Quantifying the trade effect of sanitary and phytosanitary regulations in OECD countries on South African food exports

by

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Dedication

To my mom, Roman Kiflemariyam and to my dad, Fisseha Gebrehiwet

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ABSTRACT

The integration of agriculture in multilateral trade negotiations was a crowning achievement in the reform of world agricultural trade. Restraining trade distortive agricultural policies, which were prevalent in all countries, was the major mandate of the Uruguay Round Agreement on Agriculture (URAA), where promoting market access, limiting trade distorting domestic support and curtailing export subsidies are among the key elements discussed at length and were committed for reduction by all members of the WTO. A comprehensive survey of the progress made on the implementation of the commitments by OECD countries was done in this dissertation to get insight on the major OECD agricultural policies where SADC countries are adversely affected.

Though most of the commitments have been fulfilled, significant tariff protection still exists for major products exported by SADC countries. Moreover, tariff escalation is still being practiced for almost all agriculture commodity groups by most of the OECD countries. The in-quota and over-quota tariff rates of these countries are also excessively high and trade prohibitive.

Export subsidies applied by most OECD countries, especially those of the EU, have adverse effect on the price of agricultural commodities and thus affect the welfare of many SADC countries. Moreover, domestic agricultural support of OECD countries is still significant and trade distorting. Many studies, thus, suggest that decoupling

OECD domestic support would improve the welfare of all developing countries. In addition, other studies show that tariff reduction by OECD countries will have more impact in augmenting the welfare for developing countries in general, and SADC countries in particular, than a cut in the domestic support.

Stringent sanitary and phytosanitary standards (SPS) have also proliferated in the aftermath of the URAA. These standards are currently becoming a major stumbling block in agricultural trade of developing countries. Estimating the trade impact of these stringent SPS standards, therefore, would assist to facilitate trade negotiations, promote active participation of developing countries in SPS related issues and discussions of issues related to compensation claims. Limited by inadequate resources and expertise, among other things, these countries also have poor participation rate in discussions related to SPS, which impedes the representation of their interests and concerns in the setting of international standards for agricultural products.

Using a gravity model, this study estimated the trade effect of total aflatoxin level set by five OECD countries (Ireland, Italy, Sweden, Germany and USA), on South Africa's food exports. The findings of the study support the hypotheses that stringent SPS standards are limiting trade markedly. The trade elasticity of aflatoxin standard is 0.41 and statistically significant. Moreover, the simulation result based on the assumption that these five OECD countries adopt the total aflatoxin level recommended by CODEX, shows that South Africa would have gained an estimated additional amount of US$ 69 million per year from food exports to these countries from 1995 to 1999.

The results suggest that unless due attention is given to SPS standards set by developed countries and OECD countries, in particular, the expected potential gain from agricultural trade liberalization could be seriously undermined. Stated differently, developing countries market access to OECD countries' could still be severely restricted, even though significant tariff cuts might be achieved in these developed countries.

The study recommended that active participation in all SPS related issues must be encouraged to raise concerns when new standards are established. In addition, as significant tariff barriers and massive domestic support still exist in OECD countries, it is important for pushing a further cut in tariff barriers and advocate the decoupling of OECD domestic support for realizing a welfare gain by all developing countries.

Lastly, the study indicated areas of further research to be undertaken. Among others, it suggested that the cost of compliance to standard regulations should be estimated. This is a challenging area of research that most empirical studies on the trade effects of SPS regulations have not addressed.

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LIST OF ACRONYMS

AMS	Aggregate Measure Support
ACTSA	Action for Southern Africa
CBS	Citrus Black Spot
CAP	Common Agricultural Policy
CODEX	CODEX Alimentarius Commission
EBA	Everything But Arms
ERL	Extraneous Residue Limits
EU	European Union
EUREPGAP	European Retailers Produce on Good Agricultural Practices
FAO	Food and Agriculture Organisation
GATT	General Agreement on Trade and Tariff
GER	Germany
GSP	Generalised System of Preferences
GTAP	Global Trade Analysis Project
HACCP	Hazard Analysis Critical Control Point
HS	Harmonised System
ICAC	International Cotton Advisory Committee
ICM	Integrated Crop Management
IPPC	International Plant Protection Convention
IRL	Ireland
ITA	Italy
ISIC	International Standard Industrial Classification
ISO	International Organization for Standardization
JECFA	Joint Expert Committee on Food Additives
LDC	Least Developing Countries
MFN	Most Favoured Nation
MRL	Maximum Residual Level
MPC	Maximum Permissible Concentrations
MT	Metric Ton
NPC	Nominal Protection Coefficient
NTB	Non Tariff Barriers

OECD	Organization for Economic Cooperation and Development
OIE	Office International des Epizooties
PEM	Policy Evaluation Matrix
PPQ	Plant Protection Quarantine
ppb	part per billion
PSE	Producer Support Estimate
QUAD	Quadruples (EU, USA, Canada and Japan)
SA	South Africa
SADC	South African Development Community
SDT	Special and Differential Treatment
SPS	Sanitary and Phytosanitary standards
SWE	Sweden
TBT	Technical Barriers to Trade
TRQ	Tariff Rate Quota
TSE	Total Support Estimate
UNDP	United Nations Development Fund
UNECE	UN Economic Commission for Europe
URAA	Uruguay Round Agreement on Agriculture
USA	United States of America
USAID	United States Agency for International Development
WHO	World Health Organisation
WTO	World Trade Organisation

CHAPTER ONE
INTRODUCTION

1.1 Background

After long and contested deliberations, the Uruguay Round Agreement on Agriculture (URAA) brought a landmark step for reforming world agricultural trade. Even though the previous ruling agreement, General Agreement on Tariffs and Trade (GATT), included agricultural trade in its mandate, trade distorting practices, particularly tariff barriers, domestic support and export subsidies were not restrained. As a consequence, the size of subsidy, rather than comparative advantage, was the major determinant in dictating the pattern of agricultural trade (WTO, 2001). Developing countries were, therefore, unduly disfavoured and considerably hampered from promoting their agricultural exports due to the 'artificially' low prices they received for their produce. The URAA, however, is the crowning achievement for agricultural trade, as it endeavours to discipline major trade distorting agricultural policies in the world.

The basic underpinning of the URAA rests on reforming world agricultural trade by reducing trade barriers, trade-distorting domestic support measures and export subsidies practiced by both developing and developed countries. The URAA also incorporates, among others, the Sanitary and Phytosanitary (SPS) agreement, Technical Barriers to Trade (TBT), Special and Differential Treatment (SDT), and Non-trade Concerns. These various components of the agreement attempt to integrate the wide diversity of interests and economic situations of members, while reforming world agricultural trade.

SADC, as the rest of Sub-Saharan Africa, is dependent mostly on OECD countries that import a significant portion of the region's products, most of which are in the form of unprocessed primary commodities such as coffee, cotton and ores. As the trade liberalisation dialogue continues, and as agriculture begins to be offered a more prominent role in the discussions, issues surrounding OECD agricultural trade barriers are important for SADC countries. It is therefore in SADC countries' interests that their access to markets in the developed world be barrier-free.

Extreme poverty in much of the SADC region necessitates elimination of whatever export barriers remain and therefore enhancement of opportunities for these countries to increase agricultural exports into the developed world markets. A closer look at the agricultural policy of OECD and developed countries is, therefore, important to analyse its implications for SADC countries and discuss alternative policies in trade negotiations.

Since the implementation of the URAA, world agricultural trade has been growing, (WTO, 2001). Most of agricultural exports from developing countries are, however, still facing high agricultural tariff rates in most developed countries despite a marked tariff reduction achieved for tropical agricultural products (Gibson, Wainio, Whitley and Bohman, 2001). In addition, there has been a persistent increase in developed countries' technical standards that considerably set back the imports of food and agricultural products from developing countries (Henson and Loader, 2001).

Various studies have indicated that the stringent SPS standards established by developed countries coupled with the lack of technical and economic resources in developing countries to comply with the requirements have remained major obstacles to access the market of developed countries (Otsuki, Wilson and Sewadeh, 2001; Henson and Loader, 2001; Hooker, 1999; Wilson and Otsuki, 2001). In addition, the lack of mutual recognition of inspections and standards, where the majority of importing countries tend to demand 'sameness' in the process, rather than 'equivalence', creates an additional burden for complying to the SPS standards (Matthews, 2001; Unnevehr, 2000). Even though the SPS agreement states the need for technical assistance to developing nations for strengthening their ability to comply with the requirements, there has been little concrete evidence for its execution (Zarrilli, 1999; Waniala, 2000).

Moreover, in light of the increasingly growing consumer demand for higher quality products in developed countries, complying with the SPS standards is becoming indispensable for developing nations to access the markets of developed countries (Wilson, 2001; Unnevehr, 2000). As argued by Unnevehr (2000), the modification of food safety regulations in developed countries, which now emphasizes risk control throughout the production process, has also imposed a great challenge for standard

compliance by developing countries. Hence, there is growing evidence that these strict SPS standards applied by developed countries could potentially undermine the benefits of agricultural trade liberalization under the URAA (Henson and Loader, 2001; Zarrilli, 1999).

1.2 Problem statement

The SPS agreement defined Sanitary and Phytosanitary (SPS) standards as measures taken to protect human, animal or plant life or health from risks associated with imported agricultural commodities (WTO, 1995). To prevent the use of SPS standards as trade obstacle, the agreement stipulates that countries should base their SPS standards on international guidelines and recommendations. It also permits for a country to establish its own SPS standard, above the international level, on a non-discriminatory basis, as long as it can provide a "scientifically justifiable" reason supported by a risk assessment study.

The eroding power of nations to use tariffs as an agricultural trade barrier, as posited in URAA, has proliferated the adoption of more stringent SPS standards, which are becoming a formidable challenge for developing countries' agricultural exports. As a result, many African countries are experiencing a considerable loss of export revenue due to a failure to comply with these standards. Wilson and Otsuki, (2002), for example, estimated that African banana export could be increased by US$ 410 million a year, if developed countries follow the international standard for pesticide residue, instead of establishing their own national standard. In addition, Otsuki, Wilson and Sewadah, (2001) also noted that the new harmonized European standard on aflatoxin B1 is estimated to cost African exporters over US$ 670 million per year in lost nut and grain exports. This loss could be a significant setback for the promotion of the agricultural sector, which is the backbone of the economy for many African countries with about 659 million inhabitants of which 300 million earn less than $1 a day (Wilson and Abiola, 2003).

Though the spirit of URAA is to reform agricultural trade, this objective might be elusive if there is a persistent increase in the usage of strict SPS standards that have a potential to protect agricultural export of developing countries. Hence, it is vital to

recognize the significance of these SPS standards, so that a due weight and consideration will be given to them when dealing with agricultural trade issues and negotiations.

The heavy reliance of SADC countries agricultural exports on the OECD countries markets also makes SADC countries vulnerable to the changes of agricultural policies of OECD countries. Agricultural tariff policies, export subsidy, or domestic support measures of OECD countries would, therefore, have a considerable impact on the agricultural trade of SADC countries. Hence, it is necessary to assess these policies and their implications for SADC countries.

1.3 Justification of the study

Quantifying the trade impact of SPS regulations is important to "solve disputes and serve as a basis for calculating compensation claims" (Beghin and Bureau, 2001:1). Moreover, it is helpful to devise informed policy measures, which could include decisions regarding the compliance to SPS regulations. As Otsuki, *et al.,* (2001) noted, the major issue in trade policy debate is to compare the compliance costs of exporters with its possible gains achieved through complying with the standards. Estimating the trade impact of the SPS standards, therefore, assists in resolving the policy dilemma, by measuring the possible gains that could be attained from conforming to the SPS standard.

Beghin and Bureau (2001) also mentioned that a comprehensive impact assessment of SPS standards is necessary for the following reasons. Firstly, it helps to address the role to be given to non-tariff instruments and barriers in a future trade agreement. Secondly, it helps to inform governments the costs of their SPS policies and provide the tools necessary to define more efficient regulations. As Jostling (1997:1) states, "without quantification of the trade effect of SPS standards and TBT, it is unclear as to how significant they are as trade barriers, which regulations create the most impediment to trade, and how to modify current rules in this area to reduce the unwanted trade impact".

1.4 Research objectives

The main objective of the research is to estimate the export revenue forgone from food export by South Africa as a result of the stringent total aflatoxin standard set by five OECD countries: Ireland, Italy, Germany, Sweden and USA. In addition, an extensive review will be done on the trade barriers of SADC countries' agricultural export in OECD countries and on the progress made by OECD countries in the implementation of the major commitments undertaken under the URAA. The specific objectives of the research are to:

- Review the tariff and non-tariff barriers faced by agricultural exports from SADC countries to OECD countries;
- Assess the progress of OECD countries implementation of their commitment for reduction of tariffs, export subsidies and domestic support;
- Estimate South Africa's forgone food export due to stringent aflatoxin standard used by the five OECD countries;
- Estimate the impact of adopting the international standard recommended by CODEX in the five OECD countries on the food export revenue of South Africa; and
- Estimate the trade elasticity of the total aflatoxin standard.

1.5 Hypotheses

The research will test the following two major hypotheses:

- Stringent total aflatoxin level standard used by OECD countries on the food exports of South Africa are trade limiting and have a potential to undermine the benefits of agricultural trade reform attempted to be attained by URAA.
- Adopting the international standard recommended by CODEX, which is a joint FAO and WHO organization responsible for setting international SPS standards for food commodities, will promote food exports of South Africa.

1.6 Definition of operational terms

The following terms that have been used frequently in this study have the following meanings and definitions.

The '*base year*' refers to the year 1986-88, in which all the commitments of reducing the major trade distorting agricultural policies in the URAA have used it as a reference or base period.

'Decoupled' domestic support represents all governmental support that does not affect the current production level of the producers. Supports based on land entitlement and agricultural income are typical examples of decoupled domestic supports.

Food export: this term is also used interchangeably with *food trade*, which refers to the ISIC classification at three-digit level for 'all foods' that comprises all the items described in footnote # 9, page 82.

Trade flow has also been used interchangeably with '*trade value'* that represents the dollar value of the export of a given agricultural commodity.

1.7 Research methodology

A gravity model is used to estimate the forgone trade revenue from food export by South Africa due to stringent SPS regulation of the five OECD countries. The general functional form of the model employed in this study will take the following form.

$$F_{ij} = \alpha\, GDP^{b1}{}_i GDP^{b2}{}_j POP^{b3}{}_i POP^{b4}{}_j DIS^{b5}{}_{ij} TAF^{b6}\, \varepsilon$$

Where:

F_{ij} represents the export revenue of South Africa's food exports to each of OECD countries.

GDP_i stands for the GDP of South Africa.

GDP_j represents the importing countries GDP.

POP_i is the population figure for South Africa

POP_j is the population figure for each importing country.

DIS stands for the geographical distance between the two countries. It is used as a proxy for any friction of trade flows like transportation and communication costs.

TAF_j refers to the total aflatoxin level set as a standard for food imports by each importing country.

ε stands for the statistical error term, which is assumed to be normally distributed with mean zero and constant variance.

1.8 Outline of the thesis

The thesis is divided into eight chapters. Following the introduction in Chapter one, Chapter two discusses government support for agriculture in OECD countries by focusing on the progress made on the implementation of their commitments to reduce domestic support and export subsidies. Some studies undertaken on the possible impact of their reduction on SADC countries are also reviewed in this chapter. Chapter three is devoted to assess the tariff and non-tariff protection of OECD countries for SADC agricultural commodities and review some empirical studies on the possible impact of tariff reduction on SADC countries economy. Chapter four gives a brief review of the SPS agreement and the problem faced by developing countries for active participation on SPS related issues and their major concern on the way the SPS agreement operates. It also provides some evidence on how some developing countries' economies are affected by stringent SPS standards set by developed countries. Chapter five reviews the literature on methodologies used to assess SPS impacts on trade and welfare. The basic principles of a gravity model and the specification used for the study are discussed in Chapter six. Chapter seven presents the results and their interpretation. Chapter eight draws conclusions of the study, discusses policy implications and indicates the limitations of the study and further areas of research.

CHAPTER TWO
GOVERNMENT SUPPORT TO AGRICULTURE IN OECD COUNTRIES

"Europe is by far the most significant trading partner for Southern Africa…this means that decisions made in Brussels transform lives in the region, controlling whether factories close and jobs are lost, whether farmers grows maize or roses, whether families can earn enough to send their children to school."(ACTSA, 2001a)

2.1 Introduction

OECD countries play a prominent role in world agricultural trade. It is estimated that almost three-quarters of world agricultural trade originates from these countries, (OECD, 2002a). Many OECD member states, particularly the EU and USA, are the major destination markets for SADC countries. Tanzania and Zambia, for example, export more than 80 percent of their products to OECD markets (OECD, 2002a). A closer look at the agricultural policy of OECD countries is, therefore, necessary to analyse its implications for SADC countries and discuss alternative policies in trade negotiations.

The main platform that exists for scrutinizing the agriculture policies of all member countries is the 'commitments' made under the URAA, which specify both the rate of reduction and the time frame of its execution. These commitments mainly deal with disciplining the unrestricted use of export subsidies, domestic support and agricultural tariff rates. Hence, they are used as a yardstick to gauge the progress made towards attaining the basic objective of the URAA: reforming world agricultural trade.

The main purpose of this chapter is to assess the progress made by OECD countries in implementing the commitments made to reduce the major trade-distorting agricultural support (export subsidies and domestic support). In addition, some of the studies that have analysed the impact of OECD countries agricultural support on developing countries are also briefly reviewed.

2.2 Domestic support

The URAA categorized domestic support measures into three 'boxes' according to their respective impacts on trade. Those support measures that are highly trade

distortive (mainly based on output produced and input used) are classified under *Amber box* and are earmarked for reduction. All support measures that are considered to entail minimal trade distortion (for example, support for research and development) are embraced under the *Green box*; hence, they are not bound for reduction. *Blue Box* comprises all agricultural support measures that endeavor to limit production; these are also exempted from reductions.

The URAA stipulates that all domestic support measures classified under *Amber box* should be reduced from the total aggregate measure of support (AMS)[1], which represents the total aggregate support given to agricultural producers. Accordingly, total AMS has to be reduced by 20 percent (13.3 percent for developing countries and LDCs are exempted from reduction) from the base year (1986-88) AMS level by the year 2000 (2004 for developing countries). *De minimis* level, which refers to the total support for a commodity (sector) that is less than 5 percent of the commodity (sectoral) value (10 percent for developing countries) is, however, exempted from reduction.

Table 2.1 shows the current rate of AMS as a percentage of the commitment level in OECD countries. As shown in the table, most OECD countries have current total AMS below the commitment level. Applied AMS outstripped the commitment level only for Iceland in 1998. Korea, Japan, Norway and Switzerland have mostly applied rate greater than 70 percent during 1995-1999.

[1] OECD (2002a) explains AMS as "the indicator on which domestic support discipline for URRA is based. It is determined by calculating a market price support estimate for each commodity receiving such support plus non-exempt direct payments or any other subsidy not exempted from reduction commitments, less specific agricultural fees or levies paid by producers. It differs from PSE (Producer Support Estimate) in many respects. The most important differences is that price gaps in the AMS calculation are estimated by reference to domestic administered prices and not the actual producer prices, and that external reference prices are fixed at the average levels of 1986-88 base period."

Table 2.1: Ranges of notified current total AMS levels in OECD countries, 1995-1999

Year	Current Total AMS as a percentage of total AMS commitment levels					
	0-10 %	**11-49 %**	**50-69 %**	**70-89 %**	**90-100 %**	**>100**
1995	Czech, Mexico, New Zealand, Poland	Australia, Canada, USA	EU, Hungary (1)	Iceland, Japan, Norway, Switzerland	Korea,	
1996	Mexico, New Zealand, Poland	Australia, Czech Rep. Canada, USA	EU	Iceland, Japan, Norway, Switzerland	Korea	
1997	Canada, Czech Rep., New Zealand, Poland	Australia, Mexico, USA	EU	Iceland, Japan, Norway, Switzerland	Korea	
1998	Czech Rep., New Zealand, Poland	Australia, Mexico, USA	USA	EU, Korea, Iceland (2), Norway, Switzerland		Ice-land (3)
1999	New Zealand	Czech Rep.		Korea	Norway	

Notes: Data for 1998 and 1999 are incomplete. (1) De minimis; (2). With inflation adjustment; (3). Without inflation adjustment.
Source: OECD (2001) and Diakosavvas (2001)

Despite the low current total AMS, the level of agricultural support is substantial when measured using the total support estimate (TSE)[2]. In 2001, the TSE of all OECD countries amounted to almost US$ 311 billion, which has declined to 1.3 percent of GDP, compared to 2.3 percent in 1986-88. It has remained unchanged since the year 2000. The total support given to OECD agricultural sector is, therefore, nearly US$ 1 billion per day. Out of the total TSE, 75 percent goes to the producers and the rest is allocated to general service of the agricultural sector, which includes infrastructure, research and development, marketing and promotion, public stock holdings etc (see Appendix A).

[2] TSE is an indicator of the annual monetary value of all gross transfers from taxpayers and consumers arising from policy measures that support agriculture, net of the associated budgetary receipts, regardless of their objectives and impacts on farm production and income, or consumption of farm products (OECD, 2002a).

The total agricultural support measured using producer support estimate (PSE)[3], was 31 percent for 2001, which is a modest decline from 32 percent in 2000 and 38 percent in the base period (1986-88). Figure 2.1 shows the current PSE of OECD member countries, compared to the base period. In general, PSE has declined for most of the countries except Mexico, Turkey, Hungary and Poland. The PSE has increased from the base period by 19 percentage points for Mexico, 7 percentage points for Turkey, 1 percentage point for Hungary and 8 percentage points to Poland. Iceland, Japan, Norway and Switzerland have PSE's exceeding 60 percent and moderate PSE is registered for Canada (17 percent), USA (21 percent) and EU (35 percent). The lowest PSE is recorded for Australia and New Zealand in 2001, which is 1 percent and 5 percent respectively.

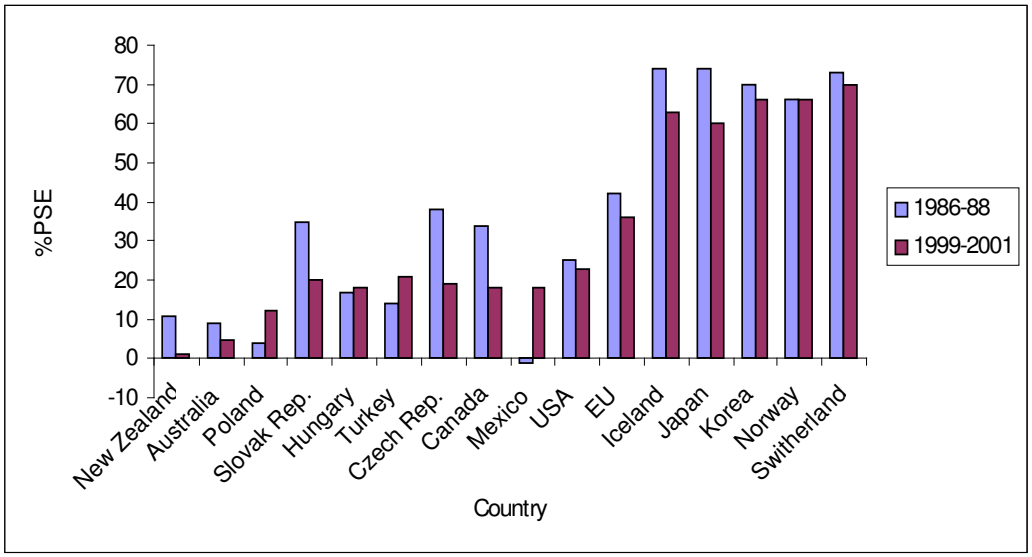

Figure 2.1: Producer Support Estimate of OECD country members of the base year and the recent average

Note: The base period for Poland, Slovak Rep, Hungary and Czech Rep is 1991-93
Source: OECD (2002a)

[3] PSE is an indicator of the annual monetary value of gross transfers from consumers and taxpayers to support agricultural producers, measured at farm gate level arising from policy measures regardless of their nature, objectives or impacts on farm production or income. The PSE measures support arising from policies targeted to agriculture relative to situation without such policies, i.e. when producers are only subjected to general policies (including, economic, social, environmental and tax policies) of the country (OECD, 2002a).

PSE comprises different kinds of support measures given to agricultural producers based on several criteria. Some of these measures are based on market price, output produced, input utilised, area harvested, and total agricultural income. For OECD countries as a whole, the percentage of market price and output-based support, which are considered to be the most trade distortive, has declined to 72 percent, compared to 82 percent of the base period (see Figure 2.2). Despite the reduction, however, the major portion of the support for most OECD countries is still highly trade distortive (OECD, 2000b). For Japan and Korea, for example, almost all PSE goes to market price support and output payments. Almost half of PSE in USA also goes to trade distorting support that affect the current level of production. EU, however, has reduced its market price support and output markedly from the level of 91 percent to 64 percent. This dramatic fall represents EU's endeavour to shift agricultural support to less trade distorting measures.

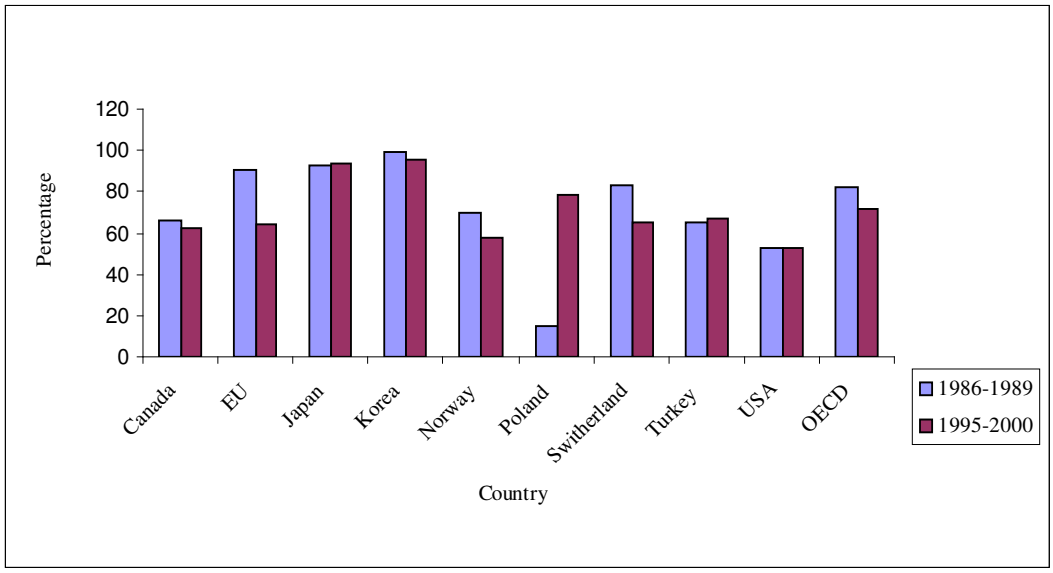

Figure 2.2: Market price and output based support as a percentage of PSE
Source: OECD, (2002a).

