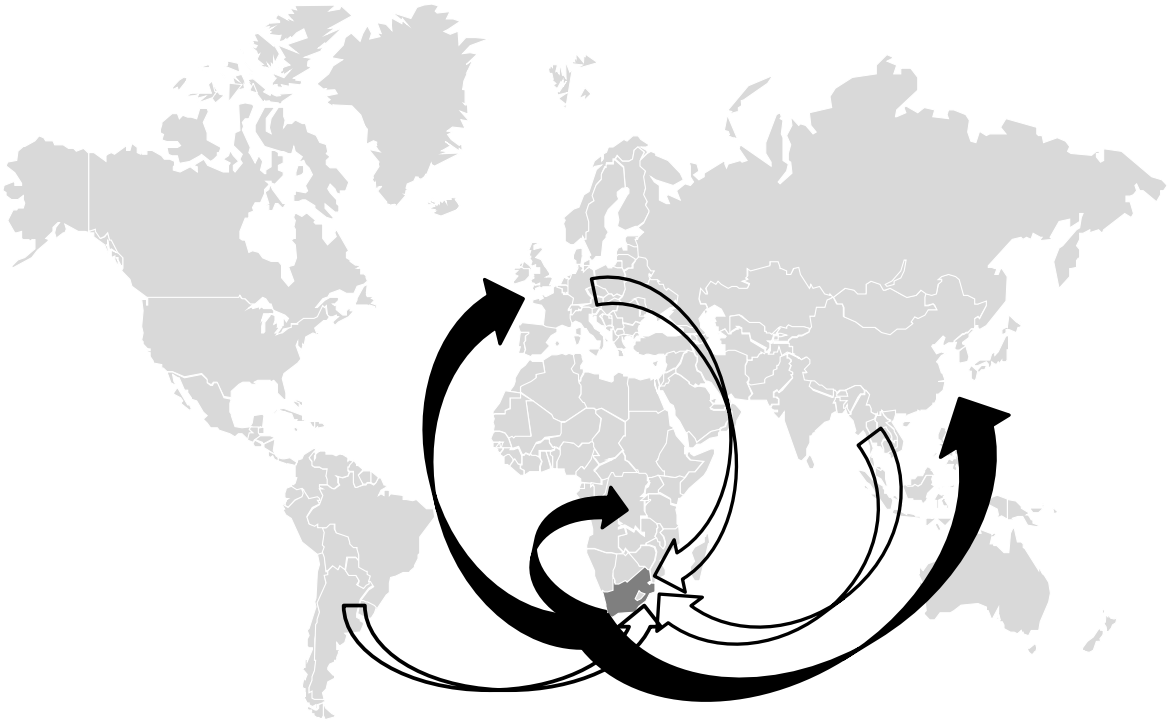
SOUTH AFRICA'S AGRICULTURAL TRADE COMPETITIVENESS

DESKTOP DIAGNOSTICS



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National Agricultural Marketing Council
Promoting market access for South African agriculture

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EXECUTIVE SUMMARY

In order to achieve the much needed structural economic growth of five percent and more, a vibrant agricultural sector is of the utmost importance. Although the contribution of primary agriculture to GDP is limited, adding food manufacturing as well as food retailing this contribution is much more significant. Furthermore, its forward economic linkages and labour absorption are important for socio-economic development.

South Africa's agricultural sector has found lucrative markets for their products in many parts of the world. Its contribution to South Africa's total exports is approximately 13 percent. However, the globalisation coupled with trade liberalisation of the last decades did not spur export-led growth or significant diversification of the country's agricultural export basket. Consequently, technological advances and market access are not sufficient to unlock the gains from trade that highlights the importance of indigenous supply-side constraints in trade development.

The ability to compete globally depends on ensuring adaptability and managing volatility in global agricultural markets. This concept of trade competitiveness depends on complementary policies to create an enabling environment for agricultural trade. To understand the micro-level elements of trade competiveness, there is a need for a comprehensive assessment of the current trade performance of South Africa's agricultural sector as well as the factors that shape its trade environment.

What matters for competitiveness is not only the capability to be productive, but also the adaptability to adjust to structural changes. This requires the redeployment of resources into higher-value activities supported by efficient product and factor markets. The understanding of a country's agricultural trade performance only provides a summary of a country's competitiveness in global markets. It is also necessary to understand the determinants of trade competitiveness. Therefore, a combination of quantitative and qualitative analyses of South Africa's agricultural trade competitiveness allows for the understanding of trade performance

and identification of the main factors that constrain it, resulting in the development of informed and targeted policy responses (such as the *Agricultural Trade Strategy* of the Department of Forestry and Fisheries) to improve the competitiveness of firms in the agro-food sector.

In order to achieve these targets, this report follows the analytical framework as laid out in the World Bank's *Trade Competitiveness Diagnostics Toolkit* compiled by Reis and Farole (2012). The focus of this report is on the quantitative analysis or *desktop diagnostics* as stipulated in the specific toolkit. The methodological framework of the toolkit consists of a trade outcome analysis and competitiveness diagnostics and is discussed in section 1. The first element analyses South Africa's agricultural trade performance with regard to the intensive margin, the extensive margin, the quality margin, and the sustainability margin and can be found in section 2 of this report. The second element of the agricultural trade competitiveness analysis evaluates South Africa's agricultural trade environment with respect to market access, supply-side factors and the trade promotion infrastructure. This analysis is discussed in section 3 and a summary of the results is provided in section 3.12.

Section 4 provides a policy brief on the implications of the outcomes of the two analytical elements of agricultural trade competitiveness that can be used for policy development. The key areas for intervention can be summed up as follows:

1. Agricultural trade performance:

i. Local production of re-exports/imports: support product development close to current core agricultural and agro-processing competences;
ii. Enhance the level of sophistication/complexity of processed food products: invest in R&D and innovation;
iii. Increase the market reach of agricultural export products: develop sizable markets in the proximity of existing agricultural export markets (piggybacking strategy); and
iv. Improve the survival rate of agricultural exports: initiate further research on 'export deaths'.

2. Agricultural trade environment:

i. Improve domestic trade logistics: address 'internal barriers to trade' in the agricultural export supply chain such as: domestic transport, time of port handling, pricing of liner shipping;

ii. Increase FDI in agriculture and enhance generic agricultural export promotion: establish a sector-specific investment and export promotion agency; establish an agricultural desk within TISA; include in the mandate of the NAMC; and

iii. Improve productivity and efficiency in the agricultural sector: increase investment in R&D, human capital, induced innovation and coordination by establishing Public Private Partnerships in R&D (e.g. Embrapa model of Brazil); establish a centre of excellence in agricultural engineering; develop a university degree in international agricultural trade; establish an Agricultural Wages Advisory Board to provide a bargaining baseline on productivity, profitability, welfare and wages in the sector.

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ABBREVIATIONS

ADEP	Aquaculture Development and Enhancement Programme
ARC	Agricultural Research Council
ARG	Argentina
AUS	Australia
BBBEE	Broad-Based Black Economic Empowerment
BLNS	Botswana, Lesotho, Namibia, Swaziland
BRA	Brazil
BRC	British Retailers Consortium
CFC	Customer Foreign Currency
CHL	Chile
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
DAFF	Department of Agriculture, Forestry and Fisheries
DBSA	Development Bank of Southern Africa
DEA	Department of Environmental Affairs
DoH	Department of Health
DRDLR	Department of Rural Development and Land Reform
DTI	Department of Trade and Industry
EM	Extensive margin
EPA	Export Promotion Agency
EU	European Union
EUR	Euro
Exp	Exports
EXPY	Export sophistication
FDI	Foreign Direct Investment
FRA	France
FTA	Free Trade Agreement

GAP	Good Agricultural Practices
GDP	Gross Domestic Product
HACCP	Hazard Analysis Critical Control Points
HII	Hirschman-Herfindahl Index
HS	Harmonised System
IAB	Investing Across Borders (World Bank publication)
IDC	Industrial Development Cooperation
IEMP	Index of Export Market Concentration
IM	Intensive margin
Imp	Imports
IND	India
IPA	Investment Promotion Agency
IPAP	Industrial Policy Action Plan
ISO	International Standards Organisation
KZN	KwaZulu-Natal
LPI	Logistical Performance Index
LSCI	Liner Shipping Connectivity Index
M&A	Mergers and Acquisition
MAI	Market Accessibility Index
MFN	Most Favoured Nation
MLRA	Marine Living Resources Act
MNE	Multi-National Enterprise
NAMC	National Agricultural Marketing Council
No.	Number
NTB	Non-Tariff Barrier
NTM	Non-Tariff Measures
OECD	Organisation of Economic Cooperation and Development
PIPA	Provincial Investment Promotion Agencies
PPECB	Perishable Products Export Control Board

PPP	Public Private Partnership
PPP	Purchasing Power Parity
PRODY	Product sophistication
PSE	Producer Support Estimate
R&D	Research and Development
RASFF	Rapid Alert System for Food and Feed
RCA	Revealed Comparative Advantage
RCI	Revealed Capital Index
REER	Real Effective Exchange Rate
RHCI	Revealed Human Capital Index
RLRI	Revealed Land Resources Index
RMA	Relative Import Advantage
RTA	Relative Trade Advantage
SA	South Africa
SITC	Standardised International Trade Classification
SQAM	Standardisation, Quality Assurance and Metrology
TFP	Total Factor Productivity
THA	Thailand
TII	Trade Intensity Index
TISA	Trade and Investment South Africa
TRQ	Tariff Rate Quotas
UNCTAD	United Nations Conference on Trade and Development
USA	United States of America
USD	US Dollar
VAT	Value Added Tax
WDI	World Development Indicators
WIPO	World Intellectual Property Organization
ZAF	South Africa
ZAR	South African Rand

1. INTRODUCTION

1.1 Background

South Africa's traditional agricultural export products, such as fruits and wine, have increasingly found their way into a manifold of global markets, thereby earning valuable foreign currency. However, leveraging agricultural trade for broad-based economic growth locally poses to be a challenge. Global trade reforms have not lead to significant export-led growth and diversification in South Africa's agricultural sector. Consequently, increased market access has proved to be not implicitly sufficient to ensure growth.

Apart from trade integration, complementary policies are required to ensure adaptability and manage volatility in global markets. This underpins the importance of trade competitiveness in the agricultural sector by addressing supply-side constraints to spur investments, private sector development, trade diversification and expansion. Tackling the multifaceted nature of competitiveness requires a deep understanding of the wide range of micro-economic factors that can contribute to it or constrain it. Since these factors are often highly endogenous and interrelated, a comprehensive approach is needed to understand the determinants of competitiveness.

1.2 Aim of the study

The ultimate aim of international trade for policy-makers is sustainable, broad-based economic growth. Since the agricultural sector is regarded as an important potential alleviator of rural poverty, the central question here is how a country can translate international agricultural trade into poverty reduction, since not all agricultural sub-sectors have equal potential to contribute to spill-overs and economic growth. Understanding its trade competitiveness is a crucial part in answering this question.

What matters for competitiveness is not only the capability to be productive, but also the adaptability to adjust to structural changes. This requires the redeployment of resources into higher-value activities supported by efficient product and factor markets. The understanding of a country's agricultural trade performance only provides a summary of a country's competitiveness in global markets. It is also necessary to understand the determinants of trade competitiveness. Therefore, a combination of quantitative and qualitative analyses of South Africa's agricultural trade competitiveness allows for the understanding of trade performance and the identification of the main factors that constrain it, resulting in the development of informed and targeted policy responses to improve the competitiveness of firms in the agri-food sector.

1.3 Approach and outcomes

In order to assess the agricultural sector's trade competitiveness, the proposed analytical framework undertakes a systematic assessment of a country's position, performance, and capabilities in export markets by applying various tools as described in the *World Bank's Trade Competitiveness Diagnostic Toolkit*. A schematic overview of the comprehensive research framework that links explanatory factors to observed trade performance is shown in Figure 1.1.

