other stakeholders. As a result, more resources seem to be required to this effect.

Given that CBS control is quite management and cost intensive, smaller farmers lacking access to extension are likely to suffer a larger impact in terms of reduced marketing options and lower income. As a result, it is important that efforts by CGA/Citrus Academy and FPEF to assist emerging citrus farmers are continued.

As for the NPPO of Swaziland it appears that lack of resources represent a major constraint. For example, the SPS system seems to rely heavily on only a few individuals. As a result, the planned recruitment drive is highly necessary. In addition, legal updates of the SPS System are equally justified (e.g. Plant Health Protection Bill).

SPS issues are only partly covered at SADC Secretariat level, giving the impression of a fragmented approach. Although some gaps are being filled, more efforts are required, starting with improved communication. For example, a SPS desk and dedicated web page are required to assist NPPOs operating in SADC countries.

Table 8: CBS related measures in place in citrus value chain

Stage in the Value Chain	CBS Related Activities
Production	<ul style="list-style-type: none"> • Old trees are being replaced; • Orchard hygiene, tree pruning (CBS related); removal of leave litter; • Spraying – at least one additional spraying is required as a result of the risk of interceptions in sensitive markets; • Movement of citrus plants is controlled at provincial level; only registered nurseries can officially sell plants.
Pack house	<ul style="list-style-type: none"> • Grading; sorting out of blemished fruits (CBS related or otherwise); • Inspections by PPECB and APIS; • Both Swazi and SA inspectors are present in Swaziland
Transport	<ul style="list-style-type: none"> • No temperature treatment required
Port (South Africa)	<ul style="list-style-type: none"> • PPECB inspectors • Pre-shipment inspection by Japanese, Korean, and USDA/APHIS inspectors
Port (Overseas)	<ul style="list-style-type: none"> • Inspections; if interception then notification by EU Member State NPPO to South African NPPO (i.e. DPH).

Annex 1: People and Organizations Met

Date	Name/Position	Organization	Location
08/03/2010	Dermot Cassidy; Project Collaborator; SPS Expert	United States Department of Agriculture	Pretoria, South Africa
09/03/2010	Alice Baxter, Director	Plant Health Directorate, Department of Agriculture, Forestry and Fisheries (DAFF)	Pretoria
09/03/2010	Marianna Theyse, Assistant Director	International Standards Directorate, DAFF	Pretoria
09/03/2010	Mashudu Silimela, Acting Deputy Director	International Standards Directorate, DAFF	Pretoria
09/03/2010	Mike Holtzhausen, Deputy Director	Agricultural Product Inspection Services Directorate	Pretoria
09/03/2010	Azwifaneli Rejoice Muavhi; Agricultural Specialist	United States Department of Agriculture	Pretoria
10/03/2010	Prof Lise Korsten	University of Pretoria	Pretoria
10/03/2010	Dr Isabella H. Rong Manager, Plant Pathology and Microbiology Division	Agricultural Research Council, Plant Protection Research Institute	Roodeplaat, Pretoria
10/03/2010	Dr. Mariette Truter, Researcher	Agricultural Research Council, Plant Protection Research Institute	Roodeplaat, Pretoria
11/03/2010	Johann Rossouw, General Manager	Letaba Estates	Tzaneen, Limpopo
11/03/2010	Dr Martin Gilbert, Entomologist	Letaba Estates	Tzaneen, Limpopo
12/03/2010	Justin Chadwick, Chief Executive Officer	Citrus Growers Association of Southern Africa	Hillcrest, KZN; met at Oliver Tambo International Airport
15/03/2010	Dr Tim G Grout, Manager Research and Technical	Citrus Research International	Nelspruit, Mpumalanga
15/03/2010	Dr Tian Schutte, Project Coordinator	Citrus Research International, Fruit and Foliar Diseases	Nelspruit, Mpumalanga
15/03/2010	Graham Piper, Manager	Crocodile Farms	Nelspruit, Mpumalanga
15/03/2010	James Warrington	Independent Consultant	Nelspruit, Mpumalanga