Producer support estimate by commodity displays the total amount of support allocated for specific commodity producers. Figure 2.3 demonstrates that in OECD countries rice has the highest PSE (80 percent), and sheepmeat, sugar, wheat, other grains and milk have PSE between 41percent and 52 percent. PSE for eggs and wool is below 10 percent. Agricultural support given to rice, sugar and milk are mainly market price support, which are the most trade distorting measures (OECD, 2002a).

Though PSE for some agricultural commodities has increased slightly, similar to the PSE level of OECD countries, the overall PSE for all agricultural commodities has shown a reduction from 38 percent at the base period to 31 percent in 2001.

The other indicator of trade distortion in domestic support is the Nominal Producer Coefficient (NPC), which measures the ratio between the average price producers receive at the farm gate and the border prices (measured at farm gate level). As shown in the appendix A, the NPC for the OECD as a whole has reduced from the base period 1.68 to 1.41 in 2001, indicating that producers in OECD countries are receiving domestic prices 41 percent above the world prices. Stated differently, OECD producers are still shielded from the market signals of world agricultural trade; hence, they are still responding to the distorted domestic prices. NPC, however, differs across countries; it varies from 1 for Australia and New Zealand to 2.39 for Japan in 2001.

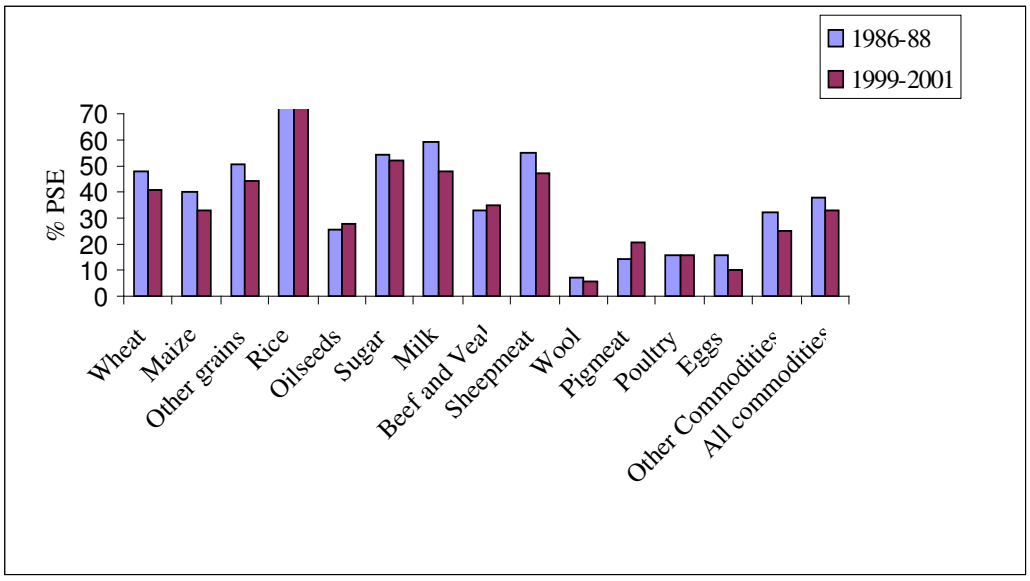

Figure 2.3: PSE of OECD countries by commodity
Source: OECD (2002a)

Given the several factors comprising the domestic support of OECD countries, a study by OECD (2001), using the Policy Evaluation Matrix (PEM), highlights that a 'change in the mix of domestic support' will result in a win-win situation for both reducing trade-distorting policies and improving income transfer efficiency for agricultural producers of OECD countries. As stabilising farm income is the key

objective of the agricultural policy in OECD countries (OECD, 2002b), the PEM result suggests that payment support based on land and historical entitlement will offer large efficiency in income transfer and yield minimum trade distortions. Based on these findings and using GTAB 5 version that captures the disaggregated domestic support, Dimaranan, Hertel, and Keeney (2003) simulated three different scenarios to analyse the impact of a cut in domestic support by OECD countries on the welfare of developing countries.

The first simulation analyses the impact of 50 percent cut in all domestic support of OECD countries. The findings reveal that the majority of developing countries, including the Sub Saharan Africa region, will experience a welfare loss due to the deterioration of their terms of trade. From SADC countries included in the study, Tanzania will experience a loss, and there will be no impact on Zambia. In addition, this scenario will reduce the farm income in OECD countries, particularly in the EU and USA.

The second simulation analyses the impact of a 50 percent reduction in the trade distorting domestic support that exclusively comes from *market price support*, *tariffs* and *export subsidy*, and a compensating support is offered to producers in a form of land payments. In short, in this scenario, domestic support was reinstituted. The result of this policy demonstrates a welfare gain for developing countries as a whole and a rise of income for OECD producers. Tanzania, Zambia and Sub Saharan Africa as a whole will also benefit as the result of the domestic support reinstitution by OECD countries.

Since the policy reinstitution (changing the composition of domestic support) is likely to be accepted politically in OECD countries (as farm income is maintained), Dimaranan *et al.,* (2003) concluded that developing countries' main focus should be improving market access (reduction of tariff barriers). Moreover, they recommend that as long as domestic support measures remains decoupled, developing countries should permit the OECD countries to augment domestic support.

Similarly, Rae and Strutt (2002) argued that, as long as domestic support is able to compensate the loss of farmer's income from other policies in OECD countries,

global welfare could be improved through a reduction of export subsidies and tariff rates. Decoupling agricultural support will also entail a low budgetary cost as compared to the existing Common Agricultural Policy for EU (Frandsen, Gersefelt and Jensen, 2002).

2.3 Export subsidies

Export subsidy is a major trade distorting policy that influences world agricultural price because of its tendency to stimulate higher production. It was utilised unrestrictedly during the GATT rule by many developed countries. Consequently, surplus agricultural production in international market and persistent fall of world agricultural prices was a common phenomenon. The URAA, however, stipulates a reduction commitment for the level of export subsidy by 24 percent in terms of its volume (36 percent for developing countries) and 25 percent in terms of its value in 2000 (14 percent for developing countries until 2004).

Table 2.2: The export subsidy volume committed and utilized in major countries from 1995-1999

All WTO Members	**Unit**	**1996**	**1996**	**1997**	**1998**	**1999**	**1995-1999**
Commitments	Mil.US$	21 036	19800	17 432	15 757	13 223	87 248
Outlays	Mil.US$	7 112	7472	5 606	6 513	6 360	33 063
Utilization	percent	34	38	32	41	48	38
EU							
Commitments	Mil.US$	15 361	13820	11 372	10 254	8 857	59 664
Outlays	Mil.US$	6 385	7062	4 945	5 968	5 985	30 345
Utilization	percent	42	51	43	58	68	51
Norway							
Commitments	Mil.US$	147	134	109	90	75	555
Outlays	Mil.US$	83	78	102	77	128	468
Utilization	percent	56	58	94	86	171	84
Switzerland							
Commitments	Mil.US$	547	490	399	362	..	1 798
Outlays	Mil.US$	447	369	296	292	..	1 404
Utilization	percent	82	75	74	81	..	78
USA							
Commitments	Mil.US$	1168	1053	939	824	709	4 693
Outlays	Mil.US$	26	121	112	147	80	486
Utilization	percent	2	11	12	18	11	10

Note: Figures for 1999 are not complete, as some country notifications are overdue.
.. not available.
Source: OECD (2002a)

As shown in table 2.2, the average utilisation of export subsidy volume commitment for all WTO members from 1995-1999 is 38 percent, indicating that export subsidies

volume commitments have been well fulfilled. Switzerland (78 percent) and Norway (84 percent) have utilised the largest share of export subsidy commitments during 1995-1999. Among all countries, the EU is the largest user of export subsidies. For the period 1995-99, it makes up more than 90 percent of total subsidy outlays in all countries. These subsidies have almost been spent on the export of coarse grains, butter, skim milk powder, beef, dairy exports and wheat (OECD, 2000a).

Under the URAA, unused export subsidy of commodities can not be transferred to other commodities, unlike domestic support measures. Stated differently, export subsidies are commodity specific. In practice, however, this is mostly violated. EU, for example, subsidises cheese exports and reports it under commitments for skim milk powder and butter, thus bypassing its cheese-specific bindings on export subsidies (Elbehri and Leetmaa, 2002).

Moreover, export subsidy commitment has the following severe limitations, despite its attempt to discipline trade-distorting practice in world agricultural trade (OECD, 2002a):

- There have been a number of cases in which countries resorted to the rollover provision, whereby unused export subsidy allowances are forwarded;

- There is no upper limit on the unit export subsidy that can be applied to a given commodity, so that the volume and value constraints do not bind simultaneously; and

- Measures such as export credits, certain aspects of parastatal trade agencies, misuse of international food aid, various price discrimination mechanisms, and export taxes and restrictions can be used to circumvent the export subsidy discipline and may distort export competition.

The future trade negotiations, therefore, have to deal with these caveats, since they have the potential to undermine the discipline gained through export subsidy commitment in URAA.

Curtailing export subsidy payments has varying impacts on the welfare of developing countries. Those countries that are net importers will be harmed as a result of the rise in the world price that may occur due to the fall in export subsidy. Conversely, other countries that are net exporters will gain from the reduction due to the high price they obtain for their exports. Using a multi-country trade modelling, Elbehri and Leetmaa (2002) analysed the removal of export subsidies alone and also when the removal is coupled with a cut in domestic support and tariff barriers. The analysis shows that the latter scenario brings a welfare gain for all countries, including net food importers, due to improved economic efficiency obtained from removing their own import barriers.

Substantial export subsidies also have a significant effect in reducing world prices of agricultural commodities. The world cotton price, for example, has plummeted since the mid 1990's to below the great depression level due to the huge export subsidy given to cotton producers. In the year 2001/01 USA has spent US$ 3.9 billion for 25,000 cotton farmers, i.e. almost US$ 230 for every acre of cotton farmland, which is five times the transfer for cereals (Watkins, 2002).

According to an estimate by International Cotton Advisory Committee (ICAC), using its world textile demand model, the elimination of US subsidies for cotton producers will increase world cotton price by 26 percent. Using the estimated rise on the cotton price by ICAC, Watkins (2002) estimated the impact of US cotton subsidies on Sub Saharan African countries' export revenue. The result indicates that Sub Saharan African countries as a whole have suffered an estimated export revenue loss of US$ 302 million during 2001/2 (see Table 2.3). Among SADC countries, Tanzania and Zimbabwe are affected significantly by the cotton subsidy. Both countries lost US$ 21 and US$ 18 million respectively. The loss has also occurred to Mozambique (US$ 6 million), Zambia (US$ 8 million) South Africa (US$ 4million) and Malawi (US$ 2 million).

Table 2.3: Foreign exchange losses as a result of USA's cotton subsidies in selected SADC countries

Country	Actual cotton export earnings in 2001/2 ($ million)	Export earnings with the withdrawal of US subsidies ($million)	Value lost as a result of US subsidies ($million)
Malawi	6	8	2
Mozambique	23	29	6
South Africa	17	21	4
Tanzania	79	100	21
Zambia	29	37	8
Zimbabwe	69	87	18
Total for Sub-Saharan Africa	1144	1446	302

Source: Watkins (2002)

ACTSA (2001b) estimated a total loss of 36,000 jobs from Swaziland sugar and sugar related industry, which was the main supplier for South Africa, due to the 'dumping' of EU's highly subsidised sugar products that flooded South African market. In addition, ACTSA (2001b) also noted that Zimbabwe's butter production fell by 92 percent between 1994-1999 because of the highly subsidised and low priced EU butter that flooded the Southern Africa markets.

2.4 Summary

OECD countries play a leading role in world agricultural trade. Among OECD countries, EU and USA in particular, are the major destination markets for most of SADC countries. Agricultural policies of these countries, therefore, have marked implications on the economies of SADC countries. Thus, it is vital to examine the progress of implementation of URAA commitments of these countries.

The progress of OECD countries on the implementation of URAA commitment in respect of curtailing domestic support and export subsidies is promising. Recent data reveals that agricultural domestic support is under the commitment level in these countries. Domestic support, measured using both TSE and PSE, indicates a modest progress towards implementation of the basic mandate of the URAA. However, the increasing part of the domestic support measures is trade distorting. Stated differently, most of the agricultural support measures are still linked with the amount of output

produced and the level of inputs used. Domestic support based on market price is also dominant in these countries.

The export subsidy outlay of OECD countries is also under the commitment level. It, however, has a significant impact on world agricultural prices. The huge subsidies offered to US cotton producers in 2001/2002, for example, had an adverse impact on the world cotton price. As a result, five SADC countries lost an estimated value of US$ 302 million due to the lower price of world cotton produce. Although export subsidy commitments endeavour to discipline one of the most trade distorting policies in world agricultural trade, it has severe limitations that need to be addressed in the future trade negotiations as they may have the potential to undermine the premise of curtailing export subsidies.

The result of various studies on the impact of the domestic support measures of OECD countries in the world agricultural trade shows that decoupling domestic support of these countries would entail a welfare gain for all countries in terms of improving the income transfer efficiency in OECD countries and reducing the trade distorting impact of these support measures for the world agricultural trade. Moreover, a reduction in export subsidies of OECD countries should be accompanied by a cut of tariffs and domestic support to bring a welfare gain for all countries.

CHAPTER THREE

TARIFF AND NON-TARIFF BARRIERS FACING SADC AGRICULTURAL EXPORTS IN OECD COUNTRIES

" The barriers the EU and US have erected to protect agriculture in our own countries effectively block Africa from wider participation in the global economy…we should lower these barriers, and allow agriculture to do for Africa what textiles and microchips have done for Asia." Jack Straw, UK Foreign Secretary, 2001

3.1 Introduction

One of the main pillars of the URAA is the commitment to augment market access through agricultural tariff rate reduction. Due to the 'tariffication' of all non-tariff trade barriers, which was posited in the URAA, agricultural tariffs have been set excessively high. Hence, tariff rate quotas have been introduced to promote agricultural trade that could have been restricted due to the excessively high tariff rates (Abbott, 2001). The practice of tariff escalation in most developed countries, which remained a major challenge for agricultural development of many developing countries, however, was not addressed in the URAA.

The purpose of this chapter is to examine the challenges faced by SADC countries in exporting agricultural commodities to OECD markets and to review the progress of tariff rate reduction commitment by OECD countries. Furthermore, the chapter reviews studies undertaken on analysing the impact of OECD countries tariff rate reduction on developing countries as a whole and SADC countries in particular.

3.2 Tariff barriers

Promoting market access in agricultural trade is one of the basic mandates of the URAA. This objective, however, is still not realised substantially due to the presence of high agricultural tariff barriers. Gibson *et al.,* (2001) estimated that the average global tariff rates for agricultural commodities is 62 percent. This high agricultural tariff rate, which partly emanates from the "tariffication" of all the non-tariff barriers, reduces the world price of agricultural commodities by curtailing the demand of agricultural products in tariff imposing countries. Moreover, the high domestic price caused by tariffs in these importing countries stimulates agricultural production that

floods the international market and squeezes world prices. The high global agricultural tariff rates, therefore, pose a global inefficient resource allocation, as the pattern of production is not dictated by comparative advantage.

Hoekman, Ng and Olarreaga (2002a) argued that most of agricultural commodities tariff rates in the so called QUAD (Canada, EU, USA and Japan) are characterised by many tariffs lines above 15 percent (tariff peaks), though they have overall low average tariff rates. These tariff peaks are specifically concentrated on products like sugar, dairy, cereals, fish, tobacco, certain alcoholic beverages, fruit and vegetables, food, industry products with high sugar content, clothing and foot wear. These products make up a large part of SADC exports.

Even though excessive tariffs applied by OECD countries are partly offset by preferential access schemes such as the Generalised System of Preferences (GSP), most of these programmes exclude "sensitive" products and subject them to quota restrictions or limit the countries that are eligible (Michalopoulos, 1999). Most preferences granted to least developed countries (LDCs) are also concentrated on low tariff products and they are "much less generous for tariff peak products" except in the case of EU (Hoekman *et al.*, 2002a). Even the EU initiative of Everything But Arms (EBA) that grants full duty and quota-free access is likely to result in a small increase in LDCs exports of tariff peak items due to the fact that most of LDCs' agricultural commodities have already been enjoying free access to the EU. According to Hoekman *et al.,* (2002a), the increase in tariff peak item export due to the EBA initiative is less than one percent of LDC's total exports.

The average bound tariff rates for agricultural commodities in selected regions after the implementation of the URAA is presented in appendix B. It can be observed that meat, dairy and sugar sweeteners are among the commodities that have the highest protection in OECD countries. Gibson *et al.,* (2001) also discovered 141 mega tariffs (tariff rates exceeding 100 percent) in EU tariff schedules where 70 percent were accounted for in dairy and meat sectors. In Japan, mega tariffs account for 63 percent of all tariff-lines in the dairy sector, with 20 of those rates in excess of 500 percent. The overall average agricultural commodities tariff rates of OECD is 45.6 percent, which indicates a presence of a substantial protection for agricultural trade.

Many agricultural exports of SADC countries face significant tariff barriers in OECD countries (see Appendix C). Maximum applied tariff rates reached 45 percent for food preparations in Malawi, 40 percent for sheep and goat meat in South Africa and 40 percent for dried vegetables in Zimbabwe. For most of these agricultural products, OECD tariff rate were lower in 2001 than in 1997. However, tariff increments were observed for products like wine of fresh grapes from Zimbabwe, dried leguminous vegetable from Mozambique and milk and cream from Zambia. Significant tariff cuts, on the other hand, occurred in the case of sunflower seed, and cottonseed from Mozambique and malt from Tanzania.

OECD countries in general, however, offer preferential treatment for Sub-Saharan African countries (see Appendix D). For all chapters, except tobacco and edible preparations, Sub-Saharan Africa applied tariff rate is lower than the MFN tariff rates set by OECD countries.

Hoekman *et al.* (2002a) analysed the impact of granting unrestricted access to LDC exports of tariff peak products in the QUAD (Canada, USA, Japan and EU) markets. The analysis found that LDCs' export revenue could expand by $2.5 billion (or 11 percent of total exports). From this unrestricted access, two-thirds of LDCs' export revenue in the EU will be derived from the export of sugar and confectionery, where the main beneficiaries would be Malawi, Zambia, and Mozambique, which captures 27, 19, and 15 percent of the total increase in LDC sugar exports, respectively. Similarly, 90 percent of the gain in Japan would be also concentrated in sugar and confectionery, where Malawi, Zambia and Mozambique are also expected to capture the marked gain. In the case of USA and Canada, most of the expansion of exports would occur in apparel, clothing and footwear sectors where Bangladesh would be the chief beneficiary. The elimination of tariffs on tobacco by USA is also estimated to bring a 25 percent increase in exports for Malawi.

Similarly, Hoekman, Ng and Olarreaga (2002b) compared the impact of global reduction in agricultural tariffs and domestic support using a partial equilibrium model of global trade in commodities. The simulated result suggests that a global tariff reduction will induce a positive welfare effect for all countries. A reduction of domestic support, on the other hand, would reduce the welfare of developing

countries as a whole and offer a marginal welfare increase to LDCs. From the simulation results, both 50 percent reduction of domestic support and 50 percent tariff cut will improve the terms of trade and welfare of SADC countries included in the study. The later reduction, however, entails more benefit than the former, indicating that tariff reduction has more impact in augmenting welfare for developing countries in general and SADC countries in particular than a cut in domestic support. Using CGE models, Beghin, David and Dominique (2002), Dimaranah Hertel and Keeney (2003) and Rae and Strutt (2002) also corroborated the findings that 'border barriers matter more than domestic support' in terms of their welfare impact on developing countries.

3.2.1 Tariff escalation

Tariff escalation refers to the case where higher tariff rates are applied when a primary commodity is going through successive processing stages. Khasmobis (1998) referred to tariff escalation as a "tax on sustainability" and an impediment to sustainable development since it prevents:

- The possibility of achieving a new era of growth in which developing countries play a larger role and reap large benefits;
- The formation of an open multilateral trading system which makes possible more efficient allocation and use of resources and to lessen demand on environment; and
- The optimal use of world's resources seeking both to protect and preserve the environment and enhance the means for doing so.

Furthermore, Khasmobis (1998) noted the various ways tariff escalation might damage the environment. First, over-depletion of natural resources (by increasing the volume of exports) and ecological disturbances (by using low quality or marginal lands and deforestation) is likely to occur when a country is compelled to export primary goods. Second, income growth of the country will decline, as a result of low inputs of value added; therefore, few resources will be available to manage resources sustainably. Third, "not only does it result in inequities in world trade, but also undermines the novelty of the notion 'growth with equity'". Finally, capital-intensive

techniques utilised in processing industries of developed countries are not environmentally friendly compared to the relatively labour intensive technology in developing countries.

Elimination of tariff escalation could also benefit the environment by encouraging processing industries, where environmental controls are more effective than non-processing sectors. Moreover it encourages specialisation according to natural comparative advantage, where resources would be used efficiently and optimally. Considering all the negative impacts, tariff escalation is therefore a distortionary and "third best" practice for resource allocation compared to a normal tariff rate where resources are misallocated and economic systems are "second-best" world (Khasmobis, 1998).

Khasmobis (1998) also suggested that a developing country that faced a tariff escalation has two options: the "Devil" or the " Deep Sea". The "Devil" refers to the case where a nation is forced to export raw materials and fall into the trap of unsustainable development, and the "Deep Sea" is retaliation with escalated tariff, leading to a balance of trade crisis. In both cases, a small developing country faces a no-win situation. Hence, Khasmobis (1998:10) contended that the "formation and strengthening of coalition of interest between developing countries producers (of processed goods, which are labour intensive) and developed countries consumers will be politically feasible for the developed countries governments to remove tariff escalation and thus, create the base for a win-win situation".

Table 3.1: Tariff escalations of agricultural products in OECD countries

Country	Year	Agricultural Product Stage		
		First stage	Semi-processed	Fully processed
Australia	1998	0.3	0.7	2.3
Canada	1999	1.7	3.6	7.0
EU	1999	7.3	12	13.1
Iceland [/a]	1999	2	9	11.5
Japan	1999	4.5	14.3	15.5
New Zealand	1999	0.5	2.7	2.8
Norway	1999	14.8	0.0	3.5
Switzerland [/a]	2000	4.6	30.5	41.8
United States	1999	7.1	4.5	10.3
Industrialised Cos. (# 23)	1998-00	4.8	8.6	12.0

Notes: [/a] *Tariff escalation of agricultural products is based on food processing only.*
Sources: WTO CD ROM 2000 and WTO Trade Policy Review, various issues, 1995-2000

As shown in table 3.1, tariff escalation is a commonplace in almost all OECD countries except Norway. Specifically, Japan and Switzerland apply very high tariff rates on processed agricultural products. The tariff structure for each group of commodities and their processing stages in each OECD countries show that all agricultural commodity groups in all OECD countries are subjected to tariff escalation except in Korea and in some cases in Mexico (see Table 3.2).

Table 3.2: OECD tariff escalation for agricultural commodity groups

Member		CE	CO	DA	FV	OI	SG	BV	CF	ME	OA
Austral.	Unprocessed	1	0	0	2	1	15	10	1	2	1
	Semi-processed	0	0	11	8	4	15				6
	Prepared/ preserved	5	11								
Canada	Unprocessed	1	0	0	4	1	8	8	2	5	1
	Semi-processed	2	2	11	7	5	8				4
	Prepared/ preserved	7	3								
EU	Unprocessed	4	3	0	7	0	10	17	5	6	1
	Semi-processed	0	9	8	16	5	17				4
	Prepared/ preserved	9	10								
Japan	Unprocessed	13	8	0	6	0	51	25	2	12	1
	Semi-processed	18	7	30	14	4	20				4
	Prepared/ preserved	18	20								
Korea Rep.	Unprocessed	186	112	36	126	97	34	39	95	31	13
	Semi-processed	310	20	82	56	24	20				32
	Prepared/ preserved	77	32								
Mexico	Unprocessed	17	0	30	13	4	132	41	27	66	25
	Semi-processed	10	0	8	14	7	62				33
	Prepared/ preserved	13	8								
New Zealand	Unprocessed	1	3	8	2	0	3	13	1	9	1
	Semi-processed	11	10	12	13	4	13				3
	Prepared/ preserved	15	16								
USA	Unprocessed	4	6	2	6	1	2	0	1	5	16
	Semi-processed	5				3	3	0	5	6	4
	Prepared/ preserved						3	2			

Notes: *Bound rates are post-Uruguay, simple average*
CE, cereals; CO, coffee, tea, and spices; DA, dairy products; FV, fruits and vegetables; OI, oilseeds, fats and oils and products; SG, sugar and confectionery; BV, beverages and spirits; CF, cut flowers, plants and vegetable materials; ME, meat and meat preparation; OA, other agricultural products.
Source: WTO (2001)

As the majority of OECD countries have tariff escalation in almost all agricultural commodities, the expansion of agro-industries in SADC region has been greatly affected due to significant protection for processed agricultural commodities. The high tariff rates imposed in sugar-based processing industries in the EU, for example, has largely undermined the development of the Southern African value-added sugar processing industries (ACTSA, 2001b). Reforming tariff escalation, therefore, would greatly enhance the establishment of agro-industries in the region.

3.2.2 Tariff rate quotas

High tariff rates for agricultural products that arise due to the "tariffication" of all non-tariff barriers in the URAA have raised a concern for WTO member countries that market access will be increasingly restricted. Hence, Tariff Rate Quotas (TRQ)

were introduced to maintain the 'current' import level at the base period (1986-1988) and to allow minimum market access. A 'current' import access refers to the equivalent amount of imports at the base period, which can be offered, on discriminatory bases by the importing country. The 'minimum' market access level, on the other hand, is offered on a Most Favoured Nation (MFN) basis, which is open for all member countries. According to the URAA, both the 'current' and 'minimum' access should be at least be 3 percent of domestic consumption of the base year (1986-88) in 1995, and expand to reach 5 percent in 2000 for developed country (2004 for developing country).