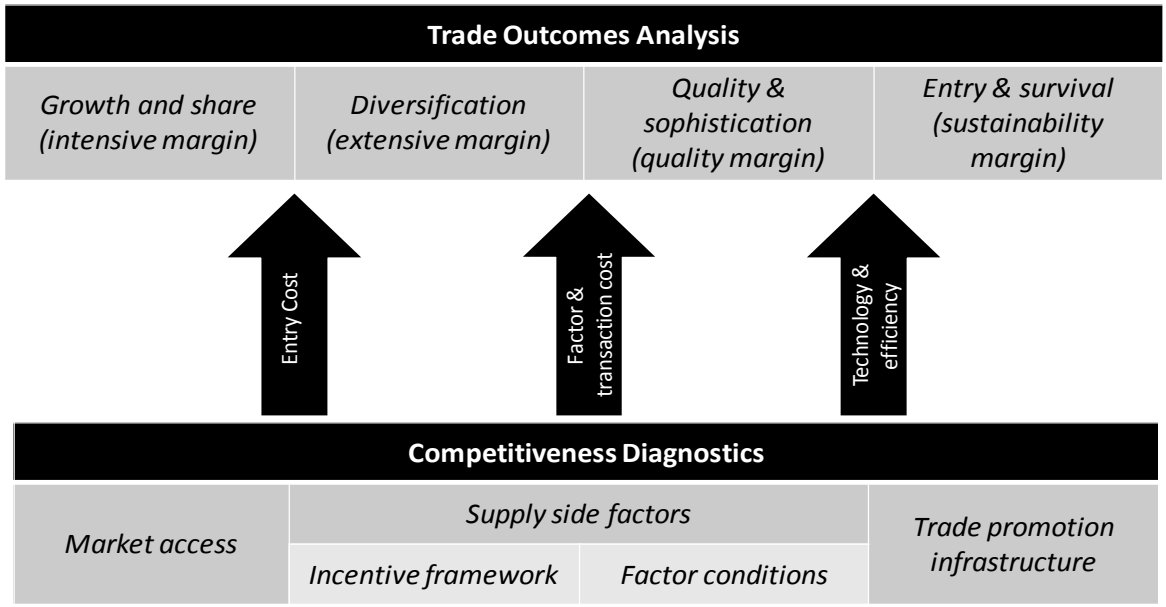


Figure 1.1: Methodological framework of the trade competitiveness analysis
Source: Adapted from Reis and Farole (2012)

The three main components of the trade competitiveness include:

1. The *Trade Outcomes Analysis* is an assessment of historic trade performance as a framework to analyse current trade competitiveness and has the following outcomes:
   i. Level, growth and market share of existing exports (intensive margin)
   ii. Diversification of products and markets (extensive margin)
   iii. Quality and sophistication of exports (quality margin)
   iv. Entry and survival of new exporters (sustainability margin)

2. The *Competitiveness Diagnostics* provides a framework for analysing the determinants of South Africa's trade competitiveness and has the following outcomes:
   i. Market access: assessment of the external trade policy environment on the basis of their facilitating or constraining impacts;
   ii. Supply-side factors: assessment of governance, macro-fiscal, trade, and domestic policies that provide the incentive framework faced by the private sector as well as the factor inputs at the farm gate;

iii. Trade promotion and facilitation infrastructure: assessment of government interventions to address market and government failures that restrict export participation and performance; and

iv. Assessment of how these three components interact with trade performance via fixed costs (risk), factor and transaction cost, and technology and efficiency.

3. In the final stage, a *Policy Brief* discussing various policy options for enhancing South Africa's trade competitiveness will be developed around the following topics: market access, trade, investment, economic, financial, labour, infrastructure, and transport.

2. TRADE OUTCOME ANALYSIS

2.1 Introduction

In this section, a variety of qualitative indicators and tools will be used to assess South Africa's historical agricultural trade performance, following the methodology as set out in the Trade Competitiveness Diagnostics Toolkit by Reis and Farole (2012). Four different dimensions of trade performance will be analysed, namely growth and share (i.e. intensive margin), diversification (i.e. extensive margin), the sustainability, and the complexity. Understanding South Africa's relative performance in these dimensions will identify its strengths, weaknesses and challenges, and provides a summary of its competitiveness within a global context. Although the predominant focus of the analysis will be on exports, imports will also be included in the analysis where possible.

Since some of the indicators will focus on country-specific analyses and others on positioning South Africa in the global landscape for other indicators, the following eight peer countries were selected:

- Brazil (BRA),
- Argentina (ARG),
- Chile (CHL),
- Australia (AUS),
- India (IND),
- Thailand (THA),
- The United States of America (USA), and
- France (FRA).

The purpose of selecting only a few peer countries is to set South Africa's trade performance within context and not to conduct a comprehensive global ranking exercise. The selection of these peer countries specifically is based on their relative significance in global agricultural

production and trade, their similarities in agricultural production (Chile, Argentina, Brazil, Australia), similarities in development (e.g. Brazil, India, Thailand, Chile) their location (e.g. Southern Hemisphere: Australia, Chile, Argentina, Brazil), their analogous classification as middle-income country (e.g. Brazil, Thailand, Chile, Argentina), their competition in agricultural markets (e.g. Chile, Brazil, Australia), their involvement in the Green Revolution (e.g. India, Thailand) and their difference in the stage of economic development (e.g. France, USA, Australia) with South Africa. Furthermore, on a global scale, all these countries are relatively large agricultural producers.

The data used in the trade performance analysis will comprise international trade statistics, classified according to the Harmonised System (HS) nomenclature of 2002 (i.e. HS02) for the medium-term analysis and the less detailed Standard International Trade Classification (SITC), Revision 2 nomenclature of 1976 for the few instances where long-term analysis is required. Furthermore, for a meaningful in-depth product-level investigation, the analyses will be conducted at the six-digit levels (i.e. products) of the HS classification. However, for ease of interpretation, the product-level dataset of the agricultural sector is disaggregated into the following five product clusters:

i. Primary agricultural production (including fisheries): 72 product groups, 221 products
ii. Agro-processing of food: 138 product groups, 522 products
iii. Agro-processing of non-food: 105 product groups, 413 products
iv. Forestry: 58 product groups, 222 products
v. Agricultural inputs: 18 product groups, 78 products

Apart from cluster *iv*, the clusters loosely represent the different stages of the agro-food value chain. A complete overview of the classification of the total of 391 agricultural product groups and 1 456 agricultural products is available from the authors.

2.2 Growth and share

South Africa is the 32nd largest global producer of agricultural products. In terms of total agricultural exports, South Africa only ranks 46th globally and compares well with countries such as Norway, Finland, Romania and Pakistan. Compared to the selected peer countries (see section 1.3), South Africa's agricultural exports are relatively small; Chile's agricultural exports are twice as large and the USA's agricultural exports are 18 times larger. Against this background, this section will assess the level, growth, and market share performance of South Africa's existing agricultural trade; the so-called *intensive margin*.

2.2.1 Trade openness

The trade to GDP ratio is one of the most basic indicators of openness to foreign trade. The ratio weighs the combined importance of exports and imports of an economy. Figure 2.1 shows a bubble graph of the average trade to GDP ratios from 2009 to 2011 for South Africa (ZAF) and its selected peers. The ratio is plotted against the share of agriculture in the total exports of each selected country for that same period. The size of the bubbles indicates the relative level of income (i.e. per capita GDP, PPP) for each country. The figure clearly shows that trade is relatively important for the South African economy. With a trade to GDP ratio of 42 percent, its openness is similar to that of France. Consequently, the country is well integrated in the global economy. However, the share of agriculture in South Africa's total exports (13 percent) is comparatively low.

More developed economies tend to have a smaller proportion of agricultural products in their export basket; see for instance the USA, Australia and France. However, some emerging economies such as South Africa, India and Thailand also have a relative low share of agriculture in their total exports, where as Argentina and Chile have a relative high proportion of agriculture in their exports. Therefore, a relative large dependence on agricultural exports is not in all instances associated with low levels of development.

Large countries, in terms of geography and population, tend to have a lower trade to GDP ratio than smaller countries as they can produce and sell a larger share of their products within their borders. Note the positions of the USA, India, and Australia in Figure 2.1. The figure furthermore shows that the level of income is not the only determinant of a country's openness. Based on their similar level of income, South Africa could either be less open, like Brazil, or have a far higher openness to foreign trade, like Thailand. Structural characteristics such as population, location (i.e. landlocked), remoteness, and cost of trading all play an important role in the (potential) dependence on foreign trade as well. However, taking these characteristics into consideration, the analysis shows that larger countries tend to trade less than smaller countries, relative to the size of their economy (Reis & Farole, 2012).

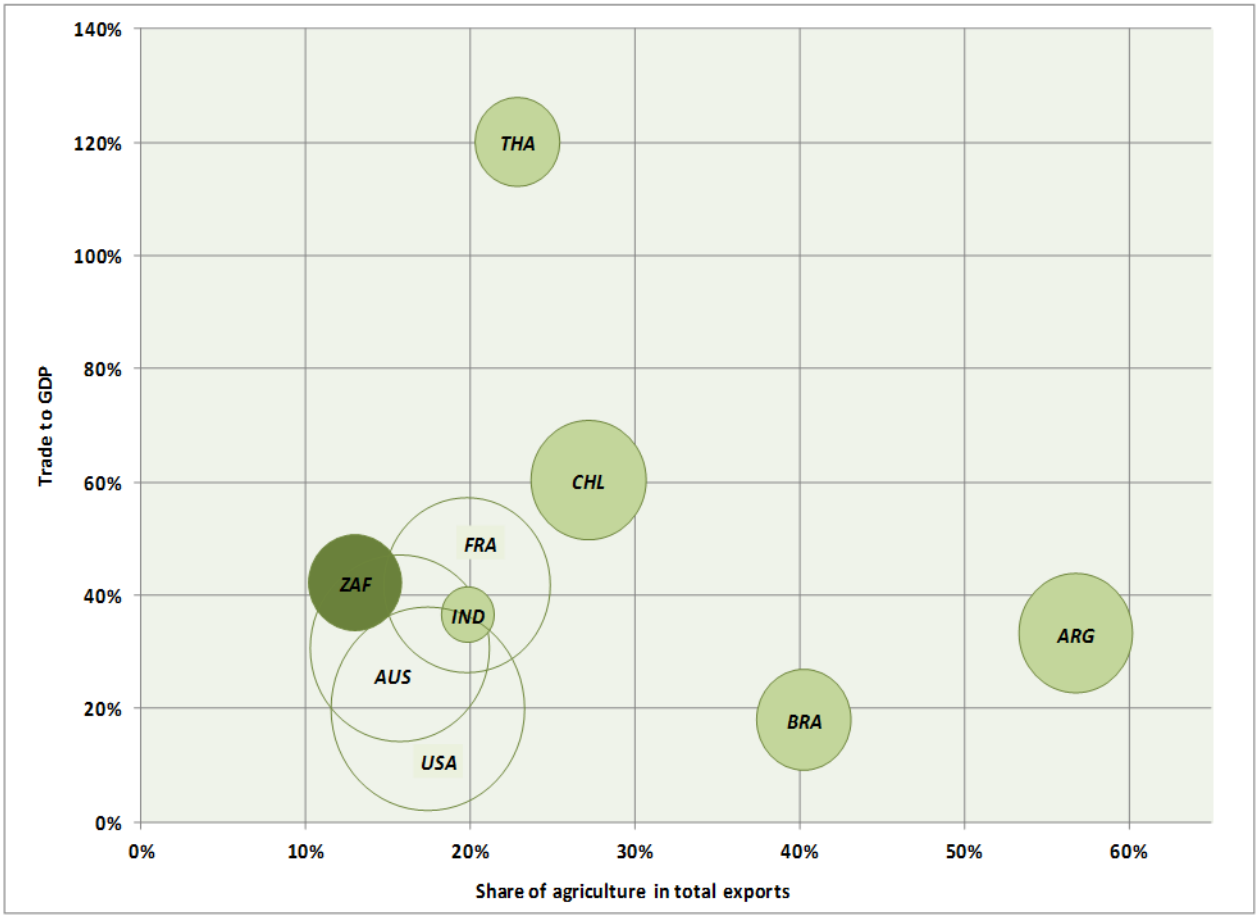
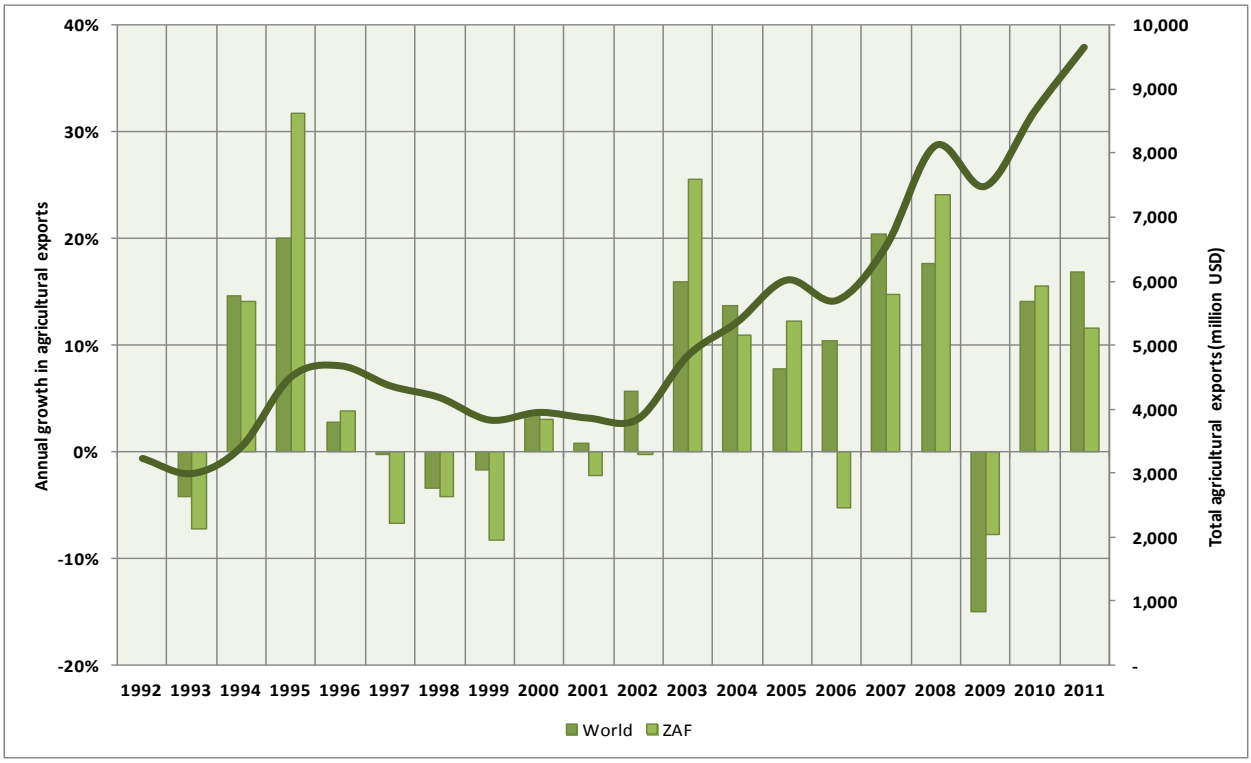


Figure 2.1: Trade openness, income and agricultural exports (2009-2011)

Source: Own calculations based on data from IMF (2013) and UN Comtrade (2013)

2.2.2 Trends in trade growth

Another indicator of South Africa's agricultural trade orientation is to assess the broad long-term trend in total agricultural exports. This trend will indicate whether growth is sustained and kept its pace with the global trend. The graph line in Figure 2.2 shows South Africa's trend in total agricultural exports and the columns indicate the annual growth of both South Africa and world's exports of agricultural products in the period 1992 to 2011[1]. It is evident from the figure that the country's agricultural exports showed stagnating growth until 2002 (averaging two percent annually) and an impressive growth from 2002 to 2011 (averaging 11 percent annually). South Africa's total agricultural exports increased from 3.2 billion USD in 1992 to 9.6 billion USD in 2011. Furthermore, South Africa's annual growth trend for the last 20 years corresponds very well with the global trend. This implies that the country is relatively well integrated with the global agricultural markets.