16/03/2010	Barry Manicom, Manager, Plant Pathology	Agricultural Research Council, Institute for Tropical and Subtropical Crops	Nelspruit, Mpumalanga
16/03/2010	Stuart Geldenhuys, Estate Manager	Tambuti Estates	Tambuti, Swaziland
17/03/2010	Ian Redman, Consultant Horticulture	TechnoServe	Mbabane, Swaziland
17/03/2010	Debbie Cutting, Programme Manager, Horticulture	TechnoServe	Mbabane, Swaziland
17/03/2010	Similo G. Mavimbela Senior Research Officer	Ministry of Agriculture, National Plant Protection Organization	Mbabane, Swaziland
17/03/2010	Richard Phillips, Managing Director	Swaziland Fruit Canners (PTY) Ltd	Malkerns, Swaziland
18/03/2010	Mawira Chitima, Consultant	Swaziland Water and Agriculture Development Enterprise (SWADE)	Swaziland
19/03/2010	Wrap-up session with Dermot Cassidy, and return flight to the UK		

Annex 2: Literature and websites

APHIS (2010), Notice of Determination of Pest-Free Areas in the Republic of South Africa, APHIS/USDA, February 2010.

CGA (2009a), Citrus Growers' Association of Southern Africa, Annual Report 2009; Hillcrest, KwaZulu-Natal, RSA.

CGA (2009b), Key Industry Statistics 2009; Citrus Growers' Association of Southern Africa, Hillcrest, KwaZulu-Natal. RSA.

DAFF (2010), Strategic Plan for the Department of Agriculture, Forestry and Fisheries, 2010/2011; Republic of South Africa.

EFSA (2008), Pest risk assessment and additional evidence provided by South Africa on *G. citricarpa*, citrus black spot fungus – CBS, Scientific Opinion of the Panel on Plant Health, (Question No EFSA-Q-2008-299) Adopted on 17 December 2008.

FVO (2009), Final Report of a Mission carried out in South Africa from 15 – 26 June 2009 in order to evaluate the system of official controls and certification of citrus fruit for export to the European Union. European Commission / DG Sanco 2009-8184.

Jennings, S. (2009), Procedural Step-by-Step Manual for SPS National Notification Authorities and SPS Enquiry Points. WTO, Geneva.

Kleih, U., Greenhalgh, P., Marter, A., with Peacock, N. (2006), Sustainability Impact Assessment of the Proposed WTO Negotiations – Final Report for the Fisheries Sector Study; Chatham, UK: Natural Resources Institute; in association with Impact Assessment Research Centre, University of Manchester. Final report: 10 July 2006 (revised).

Kuben N. (2009), Citrus Pre-season Meeting; Department of Agriculture, Directorate: Agricultural Product Inspection Services; Republic of South Africa.

Neeliah, S. A., and Goburdhun, D. (2010), Complying with the clauses of the SPS Agreement: Case of a developing country; in *Food Control 21 (2010)*, pp902-911; Elsevier.

Outspan International, (1993), Production guidelines for export citrus, Volume III, pre-harvest plant protection.

Response of the Competent Authorities of South Africa to the recommendations of Mission report ref. DG(SANCO)/2009-8184- MR carried out from 15 June to 26 June 2009 in order to evaluate the system of official controls and certification of citrus fruit for export to the European Union.

STDF (2008), Overview of SPS Needs and Assistance in Mozambique; Background paper; Standards and Trade Development Facility, LDC Ministerial Conference; 19-20 November 2008, Siem Reap, Cambodia.

Theyse, M. (no date), Phytosanitary requirements for imports and exports of plants, plant products and other regulated articles, Plant Health Directorate, Department of Agriculture, Forestry and Fisheries, Republic of South Africa.

USDA/FAS (2010), Citrus – World Markets and Trade.