TRQ refers to a two-tier tariff rate where a lower tariff rate is applied for the minimum access and a higher tariff rate is applied for any level above the quota (minimum access). Thirty-seven countries out of 142 members use TRQ commitments in their schedules.

Table 3.3: Number of tariff quotas and country specific TRQs by members

Member	Number of tariff quotas	Country specific TRQs	Member	Number of tariff quotas	Country specific TRQs
Australia	2		Malaysia	19	
Barbados	36	1	Mexico	11	9
Brazil	2		Morocco	16	
Bulgaria	73	4	New Zealand	3	
Canada	21	3	Nicaragua	9	
Colombia	67		Norway	232	3
Costa Rica	27		Panama	19	1
Czech Repu.	24		Philippines	14	
Ecuador	14		Poland	109	
El Salvador	11		Romania	12	
EU	87	15	Slovak rep.	24	
Guatemala	22		Slovenia	20	
Hungary	70		South Africa	53	
Iceland	90		Switzerland	28	
Indonesia	2		Thailand	23	
Israel	12	1	Tunisia	13	
Japan	20	1	United states	54	33
Korea, rep.	67		Venezuela	61	
Latvia	4		All (37)	1371	71

Source: WTO Secretariat, 2002. Tariff and Other Quotas, G/AG/NG/S/7, WTO, Geneva, May.

Table 3.3 shows the total number of tariff quotas notified by WTO members. Norway, Poland, Iceland, EU, Bulgaria and Hungary alone accounted for more than half of the total TRQs. The concentration of many TRQs in these countries indicates high protection set for agricultural trade. TRQs are also adopted by several Central and Eastern European Countries to ease the transition of agricultural sector into a market-oriented economy (Gibson *et al.*, 2001).

The principle of TRQs rests on promoting market access opportunity of previously non-traded and/or highly protected agricultural commodities by offering low in-quota tariff rates (Abbott, 2001). TRQs are a commonplace for "politically sensitive" commodities, and have been implemented in a manner to permit managed trade regimes to be continued under this new institutional arrangement (Abbott, 2001). As shown in table 3.4, of all TRQs, 60 percent are devoted mainly to fruits and vegetables, meat and cereals.

Table 3.4: Tariff quotas by product categories

Product category	**Number of tariff quotas**	**Percentage of all tariff lines**
Cereals	217	15.8
Oilseeds products	124	9
Sugar and sugar products	51	3.7
Dairy products	181	13.2
Meat products	247	18
Eggs and egg products	21	1.5
Beverages	35	2.55
Fruit and vegetables	355	26
Tobacco	13	1
Agricultural fibers	18	1.3
Coffee, tea, spices and processed agric. products	56	4.1
Other agricultural products	53	3.8
Total all products	1371	100

Source: WTO Secretariat, Tariff and Other Quotas, G/AG/NG/S/7, WTO, Geneva, May 2002.

3.2.2.1 In-quota and over-quota tariff rates

In principle, in-quota tariffs should be a very low tariff rate to permit market access. A study by Gibson *et al.,* (2001), however, found out that the overall world average in- quota tariff rate is equal to the average of all agricultural MFN tariff rates, which

is 62 percent. The average in-quota tariff rates of OECD are also around 49 percent and some countries like, Norway and Switzerland, have average in-quota bound tariff rates of 262 percent and 75 percent respectively (see Figure 3.1). These rates also exceed the average of all agricultural tariff rates in Australia, Czech Republic, Mexico and Norway (see Appendix E). New Zealand and Canada, on the other hand, have the lowest average in-quota tariff rates, which is in keeping with the spirit of the URAA. In general, as indicated in appendix E-1, the overall high average in-quota tariff rates indicate the protective nature of in-quota tariff rates, which are likely to entail "under-fill" of the quota volume.

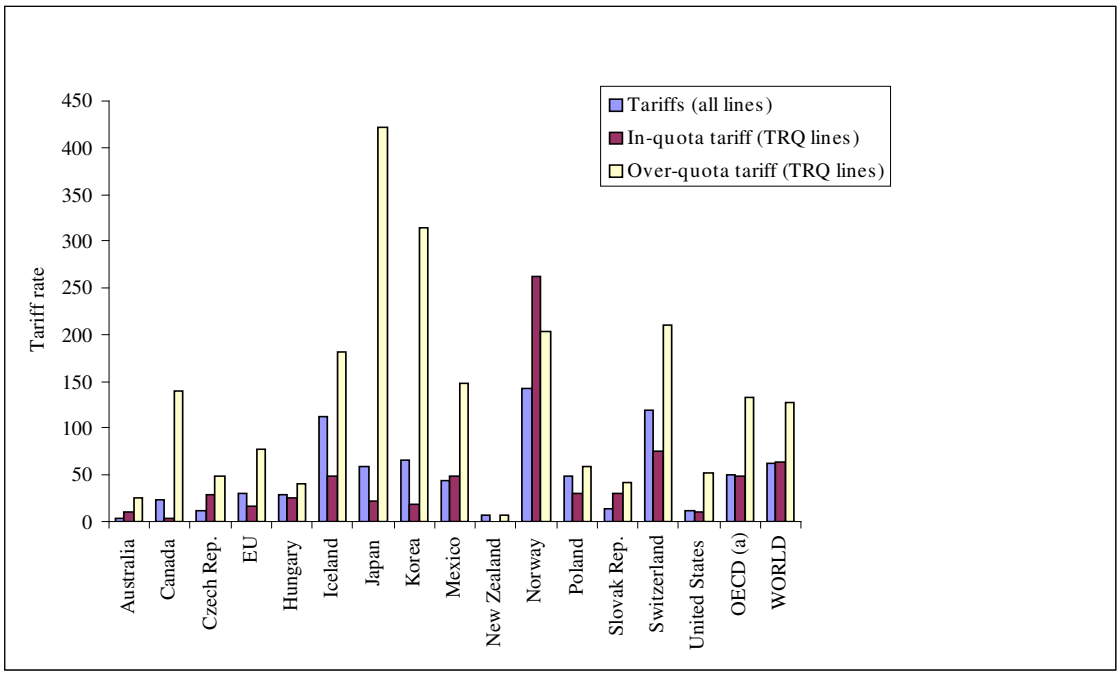

Figure 3.1 Average tariff rate of all agricultural commodities, in quota and over-quota tariff rates of OECD countries

Source, Gibson et al, (2001).

The average over-quota tariff rates by all thirty-seven countries that apply TRQs is 120 percent, reflecting that the rate is virtually trade prohibitive (Gibson *et al*., 2001). As shown in appendix E-2, the EU has relatively low over-quota tariff rates compared to other regions. It is only for sugar (114 percent) and preparations of vegetables, fruits and nuts (105 percent) that the EU has imposed mega tariff rates. For Non-EU Western Europe, almost all chapters have bound over-quota mega tariff rates. Asia Pacific has the highest over-quota tariff rates for tobacco, which reaches a four-digit level, at about 1037 percent. The average over-quota tariff rates for OECD countries

is 132 percent, where Japan (422 percent), Korea (314 percent), Switzerland (210 percent), Iceland (181percent) and Norway (203 percent) have excessively prohibitive over-quota tariff rates.

3.2.2.2 Quota fill rate

One of the top concerns about TRQs of agricultural commodities is the quota fill rate, which represents the imported proportion of the minimum access level. The average quota fill rate for all agricultural products has been around 63 percent from 1995-2000. In addition to low average fill rate, the frequency distribution of the quota fill rate demonstrates that during 1995-2000, only 51.8 percent of all the tariff quotas had been filled above 80 percent. Around 40.6 percent of the tariff lines had below 60 percent fill rate and the remaining 6.7 percent had a quota fill rate of between 60 and 80 percent (see Figure 3.2).

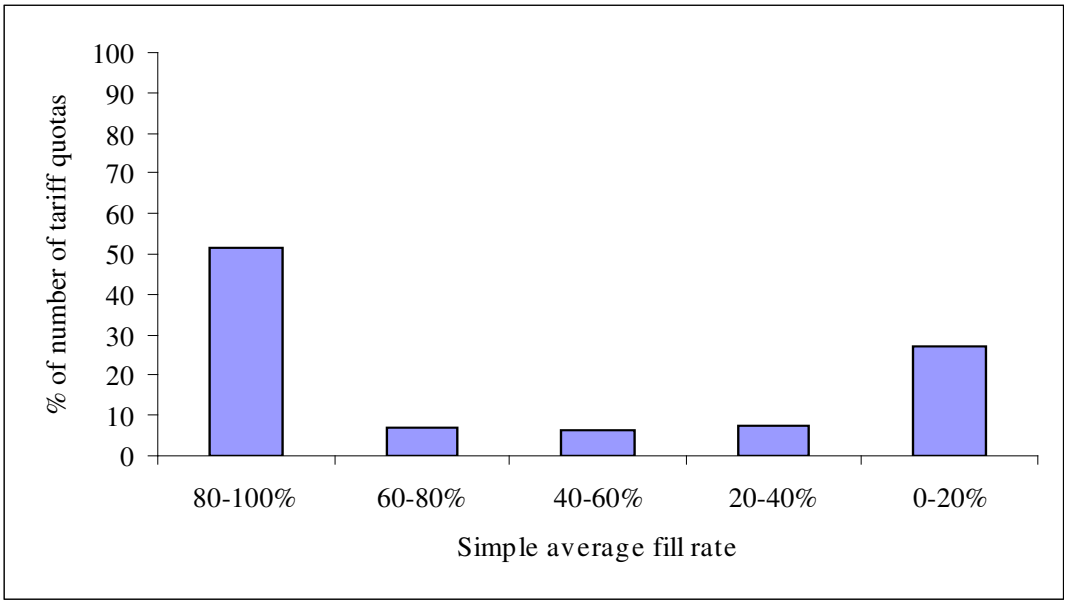

Figure3.2: Frequency distribution of all quota fill rates from 1995-2000
Source. WTO Secretariat (2002) TN/AG/S/6

Among agricultural commodities, cereals had the highest average fill rate during 1995-1999, which was about 60 percent, followed by tobacco and sugars that has almost similar fill rate: 58 percent. The other product groups are distributed between 40 and 55 percent. The lowest fill rates are registered for eggs (29 percent), beverage (37 percent), and agriculture fibre (39 percent) (see Figure 3.3).

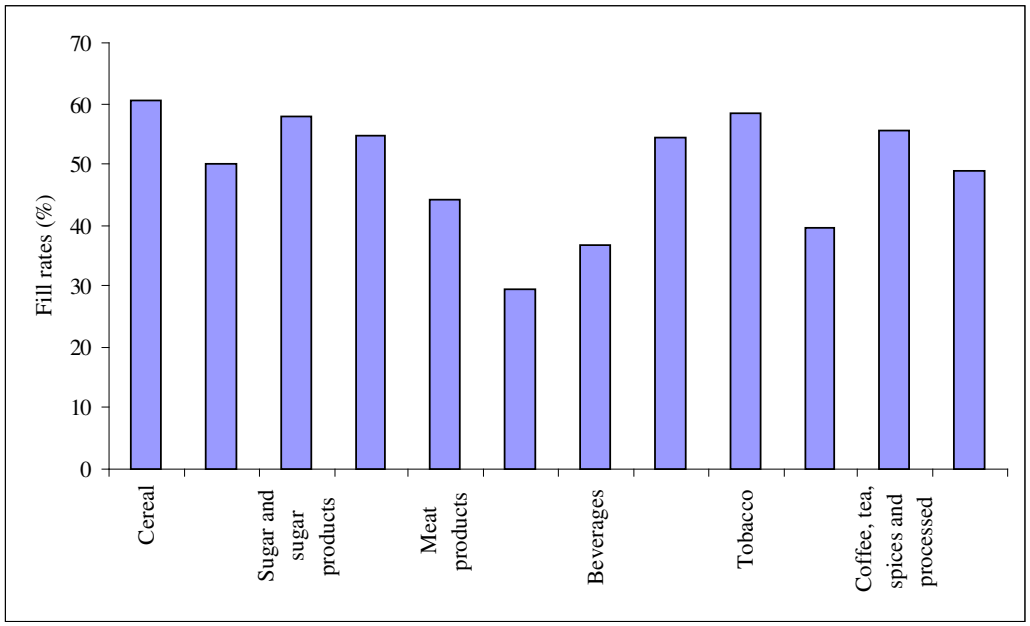

Figure 3.3. Quota fill rate of agricultural commodities from 1995-2000
Note: For cereal and coffee, tea and spices 1995-1999; Agricultural fibres 1995-1998
Source: WTO Secretariat, 2002. (G/AG/NG/S/6)

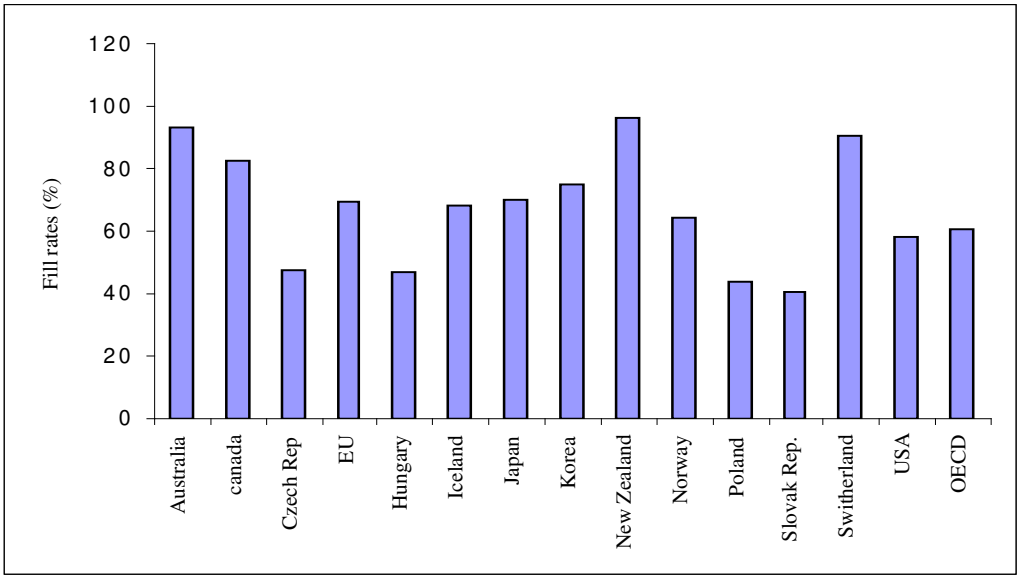

Figure 3.4. Quota fill rate of OECD countries from 1995-2000
Note: Canada, Iceland, Korea, Switzerland: 1995-98; Japan, Mexico, Norway, USA: 1995-1999
Source: Diakosavvas, (2001).

The average quota fill rate by OECD countries during 1995-2000 are demonstrated in figure 3.4. Given the number of quota lines, Australia, Mexico, Switzerland and Canada had the highest quota fill rates of 78 percent during the period. Czech Rep, Hungary, New Zealand, Poland and Slovakia have fill rates of less than 50 percent in most cases. Other countries have a quota fill rate of between 50 percent and 76

percent. The overall average fill rates for an OECD country during 1995-98 is similar to the quota fill rate of all WTO member countries, which is about 63 percent. The over all low quota fill rates of agricultural commodities in OECD countries illustrate, among other things, the importance of examining the quota administration and reforming the high in-quota tariff rates applied to agricultural commodities in most OECD countries.

There are various methods applied to administer tariff rate quotas. Each method has varying impact on the quota fill rate and in determining the one who gets the right to import under the in-quota tariff rates. If the administrative method is onerous and cumbersome, it can act as a non-tariff barrier (NTB) by increasing the transaction costs associated with imports (Abbott, 2001).

The URAA advocates two criteria for judging whether tariff quotas are properly administered. The first one is the *quota fill rate*, that suggests the given in quota volume should be imported if the market conditions permit. Stated differently, if the domestic price exceeds the world price plus the in-quota tariff rate and quota under-fill is observed in the country, the quota administration needs to be properly administered. The second criterion is the *distribution of trade* that advocates the principle of non-discrimination. In other words, trade that takes place under the TRQ principle should be based on relative efficiency of suppliers rather than alternative discriminatory criteria. Skully (1999) summarised the impact of various quota administration methods on the two criteria suggested by URAA (see Table 3.5).

Table 3.6 describes the quota administration methods and gives the percentage of all tariff rate quota they accounted for and their respective fill rates during 1995-2000. As shown in the table, despite a very low proportion of the tariff lines administered by state trading enterprises, historical importers, producer groups and mixed allocation methods, they yield relatively high filled rates than the other methods. Low fill rates are recorded for quota administration methods, “license on demand”, “auctioning” and “first- come first- served”.

Table 3.5: Summary of 'under-fill' and 'biased distribution' risks of various tariff quota administrative methods

	Risk of 'under-fill'	**Risk of 'biased distribution'**
Market Allocation		
Applied tariff	None	None
Auction	Low	Least
Quasi-market Allocation		
License on Demand	Low	Moderate
First-Come, First Served	Low	Moderate
Historical	Moderate	Very High
Discretionary Methods		
State Trading	Low	High
Producer Group	Low	High

Source: Skully (1999)

Table 3.6: Description of tariff quota administrations and their fill rate

Method	Description	% of all TRQs	Ave. fill rate
Applied Tariffs	No shares are allocated to importers. Imports of the products concerned are allowed into the territory of the Member in unlimited quantities at the in-quota tariff rate or below	45	68
First-come, first-served	No shares are allocated to importers. Imports are permitted entry at the in-quota tariff rates until such time as the tariff quota is filled; then the higher tariff automatically applies. The physical importation of the good determines the order and hence the applicable tariff	10	56.5
Licenses on demand	Importers' shares are generally allocated, or licenses issued, in relation to quantities demanded and often prior to the commencement of the period during which the physical importation is to take place. This includes methods involving licenses issued on a first come, first served basis and those systems where license requests are reduced pro rata where they exceed available quantities.	27	54
Auction	Importers; shares are allocated, or licenses issued, largely on the basis off an auctioning or competitive bid system	3.6	33
Historic.Importers	Importers; shares are allocated, or licenses issued, principally on the basis of an auctioning or competitive bid system.	7.5	72
State trading entities	Import shares are allocated entirely or mainly to a state trading entity which imports or has direct control of imports undertaken by intermediaries the product concerned	1.6	81
Producer group or associa-tion.	Imports shares are allocated entirely or mainly to a producer group or association which imports or has direct control of imports undertaken by the relevant Member the product concerned	0.7	76
Other	Administration methods which do not clearly fall within any of the above categories	0.7	82
Mixed allocati.methods	Administration methods involving a combination of the methods as set out above with on one method being dominant	3.5	73
Non-specified	Tariff quotas for which no administration method has been notified	0.5	62

Source. WTO (2002) TN/AG/S/6

In sum, 'under-fill' quotas are still present in OECD countries for commodities that are of interest to SADC countries. Among other things, a reduction in the in-quota tariff rate, an increase in the quota volume (the 'minimum' access) and an establishment of transparent and efficient administrative methods, would contribute heavily to the realisation of market access opportunities offered through TRQs.

3.3 Non-tariff measures

The restriction on using traditional barriers (tariffs) as a protection of agricultural trade has recently proliferated the development of non-tariff barriers in most developed countries. These barriers are becoming a challenge for market access of developing countries' exports. Among others, non-tariff measures include the following.

- Import licensing: It represents the need to obtain a permit to import a product. The administrative procedures require the submission of an application or other documentation to the relevant administrative body as a condition for importing;
- Variable levies: This is a complex system of import surcharges. It intends to ensure that the price of a product in the domestic market remains unchanged regardless of price fluctuations in exporting countries. Variable levies are a feature of the Common Agricultural Policy (CAP) of the European Union (Deardorff and Stern, 1997). The URAA stipulates that variable levies have to be converted to tariffs;
- Technical barriers to trade: technical regulations designed for domestic objectives but which may discriminate against imports;
- Sanitary and phytosanitary regulations: safety standards set for imports to comply to get in domestic market;
- Antidumping duties: imposition of a special import duty when the price of imports is alleged to lie below some measure of the costs of production of foreign firms. Minimum foreign prices may also be established to "trigger" antidumping investigations and actions; and
- Countervailing duties: imposition of a special import duty to counteract an alleged foreign government subsidy to exports; normally required that domestic injury be shown (Deardorff and Stern, 1997).

As noted in Oyejide, Ogunkola and Bankole (2000) the EU sets a health standard for most agricultural products and uses non-tariff barriers like reference pricing, automatic license, prior authorization, and agricultural levy for the majority Harmonised System (HS) chapters. The EU also uses seasonal quotas on the amount of certain products that can be imported into Europe. These quotas apply seasonally, so that when European goods are being harvested, they circumvent competition from cheaper African goods. The Namibian grape industry, for example, has a duty free access for only 900 tones and higher tariff rates are applied to the quantities above the limit. If this restriction were removed, the Namibian grape industry that employs over 6000 people could create more jobs in deprived rural areas (ACTSA, 2001a).

In the EU, prior authorization and agricultural levies are mostly applied on most agricultural chapters. These measures are not frequently used in USA and Japan. Variable components and retrospective surveillance that does not exist in USA and Japan are also employed in EU. In general, meat, vegetable, fruits, and dairy are mostly faced with a myriad of non-tariff measures than other products, and tariff quota and non-automatic licensing are also widely applied for most agricultural products. Generally, transparency is lacking for most of EU's NTBs as compared to Japan's, which are more explicit in terms of the purpose for which they were imposed (see Appendix G).

In Japan, almost all HS chapters of agricultural products are subjected to health requirements and most of the non-tariff barriers are concentrated on fish, dairy and animal origin products. Tariff quotas are applied for 10 HS chapters and a seasonal tariff is applied to edible fruits and nuts. In short, Japan's explicit SPS measures facing agricultural exports comprise: labeling for the purpose of health, authorization (wild life), inspection requirements, standards for human health, and quota for sensitive products (Oyejide *et al.*, 2000).

The USA has relatively few non-tariff protection measures on agricultural commodities compared to Japan and Europe. However, it applies countervailing duties, antidumping duties and tariff rate quotas for most HS chapters compared to other countries. In addition, sugar faces more non-tariff barriers, including flexible

import fees, in the USA than in other countries. Excise tax and special taxes are also some of the non-tariff barriers applied only in the USA.

3.4 Summary

Agricultural exports of SADC countries are facing tremendous challenges in their access to the OECD markets. Tariff protection, in the aftermath of the URAA implementation, is still excessively high. Recent data shows that the average agricultural tariff rate in OECD countries is 48 percent. Moreover, the tariff rate quota that has been introduced to promote agricultural trade hasn't realized its objectives, since both the in-quota and over-quota agricultural tariff rates of most OECD countries are still very high and trade prohibitive respectively. Thus, quota fill rates registered in the aftermath of URAA implementation were not promising.

Many agricultural commodities that are of the major interest to SADC countries are also highly protected in most OECD countries. In addition, tariff escalation, which remains a major obstacle for the promotion of agro-industries in SADC countries, is a commonplace in OECD. Various studies, thus, suggest that tariff reduction by OECD countries will have more impact in augmenting the welfare for developing countries in general and SADC countries in particular than a cut in the domestic support.

The constraints faced by SADC agricultural exports to OECD are not only confined in tariff barriers, but are also experienced in various kinds of non-tariff barriers. Among others, license agreements, various levies and taxes, SPS standards and TBT, which are widely applied by OECD countries, are becoming significant obstacles to agricultural exports of SADC countries'. In the next chapter, the main non-tariff barrier, SPS measures, and their implication on developing countries' agricultural trade is discussed at length.

CHAPTER FOUR

THE SPS AGREEMENT AND ITS CHALLENGE FOR DEVELOPING COUNTRIES

"The ability of developing countries to maintain and expand their world market share will depend on their ability to meet the demands of the world trading system, not only in terms of competitive prices but also in quality and safety standards." Henson and Loader, (2001).

4.1 Introduction

The URAA introduced the SPS agreement to avoid unjustifiable use of SPS standards for the purpose of trade protection by countries. However, developing countries still experience challenges in participating actively in SPS matters and on the way the SPS agreement operates. As a result, they are still largely unable to utilize the opportunities offered in the SPS agreement to maintain their interest and raise their concerns to the member countries (WTO, 2000).

This chapter provides a brief overview of the SPS agreement, the challenges and concerns of developing countries in using SPS provisions and on the way SPS agreement operates. In addition, the adverse impacts of stringent SPS standards on the economies of developing countries are briefly discussed.

4.2 Negotiation history

The GATT rules, which were established in 1948 attempted to regulate safety standards by allowing members to take safety measures for the purpose of protecting human, animal or plant health as long as they did not discriminate across countries which have similar situations and were not intended to protect domestic producers (Griffin, 1999). The GATT, however, didn't have an enforcement mechanism to ensure that members had met their obligation under the agreement. As a result, many governments have applied more restrictive standards for imported commodities than domestic goods; hence, agricultural trade became increasingly restricted (Griffin, 1995).

The non-tariff barrier issue was, for the first time, discussed at length in the Tokyo Round, which took place during 1973-1979. In this round, members succeeded in

drafting the *Agreement on Technical Barriers to Trade* (Standard code) that addressed the issues of technical requirements of food safety for safeguarding human, plant and animal health. Though the application of the Technical Barriers to Trade (TBT) was limited to the countries that ratified it, the agreement made a considerable progress in setting up a dispute settlement body, a standard setting international organisation and a set of notification procedures for members that introduced national standards higher than the international ones (Zarilli, 1999). This round, however, didn't address the issues that mostly affect the agricultural trade: Sanitary and Phytosanitary (SPS) issues.

The *Punta del Este* Declaration, which formed the basis of the Uruguay Round in 1986, called for disciplining the agricultural trade in the areas of market access, indirect and direct subsidies and sanitary and phytosanitary (SPS) standards (Zarrilli, 1999). For the SPS agreement, the key issue was to develop harmonised international standards and to establish a national standard based on scientific justification. At the beginning the EU, USA, Japan and the Cairns group[4] advocated the harmonisation of standards based on international bodies. Japan and the Cairns group, however, suggested that the decision pertaining to the acceptable level of SPS standards to be left to importing countries (Zarrilli, 1999).

Being sceptic for the applications of standards by developed countries as a means of protection for domestic producers, developing countries insisted on the harmonisation of SPS standards as set by international bodies and the removal of all SPS measures that would act as non-tariff barriers (Zarrilli, 1999). The general agreements on the *Punta del Este* Declaration were the harmonisation of the SPS regulations, the need for efficient dispute settlement mechanism and the consideration of developing countries' needs and problems. The three unsettled points in the Declaration were the issues of maintaining national standards stricter than the international ones, the concern on inspection and approval methods and the elements to be included for the analysis of risk assessment (Griffin, 1995).