Note: total agricultural exports are plotted on the secondary vertical axis

Figure 2.2: South Africa's agricultural export growth (1992-2011)

Source: Own calculations based on data from UN Comtrade (2013)

[1] The SITC Rev. 2 classification was used for the calculation of the long-term trend in agricultural exports

2.2.3 Composition of agricultural trade

In order to assess South Africa's composition of agricultural trade, the five broad product clusters (i.e. primary agriculture, agro-processing: food, agro-processing: non-food, forestry, agricultural inputs) are used and compared with the trade composition of the selected peer countries. The shares of these clusters will provide valuable insights into the factor intensity and the structure of the respective agricultural sectors. Figure 2.3 shows the composition of agricultural exports for the period from 2009 to 2011. It is evident from the figure that, with a share of 36 percent, South Africa has the second largest proportion of primary products in its agricultural export basket. Its proportion is also significantly higher than the share of primary agricultural products in global agricultural trade. Furthermore, its share of processed products (i.e. food and non-food) in total agricultural exports of 37 percent is second lowest after the USA. This share is also significantly lower than the share of processed agricultural products in global agricultural trade (54 percent). South Africa's relatively strong focus on land-intensive agricultural activities is representative of that of most developing countries in Africa. Consequently, it seems that there exists some potential for expanding agro-processing activities in South Africa in order to capture more value of these supply chains and stimulate agricultural based manufacturing. However, Chapter 5 will elaborate further on this issue.

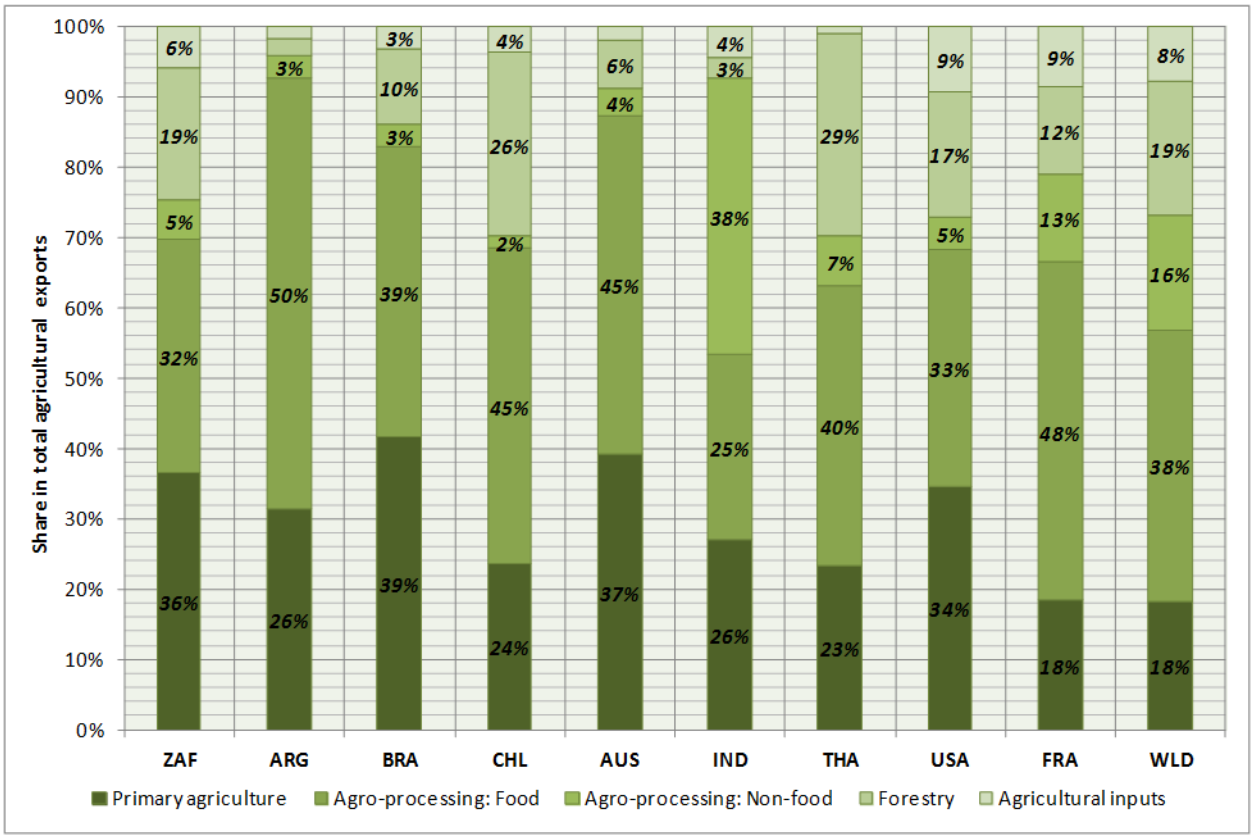


Figure 2.3: Agricultural export composition in broad product clusters (2009-2011)
Source: Own calculations based on data from UN Comtrade (2013)

The figure also shows that South Africa's proportion of processed non-food products in agricultural exports is on par with most of its peers. Only India and Thailand have a significantly higher proportion of these products in their export basket; mainly due to their well-developed textile industries. The share of forestry in agricultural exports of 19 percent is only higher in Thailand and Chile. Therefore, this reveals the relatively well-developed wood and paper industry of South Africa. The country's share of agricultural inputs of six percent in total agricultural exports is the largest among the developing peer countries.

Besides agricultural exports, the relative dependence on agricultural imports provides a more balanced view of a country's agricultural trade composition. Therefore, Figure 2.4 shows the agricultural exports-to-import ratio for each of the selected peer countries per product cluster. A ratio of more than one indicates a positive trade balance and a ratio of between zero and one

indicates a negative balance of trade for the respective product cluster. Furthermore, the higher the ratio, the less dependent the country is on agricultural imports.

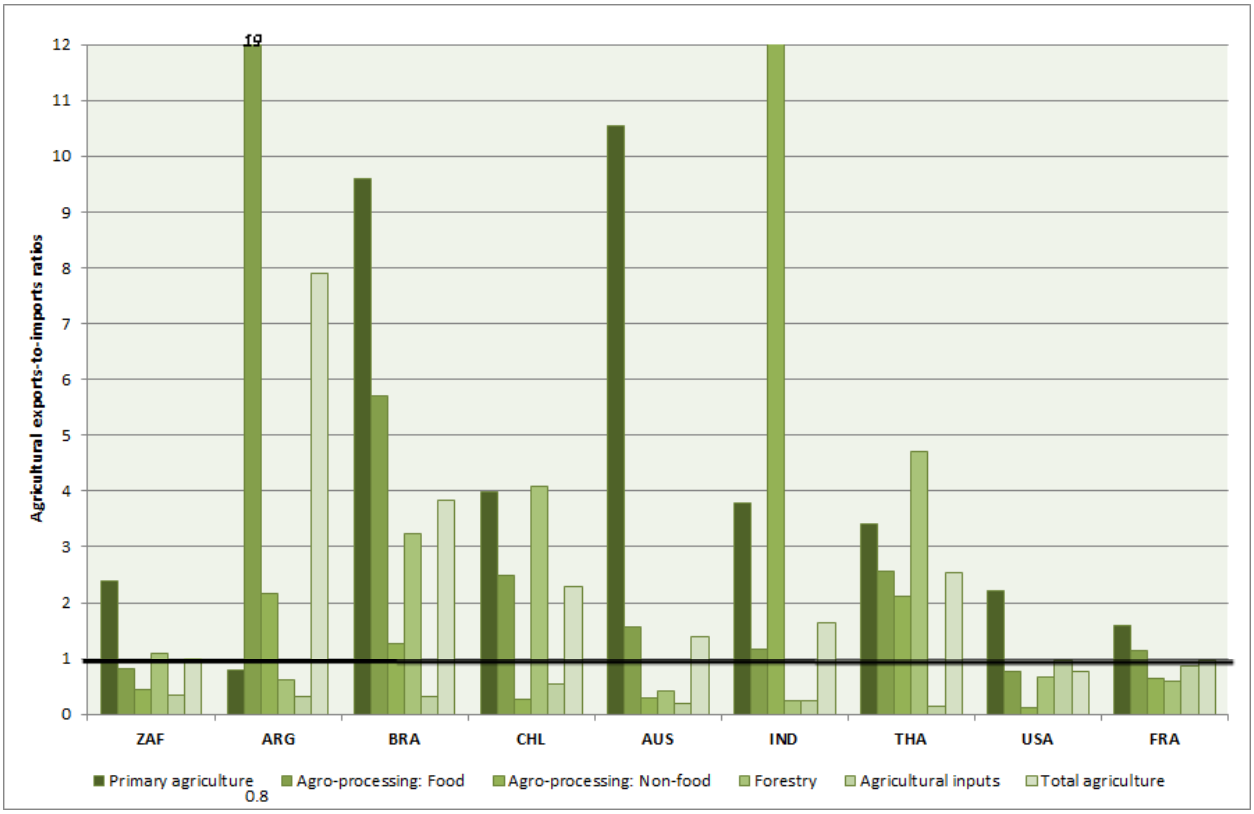


Figure 2.4: Agricultural exports-to-imports ratios per product cluster (2009-2011)
Source: Own calculations based on data from UN Comtrade (2013)

South Africa's agricultural exports-to-imports ratio of 2.4 (see Figure 2.4) for primary agricultural products indicates that exports of these products are 2.4 times larger than imports. Consequently, South Africa has a positive balance of trade for these products. Combined with the trade deficit for processed food products, South Africa is still a net food exporter. Furthermore, the country has a trade surplus for forestry products. Its trade deficit for agricultural inputs is not that problematic for a developing middle-income country like South Africa, as these are vital for investment, technological development and long-term growth of the sector.

However, its overall exports-to-imports ratio for agricultural products is just slightly below one. Compared to the middle- and low-income peer countries, South Africa's balances of trade for the different agricultural product clusters are significantly less favourable, although they compare well with those of the developed peer countries such as France and the USA. Overall, South Africa's agricultural trade has a relatively large component of imports, especially of processed products, which can prevent the development of domestic production capacities; this subsequently puts pressure on internal wealth creation and may ultimately lead to a 'debt trap'.

A detailed overview of changes in South Africa's agricultural trade composition is provided in Table 2.1. Column 1 shows the five different product clusters as well as the three main export products per cluster (based on 2011 trade). In Table 3.5, column 2 and 3 state South Africa's total value of exports for each cluster and product across 2002 to 2011. These columns further show the share in total agricultural exports per cluster or product for the two time periods as well as the relative specialisation in exports and imports per cluster. The index for the relative specialisation in exports was calculated using the Revealed Competitive Advantage (i.e. RCA)[2] and the specialisation in imports was calculated using the Revealed Comparative Import Advantage index (i.e. RMA)[3]. A value of more than one reveals a relative specialisation. Therefore, an RCA > 1 for exports reveals a relatively comparative export advantage within the global context, which is favourable for South Africa's agricultural trade performance. However, an RMA > 1 for imports reveals a comparative import advantage within the global context, which may be adverse for its performance. Column 4 depicts the trend in total exports as well as cluster-level trade specialisation for the period from 2002 to 2011.