Whiteside, J. O., Garnsey, S. M., Timmer, L. W. (1988), Compendium of citrus diseases, APS Press, ISBN 0-89054-092-6.

Van-Zwieten, L., Merrington, G., & Van-Zwieten, M. (2004), Review of impacts on soil biota caused by copper residues from fungicide Application. SuperSoil 2004: 3rd Australian New Zealand Soils Conference, 5 – 9 December 2004, University of Sydney, Australia. Published on CDROM. Website www.regional.org.au/au/asssi/.

Zaheer H. (April 2009), Pre-season Inspection Services; PPECP (Powerpoint presentation).

Websites

http://comtrade.un.org	United Nations Commodity Trade Statistics Database
www.cqa.co.za	Citrus Growers Association of Southern Africa
http://www.citrusres.com/	Citrus Research International
http://www.fpef.co.za/	Fresh Produce Exporters' Forum
http://www.daff.gov.za/	Department of Agriculture, Forestry and Fisheries, Republic of South Africa
http://www.ppecb.com/	Perishable Products Export Control Board
www.ippc.int/	International Plant Protection Convention
www.sadc.int/fanr/	SADC Secretariat; Food Agriculture and Natural Resources Directorate
http://ec.europa.eu/food/fvo/ir_search_en.cfm	European Commission; Food and Veterinary Office
http://www.aphis.usda.gov/	United States Department of Agriculture; Animal and Plant Health Inspection Service

Annex 3: Main Export Markets for SA Citrus (2008)

	Trade Value	Export value (\$/kg)	Net Weight (kg)
Belgium	\$25,079,122	0.52	48,612,907
Canada	\$21,425,144	0.51	42,164,434
China, HK	\$28,381,388	0.53	53,346,360
Italy	\$22,491,344	0.46	48,484,777
Japan	\$35,166,731	0.53	66,823,690
Netherlands	\$124,582,742	0.35	360,475,041
Russian Federation	\$60,771,322	0.44	137,213,689
Saudi Arabia	\$31,608,133	0.38	84,061,723
Spain	\$30,570,289	0.48	63,374,393
UAE	\$48,447,635	0.45	107,818,995
UK	\$79,679,964	0.47	171,203,546
USA	\$32,302,330	0.86	37,356,320
World	\$663,343,893	0.44	1,508,700,444

Source: <http://comtrade.un.org>

Annex 4: Price Trends by Market – South African Citrus (R/kg)

Price Trends - South African Citrus (R/tonne)				
<u>Oranges</u>				
Year (Feb - Jan)	Local markets	Processing	Export	
2006	1,025	301	1,843	
2007	1,278	354	2,832	
2008	1,426	419	3,395	
<u>Grapefruit</u>				
Year (Feb - Jan)	Local markets	Processing	Export	
2006	1,493	386	1,764	
2007	1,754	237	2,712	
2008	2,300	154	3,700	
<u>Soft citrus</u>				
Year (Feb - Jan)	Local markets	Processing	Export	
2006	2,133	205	4,423	
2007	2,543	239	3,758	
2008	3,013	383	4,927	
<u>Lemons & limes</u>				
Year (Feb - Jan)	Local markets	Processing	Export	
2006	1,753	178	2,478	
2007	2,454	396	3,238	
2008	3,152	516	3,954	
Citrus prices in South Africa: 2008 (R/kg)				
	Processing	Local market	Export	
Oranges	0.42	1.43	3.40	
Grapefruit	0.15	2.30	3.70	
Soft citrus	0.38	3.01	4.93	
Lemons & limes	0.52	3.15	3.95	

Source : CGA (2009b), Key Industry Statistics; based on DAFF.

NB: Sales on local markets refer to sales on SA's 20 major fresh produce markets; Some data for 2008 has been preliminary.

Annex 5: Gross Margin Analysis

Explanatory notes for Gross Margin (GM) budget for citrus growing in Southern Africa

Costs included in the GM budget

The gross margin is not gross profit because it does not include fixed or overhead cost such as depreciation, interest payments, rates, insurance and permanent labour which have to be met regardless of enterprise size.