[4] At the time of the UR negotiations the Cairns Group comprised Argentina, Australia, Brazil, Canada, Chile, Colombia, Hungary, Indonesia, Malaysia, New Zealand, the Philippines, Thailand and Uruguay. The composition of the Group has changed meanwhile, since South Africa has joined, while Hungary has left.

Due in large part to the deadlock on agriculture negotiations, the Round that was supposed to be concluded by December 1990 was ended in December 1991. This was followed by the issuance of the so-called "Dunkel Text" by the then Director General of GATT, Arthur Dunkel. The purpose of the revised text was to move the talks closer to completion (Griffin, 1995). The text excluded economic cost as a measure of risk assessment and allowed for the application of more stringent national standards if they are supported by scientific justifications. The final text of the Agreement on the application of SPS measures that was approved at the end of the Uruguay Round was largely based on the Dunkel text and fulfilled the general objectives set out for it in the *Punta del Este* Declaration (Zarrilli, 1999). The SPS agreement entered into force for most members of the WTO on January 1, 1995.

4.3 The SPS agreement[5]

The URAA has not only succeeded in disciplining the unrestricted use of domestic support, export subsidies and barriers to market access, but also the use of SPS standards that could potentially act as a non-tariff barriers. The two major components of the URAA that exclusively deal with the use of trade protection for the sake of human, animals and plants safety are TBT and SPS agreements. The SPS agreement defines SPS standards as measures taken to protect human, 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;
- Risks arising from additives, contaminants, toxins or disease-causing organisms; and
- Disease carried by animals, plants or products thereof.

All the other measures applied other than the purpose for which the SPS is applied belongs to TBT, which is also concerned to protect human, animal and plant health and safety. TBT regulations, however, are largely focused on technical regulation, labeling and voluntary standards. If labeling is required for safety purposes, for example, it falls under the SPS standard; however, if it is related to the nutritional

[5] This section is largely derived from the legal text of the SPS agreement, WTO (1995).

characteristics or the quality of the product it is categorized under the TBT agreement. The salient features of the SPS agreement are briefly summarized below.

Harmonization

The SPS agreement requires countries to base their SPS measures on the international standards, guidelines and recommendations to avoid the use of SPS standards as 'unnecessary obstacles to trade'. However, as pointed out in the Agreement, a country can establish its own SPS standards, above the international level, on a non-discriminatory basis, as long as it can provide scientifically justifiable reason that it is undertaken based on the risk assessment study, as outlined in the agreement. Members are also encouraged to participate in their relevant international organization in the process of standard setting and in reviewing all aspects of SPS issues.

Equivalence

The SPS agreement stipulates that an importing country should accept the SPS measures of other members as equivalent as long as the exporting country can objectively demonstrate that its measures (methods) would result in the same standard required by the importing country. Stated differently, equivalence emphasizes the importance of achieving the required standard rather than the way it is achieved.

Risk assessment and appropriate level of protection

Risk assessment refers to the evaluation of the likelihood of entry, establishment or spread of a pest or disease within the territory of importing member countries. According to the SPS agreement, risk assessment should be based on the techniques developed by international organizations. In assessment of risks, members should consider the available scientific evidence, relevant processes and production methods, relevant inspection, sampling and testing methods, prevalence of specific diseases or pests, existence of pest- or disease-free areas, relevant ecological and environmental conditions, and quarantine or other treatment.

In assessing the risk to animal or plant life (health) and determining the measure to be applied for setting the appropriate level of SPS standard, countries should take into account some relevant economic factors such as the potential damage in terms of loss of production or sales in the event of the entry establishment or spread of a pest or

disease, the costs of control or eradication in the territory of the importing member, and the relative cost-effectiveness of alternative approaches to limiting risks.

When establishing SPS standards, members should also consider the objective of minimizing the negative trade effects and, in cases where the same level of appropriate protection could be achieved by other methods, members shall resort to adopt the method that will lead to less trade limiting taking in to account technical and economical feasibility.

Transparency

In introducing national SPS, which is different from the international standards, guidelines or recommendations, members should notify (using the Notification Procedure) other members in advance so that the later would be able to critique and question the newly established standards. To accomplish this, members are required to set up an enquiry point, which is responsible for giving responses to questions from other members and provision of relevant documents pertaining to SPS related issues of the country.

Control, inspection and approval procedures

In undertaking control, inspection and approval procedures for approving the use of additives or for establishing tolerances for contaminants in foods, beverages or foodstuffs, members should communicate effectively the appropriate time, amount of information required and reasonable fees imposed. Moreover, the agreement stipulates that imported products should be treated equally in all procedures as domestic products.

Adaptation to regional conditions, including pest- or disease-free areas of low pest or disease prevalence

When establishing SPS standards members should consider regional conditions, areas, parts of a region or a country from which the product is originated. Exporting countries should also demonstrate that some areas or regions of the country are disease or pest free. Similarly, importing countries should recognize the concepts of pest- or disease- free areas and areas of low pest or disease prevalence of exporting countries.

Technical assistance

Considering the technical difficulty of developing countries to comply with some of the SPS standards, the agreement states that developed countries should extend technical assistance, which may take the form of advice, donation and grant to developing countries achieve the appropriate level of SPS standards. In case where developing countries require substantial investment to comply with the standard, the importing developed countries should consider extending technical assistance so that the market access opportunity will not be impaired.

Special and differential treatment (SDT)

In the preparation and implementation of SPS measures, the agreement states that developed countries should take into consideration the special needs and capability of developing and least developed countries. Specifically, longer time frames should be extended to them when new SPS standards are established, which affects products of their paramount interest. Moreover, SPS committee should grant time-limited exceptions for the whole or part of obligations under the SPS agreement upon request by developing countries.

Dispute settlement mechanisms

The SPS agreement includes a dispute settlement mechanism where, in the case of a dispute involving scientific or technical issues, a panel should seek advice from experts chosen by the panel in consultation with the parties to the dispute. The panel may also, when it deems it appropriate, establish an advisory technical experts group, or consult the relevant international organisations, at the request of either party to the dispute or on its own initiative. Members also have the right to seek settlements to disputes through other international organisations or dispute settlement mechanisms established under any other international agreements.

4.4 Developing countries' participation in the SPS agreement

Active participation of developing countries in any SPS matters, international standard setting organizations and SPS committees is important to safeguard their interests. Various studies also suggest that developing countries could realize the potential benefits of the SPS agreement if they are actively involved in the SPS agreement and its institutions (Henson and Loader, 2001; Zarrilli, 1999; WTO, 2000). There is, however, very low participation of developing countries in SPS related issues since the agreement became operational (Henson *et al*., 2000a).

At the end of July 1999, for example, the participation rate of low, lower, and middle-income countries in the WTO was only 62 percent. In contras, upper-middle and high-income countries had participation rate of 83 and 92 percent, respectively as shown in table 4.1. The membership rate for low and lower-middle income countries in Office International des Epizooties (OIE), which is responsible for harmonization of healthy requirements for international trade in animals and animal products, and CODEX Alimentarius Commission (CODEX), an international body for developing standards for specific food or classes of food, is above 70 percent, which can be regarded relatively as more representative.

In the International Plant Protection Convention (IPPC), which is responsible for phytosanitary standard setting and the harmonization of phytosanitary measures used by various countries, developing countries are poorly represented, which is below 50 percent membership rate. Only 30 percent of all low and lower middle income countries belong to the WTO and the other three international standard setting organizations. The relatively low participation rate of low-income countries in these organizations implies that the SPS agreement is largely driven by the interests of developed countries (Zarrilli, 1999).

Table 4.1: Membership in WTO and international standards organizations by income group, June 1999[b,c]

Income Group	Total Countries[a]	WTO	OIE	IPPC	CODEX Alimentarius	All
Low	60	40	52	26	51	19
Lower middle	60	34	40	35	49	20
Upper middle	29	24	25	23	31	17
High	38	35	33	25	32	26
Total	187	133	150	109	163	75
Least developed	29	29	21	11	25	9

[a]*Excluding European Communities.*
[b]*Income groups defined by World Bank.*
[c]*based on the published World Trade Organization documentation*
Source: Henson and Loader (2001)

All SADC countries are members of WTO, OIE and CODEX, except Seychelles, which is currently acceding to be a member of WTO. Seychelles is not a member of OIE either. So far nine out of fourteen SADC countries are not members of IPPC (see Table 4.2).

Table 4.2: Membership of SADC countries in WTO, OIE, IPPC and CODEX

SADC countries	WTO	OIE	IPPC	CODEX
Angola	✓	✓		✓
Botswana	✓	✓		✓
DRC	✓	✓		✓
Lesotho	✓	✓		✓
Malawi	✓	✓	✓	✓
Mauritius	✓	✓	✓	✓
Mozambique	✓	✓		✓
Namibia	✓	✓		✓
Seychelles	Acceding		✓	✓
South Africa	✓	✓	✓	✓
Swaziland	✓	✓		✓
Tanzania	✓	✓		✓
Zambia	✓	✓	✓	✓
Zimbabwe	✓	✓		✓

Source: SADC, 2000a

The relative low participation rate of least developing countries in international organizations has been exacerbated by the lack of institutions, which are key in facilitating communication in SPS related matters. Table 4.3 presents the number of countries that have so far established an enquiry point and national notification authority, which are responsible for communication regarding SPS matters within the

country and other members of the WTO. As shown in table 4.3, there are only four among 29 least developed countries and less than 50 percent of low-income countries that have both enquiry point and notification authority.

Table 4.3: Implementation of transparency obligations by WTO members by income group, June 1999[b]

Income Group	Number of Members[a]	Enquiry point	National Notification Authority	Both
Low	40	18	15	13
Lower middle	34	30	29	29
Upper middle	24	21	20	20
High	35	33	32	32
Total	133	102	96	94
Least developed	29	8	6	4

[a] *Individual country member excluding European Communities.*
[b] *Based on the published World Trade Organization documentation income groups defined by World Bank.*
Source: WTO (1998)

Among SADC countries, Botswana, Malawi, Mauritius, Namibia, South Africa, Tanzania, Zambia and Zimbabwe have established both a national notification authority and an enquiry point. They are, however, severely restricted with problems of facilities, expertise and coordination (SADC, 2000b). Establishing a national notification authority and an enquiry point are part of WTO obligations that are useful for providing information to other trading partners. Moreover, they enhance effective communication and understanding of SPS issues with domestic producers by focusing on alerting domestic producers and exporters to any proposed changes in the SPS standard of their export markets. They also engage in requesting copies of the relevant legislation and changes being considered from other members and channeling questions and comments from the domestic producers to other members (WTO, 2000).

The other indicator of developing countries low participation in SPS agreement is the lower attendance rate in the meeting of SPS committees. As shown in figure 4.1, during the period covering from November 1995 till September 1998 (12 meetings were held during this period) there were only 3 countries that participated in all SPS

committee meetings. This poor attendance rate heightened the problems and concerns of developing countries in addressing their interest to SPS committees.

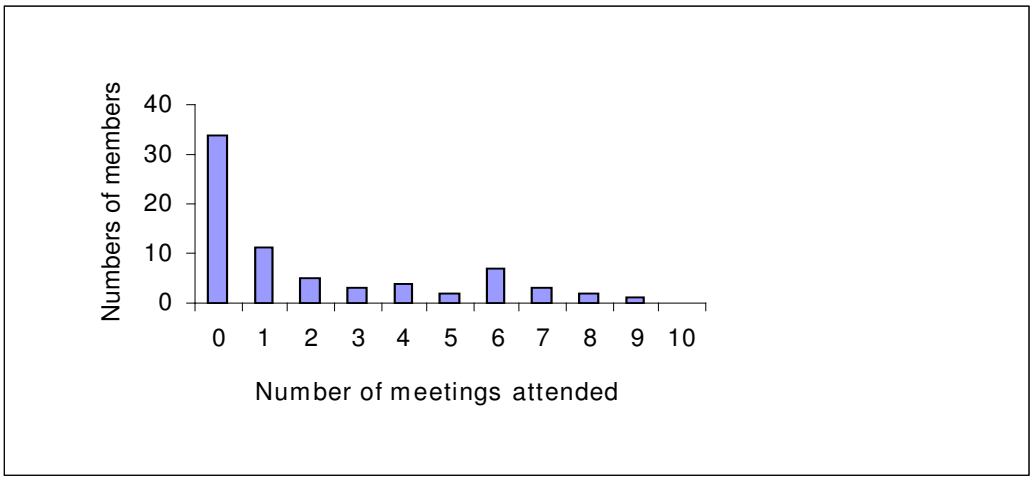

Figure 4.1: Participation in SPS committee meetings by developing country members from November 1995 to September 1998
Source: Henson et al., (2000a)

4.5 Challenges faced by developing countries in participating in SPS related issues[6]

The SPS agreement is an important milestone to discipline the misuse of standards as a non-tariff barrier for agricultural trade. Despite its provisions for accommodating the needs of developing countries, there are still formidable challenges limiting active participation in SPS related issues, particularly in the four major components of SPS agreements: transparency, risk assessment, dispute settlement and international standard setting organizations (Henson *et al*., 2000a).

Table 4.4 summarizes the findings of Henson *et al.,* (2000a) based on a survey of ten developing countries regarding the main constraints impeding them from actively participating in the SPS agreement. Almost in all cases, lack of expertise and financial resources remain the key bottlenecks that limit developing countries participation in SPS related matters.

[6] This section is largely derived from Henson *et al.,* (2000a) extensive study on ten developing countries challenges in participating and dealing with SPS matters.

Table 4.4: Summary of factors influencing ability to participate effectively in SPS agreement: From the case studies on 10 developing countries

Nature of Constraint	Countries affected	Notes
Participation in transparency mechanisms	India	Lack of resources and expertise; fragmented responsibility for SPS matters
	Zimbabwe	Finance; lack of expertise
	Egypt	EU slow to send notifications
	Kenya	Some joint attendance with Tanzania; fragmented responsibility for SPS matters.
	Cameroon	Only one person handling SPS; slow response for notifications
	The Gambia	Few representative; no Geneva mission; lack of information.
	Guatemala	Inadequate resources; slow to respond to notifications
Risk Assessment	India	Inadequate technical assistance
	Egypt	Cost-Potatoes
	Zimbabwe	Lack of expertise and therefore negotiating power
	Ghana	Limited resources and scientific data
	Kenya	Lack of information
	The Gambia	Lack of facilities and personnel
Dispute settlement Procedures	India	Shrimp Turtle case- changes made by Appellate body
	Ghana	Problems with traveling to meeting- infrastructure and expertise
	Cameroon	Low staffing- but private sector could attend if informed.
	Guatemala	Inadequate resources
International standards organizations	India	Questions as to who sets CODEX standards?
	Guatemala	Reluctance on the part of developed countries to accept equivalence. No role in setting standards

Source: Henson et al., (2000a).

4.5.1 Transparency

Developing countries have expressed their concern about the time given between to the notification and the implementation period of the newly established standard. When a member introduces a new standard it should offer ample time for developing countries to give comments, critique and analyse the implications on their trade so that enough adjustment will be made and relevant technical assistant will be sought to comply with the newly established standard (WTO, 2000). The agreement, however,

has only allowed sixty days, which is viewed by most developing countries as inadequate (Zarrilli, 1999).

Moreover, the limited participation rate of developing countries in sub-committees of SPS and the lack of expertise to comment on the notifications of developed countries impedes greatly the execution of the 'transparency' part of the agreement. As Henson *et al.,* (2000a) noted, insufficient understanding of the SPS agreement amongst government officials will also contribute to delay or nullify the reaction to notifications. Most developing countries are also lacking enough data on surveillance, toxicology and epidemiology of their country to challenge notifications of new SPS measures. Added to this, lack of financial resources to attend a regular meeting of the SPS meeting and the understaffing of missions in Geneva are the major cause for inadequate participation of developing countries in SPS matters.

4.5.2 Risk assessment

As outlined in the SPS agreement, all standards should be based on internationally established risk assessment procedures that use updated scientific methods and techniques (WTO, 1995). The two major challenges that limit developing countries' participation in the SPS agreement are the lack of expertise and resources to undertake the risk assessment procedure and the lack of available scientific data when challenged by a developed country to justify SPS measures (Henson *et al*., 2000a). Hence, they are often compelled to take a defensive position when challenged by developed countries. As the result, participation of developing countries in the risk assessment part of the agreement is severely limited.

4.5.3 Dispute settlement

The dispute settlement mechanisms in the SPS agreement are also found out to be difficult for developing countries' participation for the reasons mentioned above; namely, the lack of expertise, financial resources and scientific data. Added to this, there is skepticism that the dispute settlement procedure does not consider the interests of developing countries (Henson *et al*., 2000a).

4.5.4 International standard setting organizations

As stated in the SPS agreement on harmonisation, members are recommended to base their standard on the guidelines and recommendations of international standard setting organisations (WTO, 1995). This helps to mitigate the cost of setting many standards for a specific commodity and to set the appropriate SPS standards that protects human, animal and plant life and health. There is however no agreement on the specific procedures or approaches on how these standards are set by the international standard setting organisations. As Zarilli (1999) pointed out, the low participation of developing countries in international standard setting organisations has hampered the representation of their interests and concerns regarding international SPS standards.

It is, therefore, not surprising to note that some of the standards set by these international bodies are unattained by developing countries. Indeed, voting as the principal mechanism of decision making on determining a specific standard has promoted the interests driven by the attendants, which is largely composed of developed countries (Zarrilli, 1999). A decision, for example, to set the Maximum Residual Limit (MRL) of growth hormone of beef has been based on the vote of the attendants, where a significant number of developing countries were absent. Hence, it is argued that consensus rather than voting should be the means of decision-making. This is, of course, in addition to exerting an effort to increase the participation of developing countries in various sub committees of SPS setting organisations (Henson and Loader, 2001).

4.6 Concerns of developing countries in the operation of the SPS agreement

The operation of the SPS agreement in addressing the problems of developing countries is the fundamental concern of these countries. Among some of the concerns that they have on the SPS agreement operation is the insufficient consideration that developed countries give to developing countries while setting standards and the inadequate time interval given between the notification and the implementation of new standards (Henson and Loader, 2001; WTO, 2000). In addition, developed countries' inadequate technical assistance and the decline of equivalence and mutual

recognition of developing countries' standards are among the major concerns of developing countries (Henson *et al*., 2000a; WTO, 2000).

The result of a survey by Henson *et al.,* (2000a) also suggests that inadequate consideration of developed countries to the situation of developing countries is deemed to be the key concern in the way the SPS agreement operates followed by the limited time period given for commenting on the newly notified standard. The rank, based on Henson *et al*., (1999) study, of the major concerns of developing countries in the way the SPS agreement operates are presented in Table 4.5.

Table 4.5: Mean significance scores for problems associated with the manner in which the SPS agreement operates

Rank	Factor	Range	Mean Score
1	Developed countries take insufficient account of the needs of developing countries in setting SPS requirements	1-3	1.8
2	Insufficient time allowed between notification and implementation of SPS requirements	1-3	2.3[a]
	Insufficient technical assistance given to developing countries	1-3	2.3[a]
3	Developed countries unwilling to accept developing country SPS measures as equivalent	1-5	2.8
	Harmonization process takes insufficient account of needs of developing countries	1-5	2.8
4	Insufficient information given with notifications of SPS requirements	1-5	3.2
5	Developed countries unwilling to engage in bilateral negotiations with developing countries	1-5	3.7

[a]*Scores for these factors are not significantly different at the 5percent level.*
Source: Henson et al., (2001a)

The three main concerns of developing countries on the way the SPS agreement operates are discussed briefly below.

4.6.1 Equivalence

The major concern of developing countries in implementing the SPS agreement is the demand of 'sameness' rather than 'equivalence' in terms of procedures to certify the compliance of standards by developed countries. The rejection of developed countries

for equivalence has precluded the effect of the 'mutual recognition' agreements, which refer to the acceptance of the laboratory procedure, sampling techniques, and the like performed by other members (Zarrilli, 1999). 'Equivalence' entails a great benefit for exporters by reducing the cost of duplicative testing and delay in performing the test (WTO, 1995). Because of the fact that equivalence has not been put into practice according to the agreement, developing countries are unable to derive the potential benefit accrued through the 'mutual recognition' agreement (Zarrilli, 1999).

4.6.2 Adaptation to regional conditions

Despite the SPS agreement's consideration of a pest or disease-free zone, it is often a common practice in developed countries to ban commodities originating from the free disease zone in developing countries without any justification for the presence of diseases or pests (Zarrilli, 1999). Hence, developing countries often express their concern that developed countries should acknowledge that some areas of the exporting country as disease free to maintain market access. The EU, for example, is still banning potato imports from Egypt because of contamination from potato brown rot, even though it is originated from a recognised 'pest-free area'. In some cases, however, some developing countries (for example Brazil and Mexico) have been successful in getting market access for agricultural commodities originating from disease free areas after 80 years of ban by USA (Henson *et al*., 2000a).

4.6.3 Technical co-operation

The SPS agreement advocates for the needs of developing countries to be taken in to account in the implementation of the SPS agreement. Moreover, it stipulates that developed countries should extend assistance, which may take any form, to augment the capacity of developing countries to comply with the SPS standards set by developed countries (WTO, 1995). The SPS agreement, however, does not make any provisions that entails on developed countries to extend any form of technical assistance (Zarrilli, 1999). Hence, developing countries have serious concern that stringent standards will be bottlenecks for market access, unless developed countries

are obliged to offer technical assistance to mitigate the trade impact of their SPS standards (Zarrilli, 1999).

Technical assistance should be particularly extended to upgrade technical skills in developing countries. This is because well skilled human capacity is considered to be a pre-requisite for the international acceptance of certificates issued by them and represents a strong base for the negotiation of 'equivalence' and 'mutual recognition' agreements (Zarrill, 1999).

4.7 Impact of SPS standards on developing countries agricultural exports

As noted in various studies (Henson and Loader, 2001; Oyejide, *et al.*, 2000; Hooker, 1999; Unneveht, 2000), the stringent SPS standards set by developed countries, coupled with the lack of technical and economical resources of developing countries to participate in standard-setting process, has limited access to developed countries markets. Various developing countries have, as a result, experienced adverse repercussions on their economies as a result of failure to comply with the SPS standards. This resulted in a considerable loss of export revenue, employment and income (Noor, 2000; Ndaba, 2000; Waniala, 2000).

The broad indication of the impact of SPS standards on developing countries exports is demonstrated by the boarder rejection rate of exports from developing countries. Of all developed countries, the import detention data is only made available by USA. The detention rate of commodities due to various standard requirements from June 1996 to June 1997, as shown in table 4.6, indicates that the main detention rate for Africa, Latin America and Caribbean and Asia is mainly due to filth, microbiological contamination and decomposition. The failure to comply with these relatively less costly safety standards like food hygiene, by developing countries is an indication that compliance with standards that require more sophisticated techniques, which are very costly like maximum pesticide residual limits and heavy metals, would be tremendously challenging (Henson and Loader, 2001). The total cost of rejection at the importing countries boarder for developing countries exporters also includes the loss of product value, transport cost and other related costs.

Table 4.6: Reasons and number of contraventions for import detentions, cited by US Food and Drug Administration, June 1966-June 1997

Reasons for contravention	Africa	Latin America and the Caribbean	Europe	Asia	Total
Food additives	2 (0.7%)	57 (1.5%)	69 (5.8%)	426 (7.4%)	554 (5 %)
Pesticide residues	0 (0.0%)	821 (21.1%)	20 (1.7%)	23 (0.4%)	864 (7.7%)
Heavy metals	1 (0.3 %)	426 (10.9%)	26 (2.2%)	84 (1.5%)	537 (94.8 %)
Mould	19 (6.3%)	475 (12.2%)	27 (2.3%)	49 (0.8%)	570 (5.1%)
Microbiological contamination	125 (41.3%)	246 (6.3%)	159 (13.4%)	895 (15.5%)	1425 (12.8%)
Decomposition	9 (3%)	206 (5.3%)	7 (0.6%)	668 (11.5%)	890 (8.0%)
Filth	54 (17.8%)	1253 (32.2%)	175 (14.8%)	2037 (35.2%)	3519 (31.5%)
Low acid canned foods	4 (1.3%)	142 (3.6%)	425 (35.9%)	829 (14.3%)	1400 (12.5%)
Labeling	38 (12.5%)	201 (5.2%)	237 (20%)	622 (10.8%)	1098 (9.8%)
Other	51 (16.8%)	68 (1.7%)	39 (3.3%)	151 (2.6%)	309 (2.8%)
Total	303 (100%)	3895 (100%)	1184 (100%)	5784 (100%)	11166 (100%)

Source: FAO (1999)

A survey conducted by Henson and Loader (2001) on ten developing countries, regarding the role of SPS standards as agricultural export barrier in various developed countries has demonstrated that the EU, followed by Australia and USA, were considered to have stringent SPS standards. As most of agricultural commodities are enjoying duty free access to the EU and USA, the survey suggests that failure to comply with the stringent SPS standards established by EU and USA will greatly undermine the preference given to African countries in the Everything But Arms (EBA) initiative of the EU and in the African Growth Opportunity Act (AGOA) of the USA.

Table 4.7: Mean significance scores for problems due to SPS requirements when exporting agricultural and food products to various developed countries

Country	Mean score
European Union	2.1
Australia	2.7[a]
USA	2.8[a]
Japan	3.3[b]
Canada	3.4[b]

[a] *Scores for Australia and USA are not significantly different at the 5percent level.*
[b] *Scores for Japan and Canada are not significantly different at the 5percent level.*
Source: Henson and Loader (2001)

A similar survey conducted by Henson and Loader (2001) on the major agricultural export barriers to EU market indicates that the SPS requirements remain the major obstacle followed by other technical requirements. Tariffs and quantitative restrictions are the less important impediments to agricultural exports. As many studies suggest, compliance to SPS requirement is the major prerequisite and challenge for developing countries in the 21st century to access the market of developed countries (Unneveht, 1999; Henson and Loader, 2001).

Table 4.8: Mean significance scores for factors influencing the ability to export agricultural food products to the EU

Factor	Mean score
SPS requirements	2.1
Other technical requirements	2.8[a]
Transport and other direct export costs	2.8[a]
Tariffs	3.3
Quantitative restrictions	3.8

[a] *Score are not significantly different at the 5percent level*
Source: Henson and Loader (2001)

Mutasa and Nyamandi (1998) also assessed the degree to which standards impede African agricultural food exports through survey of CODEX Alimentarius contact points. Their finding illustrates that insufficient financial resource for food control is the most important challenge faced by African countries in exporting food products (see Table 4.9).