[2] $RCA_{ij} = \left(X_{ij}/\sum_{t,t\neq j} X_{it}\right)/\left(\sum_{n,n\neq i} X_{nj}/\sum_{n,n\neq i}\sum_{t,t\neq j} X_{nt}\right)$ Where *X* represents exports, *i* is a country, *j* is a product, *t* is a year, and *n* represents all countries.
See: Liesner (1958) and Balassa (1965). (sometimes also referred to as the RXA index)

[3] $RMA_{ij} = \left[\left(M_{ij}/\sum_{t,t\neq j} M_{it}\right)/\left(\sum_{n,n\neq i} M_{nj}/\sum_{n,n\neq i}\sum_{t,t\neq j} M_{nt}\right)\right]$

Table 2.1: Changes in the composition of South Africa's agricultural trade (2002-2011)

Exports (1)	2002 (2)				2011 (3)				2002-2011 (4)			Product competitive-ness 2009-2011 (5)
Cluster: main export products	Total exports (1000 USD)	Share in agric exp	Cluster specialisation		Total exports (1000 USD)	Share in agric exp	Cluster specialisation		Average annual exp growth	Change in cluster specialisation		
			Exp	Imp			Exp	Imp		Exp	Imp	
Primary Agriculture	**1,269,869**	**28%**	**2.31**	**0.99**	**3,971,928**	**37%**	**1.51**	**0.70**	**24%**	**-35%**	**-29%**	
Maize	*82,437.87*	*2%*			*744,911*	*7%*			*89%*			*3.51*
Oranges	*131,292.33*	*3%*			*588,858*	*6%*			*39%*			*21.95*
Table grapes	*127,393.03*	*3%*			*427,233*	*4%*			*26%*			*12.14*
Agro-processing: Food	**1,426,547**	**31%**	**1.12**	**0.67**	**3,389,964**	**32%**	**0.62**	**0.82**	**15%**	**-45%**	**22%**	
Wine, containers < 2 l	*252,741*	*6%*			*498,436*	*5%*			*11%*			*4.48*
Wine, containers > 2 l	*29,066*	*1%*			*221,243*	*2%*			*73%*			*11.83*
*Food preparations nes**	*30,788*	*1%*			*149,992*	*1%*			*43%*			*-0.08*
Agro-processing: Non-food	**78,166**	**10%**	**0.66**	**0.41**	**98,834**	**6%**	**0.26**	**0.61**	**3%**	**-61%**	**49%**	
Cigarettes	*49,561*	*1%*			*96,036*	*1%*			*10%*			*0.68*
Smoking tobacco	*5,117*	*0.1%*			*59,100*	*1%*			*117%*			*5.19*
Leather of ostriches / game animals	*25,258*	*1%*			*59,071*	*1%*			*15%*			*28.00*
Forestry (wood and paper)	**1,080,113**	**24%**	**1.22**	**0.66**	**2,045,440**	**19%**	**0.76**	**0.70**	**10%**	**-38%**	**6%**	
Chemical wood pulp	*196,929*	*4%*			*586,464*	*6%*			*22%*			*36.67*
Wood chips, non-conif.	*185,637*	*4%*			*214,766*	*2%*			*2%*			*18.83*
Kraftliner in rolls	*12,507*	*0.3%*			*173,289*	*2%*			*143%*			*20.58*
Agricultural inputs	**311,576**	**7%**	**1.22**	**2.03**	**616,215**	**6%**	**0.50**	**1.71**	**11%**	**-59%**	**-16%**	
Biocides	*3,432*	*0.1%*			*77,657*	*1%*			*240%*			*1.99*
Herbicides	*59,771*	*1%*			*74,005*	*1%*			*3%*			*-0.67*
Chemical fertiliser (3 el)	*48,283*	*1%*			*64,615*	*1%*			*4%*			*3.04*
TOTAL AGRICULTURE	**4,566,271**		**1.24**	**0.76**	**10,622,382**		**0.74**	**0.82**	**15%**	**-40%**	**8%**	

Note: *Food preparations nowhere else specified (nes) includes food additives such as: syrups, sweetening substances, compound alcoholic substances etc.

Source: Own calculations based on data from UN Comtrade (2013)

The RCA index is often used as an indicator for relative export advantage or competitiveness, but it only accounts for exports. Therefore, the Revealed Trade Advantage (i.e. RTA)[4] index accounts for exports and imports simultaneously and was used as an indicator of product-level competitiveness in column 5. An RTA > 0 reveals a positive comparative trade advantage or trade competitiveness and an RTA > 1 reveals relative export competitiveness accounting for imports. Since agriculture is prone to natural shocks, the index was calculated as an average of the period 2009 to 2011.

Table 2.1 reveals that, apart from primary agricultural products, South Africa's agricultural export specialisation has declined below the threshold of 1 for three of the product clusters since 2002 (see column 3), namely processed food products, forestry products and agricultural inputs. Therefore, South Africa has lost significant ground in its agricultural export competitiveness, especially for inputs and processed food products. The export specialisation for processed non-food products remained negative throughout the entire period from 2002 to 2011. In terms of agricultural import specialisation, the shifts were less significant; apart from agricultural inputs, all product clusters remained below the threshold of 1 – not surprising, given South Africa's relatively small local and regional markets (i.e. re-exports). However, South Africa's growing import specialisation in processed food and non-food products is cumbersome for its own economic development.

At the product level, Table 2.1 reveals that some products showed some significant growth in exports since 2002. This growth corresponds well with the increases in the respective share in agricultural exports, especially for: maize, wine: containers > 2 litres, Kraft liner, smoking tobacco, and biocides. Column 5 reveals that the trade competitiveness is positive for most of the key primary and processed export products. However, no trade competitiveness was revealed for food preparations n.e.s. and herbicides, indicating a relatively strong dependency on imports. Therefore, the exports of these products are mainly made up of re-exports.

[4] $RTA_{ij} = RCA_{ij} - RMA_{ij}$
See: Vollrath (1991)

2.2.4 Market shares of agricultural trade

The degree to which a country is integrated in global agricultural markets is a good indicator of its ability to produce agricultural products that can sustain foreign competition. Therefore, Figure 2.5 depicts the respective shares in global agricultural trade in the years 1983, 1995 and 2011, for South Africa and the eight peer countries. The figure confirms that South Africa is a relatively small exporter of agricultural products. The country's small share declined by 0.34 percent from 0.87 percent in 1983 to 0.53 percent in 2011. All of the developing peer countries recorded small increases in their respective shares in global agricultural trade, whereas the three developed countries all recorded a decline. However, South Africa's decrease in global market share was significantly smaller than its developed counterparts, such as the USA and France.

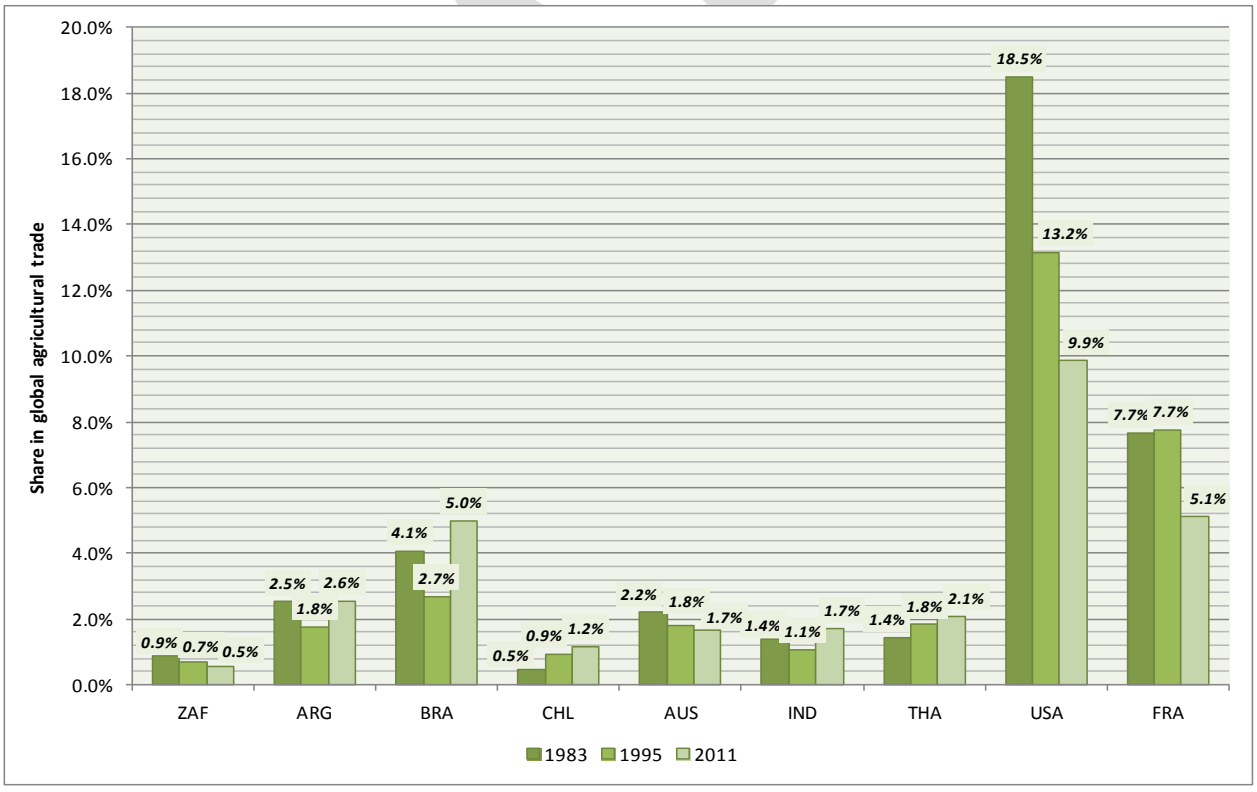


Figure 2.5: Shares in global agricultural trade (1983, 1995, 2011)

Source: Own calculations based on data from UN Comtrade (2013)

Measuring the market shares at product-level provides a further measure of integration in global agricultural markets. Figure 2.6 (A-E) shows the market shares and sizes at product level according to the five agricultural clusters. South Africa's (ZAF) global market share per product is plotted against the respective global market size. This exercise will reveal whether South Africa is exporting those agricultural products that have relatively large global markets. Since log values were used, the values closer to 0 indicate a higher relative market share or size. The results of this exercise often correlate with the outcomes of the RTA analysis, since most products with large market shares will also have a relatively high RTA index. However, a high RTA is not a sufficient precondition for exporting to larger markets.

The graphs in Figure 2.6 are divided into four quadrants by two bold lines. The horizontal bold line depicts the average global market size and the vertical bold line depicts South Africa's average share in global exports. The products located in the upper-right quadrant have a more than average global market size and South Africa has a disproportionately high market share in these products.

Approximately 27 percent (i.e. 54 products) of South Africa's primary agricultural exports have a relatively high market share in products with a relatively large global market (see Figure 2.6 A). The most important products and their respective market shares include: oranges (12%), grapefruit (10%), plums (8%), greasy wool; not carded/combed (8%), pears (6%), tree nuts n.e.s. (6%), fresh grapes (6%), and lemons (5%). The figure also shows that South Africa has a relatively small share for some of the primary agricultural products with relatively large global markets (i.e. upper-left quadrant). These include: wheat, durum wheat, bananas, cocoa beans, rape seed, tomatoes, live bovine animals, barley, fresh peppers, and almonds. Obviously, some of these products cannot be competitively produced under South African conditions.