A GM budget has been constructed to illustrate the cost of CBS control on a per hectare basis (Table A5.1 below). This is based on growing costs in the Sundays River area of South Africa which has a high CBS prevalence. However it can be regarded as typical of the management required of citrus along the Eastern Escarpment of the Maloti/Drakensberg between Hoedspruit in Limpopo province to the Eastern Cape.

The specific chemical costs associated with spraying for CBS are highlighted in orange. This cost excludes the need for complex equipment (a high KW tractor and mist blower for high volume full cover sprays) both of which have high maintenance costs and depreciation rates. Direct costs for spraying labour are included in the general provision for labour.

The total estimated cost of CBS control amounts to R 5,760.00/ha of which the agrochemical component is R 5,201.88/ha

Table A5.1: CITRUS Gross Margin Budget

GROSS MARGIN PER HECTARE [2009 Prices]					Totals	
	Units	Kgs	Farmgate price / unit	Income		
Export	1,800 15 Kg Cartons @	27,000 R	45.00 /Carton	R 81,000.00		
Fresh Market	450 10 Kg Bags @	4,500 R	15.00 /Bag	R 6,750.00		
Processing	13,500 Kg @	13,500 R	0.40 /kg	R 5,400.00		
		45,000 Total R		R 93,150.00		
TOTAL INCOME					R	93,150.00
VARIABLE COST PER HECTARE						
Fertiliser:	875.0 Kg LAN(28)	R 1.44 / Kg		R 1,260.00	R	2,888.21
	300.0 Kg Supers @	R 1.31 / Kg		R 394.20		
	675.0 Potassiumchl @	R 1.84 / Kg		R 688.50		
	12.0 Kg Zinc Oxide @	R 20.25 / Kg		R 135.00		
	12.0 Kg Soluber @	R 16.04 / Kg		R 106.92		
Railage:	1,874.0 Kg @	R 0.16 / Kg		R 303.59		
Lime:	750.00 Kg @	R 165.60 / Ton			R	124.20
Herbicides:	3.10 L Gramoxone @	R 37.28 / Litre			R	115.56
Pesticides:	12.0 Kg Copper Oxi-c @	R 34.74 / Kg		R 416.88	R	10,926.24
	48.0 Kg Tartox @	R 33.95 / Kg		R 1,629.50		
	12.0 L Thiodan @	R 62.44 / Litre		R 749.30		
	15.00 azoxystrobin @	R 275.00 / Litre		R 4,125.00		
	104.0 L Agri-oil @	R 11.84 / Litre		R 1,231.78		
	4.0 L Hosthathion @	R 172.80 / Litre		R 691.20		
	48.0 Kg Sugar @	R 2.97 / Kg		R 142.56		
	6.0 L Sting @	R 50.40 / Litre		R 302.40		
	2.0 Kg Diptex @	R 116.71 / Kg		R 233.42		
	32.0 Kg Himelure @	R 23.26 / Kg		R 744.19		
	12.00 Kg Dithane @	R 55.00 / Kg		R 660.00		
Orchard Sanit.:					R	90.00
Fuel:	115.0 L Diesel	R 2.86 / Litre			R	329.13
Repairs & Maintenance:					R	277.61
Labour:					R	1,495.23
Packing Material	1,732 Cartons @	R 5.58 each		R 9,664.56	R	11,955.42
	2,314 Bags @	R 0.99 each		R 2,290.86		
Packing:	56,854 Kg @	R 0.297 / Kg			R	16,885.76
Tray Hire	56.0 Trays @	R 1.62 / Carton			R	90.72
Electricity					R	525.00
Interest working Capital:	18.5%	6.00 Months			R	4,227.53
TOTAL VARIABLE COSTS					R	49,930.61
GROSS MARGIN PER HECTARE					R	43,219.39