Table 4.9: Main difficulties faced by African developing countries in exporting food products

Factor	Score
Insufficient financial resources for food control	22
Inadequate testing and inspection facilities	36
Inadequate trained manpower in the food industry	41
Inadequate standards and or regulations	50
Inefficient food processing technologies	51

Note: Each factor was scored on a five-point scale from 'highest priority' (1) to 'lowest priority' (5).
Source: Mutasa and Nyamandi (1998).

As the agreement on SPS states, members are required to notify when setting standards that are different from the ones internationally recognized. The low number of notifications by developing countries as indicated in table 4.10 demonstrates that developing countries may have been, in most cases, adhering to the international standards or they may have failed to notify the measures that they have taken to other members. On the other hand, the large number of measures notified by high-income countries indicates the proliferation of stringent SPS standards, which are stricter than the international standards. Out of all notifications, high-income countries make up 75 percent of the notifications for new standards. This indicates that developing countries are constantly facing new standards set by developed countries.

Table 4.10: Notification of SPS measures by WTO Members, July 1999[a]

Income Group	Number of Members[b]	Number of Members Notifying Standards[c]	Number of Measures Notified
Low	40	9	19
Lower Middle	34	16	201
Upper Middle	24	14	372
High	35	28	1708
Total	133	67	2302
Least developed	29	4	8

[a]*Income groups defined by World Bank*
[b]*Individual country members, excluding the EU.*
[c]*EU member states are counted as individual notifying members*
Source: WTO (1999)

Some of the impacts of these stringent SPS standards on some of developing countries' exports are discussed below through a number of case studies.

4.7.1 The frozen shrimp industry in Bangladesh

The EU constitutes 45 percent of frozen shrimp export market of Bangladesh (Cato and Lima dos Santos, 1998). The EU banned the frozen shrimp industry for five months, from August to December 1997, after the EU inspectors' evaluation of the seafood processing plants, which questioned the compliance with Hazard Analysis Critical Control Point (HACCP) regulations and the credibility of local inspections. According to Cato and Lima dos Santos (1998) estimation, the ban could have inflicted a loss of US$ 65.1 million; however, market diversion to USA and Japan reduced the loss to US$ 14.7 million. The estimated overall cost of compliance to the required standard by upgrading the industry facilities is estimated to be US$18 million and the annual cost of maintaining the HACCP program is also estimated to be US$2.4 million (Cato and Lima dos Santos, 1998).

4.7.2 Snow pea exports in Guatemala

Snow pea is among Guatemala's major non-traditional exports, which has grown 16 percent between 1983 and 1997 (Sullivan, Sanchez, Weller and Edwards, 1999). Due to the insect infestation and disease, producers used to apply extensive chemical pesticides, which was above the acceptable level for the USA plant protection quarantine. As a result, a lot of rejection rates occurred for the shipments of the snow pea.

Sullivan *et al*., (1999) noted that during 1984-1994 over 3000 Guatemalan shipments valued at over US$18 million were rejected at US ports of entry on account of chemical residue violations. In addition, the USA Plant Protection Quarantine (PPQ) totally banned imports of a snow pea from Guatemala when a leaf miner crisis occurred in 1995. A study undertaken by Guatemala and USAID, however, conclude that applying integrated pests management would reduce the chemical use and lowered product rejection rates. As a result, PPQ removed the ban in 1997 and an amount of $34 million worth of annual market was re-established (Sullivan *et al*., 1999).

4.7.3 Beverages and spices in Sri Lanka[7]

Spices and beverages in Sri Lanka contribute US$ 70.2 million to the foreign exchange of the nation and it provides 470,000 jobs. Moreover, it contributes to environmental services by increasing biodiversity and reducing land degradation. One of the challenges for complying with the SPS standards by the industry is the presence of mould, high moisture content and aflatoxin in the commodities. In addition, the following factors makes complying with the standard more difficult.

- Poor weather conditions experienced by many producers with low cost processing technology;
- Poor storage facilities;
- Small scale nature of production units; and
- Early harvesting habits to meet family cash needs of resource poor farmers.

As a result, the quality of most of the products at farm-gate is substandard compared to the required level. Hence, the non-compliance of SPS requirement has inflicted a direct loss of potential export volume estimated about 5500 MT during 1990-2000, which is 34 percent of the total exports of spices and beverages during the same period. Accordingly, it represents an estimated opportunity value of US$ 2.2 million per year, amounting to about 6 percent of the foreign exchange earning from spices and beverages. In total, the estimated value of foreign exchange loss due to non-compliance is US$ 2.9 million every year which is about 7 percent of the total foreign exchange earnings from spices and beverage crops in 2000. Net loss of employment is in the range of 2400 persons every year, which is about 4 percent of the total labor employed in trading activities of spice and beverage crops.

The investment cost of research in processing is in the range of US$ 24,000 per annum, which is grossly inadequate for introducing improved technology to upgrade the quality of spice and beverage crops. The total cost of a training program for producers and traders will also be in the range of US $ 1.9 million. However, the annual budget allocated for training of stakeholders in the sector is US$ 24 400, which is only 3 percent of the requirement.

[7] This section is largely borrowed from Herath (2002)

4.7.4 The Fishery sector in Kenya, Uganda and Mozambique

The EU has imposed several bans on the fishing export from Lake Victoria, which was the main source of fisheries for Kenya, Uganda and Mozambique (Henson, Brouder, and Mitullah, 2000b). The first ban, which occurred in April 1997, was due to the presence of *salmonellae* and the second ban, was as a result of the cholera outbreak in 1998. The EU insisted the second ban despite the study undertaken by WTO and FAO that indicated the outbreak of the disease would not pose any health threat to consumers. The third ban was imposed as a result of fish poisoning on Lake Victoria in 1999.

The consecutive three bans on the fisheries sector in Kenya cost the agricultural sector both at the macro and micro level. A study by Henson *et al*., (2000b) suggests that at the macro level, the Nile Perch export dropped by 66 percent and the total fish exports has fallen by 24 percent with a corresponding 32 percent drop in value. The third ban is estimated to have an adverse impact on approximately 40,000 artisan fishermen's livelihood. During 1998 when exports of fresh fish were prohibited for a period of six months, the volume of exports was 29 percent lower than the 1996 level, while exports to the EU were 69 percent lower. Similarly, in 1999 total fish exports were 21 percent lower than in 1996, while exports to the EU were 64 percent lower. The modest decline of export to the EU market during 1999 is due to a trade diversion to other countries.

As estimated by Henson *et al.,* (2001b), the cost of upgrading a single landing site on Lake Victoria to provide cooling facilities and other related materials is around US$1.2 million. Given that there are five main beaches that supply fish for export, the total cost is estimated to be US$ 5.8 million. The cost of upgrading laboratory facilities for chemical and microbiological analysis is also estimated to be US$ 1.1 million.

Similarly the ban also affected the Ugandan economy. According to a study by Waniala (2000), the following cost has occurred to the economy as a whole:

- An estimated loss of 36.9 million US$ was posted over the period of the ban and loss to the fishermen community in terms of reduced prices and less activity of fishing, estimated at $1 million per month;
- Out of 11 factories, which were operational at that time three were closed and the remaining were operating at about 20 percent capacity. As a consequence, 60-70 percent of the directly employed people were laid off;
- People involved in the various fishing activities became unemployed and those that had some work to do earned less than a third of their normal earnings – this directly affected families and dependants of people involved in fishing and supplementary activities;
- Other related industries like packaging, transport and the overall economy were directly affected; and
- The restrictions concerning trade in Nile Perch, which had been considered a proper substitute for cod in low season in Europe before the ban, had negative impact on its popularity. An expensive marketing campaign is required to restore the former acceptance levels.

The government and fish exporters have been compelled to upgrade the existing facilities, laboratories and all other equipments. An amount of US$ 180,000 was invested in a monitoring program on Lake Victoria and ten inspectors were recruited to supervise fish production at factories (Waniala, 2000). In order to create capacity to analyze pesticide residues, a privately run laboratory was set up at a considerable cost with support from the UNDP.

In Mozambique, the ban by the EU on fresh fisheries products reportedly resulted in a loss of about US$ 60 000 a month (Mussa, 2000). The trade impact on Mozambique's main fishery export, deep-frozen prawns was not considered. This is because they were only subjected to testing and they were not totally banned. According to Mussa (2000), the ban on Mozambique was unfortunate, as it has already set curative and preventive measures well before the imposition of the ban.

Recently, after a huge investment Uganda and Tanzania have obtained the first grade to export to the EU in 2001. Kenya and Mozambique, on the other hand, have been

accepted provisionally to export to EU in 1999 (Mussa, Vossenaar and Waniala, 2001).

4.7.5 Citrus fruits in South Africa

South Africa's main export destination of citrus fruit is the EU, which makes up 65 percent of all citrus fruits export destination market. A recent Citrus Black Spot (CBS) standard established by EU and USA that banned exports of citrus form some parts of SA inflicted a loss of export revenue and increased the cost of compliance.

Citrus fruit exporters in South Africa have to comply with either the requirements of HACCP or its similar component, Integrated Crop Management (ICM). The main focus of ICM, among others, lies in environmental management, responsible agricultural practices and socio aspects. Exporters are also confronted with conforming to European Retailers Produce on Good Agricultural Practice (EUREPGAP) protocol, which is perceived as a major challenge for citrus exporters as it include issues that are not related to maintaining the quality of the citrus. Among others, EUREPGAP require farms to prepare washing facilities and portable toilets for every 600 meters in the orchard (Grieb, 2002 as cited in Jooste, Kruger and Kotze, 2003).

Jooste, *et.al.,* (2003) estimated the cost of compliance with the new CBS under the EUREPGAP regulations based on feedback received from three different citrus companies in Eastern Cape. As shown in Table 4.11, the average revenue lost due to cost incurred in compliance with the new CBS and EUREPGAP regulations is 4% of the total revenue. However, when the forgone earnings per year estimate of the cost of US CBS regulations is estimated for Patensie Citrus Company, it is considerable, which is around 10 million Rand (10% of the total revenue). The cost of complying with the two-certification system (EUREPGAP and HACCP) is also estimated at 1.29 million Rand. So far, only one grower in Kirkwood has upgraded its farm to comply with this two-certification system (Jooste*, et.al,* 2003).

The government of SA also spent between Rand 11 to 16.5 million during the 1995 season and between Rand 30 - 50 million in the 1997 season on fungicides alone for

pre-harvest control of CBS (SADC, 2000a). This estimate excluded the indirect losses due to CBS, *viz.* spray cost (labor, tractor and spraying equipment maintenance, etc.) and rejection of exportable fruit due to the development of CBS in transit (processing and packing material costs, etc.).

Risk analysis using latest scientific techniques undertaken by experts shows that CBS cannot spread to EU member counties, since fruit exported to EU reaches when unfavourable climate prevails for the disease to germinate (SADC, 2000a). Fruits have been exported to EU since 1925; however, there has never been the occurrence of black spot on European orchards. Hence the recent phytosanitary standard would appear to be a disguised means of protection, which is not based on scientific justifications (Cook, 2002).

Table 4.11: Estimated cost of compliance on selected farms in South Africa with select standards currently being applied externally to citrus exports

Costs and Other Details	**Whyte Citrus**	**Riverside Enterprises**	**Patensie Citrus**	**Average**
Tons of citrus grown (2001)	2700	11000	15000	9567
Hectares used	40	150	200	130
Revenue received per ton (2001) rand	2520	1675	1525	1907
Per year costs of compliance per ton (2001-2002) with CBS-rand	19	68	27	38
Per year costs of compliance per ton (2001-2002) with EUREP GAP regulations-rand	37	9	47	31
Percentage of Revenue lost due to costs incurred in compliance with CBNS and EUREP GAP regulations	2.2 %	4.6 %	4.9 %	3.9 %
A foregone earnings per year estimate of the cost of US CBS regulations (Percentage of total revenue)	-	-	R 10 million (10 %)	-

Source: Jooste, et al., (2003)

4.8 Major SPS standards affecting agricultural trade

International standards for food are set by the CODEX, which is an institution attached to WTO and FAO. It sets standards to ensure the safety of the consumers and circumvent the use of standards for trade protection purposes. It sets, Maximum Residual Levels (MRL) for agricultural and veterinary chemical residues, Maximum Permissible Concentrations (MPC) for heavy metals such as cadmium, lead and

mercury and Extraneous Residue Limits (ERL) for some of the environmental contaminants in foods.

Among OECD countries, the EU is known for its most stringent SPS standards that hinder market access of developing countries (Henson and Loader, 2001). In most cases, the standards established by EU are often more stringent than the CODEX and the USA level.

The European Union has, since 1993, been engaged in ironing out the irregularities of its members on using the standards of food products. These standards are focused on the crops, which are classified as the 'major' crops. Under this classification, only banana and citrus fruits, which are the main products of developing countries, are recognized (Chan and King, 2000). Thus, most of the tropical crops are not incorporated in this standard setting process. Hence, the recent EU proposal pertaining to the maximum pesticide residuals limits, stipulates that for most of the tropical crops, MRL should be set at an analytical zero level, which implies a zero tolerance level for any pesticide residue. Since the standards of most tropical crops don't exist in CODEX, there is a serious concern that these stringent standard proposed by EU will have the opportunity to gain an international legacy (Chan and King, 2000).

Thus, the EU proposal is anticipated to bring a devastating impact on small-scale agricultural sectors of developing countries. Particularly, fruits and vegetables (horticulture) producers, which are a booming business for small-scale farmers in many developing countries, are facing severe challenges in complying with this new standard. A recent study on Ghana pineapple producers demonstrates that the new pesticide residual level of *ethephon* that has reduced from the level of 2mg/kg to 0.5mg/kg by EU has hit the small holder farming of the country hard (Gogoe, Dekpor and King, 2000). Jooste *et.al.,* (2003) also noted that the EU limit the SO_2 levels in dried apple and pears from 2000mg/kg to 600mg/kg, despite the 2000mg/kg maximum level set by CODEX, The UN Economic Commission for Europe (UNECE), and International Organization for Standardization (ISO).

In this study, the trade effect of the total aflatoxin level set on food products of SA by five OECD countries is estimated. Aflatoxins are a group of structurally related toxic compounds, which contaminate certain foods and results in the production of acute liver carcinogens in the human body (Otsuki *et al.*, 2001). The major aflatoxins of concern are designated as B1, B2, G1, and G2, which are usually found together in foods. Total aflatoxin level presented in Table 4.12 refers to the sum total of elements B1 + B2 + G1 + G2 in parts per billion (ppb). So far there is no evidence explaining the cause and effect relationship between liver cancer incidence and the aflatoxin content of the diet. However, a study undertaken by Joint Expert Committee on Food Additives (JECFA) analysed the potential impact of aflatoxin on human health by hypothetically reducing the level of aflatoxin from 20 ppb to 10 ppb, under the assumption of the percentage of carriers of hepatitis B1 is around one percent. The result suggested that the reduction will drop the risk of approximately 2 cancer deaths a year per billion people (Otsuki *et al.*, 2001).

Table 4.12: Maximum allowable aflatoxin levels in Europe and Africa in part per billion (ppb)

Country	Commodity	Aflatoxin B1	Aflatoxin Total
Austria	All foods	1	na
	Milling and shelled products and derived foods	2	na
Belgium	Groundnuts	5	na
Denmark	Groundnuts	2	4
	Brazil nuts	2	4
	Dried figs	2	4
Finland	All foods	na	5
France	All foods	10	na
	Groundnuts	1	na
	Wheat meal	3	na
	Wheat bran	10	na
	Vegetable oils, cereals, wheat meal	5	na
Germany	All foods	2	4
	Enzyme	na	0.05
Greece	Nuts and edible seeds	5	10
	Dried fruits	5	10
Ireland	All foods	5	30
Italy	All foods	5	10
	Dried figs	5	10
	Spices	20	40
Luxembourg	Groundnuts	5	na
The Netherlands	All foods	5	na
Portugal	All foods	20	na
	Groundnuts	25	na
Spain	All foods	5	10
Sweden	All foods	na	5
United Kingdom	Nuts, dried figs	na	4
	Groundnuts, copra, palm-kernel, cotton seed	20	na
Norway (EEA)	All foods	na	5
	Brazil nuts	na	5
	Mixed foodstuffs depending on animal	50	na
Africa	Groundnuts	14	44

Source: FAO (1995)

4.8 Summary

The SPS agreement is part of the URAA, which attempts to restrain the unjustifiable use of SPS regulations for trade protection purpose. Developing countries, however, are still facing challenges in exhausting the opportunities offered by the SPS agreement and complying with the regulations set by developed countries due to, among other things, their financial problems and technical limitations.

Despite the provisions of the SPS agreement for accommodating the needs of developing countries, in four major areas of SPS agreements, which are transparency, risk assessment, dispute settlement and international standard setting organizations, there are still formidable challenges facing developing countries that limit their active participation in SPS related issues.

In addition, developing countries have serious concerns on the way the SPS agreement operates. Some of these concerns include, the insufficient consideration that developed countries give to developing countries while setting new standards and the inadequate time interval given between the notification and the implementation of these new standards. Developed countries' inadequate technical assistance and the decline of 'equivalence' and 'mutual recognition' of developing countries' standards are also the major challenges of developing countries. Various developing countries have, as a result, experienced adverse repercussion on their economies as a result of failure to comply with SPS standards. This resulted in a considerable loss of export revenue, employment and income in these countries.

CHAPTER FIVE

METHODOLOGIES TO MEASURE THE IMPACT OF SPS STANDARDS ON TRADE AND WELFARE

5.1 Introduction

Measuring the impact of SPS standards is of paramount importance for developing countries that persistently face a challenge in complying with these standards. Quantification of these impacts on agricultural trade is useful for countries to appeal for compensation and to facilitate trade negotiations. This would also inform policymakers of the importance that should be given to non-tariff barriers in trade issues. Specifically, in light of the proliferation of new stringent SPS standards in developed countries, estimating their trade impact is useful for developing countries to request technical assistance and justify wavering for the newly established standard.

Attempts to quantify SPS impacts have focused on both trade and welfare effects. However, as the key theme of negotiations is to facilitate trade, the impact of SPS standards on trade often gains more emphasis. Quantification of non-tariff barrier, SPS in particular, however, is a recent phenomenon that needs further development (Beghin and Bureau, 2001). This chapter reviews the main methodologies used to estimate the trade impacts of SPS as well as TBT measures and suggests the appropriate methodology to be applied for this study.

5.2 The Analytical framework

A country often reverts to establish SPS standards to reduce both risk and non-risk factors associated with imports (Roberts, Josling, and Orden, 1999). The risk reducing measures attempt to mitigate the risk of imported products from affecting consumers, animals, plants and environmental health and safety. The non-risk reducing measures, on the other hand, are centred on monitoring imported products for complying a particular standards for compatibility, consumer information and conservation reasons. Governments often give priority to reduce risk-reducing measures by establishing SPS standards for monitoring import compliance.

The established SPS standard could affect trade in three ways (Henson and Loader, 2001). First, it can cause a complete ban of the imported products through prohibitively high production and marketing cost. Second, it can divert trade across countries by setting different standards and treatment from different sources. Third, they can limit trade flows by raising the cost of compliance for potential importers, particularly when importers are faced by a rather strict regulation than domestic firms.

Graphically, the impacts of the SPS regulations on trade can be illustrated using a simple demand and supply curves of the imported goods (see Figure 5.1).

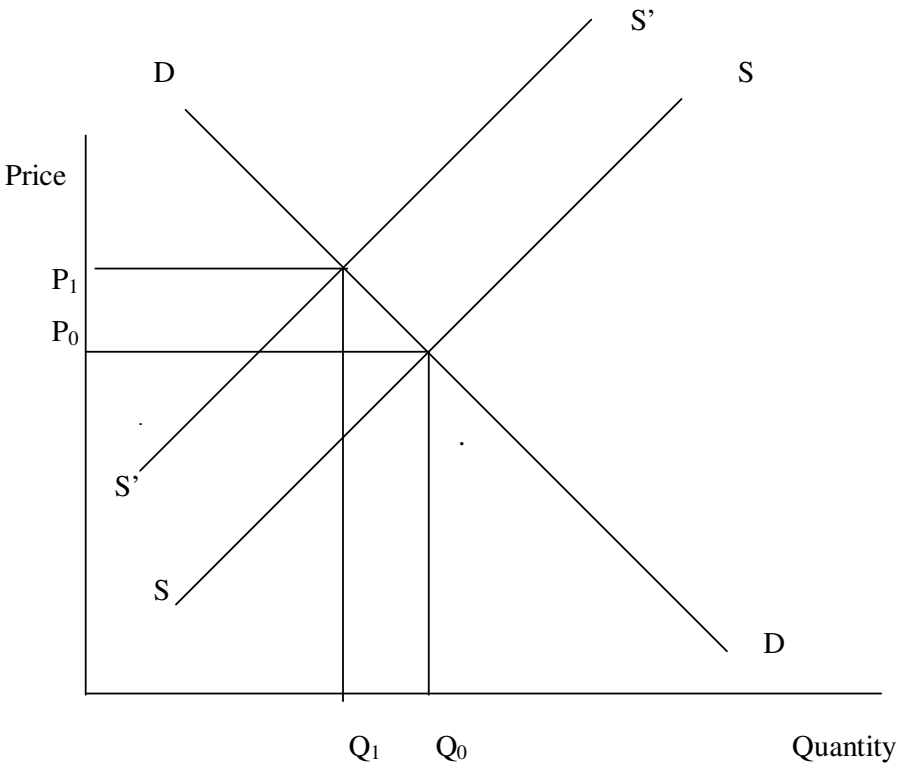

Figure 5.1 The impact of SPS regulation on quantity demanded and price

For a simple illustration we assume a positively sloped supply and a negatively sloped demand curve, implying that importing nation is large enough to affect the world price. Moreover a compliance cost is considered to increase the cost of exporters and hence reduce the domestic supply of the product. As shown in figure 5.1, the introduction of a SPS standard will shift the domestic supply curve to the left, hence, reducing the quantity demanded at the given price. The new quantity demanded under

a competitive market situation will be Q_1 and the new price will be P_1. The difference between the old and the new price reflects the change in domestic price before and after the introduction of the SPS standard. Hence, the price between P_1 and P_0, can serve as handy measures of the SPS impact on domestic prices.

One of the serious shortcomings of estimating the impact of SPS regulation on trade using the demand and supply curves, however, is that they do not actually reflect the properties of NTBs, rather they demonstrate the effect that hinges heavily on the characteristics of the demand and supply curves (Deardorf and Stern, 1997). Thus, the effect of the same NTBs can vary for several markets as a result of different elasticities of the demand curve, even though, supply curves could be competitive at all markets.

To rectify this problem, the impacts of SPS measures can be measured based on the assumption that the price paid by consumers will remain unchanged. Thus, a fall in the quantity demanded from Q_o to Q_1 could be an alternative way to capture the effect of SPS on quantity (Deardorf and Stern, 1997). The price difference between P_0 and P_1 could be also be an alternative way of estimating the equivalent tariff rate that would be required to reduce the quantity supplied to the level equivalent to the quantity after the introduction of the SPS standard.

Deardorf and Stern (1997) also noted major principles that should be incorporated in measuring the impact of NTBs to the economy as a whole. These includes, among others, the reduction in quantity of imports, the increase in price of imports, the change in the elasticity of demand for imports, the variability, uncertainty, welfare costs and resource costs of NTBs. The following section will briefly summarise the basic principles contained in some of the widely used methodologies of measuring NTBs impact on trade and welfare.

5.3 Methodologies of measuring SPS impacts on trade and welfare

The impact of NTBs in general and SPS in particular on trade and welfare could be measured based on the following three main categories (Deardorff and Stern, 1997).

The first method is the *frequency-type measures*, which present the general proportion of NTB occurrence in a given HS classified commodity and/or sector. This measurement gives general information on the level of protection for a given sector or commodities using any type of NTBs. The second category of measuring the presence or size of the NTBs is using the *price comparison measures*, which compares the effect of NTBs on the domestic prices with a given reference prices. The third method, the *quantity impact measures*, uses econometric techniques to model the flow of trade between countries to capture the impact of introducing SPS regulations on the trade flow of the commodity.

Beghin and Bureau (2001) provided a thorough review of the literature on the existing methodologies applied to estimate the trade impact of SPS and TBT. Though the classification is basically similar to the categories of Deardorff and Stern (1997), they have offered a very detailed analysis on the principles, applications and limitation of the models, which they have categorised in to the following five main methods[8].

5.3.1 Price-wedge method

SPS regulations introduced by a country often entail compliance cost for foreign exporters. Thus, the price that will prevail in importing countries will mostly be higher than the price that could have been without the SPS requirement. The premise of a price wedge method, therefore, is to gauge this price difference and obtain the residual price that reflects an equivalent tariff rate for all non-tariff barriers after correcting for tariffs, and other marketing costs.

In practice, however, it is often difficult to observe these prices. As a result, the method relies on a comparison of domestic and foreign prices of the commodity in the presence of NTBs. Thus, the domestic price of a substituted domestic good should be compared with the invoice price (i.e. the cost, insurance, and freight) of the imported good as paid by domestic importer to the foreign exporter inclusive of transport costs but exclusive of tariffs). The price difference between the two commodities is, therefore, used as a proxy for an equivalent tariff rate of the non-tariff barriers (SPS regulation), after adjustment for the imposed tariff rate.

The problem with this methodology resides on obtaining reliable data and as the computed residual price reflects a proxy for all NTBs, the method is unable to specify for the impact of specific categories of NTBs. In addition, the welfare analysis component of the computed equivalent tariff is not analogous to the standard analysis of a tariff protection, as government does not collect the rent. Comparison of the prices of domestic and imported commodities is also valid only under the assumption of perfect substitutability between imported and domestic commodities. Hence, as Beghin and Bureau (2001) stated, this methodology is successful only on few case studies, where the focus is on specific products that are relatively standardised. For larger scale studies, however, the price-wedge method does not appear reliable.

5.3.2 Inventory-based approaches

The basic notion of this approach is assessing the importance of domestic regulations as trade barriers. There are two ratios used to refer to the occurrence of non-tariff barriers in this approach. The first is the *frequency ratio*, which represents the number of NTB occurrences of a product category as a ratio of the whole product category in the product classification (HS). For example, if the frequency ratio for food and animal products is 4 percent, it implies that 4 percent of the total products in the food and animal product groups are faced with any non-tariff barriers. The other ratio used to indicate the presence of non-tariff barriers is the *import coverage ratio,* which represents the value of imports subjected to non-tariff barriers to the total value of the imports for a product category. It is similar to the frequency ratio, except that it uses the value of the import rather than the number of products subject to NTBs in the import coverage ratio.