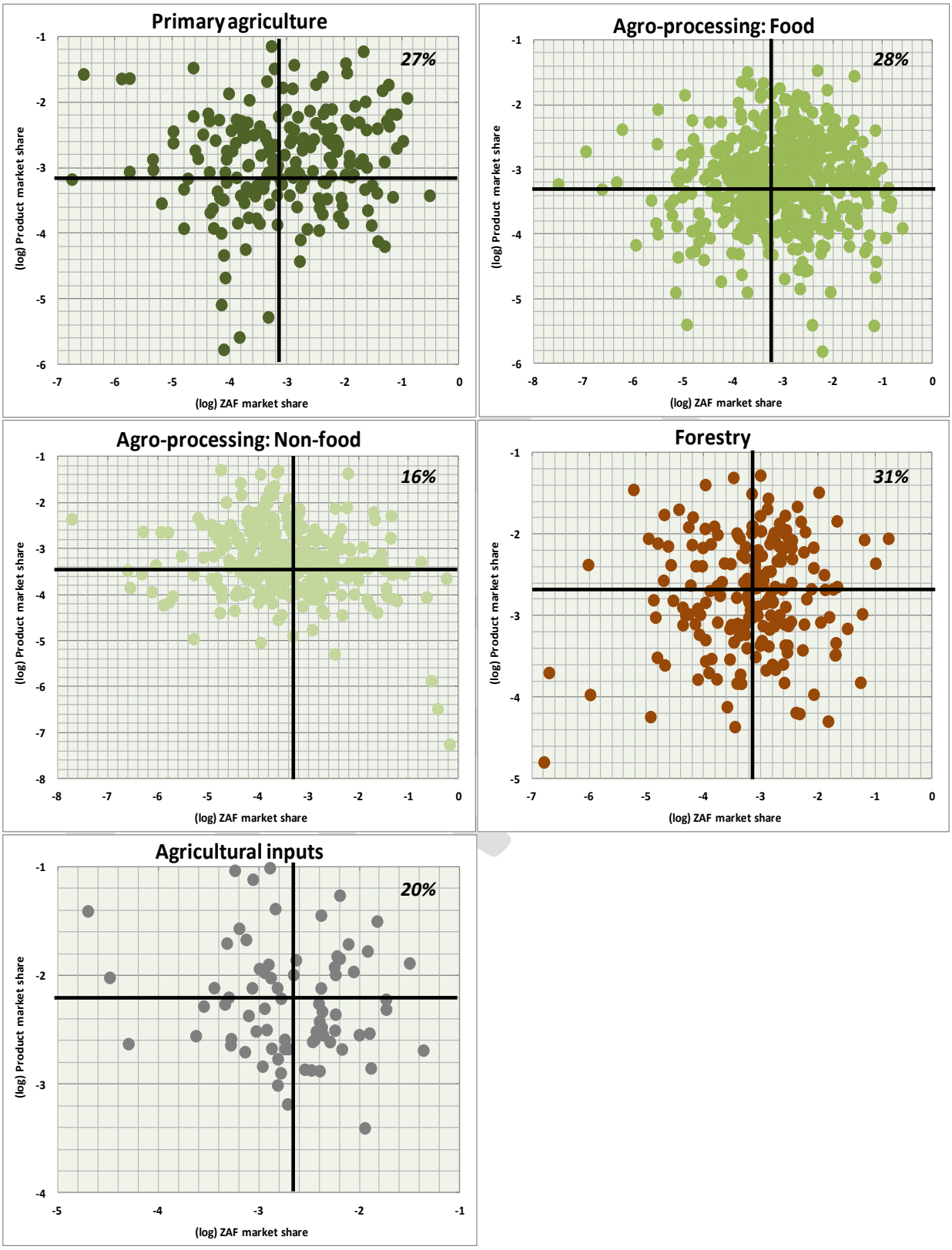


Figure 2.6 (A-E): Global market shares for SA's agricultural products (2009 – 2011)

Source: Own calculations based on data from UN Comtrade (2013)

A considerable 28 percent (i.e. 139 products) of South Africa's processed food exports have relatively high market shares for products with a large global market size (see Figure 2.6 B). The most important of these products and their respective market shares include: preserved peaches (9%), wine, containers > 2l (7%), meat offal n.e.s. (7%), frozen rock lobster (5%), fermented beverages (5%), preserved fruit mixtures (4%), sunflower oil (4%), and grape juice (4%). A substantial proportion of South Africa's top processed food exports can be classified as niche products (i.e. lower-right quadrant), as those products have a relatively small global market.

Only 16 percent (i.e. 51 products) of South Africa's exports of processed non-food exports have a relatively large presence in the respective larger-sized global product markets (see Figure 2.6 C). This is the smallest proportion of all the five product clusters. The most important of these products and their respective market shares include: cigarettes (5%), raw sheep skins (4%), essential oils of lemon (3%), and hides of bovine animals (2%). The figure furthermore shows that South Africa has little presence in the relatively larger global processed non-food markets, which mainly consist of textile products.

Of South Africa's forestry products, approximately 31 percent (i.e. 62 products) have a relatively high share in the larger global markets for those products (see Figure 2.6 D). This is the largest proportion of all five product clusters. The best performing products in the upper-right quadrant and their respective market shares include: chemical wood pulp, dissolving grades (17%), Kraft liner (10%), wood chips (6%), chemical wood pulp, sulphite (2%), and paper and paperboard, not containing fibres (2%).

South Africa's exports of agricultural inputs have the second smallest share of products in the upper-right quadrant, i.e. twenty percent (i.e. 15 products). The products with a relatively large share in exports in the larger global markets include: biocides (3%), poultry keeping machines (2%), chemical fertilisers, containing the three elements (2%), and ammonium nitrate (1%).

Most of South Africa's agricultural inputs can be classified as niche products on the global markets (i.e. lower-right quadrant).

2.2.5 Agricultural trading partners

The trends in the number of agricultural export destinations and their respective market shares reveal South Africa's dynamism and ability to reorient or diversity its markets. Figure 2.7 indicates the total number of agricultural export markets for South Africa and the selected peer countries for 1995 and 2011. The figure reveals that the number South Africa's export destinations increased significantly with 14 to 78 markets in the period from 1995 to 2011. The country is only outperformed by India. South Africa also performs well in terms of the total agricultural export markets; it even outperforms the three developed peer countries and is only surpassed by Brazil and India.

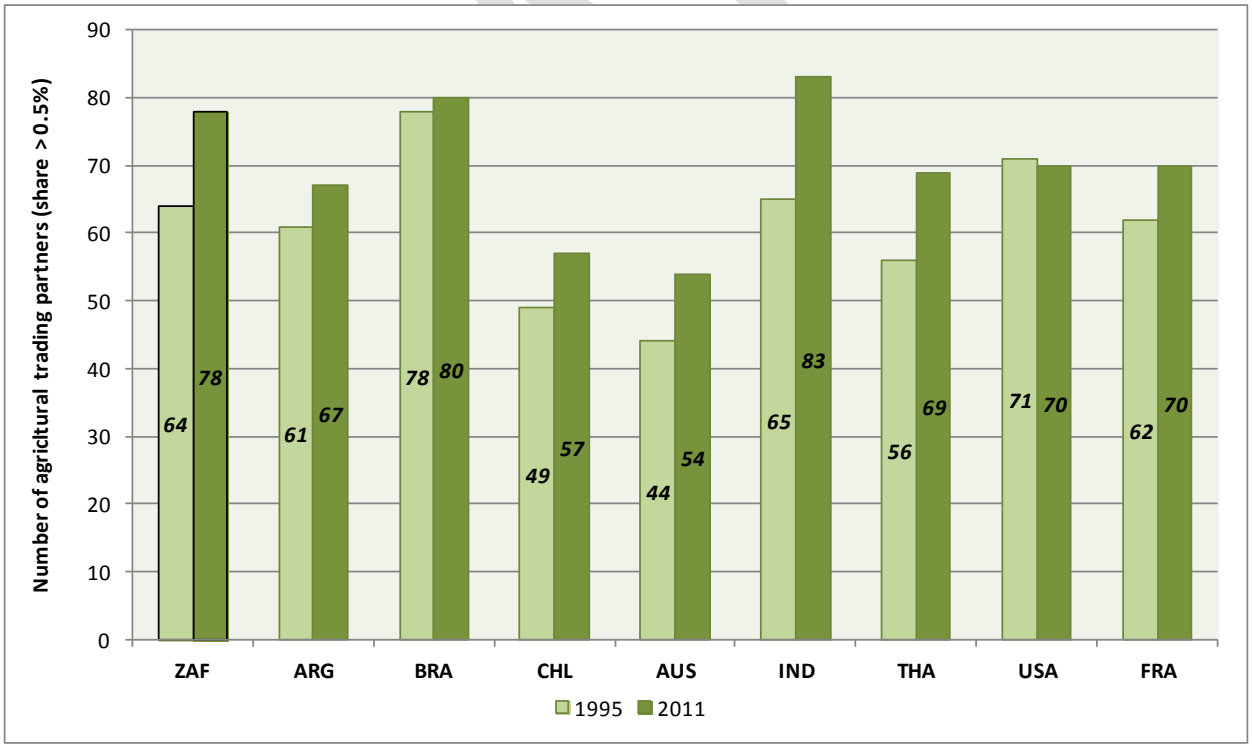


Figure 2.7: Trend in the number of agricultural export markets (1995 / 2011)

Source: Own calculations based on data from UN Comtrade (2013)

Figure 2.8 elaborates further on the regional composition of South Africa's agricultural export destinations and their respective shifts between 1995 and 2011. It is evident from the figure that there were no drastic shifts in this composition in the last 15 years. However, East Africa took over from Western Europe as most important export destination for agricultural products during this period. Its share rose with 3.6 percent to 20.9 percent, whereas Western Europe's share dropped from with 3.1 percent from 23.8 to 20.7 percent. The third most important export region is Eastern Asia, which also recorded a small decline in its market share. The top three regional export destinations comprised 56 percent of total market share in 2011.

The regions that increased market share in agricultural exports from South Africa include: Eastern Africa (+3.6%), Central America (+3.5%), Western Africa (+2.1%), and Eastern Europe (+1.6%). Relatively large decreases in South Africa's market share of agricultural exports were experienced by Southern Europe (-4.4%), Northern America (-2.1%), and Australia and New Zealand (-1.6%).

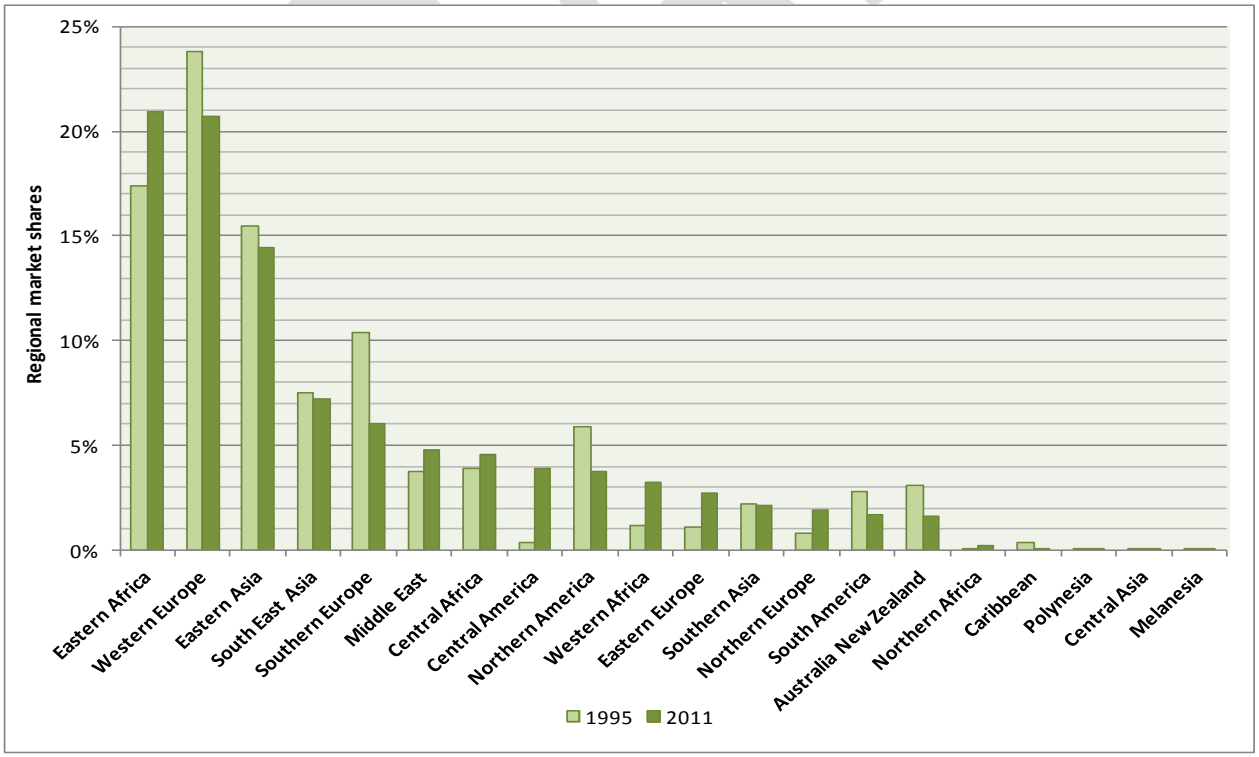


Figure 2.8: Trend in regional market shares for SA's agricultural exports (1995 / 2011)

Source: Own calculations based on data from UN Comtrade (2013)

Analysing the relative importance of each of South Africa's agricultural export destinations is another important dimension of the country's trade patterns. The Trade Intensity Index (TII) is used in this regard since it measures South Africa's exports to a country relative to its total agricultural exports divided by the world's agricultural exports to that country relative to global agricultural exports[5]. This measure is similar to the RCA index, but applied to export markets. An agricultural export market with a TII higher than 1 indicates that South Africa's exports to this market represents a larger share of its total agricultural exports than the share of world exports to this market.

In Figure 2.9, the TII for South Africa's 182 agricultural export markets (y-axis) is plotted against the respective total agricultural imports from the world of each market (x-axis). The countries located above the bold horizontal threshold line have comparative agricultural trade intensity for South Africa. The figure shows that most of South Africa's export markets with a relatively high TII are continental markets, such as Zimbabwe, Zambia, Malawi and Mozambique. However, the country also has a strong presence in some of the larger agricultural import markets such as the UK, the Netherlands and Japan. Overall, the country has a positive TII in 35 percent of its agricultural export markets. Due to the significant size of some agricultural export markets (e.g. USA, China, Russia, France), it is not surprising that South Africa has a relatively low TII in those markets. However, some of the relatively medium-sized agricultural export markets for which South Africa has a low TII (i.e. below 1) include: Belgium, Italy, Poland, Austria, Turkey, Switzerland, Vietnam, Egypt, Portugal, Czech Republic, Denmark, Singapore, and the Philippines. It seems South Africa has some potential to increase its TII of these markets.