In the inventory-based approach, some proxies are also derived to represent the occurrence of NTBs. Some of these proxies are: data on the number of regulations (which can be used to construct various statistical indicators); the number of pages of national regulations; the frequency of detentions; the number of complaints from the industry against discriminatory regulatory practices and the number of notifications to international bodies about such practices (Beghin and Bureau, 2001).

[8] The discussion of these five methods are largely derived from Beghin and Bureau (2001)

Inventory based approach is a useful indicator of the overall occurrence of various non-tariff barriers and their value/product coverage for a group of commodities or sector. The method, however, have the following drawbacks, (Deardorf and Stern, 1997). First, the reporting of NTBs is somewhat uneven among different countries, and there may be problems arising from how NTBs are defined and the level and type of aggregation used in calculating commodity and sectoral ratios. Second, the possible deterrent effect of NTBs on pricing or quantity decision of foreign exporters is not elicited by the frequency and import coverage ratio. Third, the frequency and import coverage ratios refer primarily to border measures and thus ignore the entire range of internal governmental measures and the restrictive actions of imperfectly competitive firms. Finally and most importantly, the frequency-type measures provide no information on the economic impact that NTBs may have on prices, production, consumption, and international trade.

5.3.3 Survey- based approach

In a situation where there is no available data to estimate/assess the trade impact and occurrence of the SPS, a survey-based approach is often a good approach to identify the major non-tariff barriers that affects exporters. Unlike the inventory methods, survey-based approach narrows the scope of NTBs into few and major types of NTBs that limit trade considerably. Particularly, when in-depth interview accompanies the questionnaire, the method offers insightful understanding about major trade barriers than are usually overlooked by modellers and economists. A survey-based approach also helps to identify the barriers that are difficult to measure, such as those related to administrative ones. In some cases, the information provided by a survey is also useful to derive some variables using statistical techniques, as input for various estimations.

In conducting surveys, however, the following may cause bias to the usefulness and importance of survey. First, respondent may be biased if they consider the survey will be used for policy purpose and initiate dispute settlement procedure. Second, the way the survey conducted and the construction of the questionnaire are also likely to affect respondents' response and, hence, the NTB estimate.

5.3.4 Gravity based approach

In their survey of the methodologies for quantifying the SPS and TBT impacts on trade, Beghin and Bureau (2001) noted that estimating the trade forgone as a result of strict SPS regulation is an alternative approach to capture the trade impacts of NTBs. Hence, gravity models are well suited to be used for capturing the trade effects of NTBs. Moenius (1999) and Mahe (1997) also stated that the model is one of the most successful and therefore widely used frameworks for empirical analysis of trade flows between countries.

The gravity model has some advantage over the other similar methods in estimating the trade flows among countries. Firstly, it requires relatively limited amount of data; hence, it is conducive for application where data is scarce and costly to acquire. Secondly, as Head (2000) noted, theoretical considerations are now fully elaborated and developed for the gravity model. Thus, the model has the advantage over general equilibrium approaches in estimating the effects of protection on the volume of trade. Thirdly, the gravity model is able 'to capture the trade-enhancing effect of regulations' and the distinct forms of NTBs (binary or discrete) in estimating the trade flows (Beghin and Bureau, 2001).

Despite its strength, the gravity model has some limitations. For example, it cannot be used to analyze the welfare impact of barriers on the nation since the demand and supply side of the effects are not captured in the model (Wall, 1999). In addition, as Beghin and Bureau (2001) noted, the model cannot correctly explain all trade flows, and the prediction is likely to be sensitive to the assumptions of the models. However, they argued that economic refinements are possible to the model and, therefore, estimations could be improved.

The concept of the gravity model initially evolved from the idea of Newton's law of gravitational attraction between two masses. In short, the law stipulates that the force exerted between two bodies is directly related to their body mass and inversely to the distance between them. Emanating from this concept, Tinbergen (1962) established the following similar functional form to demonstrate the determinants of trade flows between two nations.

$$F_{ij} = G \frac{M_i^a M_j^b}{D_{ij}}$$

Where F_{ij} = trade flow between country i and j

M_i = economic mass of a country measured by its GDP

M_j = economic mass of country j represented by its GDP

D_{ij} = distance between country I and j

This simple functional form is "augmented" to incorporate other determinants of trade flows between two nations. Key factors, like colony ties, language, adjacency and trading blocks can be included in the model to strengthen the predictability of the model.

There are few studies undertaken to estimate the impact of SPS regulation on agricultural exports of developing countries using gravity models. Otsuki, *et al.,* (2000) used the model to study the impact of new aflatoxin level proposed by EU on Africa's food exports. The result demonstrates that a marginal decrease in the afflatoxin level, vis-a-vis the international standard will impose a loss of 64 percent of the total value of African exports, estimated around US$ 670 million annually. Using similar method, Wilson and Otsuki (2002) attempted to quantify the impact of tighter pesticides *chlorpyrifos* on banana exports of 19 exporting developing countries from Latin America, Africa and Asia. Their finding demonstrates that a 10 percent increase in regulatory stringency leads to a decrease in banana imports by 14.8 percent. Moreover, their analysis predicts that world export of banana would increase by US$ 5 billion if the CODEX standards were implemented by all countries. Wilson, Sewadeh, and Otsuki (2001) also employed the model to investigate the impact of strict environmental regulation on international trade patterns.

5.3.5 Risk-assessment-based cost-benefit measures

As NTBs are sometimes used to correct market failures, it is important to unravel the protectionist part of these NTBs by considering the gain occurred as a result of correcting the market failure (efficiency part of the regulation). Risk assessment approaches, thus, help to identity the trade protectionist part of NTBs by comparing the cost of compliance with the benefit accrued, estimated by assessing the cost of failure to comply using risk-assessment techniques. All the cost incurred above the benefit, therefore, represents the protectionist side of the regulations.

This methodology provides an important tool to investigate the trade distortion part of a regulation by incorporating both the scientific and economic rationale of the imposed standards. Among the limitations of this approach, however, are the uncertainty on both the level of risks and the economic consequences of the regulation.

5.3.6 Stylised microeconomic approaches

The impact of SPS standards on producers and consumers can also be estimated using the demand and supply of the product, using the standard estimates of cost or profit functions, as well as utility or demand functions estimated econometrically. This approach will help to fine tune the cost-benefit analysis using the concept of consumers and producer surplus. A duality theorem can, therefore, be applied to estimate the shadow price of the SPS regulation.

As the impact of regulation differs to consumers and producers as a result of the market structure, information accessibility and economy of scale, various studies have offered an analytical framework to analyse the impact of regulations on different aspects of the market.

According to Beghin and Bureau (2001), this method is so far largely theoretical and illustrates economic mechanisms at stake rather than providing quantitative estimates of the impact of non-tariff barriers. Added to this, the analytical framework that makes it to account for the overall effect of NTBs also becomes rapidly intractable

unless simplifying assumptions are made for the demand curves and the market structure.

5.3.7 Sectoral or multi-market models

These models provide a framework for analysing the tariff-rate equivalents of standards and technical regulations, which are computed using one of the above methods, on the equilibrium of the economy, i.e. on the changes in price and quantity. Unlike the gravity models, this approach also provides quantitative result on the welfare impact of SPS regulations. Thus when the economy impact is compared with the effect of SPS regulation, say on illness reduction and consumer valuation of the standards, the method yields a thorough cost-benefit analysis of the regulation for the whole economy

5.4 Summary

Estimating the impact of stringent SPS regulations is of paramount importance for developing countries. It could help them in appealing for compensation claims and facilitating trade negotiations. Moreover, they are useful to compare the potential gain realized by complying with the standards and the compliance cost. Hence, quantifying the impact of SPS standards on trade and welfare is helpful for undertaking informed policy decisions.

There are various methodologies that are widely applied to estimate the impact of SPS regulations on trade and welfare. Among these methods includes, price wedge approach, inventory based approach, survey, gravity based approach, risk assessment cost benefit measures, stylised microeconomic approach and sectoral or multi-market models. Though each method has its own weaknesses and strengths and differs on the main aspects it measures, combining them would provide a better estimate of SPS standards impact on trade and welfare.

Considering the objective of this study, which attempts to estimate the impact of stringent SPS standards of OECD countries on South Africa's food export, the gravity model is used. The model is chosen as the appropriate methodology since it captures

the trade forgone due to SPS standards more effectively than the other approaches. Moreover, in view of the limitation of the study in terms of time, cost and scope, data required for the gravity model are relatively more available than for the other methods.

CHAPTER SIX

RESEARCH METHODOLOGY

6.1 Introduction

A gravity model is applied to estimate the trade effects of stringent SPS regulations of aflatoxin level used by OECD countries on South Africa's food export.
The simplest form of the gravity model is as follows (Head, 2000).

$$ln\ T_{ij} = \alpha + \beta\, lnD_{ij} + \gamma ln\ S_i + \phi\ ln\ S_j + \varepsilon \quad \text{.....Eq.1}$$

Where T_{ij} refers to the trade flow from country i to j., which is determined by the physical distance between them (D_{ij}) and the size of the economy of the two countries (captured by S_i and S_j). The conventional error term in the model, which is assumed to be normally distributed with constant variance and zero mean, is captured by the term ε.

This simple functional form can be "augmented" to incorporate other major determinants of trade flows between two countries like colony ties, language, adjacency and trading blocks to strength the predictability of the model.

The purpose of this chapter is to discuss the basic premises of the gravity model and explain the specification of the model as applied in this study.

6.2 Economic explanations of the gravity model

Economists have explained the gravity model using the basic concepts of demand and supply (Head, 2000). Let $\mathbf{M_i}$ represents the amount of goods willing to be supplied by the country i (the origin) and $\mathbf{M_j}$ stands for the willingness to demand for the goods originated from i by country j. Similarly, let $\mathbf{F_{ij}}$ refers to the total amount of goods flow from country i to j and distance ($\mathbf{D_{ij}}$) acts as a trade barrier or a sort of tax that reduce the trade flow between both countries. In the same token, let $\mathbf{M_j}$ represents the amount of income spent by country **j** on all goods originated from country **i**, and let the share of income spent on goods originated from country **i** by country **j** be expressed as $\mathbf{S_{ij}}$.

Thus, the total trade flow of a particular good between country i and j can be put as:

$$\mathbf{F_{ij} = s_{ij} M_j,} \quad \text{..... Eq. 2}$$

The three basic characteristics of the term $\mathbf{S_{ij}}$ are: first, it lies between 0 and 1; second, it should increase if **i** produces goods in vide variety ($\boldsymbol{n}$) and/or of high quality ($\boldsymbol{\mu}$); and thirdly, it should decrease by trade barriers such as distance, $\mathbf{D_{ij}}$.

Based on the above arguments, $\mathbf{S_{ij}}$ can be represented as

$$\mathbf{S_{ij}} = \frac{\mathbf{g}(\boldsymbol{\mu_j}, \boldsymbol{n_j}, \boldsymbol{D_{ij}})}{\boldsymbol{\Sigma_l}\, \mathbf{g}(\boldsymbol{\mu_l}, \boldsymbol{n_l}, \boldsymbol{D_{lj}})} \quad \text{.....Eq. 3}$$

Where the g(.) function is increasing with the improvement and increment of variety (n) and quality (μ) of goods and services, and decreasing function for the distance (D_{ij}).

To derive the specific functional form of the **g(.)**, function we can use two approaches (Head, 2000). The first one applies the Dixit and Stiglitz model of monopolistic competition between differentiated but symmetric firms; thus the model sets $\boldsymbol{\mu_i} = 1$ and makes $\boldsymbol{n_i}$ proportional to $\mathbf{M_i}$. The second approach assumes a single good from each country ($\boldsymbol{n_i} = 1$, but it lets the preference parameter $\boldsymbol{\mu_i}$ differ in such a way that it will be proportional to the size of the economy, $\mathbf{M_i}$. Both approaches presume trade costs to be a power function of distance.

Thus,

$$\mathbf{S_{ij} = M_i D_{ij}^{-\theta} R_j,} \quad \text{.....Eq.4}$$

Where $\mathbf{R_j = 1 / (\Sigma_l M_l D_{lj}^{-\theta})}$. After substituting and rearranging, the following functional form is obtained, which is close to the gravity functional form.

$$\mathbf{F_{ij} = R_j \frac{M_i M_j}{D_{ij}^{\theta}}} \quad \text{.....Eq.5}$$

The main difference between the Newton gravity model ($\mathbf{F_{ij} = G\ M_i^a\ M_j^b\ /\ D_{ij}}$) and the one developed by economists (Eq. 5) is the term R_j, in which in the later case it is defined as "remoteness", where it is captured in the intercept of the regression. A low value of $\mathbf{R_j}$ indicates that the importing country have a lot of alternatives that it will import less from each particular source (Head, 2000).

6.3 Model specification

Regression variables that are mostly incorporated in a standard gravity equation applied for estimating the impact of SPS measures on agricultural export is included in the specified model used in this study. The specification of the gravity model, which is applied in this study, holds the following functional form.

$$ln\ T_{ij} = \alpha + \gamma lnGDP_i + \phi\, lnGDP_j + \beta\, lnD_{ij} + \delta\, ln\ P_i + \lambda\, ln\ P_j + \xi\, TAF_j + \varepsilon \quad \text{.....Eq.6}$$

Table 6.1: Variables used in the Model

Independent Variables	**Abbreviations**
Natural log of South Africa's population	*ln P i*
Natural log of importing country's population	*ln P j*
Natural log of real South Africa's GDP	*ln GDP i*
Natural log of real importing county's GDP	*ln GDP j*
Natural log of distance between both countries	*ln D ij*
Natural log of the total aflatoxin standard of importing country	*ln TAFj*

Gross Domestic Product (GDP): Like the mass of the two bodies, as stated in the law of gravity that determines the force of attraction between them, GDP of the trading countries represents both the productive and consumption capacity that determines heavily the trade flow between themselves. It is expected that an importing country's GDP play a significant role in determining the trade flow originating from exporting countries. This is because the importing country's GDP, like the income of the consumer, plays a significant role in determining the demand for the goods originating from exporting countries. An exporting country's GDP also plays a role in determining the productive capacity of the exporting country, i.e. the amount of the goods that could be supplied. In the gravity model, it is expected that an exporting country's GDP will play relatively less significant role than that of the importing country's in determining the trade flow of goods originated from exporting country.

Population: The impact of population on trade flow is inconclusive. On the one hand, population may increase trade flow due to an enlarged market size. On the other hand, large population may also imply low per capita income of the population; hence, it may affect the trade flow between two countries negatively.

Distance, is another important element, which is used to capture the proxy for the trade cost between countries. Countries with short distance between each other are expected to trade more than those who are wide apart due to a lower transaction cost. Distance can also be used as a proxy for the risks associated with the quality of some of the perishable goods and the cost of the personal contact between managers and customers.

SPS standards can be either captured through dummy variables or directly using the levels of the specific element used to regulate the trade flow of agricultural commodities. It is generally expected that stringent regulations would limit the flow of trade between countries.

Among other factors often included in gravity model to predict the trade flows is the colonial tie existed between two countries. Countries, which have a colonial ties, are expected to be trading partners due to the trade relations they established before and the common language and culture they share, which eases the transaction cost of trading. In Table 6.2, the former colonial rulers of SADC countries and their respective main trading partner are presented. As shown in the Table, for most of the countries the main trading partners are the former colonizer.

In the model specified for this study, however, the variable has not been included due to the lack of colony ties of South Africa with the five OECD countries included in the study. The UK and the Netherlands, which are the former colonizers and the main trading partner of South Africa, were not included in the study due to the lack of data on the total aflatoxin level they applied for "all foods".

Table 6.2: The SADC countries, their former colonial ruler and main trading Partner

Country	Former Colonial Ruler	Main Trading Partner
Angola	Portugal	USA, Spain and Italy
Botswana	United Kingdom	UK, South Africa and Zimbabwe
Dem. Rep of Congo	Belgium	Belgium, South Africa and Italy
Lesotho	United Kingdom	South Africa and EU
Malawi	United Kingdom	South Africa, Germany and USA
Mauritius	France	France and UK
Mozambique	Portugal	Spain, Portugal and South Africa
Namibia	United Kingdom	UK and South Africa
Seychelles	France	USA, UK and France
South Africa	UK and the Netherlands	Japan, Germany, UK, USA
Swaziland	United Kingdom	South Africa, EU
Tanzania	United Kingdom	UK, Germany, Belgium
Zambia	United Kingdom	Japan, South Africa and Thailand
Zimbabwe	United Kingdom	South Africa and UK

Sources: African Import and Export Bank (1998).

6.4 Data

Data for GDP and population of the countries included in the study is obtained from the World Development Indicators 2002 CD-ROM. All values of GDP are expressed in real terms and expressed in US$. The trade flow of food from South Africa to the five countries is obtained from the database of Trade and Production 2001 CD ROM. The International Standard Industrial Classification (ISIC) at 3-digit level, which is referred to as "food products", is used by aggregating the detailed 4-digit level[9] food classification. The data were deflated using the OECD countries CPI, which was obtained from World Development Indicators 2002 CD-ROM. Distance is measured between the capital cities of each country, which was obtained from the web site www.indo.com/distance. Data on the level of total aflatoxin levels were obtained from the FAO (1995) document and all the data for all variables included in the study are from 1995-1999. Due to the data availability problem on the total aflatoxin level adopted by main trading partners of South Africa, only five OECD countries for which data are available are covered in this study.

[9] The ISIC 4 digit classification used to compute the total food products are: 3111 slaughtering preparing and preserving meat, 3112 Manufacture of dairy product, 3113 canning and preserving of fruits and vegetables, 3114 Canning preserving and processing of fish crustacean and similar foods, 3115 manufacture of vegetable and animal oils and fats, 3116 Grain mill products, 3117 Manufacture of bakery products, 3118 Sugar factories and refineries, 3119, manufacture of cocoa chocolate and sugar confectionery, 3121 manufacture of food products not elsewhere classified, 3122, manufacture of prepared animal feeds.

CHAPTER SEVEN

EMPRICAL ANALYSIS AND INTERPRETATION

7.1 Introduction

Panel data are used to estimate the trade effect of aflatoxin level set by five OECD countries on South African food export. This chapter discusses the model used to analyse the panel data and presents the results and their interpretation.

7.2 Test for poolability of the data

Since both the cross sectional and time series data are combined, the poolability of the data would need to be tested using the F-test to choose the appropriate model for the panel data. The null and alternative hypotheses of the F-test are the following.

H_O: $\mu_1 = \mu_2 = \mu_3 = \mu_4 = \mu_5$ (No individual effects; same intercept for all cross section).

H_1: Not all are equal, i.e (Fixed effects or 'within' estimation, in which each country has its own unique effects on the regressor; hence, it has unique intercept for each countries).

The F-test is applied by combining the residual sum of squares of the regression both with constraints (under the null) and without (under the alternative).

$$\mathbf{F = \frac{(RRSS - URSS) / (N-1)}{URSS / (NT - N - K)} \sim F_{(N-1),\,(NT - N - K)}}$$

Regression with constraint refers to an ordinary least square estimation, since individual effects (that may arise due to the uniqueness of the country) on the trade flow are not considered in the estimation. Unconstrained regression, on the other hand, is estimated using the 'within' estimation or fixed effect model, which allows to capture the impact of the uniqueness of a country on trade flow.

$$\mathbf{F = \frac{(0.333-0.306) / (5-1)}{0.306 / (30 - 5 - 6)}}$$

F = 0.4 which is evaluated against the critical value which is distributed as **F (N-1), (NT-N-K)**

F critical = F (4, 29) = 2.69 at 5 % and 2.14 at 10 % (From the F distribution table). As the computed F value is less than the critical F value, we fail to reject the null hypothesis that states the poolability of the data across the cross section. As a result, a pooled model is chosen in this study to undertake the analysis of the panel data.

7.3 Results and Interpretation

The result of the pooled model is given below.

Table 7.1: The result of the pooled model estimation.

Dependent Variable: *ln TVij*			
Variable	**Coefficient**	**Std. Error**	**T Statistics**
C	17.23	19.56	0.88
ln GDP j	1.5	0.73	2.03**
ln GDP i	6.06	5.68	1.06
ln P j	-0.2	0.73	0.28
ln P i	-9.9	6.87	1.45
ln D ij	-4.94	0.78	6.33***
ln TAF j	0.41	0.17	2.33**
R-squared 0.988	Durbin-Watson 2.19		
Adj R-square 0.984	F stat. 258***		

Note ***, **, * are respectively level of significant at 1 %, 5 % and 10 %

Classical econometric problems of the model have been tested. Serial correlation is not found in the model, as indicated by the value of Durbin Watson, which is 2.19, showing that the null hypotheses of the absence of serial correlation falls within the acceptance region. White heteroskedasticity-consistent standard errors & covariance have also been used in the model to consider the presence of heteroskedasticity in the model.

The robustness of the result of the model is also tested against multicollinearity that may exist between the GDP and population variables. Hence, the population variables were omitted in the second model to mitigate the collinearity between GDP and population variables. As the result shows in the Table 7.2, the coefficient of the total aflatoxin level, importing countries GDP and distance is robust, i.e. they are still

positive and significant. The coefficient of the exporting GDP, though changed its sign, it is still insignificant like the first pooled model. Hence, the first model is chosen as classic econometric problems are not present and it has the expected signs for key variables.

Table 7.2: The result of the pooled model excluding population variables.

Dependent Variable: *ln TVij*			
Variable	**Coefficient**	**Std. Error**	**T Statistics**
C	28.28	15.18	1.86
Ln GDPj	1.29	0.03	38***
ln GDPi	-1.68	1.34	1.24
ln D ij	-4.73	0.24	19.3***
ln TAf	0.37	0.6	5.43***
R-squared 0.987	Durbin-Watson 2		
Adj R-square 0.984	F stat. 214***		

Note ***, **, * are respectively level of significant at 1 %, 5 % and 10 %.

The variables in the equation explained 98 percent of the variations in the total trade flow of South African food export to the five OECD countries, as shown by the value of adjusted R^2. The estimated food trade flows from South Africa and the five OECD countries included in the study are as follows.

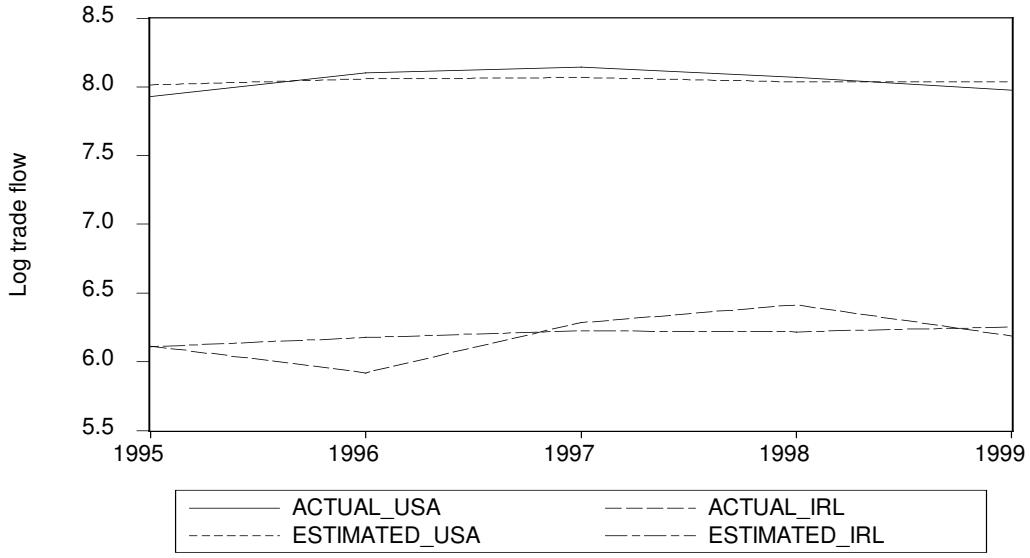

Fig. 7.1: The estimated and the actual trade flow from SA to Ireland and from SA to USA

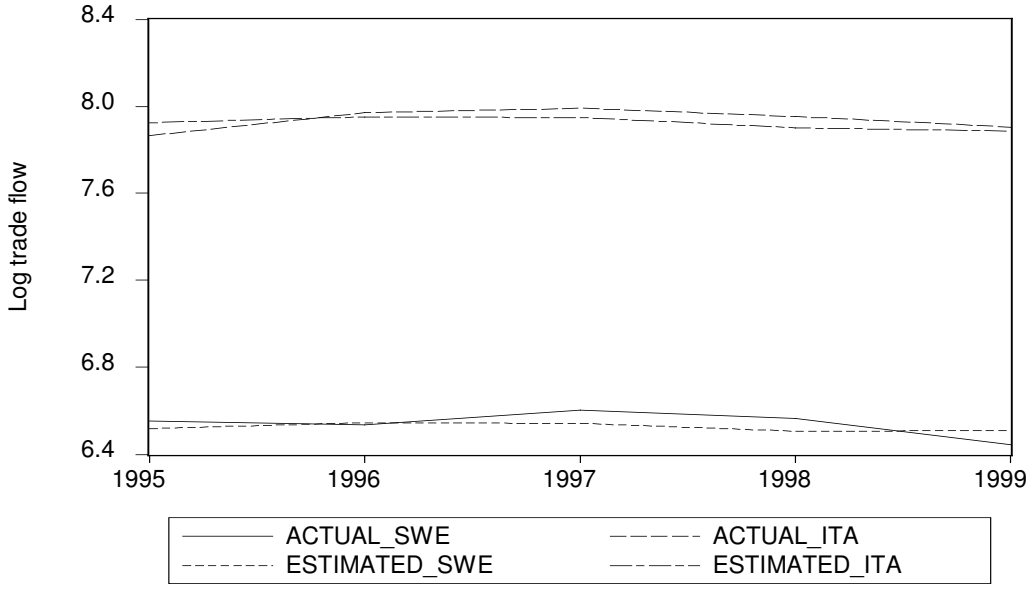

Fig. 7.2: The estimated and the actual trade flow from SA to Italy and from SA to Sweden

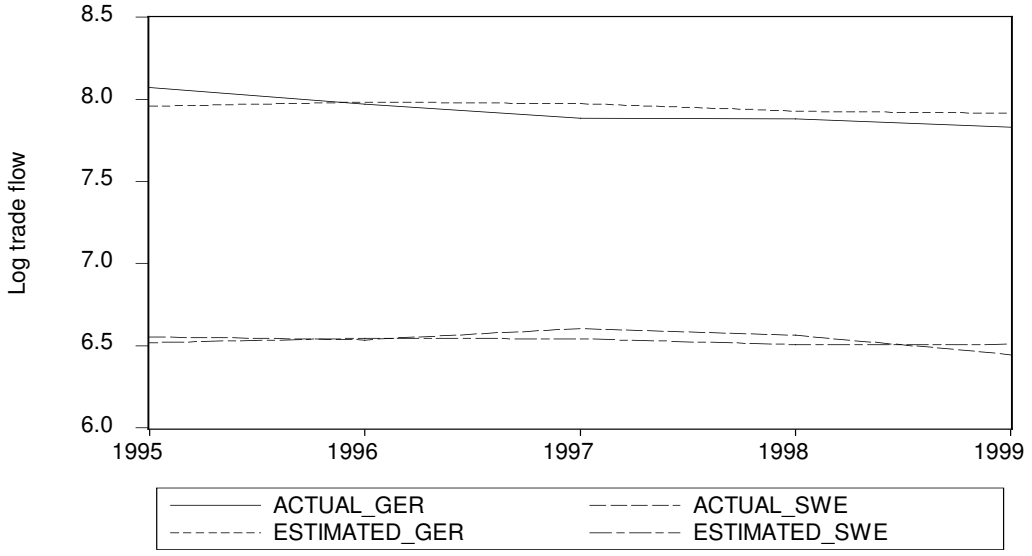

Fig. 7.3: The estimated and the actual trade flow from SA to Germany

The result of the model shows that the importing countries GDP, distance and aflatoxin level are found to be significant to affect food trade flow to the importing countries. The elasticity of the importing country's GDP is 1.5, which indicates that a

10 percent increase on importing countries GDP is expected to increase the food trade flow by 15 percent; which shows an elastic relationship.

The coefficient of the total aflatoxin level is also significant, though inelastic. A 10 percent increase in the total aflatoxin standard by the importing countries would reduce food trade flow of South Africa by 4.1 percent. Distance, as theoretically expected, is significant and affects the food trade flow negatively. The sign for the coefficient of the population for both importing and exporting countries is negative, which supports the proposition that under *ceteris paribus* assumption, the increase of population will reduce trade flow between countries. In our model, however, these variables are insignificant in determining the food trade flow.

7.4 Sensitivity test of the model

For the model to be used for policy analysis it is quite important to observe the robustness of the model to variations in the parameters of the exogenous variables in the model. In this case, a shock of 10 percent on the GDP of importing countries was examined to observe its impact on the food trade flow from South Africa. Hence, starting from 1997, a 10 percent increment on the GDP of importing countries was experimented with to verify the sensitivity of the coefficient in the model.

Fig. 7.4: The estimated and the shocked food trade flow between SA and Ireland

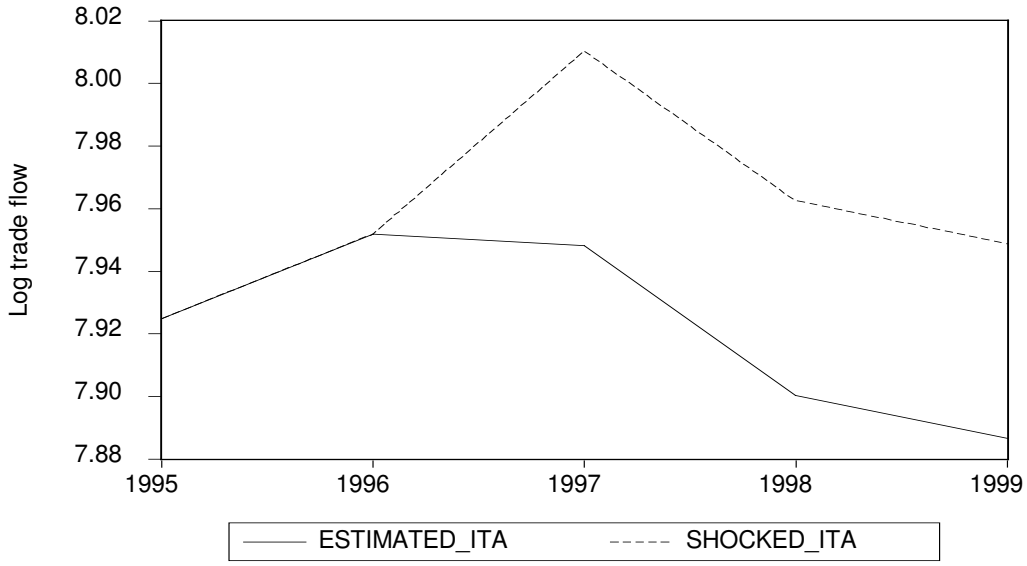

Fig. 7.5: The estimated and the shocked trade flow between SA and Italy

Fig. 7.6: The estimated and the shocked trade flow between SA and Sweden

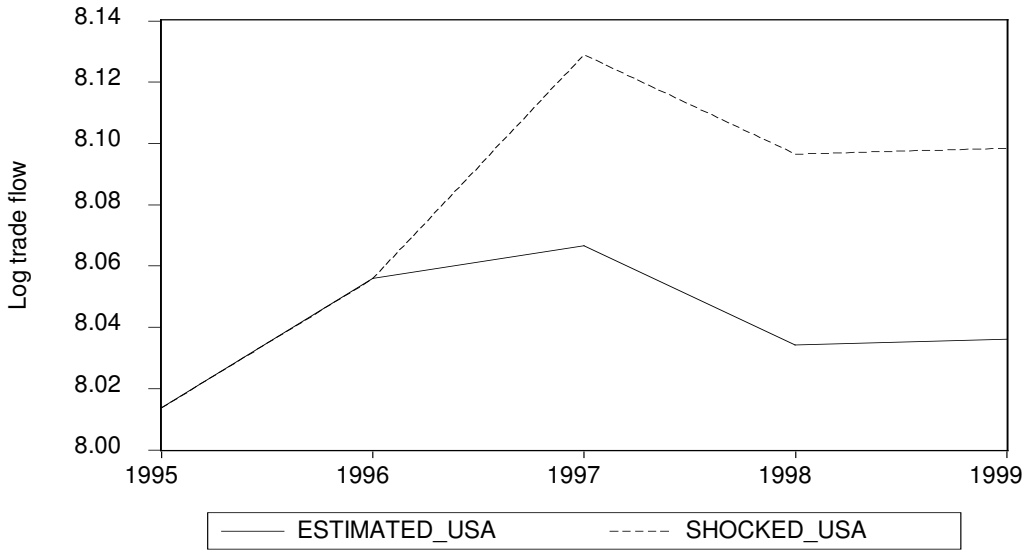

Fig. 7.7: The estimated and the shocked trade flow between SA and USA

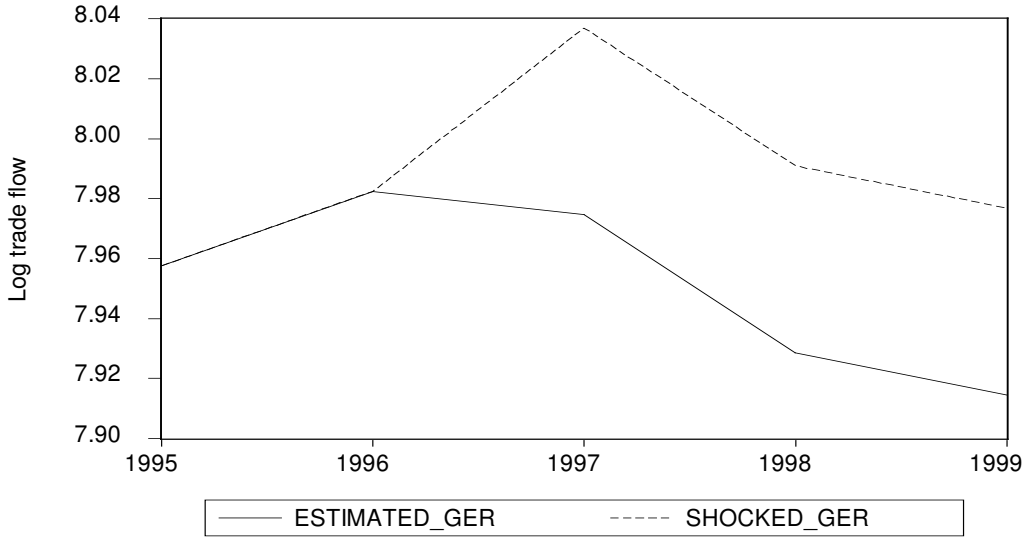

Figure. 7.8: The estimated and the shocked trade flow between South Africa and Germany

As observed in the shock of 10 percent GDP has induced a 15.4 percent change of food trade from South Africa. The change is very close to the predicted change, 15.14 percent; hence, we could use the result of the model for policy analysis and simulation purpose.

7.5 Simulation result of applying CODEX recommended standard by five OECD countries on South African food export.

The CODEX has set total aflatoxin levels, which is lenient compare to those imposed by most EU countries and a bit stringent compared, to few countries included in the study, namely USA and Ireland. As shown in Table 4.11, CODEX has set the total aflatoxin level for all foods at 15 ppb, while Germany, Sweden and Italy has set the standard at 4 ppb, 5 ppb and 10 ppb respectively. On the other hand, USA and Ireland has set the total aflatoxin standard at 20 ppb and 30 ppb respectively. These levels are more lenient than the CODEX.

To estimate the trade flow that would have occurred if the countries considered in the study were adopting the CODEX standard, a simulation was done on the model. As depicted in Figure 7.9 – 7.11, the trade flow for Germany, Italy and Sweden shows an upward shift as opposed to the actual level, due to the introduction of more lenient total aflatoxin standard recommended by CODEX. USA and Ireland, however, would have experienced a decline in trade flow, as the CODEX standard, which is relatively strict to these countries, would limit the trade flow that have occurred actually.

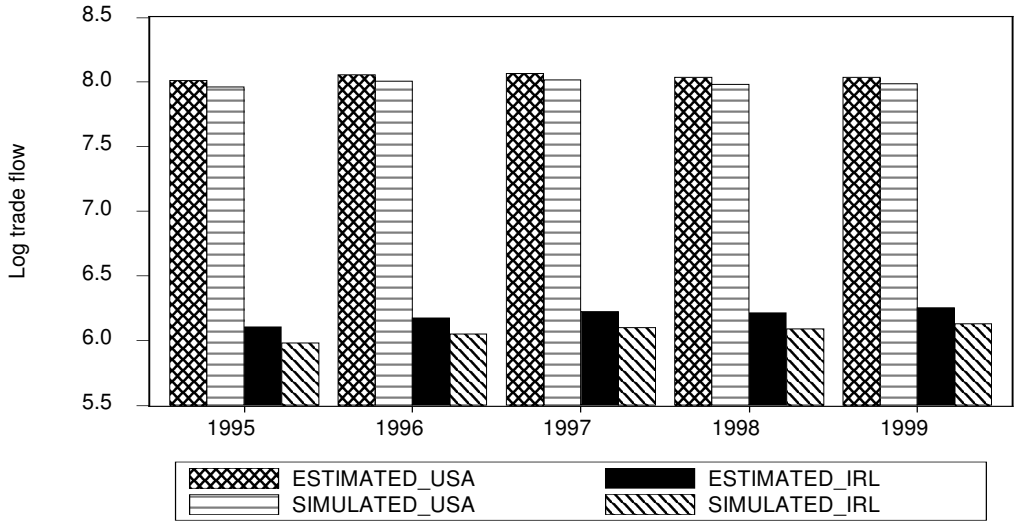

Fig. 7.9: The estimated and the simulated trade flow between SA and Ireland and SA and USA

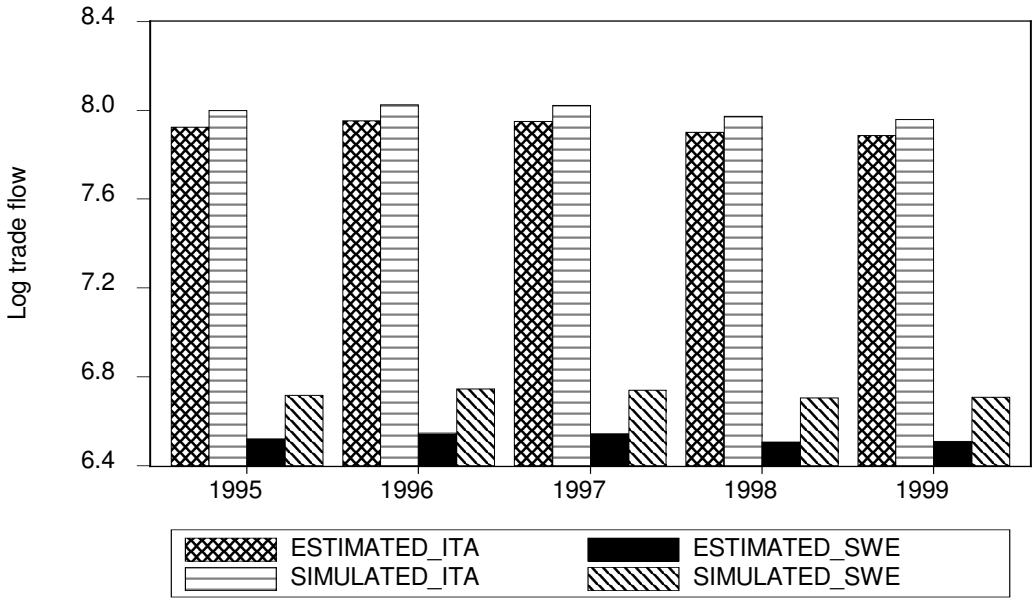

Fig. 7.10: The estimated and the simulated food trade flow between South Africa and Sweden and South Africa and Italy

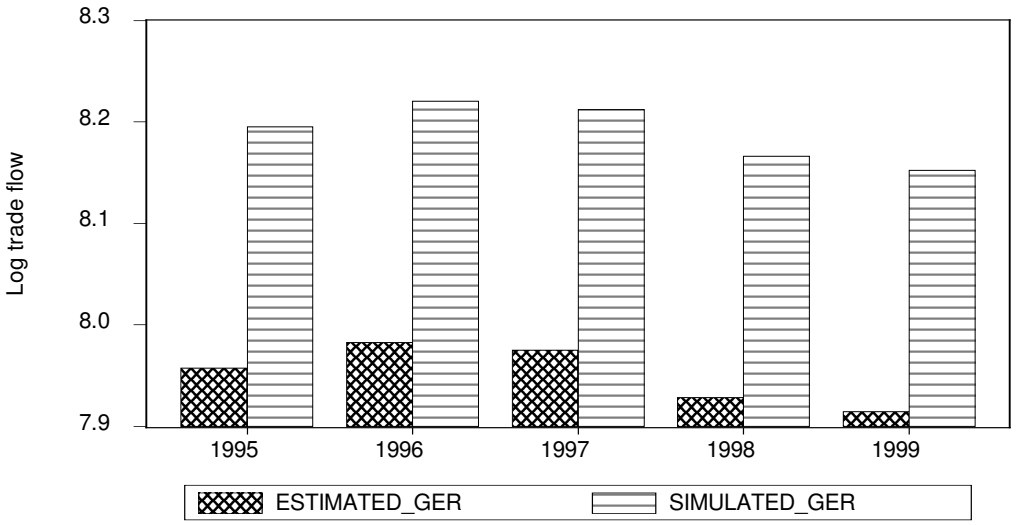

Fig. 7.11: The estimated and the simulated food trade flow between South Africa and Germany

The adoption of total aflatoxin level standard by these five OECD countries would have increased the total food trade flow of South Africa in aggregate. As shown Table 7.3, the trade volume with Germany in particular will increase significantly due to the removal of the highly stringent aflatoxin standard (2 ppb) used currently compared to the more lenient standard recommended by CODEX (15ppb). It is anticipated that the

total food trade flow would increase by US$ 65.2 million. Among the food products exported to Germany, it is expected that this large gain would be largely from the increase in the export of fruits, vegetables, meat and fish products, which constitutes the large portion of South Africa's food export to Germany.

The other two countries that are using more stringent standard than the recommended CODEX level, Sweden and Italy, would also have experienced an increase in food trade flow from South Africa. The estimated food trade flows to Sweden and Italy is respectively US$ 15.3 million and US$ 1.9 million. The main food products, which are expected to increase to Italy due to the newly adopted standard, are meat and fish products and to Sweden the main food products expected to increase are fruits, vegetables and meat.

Trade flow to USA and Ireland, however, would have been reduced due to the relatively more stringent requirement of CODEX level as compared to each country's current level. The simulation result shows that food trade flow to both USA and Ireland is estimated to be decreased by US$ 12.35 and US$ 0.39 million respectively. For Ireland the main products, which are expected to be reduced due to the introduction of the CODEX standard are fruits, vegetables and sugar products and for USA, the main products, which are expected to be reduced, are fish, sugar, fruits and vegetables.

The aggregated simulation result indicates that, on average each year more than US$ 69 million is forgone due to the stringent aflatoxin standard imposed on food products of South Africa by the five countries included in the study. Among the five countries included in the study, trade flow to Germany, Sweden and Italy, would have increased by 72 percent, 57.5 percent and 18.2 percent respectively and trade flow to Ireland and USA, on the other hand, would have decreased by 25 percent and 11.23 percent respectively.

Table 7.3: Simulation result of adopting CODEX recommendation by OECD countries and its impact on the trade value of South African food export (in US $ million)

Year	GER	ITA	IRL	SWE	USA	TOTAL	AVERAGE
1995	66.04	15.36	-0.31	1.90	-11.58	71.41	69.73
1996	69.94	16.35	-0.37	2.02	-12.76	75.18	69.73
1997	68.69	16.21	-0.41	2.00	-13.08	73.41	69.73
1998	61.78	14.52	-0.41	1.84	-12.14	65.59	69.73
1999	59.80	14.06	-0.44	1.85	-12.19	63.07	69.73
Total	326.26	76.52	-1.96	9.63	-61.77	348.68	
Average	65.25	15.30	-0.39	1.92	-12.35		
% change from the actual level.	72.1 %	18.27 %	-25 %	57.5 %	-11 %		

7.6 Summary

A panel data are used to estimate the trade effect of aflatoxin level set by five OECD countries on South African food export. An F-test was done on the panel data to choose the appropriate model to be used to analyse the data. The test results shows that the data could be pooled. Hence, a pooled model was used to estimate the trade effects of the aflatoxin standard on food exports.

The pooled estimated result shows that the GDP of the importing nation, distance from the exporting country and the aflatoxin level set on food products by importing countries are both statistically significant and have the expected sign in the model to affect the food trade flow from South Africa. Elasticity of the aflatoxin standard, and GDP of importing nation are 0.41 and 1.5 respectively. The sign of both SA's and OECD countries' population variables is negative and they are statistically insignificant in the model.

The robustness of the result of the first model is also tested by omitting the population variables, to mitigate the collinearity between GDP and population variables. The result of the second model shows that the coefficient of the total aflatoxin level, distance and importing countries GDP is robust, i.e. it is still significant and has the same sign as the first model. The GDP of exporting country is also insignificant like

the first model. The magnitudes of the coefficients in the second model are also not quite different from the first model.

Simulation was also done in the model to estimate the trade effect, if the five OECD countries had applied the CODEX recommended standard of total aflatoxin levels. The result shows total food export to Germany, Italy and Sweden would have increased respectively by US$ 65, 15 and 1.9 million annually from 1995 to 1999. For Ireland and USA, however, the food export would have decreased by US$ 12.35 and 0.39 million respectively. On aggregate, the total food export of South Africa would have increased by US$ 69 million annually, if the countries had applied the CODEX recommended standard.

CHAPTER EIGHT
CONCLUSIONS AND RECOMMENDATIONS

8.1 Conclusions

The URAA was a crowning achievement for reforming world agricultural trade since it sought to restrain major trade distortive agricultural policies, which have been practiced by both developed and developing countries. The three basic pillars of the agreement are: improving market access through tariff reduction; limiting trade distortive domestic support; and curtailing export subsidies. Since most OECD member states, notably EU and USA, are the major destination markets for SADC countries exports a close investigation at their agricultural policy and the progress of implementation of the URAA commitment is important to analyze the impact this may have on the welfare of SADC countries. Alternative policies could then be proposed to assist SADC countries in the ongoing process of trade negotiations.

Notwithstanding the platform provided by the URAA on restraining trade distortions, data and other empirical evidence on market access after the implementation of the URAA reveal that OECD markets are still protected against competition from major products of SADC countries. Most of agricultural tariff rates are still tariff peaks on products that are important to SADC countries. Added to this, some of the preferential arrangements offered by some of OECD countries don't achieve their intended positive effects, since they tend to exclude major commodities. They exclude the major agricultural products by classifying them as 'sensitive' products, by subjecting them to quota restrictions and in some cases by limiting the eligible countries.

The URAA also introduced tariff rate quotas to allow agricultural trade for previously protected products. The in-quota and over-quota tariff rate structure of the OECD countries, however, shows that the latter tariff rates are trade prohibitive and the former tariff rates are excessively high. Consequently, the registered quota fill rate for most agricultural commodities is disappointingly low. The onerous administrative method for quota also acts as a non-tariff barrier that contributes for the dismal quota fill rate for most agricultural commodities.

Tariff escalation is also another major obstacle that impedes the promotion of agro industries in the SADC region. In addition to its detrimental impact on value-added industries, it entails adverse effect on environmental sustainability. Recent data on tariff rate structures at each stage of processing for agricultural commodity groups shows that in most of the OECD countries, all agricultural commodities are still facing tariff escalation.

The total agricultural support of OECD countries measured using the Producer Support Estimate (PSE) was 31 percent in 2001, which is a modest decline from 32 percent in 2000 and 38 percent in 1986-88. Despite the reduction of PSE, the major portion of the support for most OECD countries is still highly trade distortive, as it is mainly based on output produced, input utilized and market price support that encouraged massive production, which has squeezed the world price of agricultural products. In 2001, the Nominal Protection Coefficient (NPC) of OECD countries indicated that domestic agricultural price of these countries was 41percent above the world prices. Stated differently, OECD producers are still protected from the market signals of the world agricultural trade, hence they are still responding to the distorted domestic agricultural prices.

Reviews of export subsidy utilization by all OECD countries reveal that the export subsidy commitment during 1995-1999 has been fulfilled. The average utilization of export subsidy volume commitment for all WTO members is only 38 percent. Out of all OECD countries, EU is the largest user; it makes up more that 90 percent of total subsidy outlays in all countries. These export subsidies, mainly by the EU, have a significant effect in reducing world prices of agricultural commodities and hampering the development of agricultural industries in SADC countries due to the artificially cheap products that flood the regional market.

Although regulations on export subsidy commitment have attempted to discipline trade distorting practices in world agricultural trade, their goal could be elusive unless certain aspects of implementing the export subsidy commitment are addressed in the upcoming trade negotiations. Namely, export credits, certain aspects of parastatal trade agencies, misuse of international food aid and various price discrimination mechanisms.

The proliferation of non-tariff barriers in the aftermath of the URAA agreement has also strained the expansion of developing countries' agricultural trade. Though the SPS agreement has attempted to consider the economic status and interest of developing countries, there is ample evidence that they are still facing a formidable challenge in active participation in negotiations on SPS matters and has reservation on some of the operations of SPS agreement. Among others, lack of expertise, limited scientific data and inadequate resources to attend regular meetings limit the active participation of developing countries. Moreover, inadequate account of the needs of developing countries in setting SPS standards by developed countries is cited as the main factor that impedes the manner in which the SPS agreement operates.

Various studies suggest that tariff reduction by OECD countries will have more impact in augmenting the welfare for developing countries in general, and SADC countries in particular, than a cut in the domestic support. Decoupling domestic support of OECD countries is also expected to bring a welfare gain for all countries in terms of improving the income transfer efficiency in OECD countries and reducing the trade distorting impact of these supports to the world agricultural trade. Similar studies have also recommended that a reduction of export subsidy of OECD countries should be accompanied by a tariff cut and domestic support to bring a welfare gain for all countries.

There are few attempts made to estimate the effects of these stringent SPS standards on agricultural trade of developing countries. Estimating the impacts, however, is vital to facilitate trade negotiations, serve as a basis for calculating compensation claims and solve policy dilemmas. This study estimated the impact of the total aflatoxin standard set by five OECD countries on South Africa's food export using a gravity model.

Elasticity of the total aflatoxin level is found out to be 0.41 and the effect of the standard on trade is statistically significant. The simulation result also shows that, if all these 5 OECD countries included in the study were to apply the aflatoxin level recommended by CODEX, South Africa would have gained an estimated additional US$ 69 million from food exports to these countries annually from 1995 to 1999. Due to the stringent standards applied by some of these countries, however, this amount

(US$ 69 million) represents the forgone export revenue for South Africa. Thus, the study concludes that stringent SPS standards set by developed countries have a potential to offset the perceived gain of liberalizing agricultural trade unless they are given a serious attention from both developed and developing countries. The conclusion of the study has the following major policy implications and recommendations.

8.2 Policy implications and recommendations

- High tariff protection for agricultural commodities in general and tariff escalation in particular still exists for commodities that are important in SADC countries. Upcoming trade negotiations, therefore, should consider the case and push for their reduction.

- Decoupled domestic support by developed countries may improve the welfare of developing countries as a whole. Hence, SADC countries should concentrate on the reduction of other trade distorting policies, namely export subsidies and tariff protection, provided that domestic supports of OECD countries are decoupled.

- Active participation by developing countries, including SADC, in international organizations that are responsible for setting SPS standards is important to present their interest and concern regarding SPS matters. Appointing a representative for the SADC regional block as a whole or representatives for different products or commodity groups would also partly alleviate the problems that hinder active participation of these countries.

- SADC regional research and policy analysis networks should invest in research programmes aimed at estimating the trade effects of various SPS standards. This would enable informed decision-making by governments to request compensation claims, where applicable, as stated in the SPS agreement.

- In light of the persistent increase of stringent SPS standards, often established by developed countries, due attention should be paid to SPS regulations in trade negotiations as they may have a potential to offset the possible gain that may be attained by reducing other trade-distorting agricultural policies in developing countries, including SADC.

8.3 Limitation of the study and areas of further research

Due to limitation of data on SPS standards and the trade flow of key agricultural commodities, the trade effect of major SPS standards on SADC countries as a whole, which was the basic motivation of the paper, could not be estimated. Hence, using the available data, the study attempted to estimate the trade impact of total aflatoxin level set by five OECD countries on South Africa's food export.