[5] $TII_{ij} = \frac{\frac{x_{ij}}{X_i}}{\frac{x_{wj}}{X_w}}$ Where *x* is exports, *i* is South Africa, *j* is a country, and w is the world

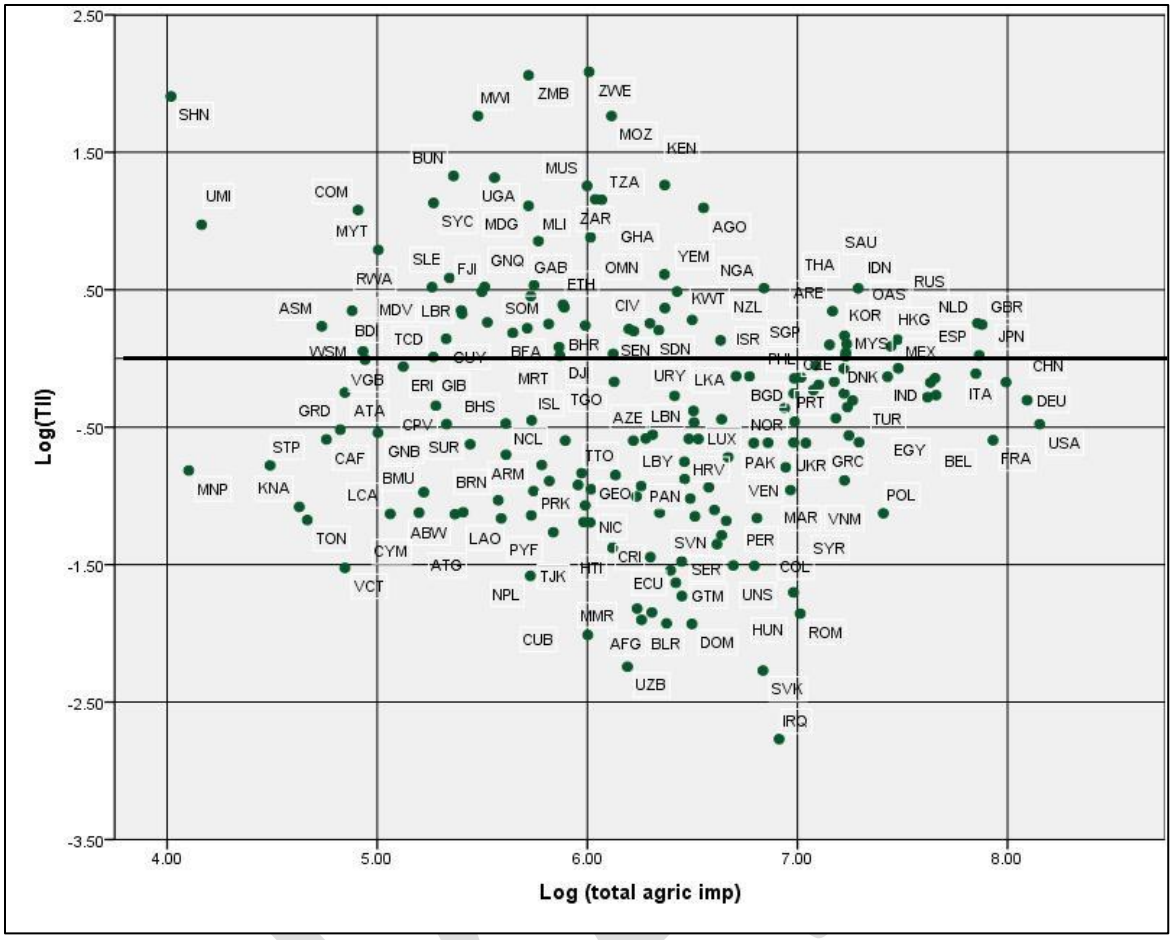


Figure 2.9: South Africa's agricultural Trade Intensity Index (2009-2011)

Source: Own calculations based on data from UN Comtrade (2013)

2.2.6 Growth orientation

How South Africa's agricultural export basket is orientated towards global growth in products or markets will shape future performance and is a critical part of analysing the intensive margin. Of the 1 206 agricultural products exported by South Africa in the period from 2002 to 2011, 818 products, or 68 percent, showed a positive growth and 788 products, or 65 percent, did so in a growing global market. Of the 388 South African agricultural products that showed a negative growth in exports, a predominant share of 90 percent did so in a growing global market. Figure 2.10 shows the growth orientation for South Africa's agricultural export products with a positive growth in exports and global imports.

Figure 2.10: Growth orientation of South Africa's agricultural export products

Source: Own calculations based on data from UN Comtrade (2013)

Each product is plotted against its share in South Africa's agricultural exports (x-axis) and the annual average growth in global imports (i.e. international demand) over the period 2002 to 2011 (y-axis). Since log values are used, the products located closer to 1 have a higher share in South Africa's agricultural exports and/or a stronger growth of global imports, respectively. The linear trend shows that there exists a weak correlation with the share in South Africa's agricultural exports and growth in global markets. However, for South Africa's agricultural exports to be pulled further by global market growth, this correlation needs to be stronger. Furthermore, most of South Africa's export products are located in the lower parts of the

graph, thereby experiencing below average growth in global markets. Figure 2.11 shows the growth orientation of South Africa's agricultural export destinations.

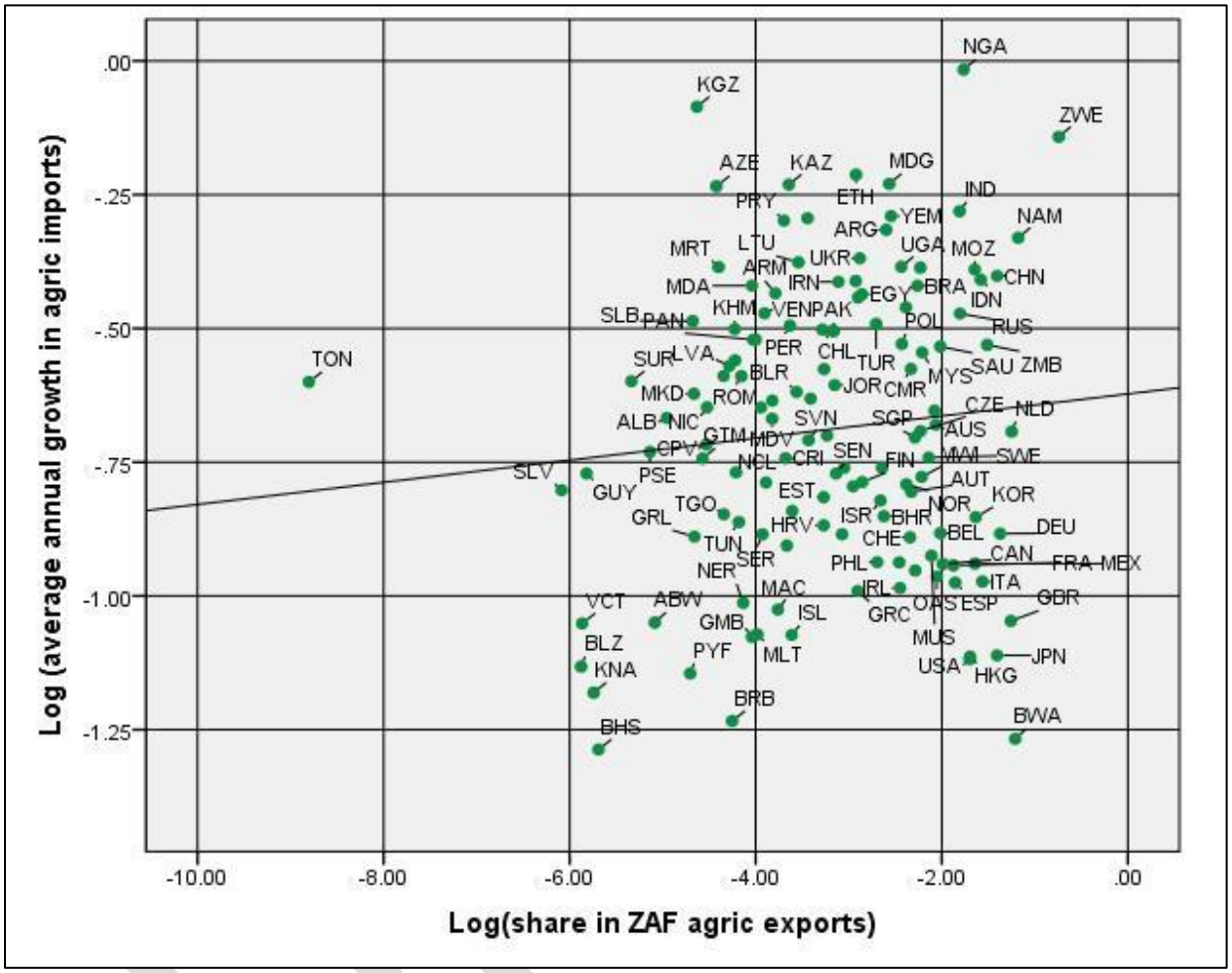


Figure 2.11: Growth orientation of South Africa's agricultural export destinations
Source: Own calculations based on data from UN Comtrade (2013)

In Figure 2.11, each export market is plotted against its share in South Africa's agricultural trade (x-axis) in 2011 and its average annual growth of agricultural imports from the world for the period 2002 to 2011 (y-axis). The linear trend line shows that the country's agricultural exports are growth orientated as its export share is positively correlated with export destinations that recorded higher growth in total agricultural imports. Recall from the previous section that South Africa's agricultural products are increasingly becoming exports to growth markets in

Central- and Eastern Africa and diverted away from Western Europe and Northern America (see section 2.2.5).

2.3 Diversification

The role of the extensive margin (i.e. diversification) in export growth is small in most developing countries; a more diversified structure of production (and de facto exports) is preferable for structural economic upgrading (Brenton & Newfarmer, 2009). Furthermore, the reliance on a narrow export base also weakens a country's resilience to economic shocks in global markets. Apart from the diversification of products, the diversification of export markets is just as important in this regard. Therefore, this section will focus on South Africa's agricultural export performance in the extensive margin.

2.3.1 Agricultural export concentration

One of the widespread measures used to measure export concentration is the Hirschman-Herfindahl Index (HHI)[6]. A country with a diversified export portfolio will have an index close to zero and a country with a concentrated export portfolio will have an index close to one. Figure 2.12 shows the export concentration (i.e. HHI) per agricultural cluster for South Africa and the eight peer countries. The HHI was calculated at HS6 level for the period 2008 to 2011. The figure clearly indicates that South Africa performs relatively well with regard to export diversification for especially processed food products and agricultural inputs. South Africa has some room for improvement in diversifying its export portfolio of primary agricultural products, forestry products as well as processed non-food products.

[6] $HHI_j = \sum(S_{ij})^2$ Where *S* is the share of exports *j* in the total exports of country *i*.

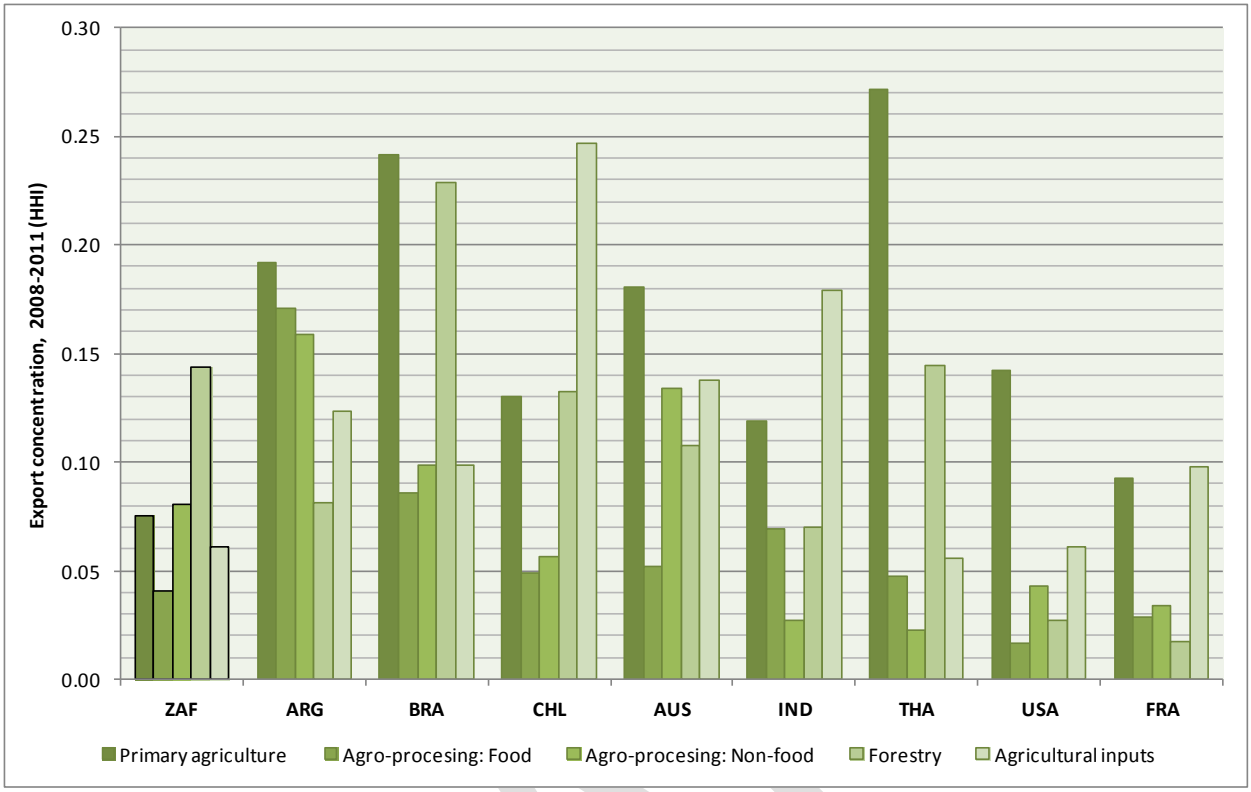


Figure 2.12: Agricultural export concentration per product cluster of South Africa and peer countries (2008 – 2011)

Source: Own calculations based on data from UN Comtrade (2013)

Although South Africa's agricultural export is relatively diversified in comparison to the eight peer countries, further analyses of the trends in its agricultural export concentration show a different picture. Figure 2.13 shows the long-term trend in South Africa's agricultural export concentration for the period 1976 to 2011 reflected by the share of the top five products in exports. The figure shows that since the mid-90s there has been a distinguished increase in the concentration of the agricultural export portfolio. However, the top five products in this portfolio did not change much over time. Products that have featured consistently in the top five since 1976 are: oranges, grapes, and wood pulp. Therefore, South Africa's agricultural export growth is mainly driven by the intensive margin. The only important export growth from South Africa's extensive margin came from wine.