The total aflatoxin level is composed of four components called B1, B2, G1 and G2. Despite complying with the total aflatoxin standard, food exports may still be protected due to the failure of complying with the standard of each component of the total aflatoxin elements. Moreover, for some food components, the level of each aflatoxin element could play a more significant role in determining the trade flow than the total aflatoxin level. Therefore, a better estimate of the trade impact should further investigate the impact of these particular elements of the total aflatoxin standard on the affected key food commodities.

Furthermore, comparing the compliance costs and the benefits incurred from complying with the SPS standards is relevant for sound policy decision making. Hence, it is vital to undertake the estimation of the cost of compliance to standard regulations, which is a challenging area of research that most of empirical studies on the trade effects of SPS regulations lack.

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APPENDICES

Appendix A. OECD estimates of support to agriculture (US$)

Total value of production (at farm gate)	**1986-88**	**1999-2001**	**1999**	**2000**	**2001**
Of which share of MPS commodities (percent)	71	68	69	68	68
Total value of consumption (at farm gate)	533 643	608 065	610 659	607 695	605 840
Producer Support Estimate (PSE)	238 936	248 302	272 563	241 599	230 744
Market price support	184 539	160 142	181 767	153 390	145 268
Of which MPS commodities	130 379	109 603	124 821	104 825	99 163
Payments based on output	11 742	16 012	16 437	17 395	14 203
Payments based on area planted/animal numbers	15 664	29 078	29406	28 772	29 057
Payments based on historical entitlement	515	13179	13 480	13 609	12 448
Payments based on input use	20328	20671	22 713	19 794	19 505
Payments based on input constraints	2995	6262	6 357	5 844	6 586
Payments based on overall farming income	2853	3 000	2 669	3 089	3 241
Miscellaneous payments	300	-41	-266	-293	436
Percentage PSE	38	33	35	32	31
Producer NPC	1.58	1.35	1.41	1.34	1.31
Producer NAC	1.62	1.49	1.54	1.47	1.45
General Service Support Estimate (GSSE)	41 439	55 077	57 448	53 943	53 838
Research and development	3 989	5 627	5 907	5 479	5 497
Agricultural schools	759	1 608	1 531	1 603	1 688
Inspection services	1 140	1 830	1 792	1 885	1 814
Infrastructure	12 579	17 174	17 403	17 364	16 753
Marketing and promotion	13 384	22 036	23 858	20 726	21 525
Public stockholding	7 416	3 019	3 488	2 864	2 704
Miscellaneous	2 173	3 782	3 469	4 022	3 856
GSSE as a share of TSE (percent)	13.7	16.7	16.1	16.8	17.3
Consumer Support Estimate (CSE)	-168 704	-153 815	-176 184	-148 136	-137 124
Transfer to producers from consumers	-184 734	-158 447	-182 390	-152 106	-140 844
Other transfers from consumers	-17 452	-24 076	-25 097	-23 774	-23 356
Transfers to consumers from taxpayers	21 703	26 185	26 618	25 562	26 376
Excess feed cost	11 779	2 522	4 685	2 182	699
Percentage CSE	-33	-26	-30	-25	-24
Consumer NPC	1.62	1.43	1.51	1.41	1.37

Total value of production (at farm gate)	**1986-88**	**1999-2001**	**1999**	**2000**	**2001**
Consumer NAC	1.5	1.36	1.43	1.34	1.31
Total Support Estimate (TSE)	302 078	329 564	356 629	321 104	310 959
Transfer from consumers	202 186	182 522	207 487	175 880	164 200
Transfer from taxpayers	117 345	171 117	174 239	168 998	170 115
Budget revenue	-17 452	-24 076	-25 097	-23 774	-23 356
Percentage TSE (expressed as a share of GDP)	2.3	1.3	1.4	1.3	1.3

Source: OECD, PSE/CSE database (2002)

Notes p: provisional.

MPS commodities: see notes to country tables.

MPS is net of producer levies and excess feed costs

TSE as a share of GDP for 1986-88 for the OECD excludes Czech Rep. Hungary, Poland and Slovak Republic, as GDP data is not available for this period.

NPC: Nominal Protection Coefficient.

NAC: Nominal Assistance Coefficient.

Appendix B. Average tariff rates for agricultural commodities by region

Commodity	**OECD**	**EU**	**N. Ameri**	**Asia pacif**	**Non-EU Western Europe**	**E. Europ**	**South America**
All commodities	45.6	30	25	34	104	49	39
Grains	78	53	25	60	100	47	46
Grain products	85	48	19	54	122	65	40
Feed	48	47	23	22	131	17	39
Starches	84	24	14	64	93	49	38
Oilseeds	46	0	18	33	90	14	37
Oilcake	31	3	13	22	81	9	40
Vegetable oils	39	13	17	24	95	34	39
Fats & oils	36	10	28	23	85	33	38
Live animals	82	30	21	30	233	65	34
Meat: fresh, or frozen other meat	82	70	10	27	206	69	38
Meat: fresh beef, pork or poultry	96	41	49	32	274	90	43
Meat: frozen beef, pork, or poultry	106	66	80	31	309	82	43
Meat: prepared	92	43	41	35	282	74	41
Skins & hides	4	0	6	20	22	45	37
Dairy	116	87	85	73	230	85	43
Eggs	74	22	60	28	189	49	38
Fruit: fresh	25	21	10	30	51	39	40
Fruit: frozen	18	20	17	30	34	39	40
Fruit: dried & fresh	11	4	15	26	21	14	41
Fruit: dried (raisins)	7	2	7	25	19	16	38
Fruit: preparations	19	21	12	28	48	49	39
Fruit juice	25	37	12	28	49	66	37
Vegetables: fresh	87	16	11	31	175	28	41
Vegetables: frozen	61	14	17	24	146	47	39

Commodity	OECD	EU	N. Ameri	Asia pacif	Non-EU Western Europe	E. Europ	South America
Vegetables: frozen or prepared (other)	52	18	13	38	103	23	40
Vegetables: dried & fresh roots & tubers	75	38	11	74	70	32	39
Vegetables: dried	47	2	11	54	47	22	36
Vegetables: preparations	47	21	12	28	123	47	38
Vegetable juice: tomato	21	16	25	32	26	88	39
Nuts	21	5	18	31	31	17	38
Nuts & fruit dried, fresh & prepared	22	16	11	30	49	37	38
Horticulture live	31	5	1	23	67	8	33
Horticulture: cut flowers & foliage	33	5	13	29	91	34	36
Sugar beet	104	349	12	22	144	49	38
Sugar cane	52	56	12	24	99	34	38
Sweeteners	64	59	50	38	82	73	39
Tobacco: unmanufactured	22	14	28	206	28	42	38
Tobacco: products	51	38	112	32	29	64	38
Fibre	8	0	12	21	23	40	37
Food preparations	53	15	30	33	105	48	36
Coffee	13	6	18	29	20	22	38
Coffee: other	29	10	19	32	37	25	38
Tea & tea extracts	30	2	14	41	23	19	38
Cocoa beans & products	41	17	28	25	84	61	36
Spices	10	2	8	24	26	14	38
Essential oils	9	3	14	22	23	24	31

Note: averages are computed using the commodity average for each country in a particular region.

Tariffs are bound MFN rates based in final URAA implementation

Countries in Data set and Regional Groupings.

OECD: *EU-15, Canada, USA, Japan, Iceland, Norway, Mexico, Poland, Switzerland, Norway, Czech Rep, Poland, Slovenia*

EU-15: *European Union*

North America: *Canada, Mexico and United States*

Asia-Pacific: *Australia, Brunei, Fiji, Hong Kong, Indonesia, Japan, Korea, Macau, Malaysia, Maldives, New Zealand, Papua New Guinea, Philippines, Singapore, Solomon Islands, Thailand*

South America: *Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Guyana, Paraguay, Peru, Suriname, Uruguay, and Venezuela*

Non-EU Western Europe: *Cyprus, Iceland, Malta, Norway, and Switzerland*

Eastern Europe: *Czech Republic, Hungary, Poland, Romania, Slovak Republic, and Slovenia*

Source: Gibson et al.,, (2001)

Appendix C. Tariff rates of selected export commodities of SADC in OECD countries.

Mozambique

Code	Description	OECD (1997)	OECD (2001)	USA (2001)	Canada (1997)	EU (1997)	DEV (2001)
1101	Wheat & Muslin floor	35	30	30		35	30
1001	Wheat & Muslin	2.5	2.5	2.5	2.5		2.5
1512	Sunflower seed, safflower or cotton seed oil	28.13	2.5	2.5			2.5
1103	Cereal groats, meal and pellets	7.5	7.5	7.5			7.5
1107	Malt whether or not roasted	2.5	2.5				2.5
1005	Maize (Corn)		5				
0402	Milk and Cream (concentrated and added)	22.5	22.5	30			22.5
1502	Fats of bovine animals, sheep or goats	7.5	2.5				2.5
0713	Dried leguminous vegetable	15.68	30		5		30
1901	Malt extract, food preparation of flour	3.89	2.5				2.5

Note: DEV refers all industrialized countries
Source: TRN (2002)

Zambia

Code	Description	OECD (1997)	DEV (1997)	EU (1997)	Japan (1997)
1006	Rice	5	5		5
0407	Birds eggs in shell, fresh preserved or cooked	10	10		
2208	Undenatured ethyl alcohol of an alcoholic strength	25	25	25	
2402	Cigars, cheroots cigarillos and cigarettes	25	25	25	
0105	Live Poultry	5	8.33	5	
1502	Fats of bovine animals, sheep, goat	5	5		
0402	Milk and Cream	13.64	15.21	12.5	
1209	Seeds, fruits and spores of a kind used for sowing	5	5		
1101	Wheat or Meslin flour	15	15		
0713	Dried leguminous vegetables	10	10		
2002	Tomatoes prepared or preserved	25	25		
2204	Wine of fresh grapes	25	25		

Source: TRN (2002)

Zimbabwe

Code	Description	OECD (1997)	OECD (2001)	DEV (2001)	USA (2001)
0402	Milk and cream	37	32.5	32.5	
1209	Seeds, fruits and spores of a kind used for sowing	5	5	5	5
2204	Wine of fresh grapes	38.49	44.77	44.77	
2309	Undenatured ethyl alcohol of an alcoholic strength	40	31.25	31.25	
0602	Other live plants (including their roots)	0	0	0	0
2208	Undenatured ethyl alcohol of an alcoholic strength	52.17	0	0	
1302	Vegetable saps and extracts; pectic substances	30	15	15	15
0511	Animal products	11.36	5	5	5
0712	Dried vegetables	40	40	40	40
1806	Chocolate and other food preparation	30.3	40	40	

Source: TRN (2002)

Tanzania

Code	Description	OECD (1997)	OECD (2000)	DVE (2000)	USA (2000)	EU (2000)	Canad. (2000)	Jap 2000
1001	Wheat & Muslin	30	12.5	12.5	12.5	12.5	12.5	
0713	Dried leguminous vegetables	22.5	12.5	12.5	12.5	12.5	12.5	12.5
1701	Cane or beet sugar and chemically pure sucrose	30	25	25		25	25	25
1006	Rice	24.74	16.18	16	10	25	10	15
1107	Malt whether or not roasted	30	10.00	10.00		10.00		
1005	Maize (corn)	20	20.83	19.44	25	25	25	
1103	Cereal groats, meal and pellets	30	25	25	25		25	
1502	Fats of bovine animals, sheep or goats	30	10	10				
2208	Undenatured ethyl alcohol of an alcoholic strength	18.29	25	25	25	25	25	
2401	Unmanufactured tobacco, tobacco refuse	40	5	5	5	5	5	
1516	Animal or vegetable fats and oils	25	25	25	25	25	25	
2203	Beer made from malt	13.33	25	25		25		

Source: TRN (2002)

South Africa

Cod.	Description	OECD (1997)	OECD (2001)	USA (2001)	Canad (2001)	Japan (2001)	EU (2001)	DVE (2001)
1001	Wheat & Muslin	0.00	0.00	0.00				0.00
2208	Undenatured ethyl alcohol of an alcoholic strength	25						
1006	Rice	0.00	0.00	0.00		0.00	0.00	0.00
2106	Food preparations	10.68	8.59	9.29	9.29	9.29	9.29	8.62
2309	Undenatured ethyl alcohol of an alcoholic strength	3.59	3.56	4	4	2.22	4	3.35
0207	Meat and edible offal	6.46	3.46	4.57	5.33		0.71	3.11
1003	Barley	0.00	0.00		0.00		0.00	0.00
1005	Maize (Corn)	0.00						
0204	Meat of sheep or goat	40.00	40.00	40.00			40.00	40.00
1107	Malt whether or not roasted	0.69	0.82	0.00	1.00		0.6	0.82
2202	Waters, including mineral and aerated water	25	25	25			25	25
0504	Guts, bladder and stomachs of animals	0.00	0.00	0.00	0.00		0.00	0.00
1302	Vegetable saps and extracts; pectic substances	7.36	8.11	6.92		0.00	6.82	8.27
1209	Seeds, fruits and spores of a kind used for sowing	0.00	0.00	0.00	0.00	0.00	0.00	

Source: TRN (2002)

Malawi

Code	Description	OECD (1997)	OECD (2001)	DEV (2001)	USA (2001)
0402	Milk and Cream	11.25	10	10	
1001	Wheat & Muslin	0.00	0.00	0.00	0.00
1101	Wheat or Muslin flour	10.00	0.00	0.00	
1901	Malt extract, food preparation of flour	25.00	25.00	25.00	25.00
2401	Unmanufactured tobacco	40.00	40.00*		
1005	Maize (Corn)	0.00	0.00	0.00	0.00
2106	Food preparations	45.00	25.00	25.00	
2204	Wine of fresh grape	20.00	25.00	25.00	
0207	Meat and edible offal		10.00	10.00	
1702	Sugar (chemically pure lactose)	20.00	10.00	10.00	
1302	Vegetable saps and extracts; pectic substance		0.00	0.00	
5202	Cotton waste (including yarn waste)	35.00	10.00*		
2102	Yeast		10.00*		

* = Data used for 1998

Source: TRN (2002)

Appendix D. Trade preferential of Sub Saharan countries to OECD countries

Product code	Product description			
		Applie	MHS	Margin*
01	Live animals	0	1	1
02	Meat and edible meat offal	4	10	7
03	Fish & crustacean, mollusc & other aquatic invert	1	8	6
04	Dairy prod; birds' eggs; natural honey; edible pr	5	14	9
05	Products of animal origin, nes or included.	0	0	0
06	Live tree & other plant; bulb, root; cut flowers	1	5	4
07	Edible vegetables and certain roots and tubers.	2	6	4
08	Edible fruit and nuts; peel of citrus fruit or me	4	14	9
09	Coffee, tea, matï and spices.	1	3	2
10	Cereals	2	5	3
11	Prod.mill.indust; malt; starches; inulin; wheat g	2	4	3
12	Oil seed, oleagi fruits; miscell grain, seed, fru	2	2	1
13	Lac; gums, resins & other vegetable saps & extrac	1	1	0
14	Vegetable plaiting materials; vegetable products	0	5	5
15	Animal/veg fats & oils & their cleavage products;	1	13	12
16	Prep of meat, fish or crustaceans, molluscs etc	2	6	4
17	Sugars and sugar confectionery.	2	5	3
18	Cocoa and cocoa preparations.	1	6	5
19	Prep.of cereal, flour, starch/milk; pastrycooks'	2	16	14
20	Prep of vegetable, fruit, nuts or other parts of	5	10	5
21	Miscellaneous edible preparations.	4	3	-1
22	Beverages, spirits and vinegar.	1	3	2
23	Residues & waste from the food indust; prepr ani	1	32	30
24	Tobacco and manufactured tobacco substitutes	10	3	-6
52	Cotton	3	8	5

**Approximation of digits*
Source: Wits Database

Appendix E. Average agricultural tariff and tariff quota rates of OECD (percent)

Country	Simple Average Bound Tariffs					
	OECD			US$A		
	In-quota	Over-quota	All Ag MFN tariffs	In-quota	Over-quota	All Ag. MFN tariffs
Australia	7	27	2.5	10	25	4
Canada	8	203	4.6	3	139	23
Chech Rep.	27	49	18.9	28	48	12
EU	8	45	19.5	17	78	30
Hungary	21	39	22.2	26	40	29
Iceland	51	223	48.4	49	181	113
Japan	20	274	11.7	22	422	58
Korea	21	366	62.2	106	248	66
Mexico	49	41	42.9	48	148	43
New Zealand	0	7	8.7	0	7	7
Norway	216	239	123.7	262	203	142
Poland	25	56	52.8	31	59	48
Switzerland	36	81	51.1	75	210	120
USA	10	29	9.0	10	52	12
OECD Average	36	120				
World				63	128	62

Sources: OECD (2001) and Gibson et al., (2001)
Notes: [(a)]Tariffs are bound MFN rates based on final URAA implementation.

Appendix F. In-quota and over-quota tariff rates of the world

In-quota tariff rates

Cha.	Description	EU	N. Ame	Asia	S. Ame	Non-EU W. Euro.	Eastern Europe
01	Live animal	14	1	18		105	21
02	Meat and edible meat offal	14	17	60	113	110	22
04	Dairy produce: birds eggs natural honey edible products of animal origin, nesoi	30	11	29	76	232	37
05	Products of animal origin, nesoi			7		0	15
06	Live trees and other plants; bulbs, roots and the like; cut flowers and ornamental foliage			8		38	28
07	Edible vegetables and certain roots and tubers	5	50	24	129	100	28
08	Edible fruits and nuts; peel of citrus fruit or melons	6		35	14	63	25
09	Coffee, tea, mate and spices		50	33			20
10	Cereals	16	25	12	58	572	15
11	Products of the milling industry; malt; starches; inulin; wheat gluten	46	3	16	65	174	34
12	Oil seeds and oleaginous fruits; miscellaneous grains seeds and fruits, industrial or medicinal plants; straw and fodder		10	19	86	197	17
13	Lac; gums, resins and other vegetable saps and extracts			20			45
14	Vegetable plaiting materials; vegetable products nesoi			23			
15	Animals or vegetables fats and oils and their cleavage products prepared edible fats; animal or vegetable wax		26		88	87	21
16	Preparations of meat, of fish or of crustaceans, nluuuscs or other aquatic invertebrates	28	3	27		71	34
17	Sugars and sugar confectionery	6	28	13	65	24	66
18	Cocoa and cocoa preparations		13	21		21	30

Cha.	Description	EU	N. Ame	Asia	S. Ame	Non-EU W. Euro.	Eastern Europe
19	Preparations of cereals, flour, starch or milk; bakers' wares		8	48	40	158	23
20	Preparations of vegetables, fruit, nuts or other parts of plants	28	3	23	137	357	30
21	Miscellaneous edible preparations		19	25	40	53	30
22	Beverages, spirits and vinegar		31	7		51	50
23	Residues and waste from the food industries; prepared animal feed	20	3	378	71	311	15
24	Tobacco and manufactured tobacco substitutes						78
29	Organic chemicals						15
33	Essential oils and resinoids; perfumery, cosmetic or toilet preparation						15
35	Albuminoidal substances; modified starches; glues; enzymes					6	30
38	Miscellaneous chemical products						22
41	Raw hides and skins (other than furskins) and leather						23
43	Furskins and artificial fur; manufactures thereof						
50	Silk						
51	Wool, fine or coarse animal hair; horsehair yarn and woven fabric						30
52	Cotton		2		90		
53	Other vegetable textile fibers; paper yarn and woven fabric of paper yarn						10

Source: Gibson et al., (2001).

Over-quota tariff rates

Cha	Description	EU	N. Ame	Asia Pac.	S. Ame	Non-EU W Euro	Eastern Europe
01	Live animals	75	210	32		416	46
02	Meat and edible meat offal	89	164	62	112	375	50
04	Dairy produce: birds eggs natural honey edible products of animal origin, nesoi	74	121	274	107	276	53
05	Products of animal origin, nesoi			22		88	19
06	Live trees and other plants; bulbs, roots and the like; cut flowers and ornamental foliage			18		217	35
07	Edible vegetables and certain roots and tubers	56	185	374	178	201	48
08	Edible fruits and nuts; peel of citrus fruit or melons	42		244	29	83	37
09	Coffee, tea, mate and spices		72	151	100		34
10	Cereals	72	80	321	105	127	47
11	Products of the milling industry; malt; starches; inulin; wheat gluten	55	15	433	124	153	55
12	Oil seeds and oleaginous fruits; miscellaneous grains seeds and fruits, industrial or medicinal plants; straw and fodder		148	485		170	35
13	Lac; gums, resins and other vegetable saps and extracts			754			86
14	Vegetable pliting materials; vegetable products nesoi				108		
15	Animals or vegetables fats and oils and their cleavage products prepared edible fats; animal or vegetable wax		160	178		97	35
16	Preparations of meat, of fish or of crustaceans, nluuuscs or other aquatic invertebrates	55	205		92	393	69
17	Sugars and sugar confectionerty	114	109	61		103	65
18	Cocoa and cocoa preparations		44		116	95	29

Cha	Description	EU	N. Ame	Asia Pac.	S. Ame	Non-EU W Euro	Eastern Europe
19	Preparations of cereals, flour, starch or milk; bakers' wares		44	208	137	233	33
20	Preparations of vegetables, fruit, nuts or other parts of plants	105	132	56	90	249	35
21	Miscellaneous edible preparations		70	292		135	42
22	Beverages, spirits and vinegar	1	117	87	106	191	57
23	Residues and waste from the food industries; prepared animal feed	31	99	49		205	31
24	Tobacco and manufactured tobacco substitutes			1037			83
33	Essential oils and resinoids; perfumery, cosmetic or toilet preparation						19
35	Albuminoidal substances; modified starches; glues; enzymes	24		307	132		37
38	Miscellaneous chemical products						27
41	Raw hides and skins (other than furskins) and leather						22
50	Silk			156			
51	Wool, fine or coarse animal hair; horsehair yarn and woven fabric						19
52	Cotton		15		99		
53	Other vegetable textile fibers; paper yarn and woven fabric of paper yarn						26

Notes: Countries in Data set and Regional Groupings are the same as appendix B
Source: Gibson et al., (2001)

Appendix G. Non tariff barriers faced by SADC exports

EU

	health	**Prior authorization**	**Non auto. Licen.**	**Agricultural levy**	**Tariff quota**	**Variable component**	**Retrospective surveillance**	**Seasonal tariff**	**Automatic license**	**Reference prices**	**Bilateral quotas**	**Quotas**	**Import monopoly**
01 Live anima.	x	x	x	x									
02 Meat and edible meat	x	x		x	x								
03 Fish and crustaceans		x				x	x		x				
04 Dairy Products	x	x	x	x	x								
05 Products of animal		x											
06 vegetable products		x				x	x						
07 Edible vegetables			x	x	x	x		x	x	x			
08 Edible fruits and nuts			x	x	x		x	x		x	x		
09coffee, tea and spices												x	
10 cereals			x		x					x			
11 Malt: starches & gluten					x								
12. Oilseeds, grains, etc			x	x		x	x						
13 Gum, resisins, etc													
14 vegetable plaiting material		x											
15. Animal vegetable fats oils		x		x			x						
16. Preparation of meat, fish	x	x	x	x	x								
17. Sugars				x									
18 Cocoa						x							
19. Preparation of cereal, starch						x							
20. Preparation of vegetables/ / fruits			x	x	x	x	x				x		
21. Miscellaneous edible preparation		x				x						x	
22. Beverages, spirit			x	x		x							x
23. Residues from food industries		x	x		x								
24. Tobacco					x								x

Source: Oyejide et al., (2000)

USA

	Countervailing duties	Tariff quotas	Antidumping duties.	Counterveiling p-under	Import monitoring	Embargo	Seasonal tariff:high	Non-commer. prohi	Quota: unallo	Special taxes	Seasonal tariff:low	Licence	Flexible import fee	Safeguard tar rates	Excise tax
01 Live anima.	x														
02 Meat and edible meat	x	x	x	x	x										
03 Fish and crustaceans	x		x	x		x									
04 Dairy Products	x	x		x			x	x							
05 Products of animal origin	x							x	x						
06 vegetable products	x	x	x												
07 Edible vegetables							x			x	x				
08 Edible fruits and nuts	x		x				x								
09coffee, tea and spices															
10 cereals	x														
11 Malt: starches & gluten										x					
12. Oilseeds, grains, etc	x	x													
13 Gum, resisins, etc															
14 vegetable plaiting material															
15. Animal vegetable fats and oils	x	x	x												
16. Preparation of meat, fish						x			x						
17. Sugars	x	x	x									x	x		
18 Cocoa		x													
19. Preparation of cereal, starch		x													
20. Preparation of vegetables/ / fruits	x	x	x							x				x	
21. Miscellaneous edible preparation	x	x	x											x	x
22. Beverages, spirit		x	x												x
23. Residues from food industries	x	x		x										x	
24. Tobacco															x

Source: Oyejide et al., (2000)

Japan

	Health Req	**Autho. (wild life)**	**Variable charges n.e.s**	**Labelling (health)**	**Inspection requi**	**Non automatic license**	**Global quota**	**Automatic licence**	**Tariff quota**	**Sole importing agency**	**Standard (human health)**	**Seasonal tariff**	**Technical measures n.e.s**	**Import monopoly**	**Quota (sensitive prosuct)**
01 Live anima.	x	x	x												
02 Meat and edible meat			x	x	x	x									
03 Fish and crustaceans	x	x	x	x	x	x	x	x							
04 Dairy Products	x	x		x		x			x	x					
05 Products of animal origin	x	x	x	x	x	x									
06 vegetable products	x														
07 Edible vegetables	x		x					x	x						
08 Edible fruits and nuts	x			x							x	x	x		
09coffee, tea and spices	x			x											
10 cereals	x			x			x		x					x	
11 Malt: starches &	x			x					x						
12. Oilseeds, grains, etc	x	x						x	x				x		
13 Gum, resisins, etc	x													x	x
14 vegetable plaiting material	x														
15. Animal vegetable fats	x	x				x							x		
16. Preparation of meat, fish	x	x	x			x									
17. Sugars	x								x						
18 Cocoa	x												x		
19. Preparation of cereal.	x						x		x						
20. Preparation of vegetables/ / fruits	x								x						
21. Miscellaneous edible preparation	x	x				x			x					x	
22. Beverages, spirit	x								x					x	
23. Residues from food industries	x	x	x			x									
24. Tobacco	x									x					

Source: Oyejide et al., (2000)