The trend depicted in Figure 2.13 may well be in line with the diversification path discussed in by Imbs and Wacziarg (2003). They found that most countries tend to diversify their economy (i.e. exports) up until a certain threshold of income after which a process of specialisation follows. This u-shaped relation between export diversification and income may be an indication of South Africa's progress on the development path towards a more specialised agricultural sector.

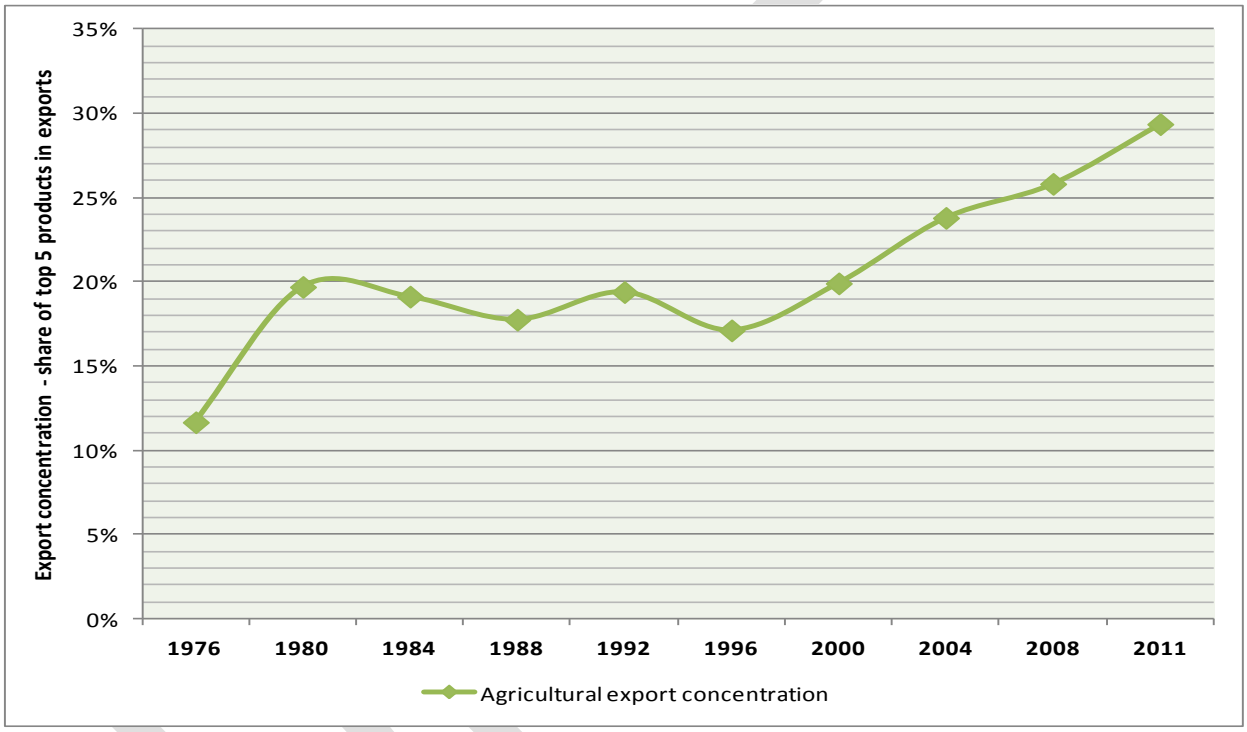


Figure 2.13: Trend in South Africa's agricultural export concentration of products (1976-2011)

Source: Own calculations based on data from UN Comtrade (2013)

Further detail on the increase in South Africa's agricultural export concentration is depicted in Figure 2.14. The figure shows the trend in export concentration per agricultural product cluster for the period 2002 to 2011. It becomes evident that especially the export concentration in primary agricultural and forestry products is rapidly increasing. On the contrary, exports of processed food products and agricultural inputs became more diversified.

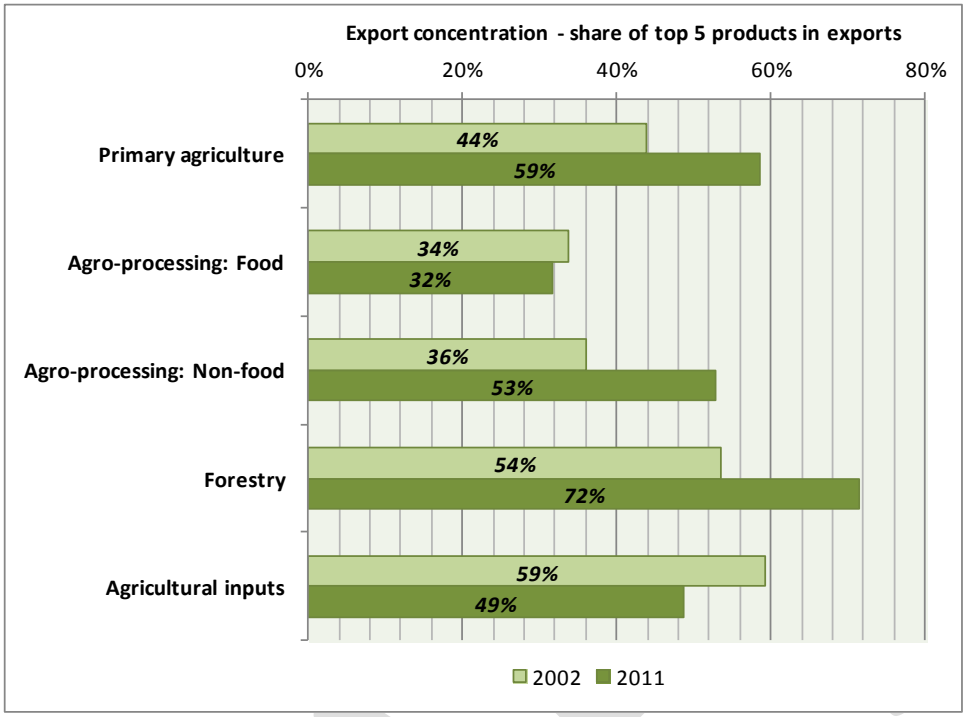


Figure 2.14: Trend in South Africa's agricultural export concentration per product cluster (2002-2011)

Source: Own calculations based on data from UN Comtrade (2013)

The concentration of export markets is an important indicator of market diversification and South Africa's integration in global markets. Figure 2.15 shows South Africa's agricultural export market concentration for the period 1976 to 2011. The concentration of export destinations is reflected by the share of the top five markets in total agricultural exports. From the figure it is evident that South Africa's export market concentration markets declined significantly; from 85 percent in 1976 to 42 percent in 2011. Therefore, the country has a diversified portfolio of agricultural export markets. However, preliminary signs of an upsurge in export market specialisation are apparent for the period from 2008 to 2011. As discussed in section 2.1.5, South Africa's agricultural exports are slowly diverting away from markets in Western Europe and Northern America to regional markets. The UK, Germany, Japan, and the USA dominated the top five agricultural export markets from the late 1970s until the end of the 1990s, after which alternative markets such as Zimbabwe, Botswana and Mozambique gained importance.

Although losing ground, the UK still remains one of South Africa's most important agricultural export destinations.

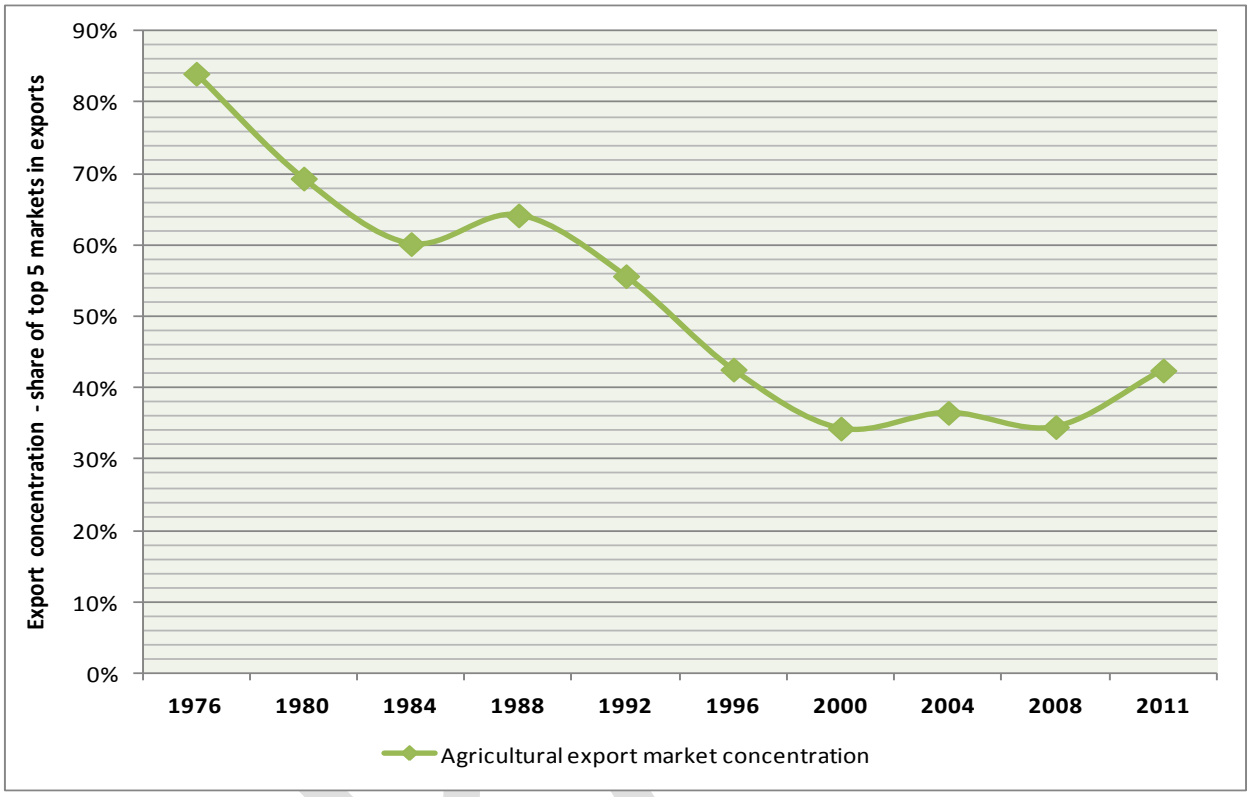


Figure 2.15: Trend in South Africa's agricultural export market concentration (1976-2011)
Source: Own calculations based on data from UN Comtrade (2013)

2.3.2 The agricultural intensive and extensive margin

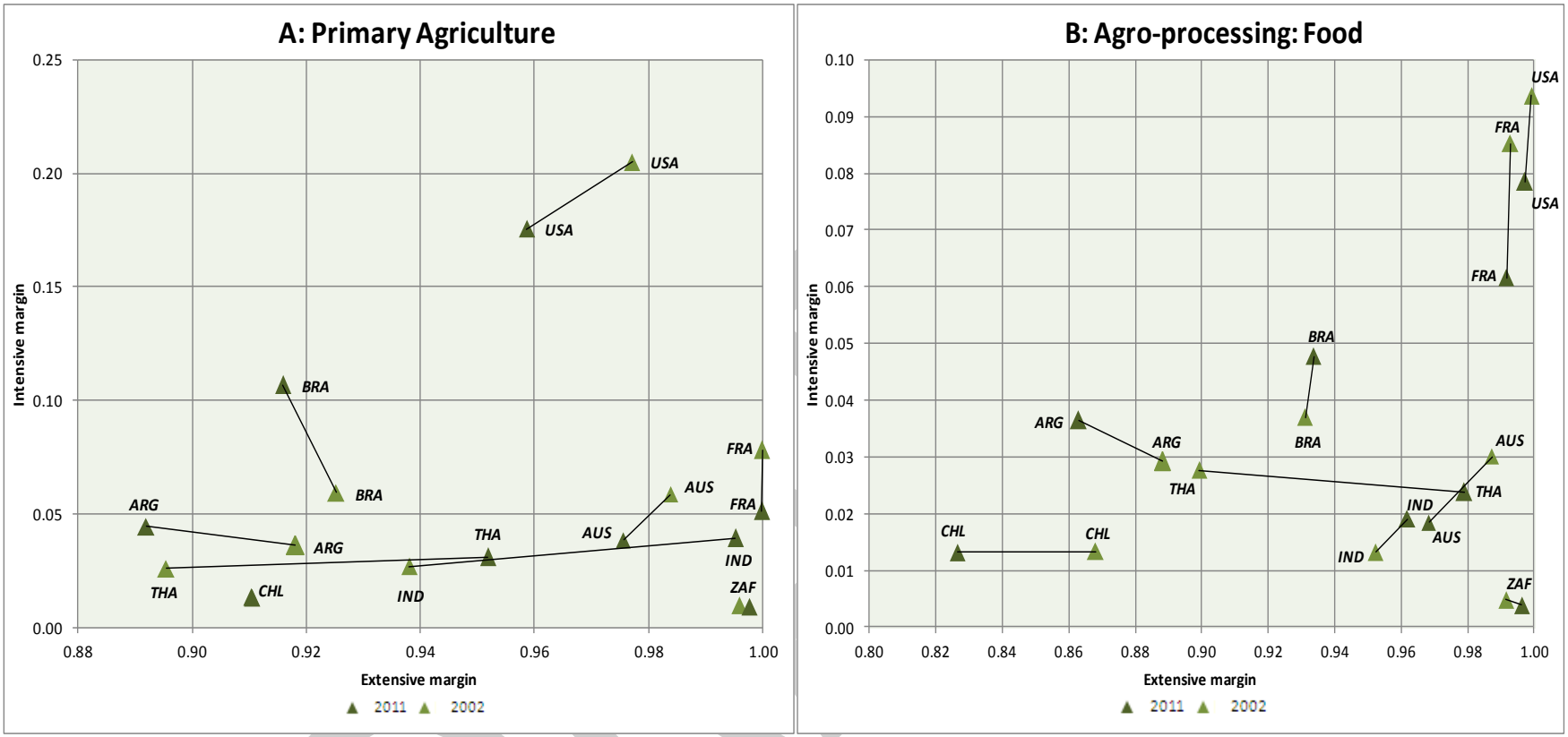
Export growth can take place in the intensive margin (e.g. selling existing products to existing markets) or at the extensive margin (e.g. selling existing products to new markets, selling new products to existing or new markets). Following the work of Hummels and Klenow (2005), this section will determine how South Africa has performed in its intensive and extensive margins for each agricultural product cluster for the years 2002 and 2011 compared to the eight peer countries. This performance will be measured on the basis of how big a player South Africa is in the agricultural products it exports (i.e. intensive margin) and how important South Africa's agricultural exports are to the world (i.e. extensive margin). The latter is therefore an indication

of the width of a country's export portfolio. The intensive margin is calculated as South Africa's market share in what it exports[7] and the extensive margin is calculated as the share of agricultural products included in South Africa's export portfolio in world trade[8].

Figure 2.16 (A-E) plots the Hummels-Klenow intensive (y-axis) and extensive margin (x-axis) of South Africa and its peers for the five different agricultural product clusters. The figure shows that South Africa has a relatively static position in terms of its growth in the intensive and extensive margin for most clusters. The figure furthermore reveals that is relatively diversified with regard to its export position in all clusters. South Africa's exports of primary agricultural-, processed food-, agricultural input- and forestry products showed almost no movement in both the intensive and extensive margins since 2002. The country's only slight shift was recorded by the exports of processed non-food, which experienced a decrease in mainly the extensive margin. Consequently, overall the country's agricultural sector experienced no structural change and consolidated its status quo.

[7] $IM_{ij} = \sum_{k^i} X_k^i \Big/ \sum_{k^i} X_k^w$ Where k^i is the set of products exported by country *i*, *w* is world, *X* is exports.

[8] $EM_{ij} = \sum_{k^i} X_k^w \Big/ \sum_{k^w} X_k^w$


A: Primary Agriculture
Intensive margin
Extensive margin
0.25
0.20
0.15
0.10
0.05
0.00
0.88
0.90
0.92
0.94
0.96
0.98
1.00
USA
USA
BRA
BRA
FRA
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AUS
ARG
ARG
THA
AUS
THA
IND
CHL
IND
ZAF
2011
2002
B: Agro-processing: Food
Intensive margin
Extensive margin
0.10
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
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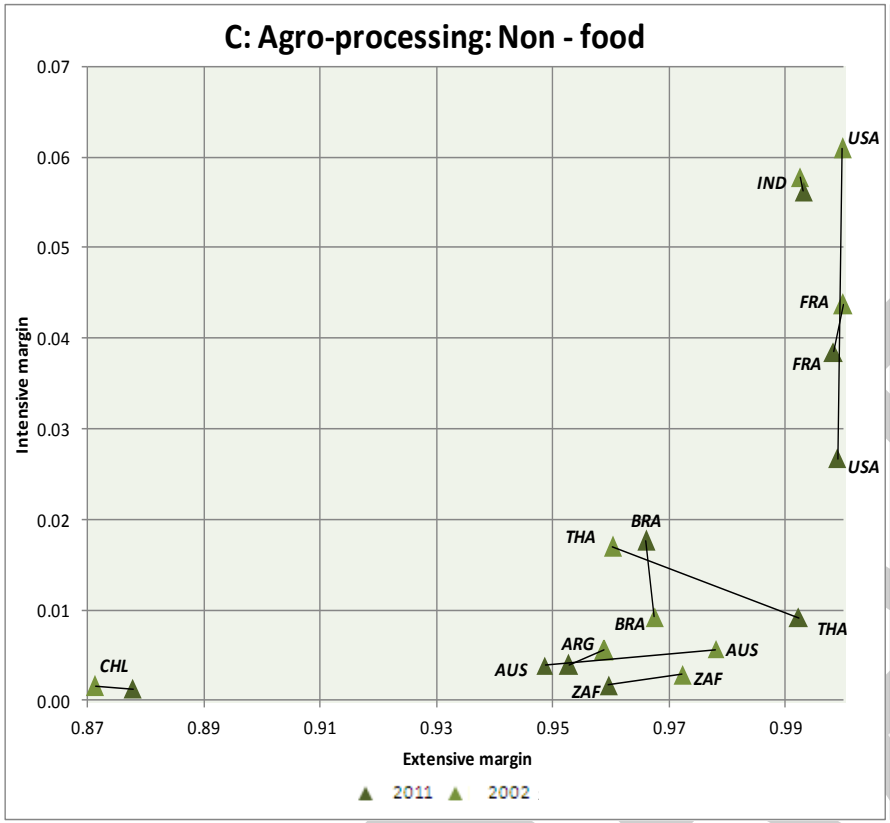
2002

(Fig 2.16)


C: Agro-processing: Non - food
Intensive margin
Extensive margin
0.07
0.06
0.05
0.04
0.03
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0.01
0.00
0.87
0.89
0.91
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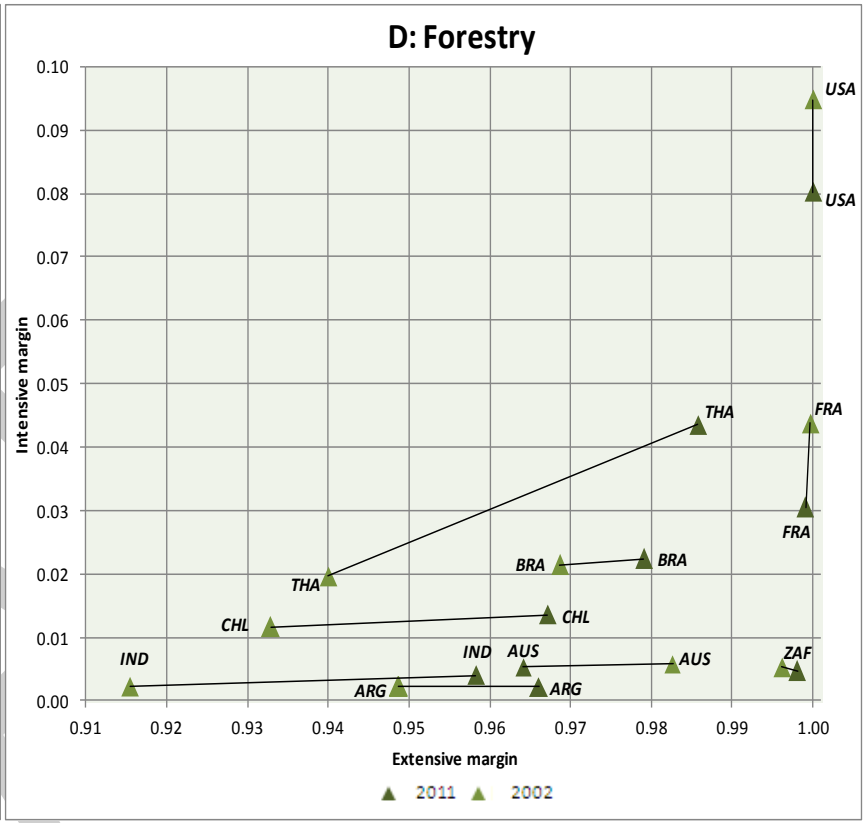
D: Forestry
Intensive margin
Extensive margin
0.10
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
0.91
0.92
0.93
0.94
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0.96
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THA
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ARG
2011
2002

(Fig 2.16)

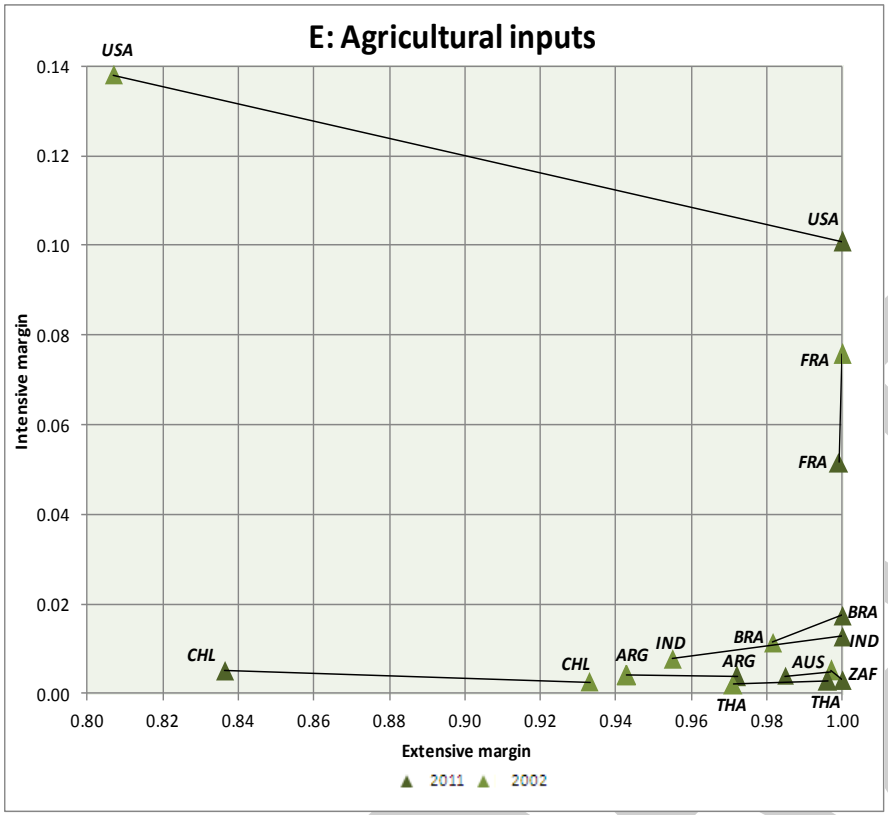


Figure 2.16 (A-E): Intensive and extensive margin in agricultural products (2002 – 2011)

Source: Own calculations based on data from UN Comtrade (2013)

In most of the agricultural product clusters depicted in Figure 2.16, the low- and middle-income countries experienced significant positive shifts in the extensive margin and relatively smaller increases in the intensive margin. On the contrary, the high-income countries showed relatively larger decreases in the intensive margin and only a minor negative shift in the extensive margin. Therefore, the structural changes in global agriculture that are illustrated in Figure 2.16 include:

i. high-income countries lose ground in agricultural trade to strong growth in the intensive margin of developing countries in Southern-America;
ii. the high-income countries lose ground in agricultural trade to strong growth in the extensive margin of developing countries in Asia; and
iii. the increase in the extensive margin of agricultural inputs for all the low-, middle- and high-income countries shows the intensification of technology in agriculture globally.

It seems that most of South Africa's future growth in agricultural exports has to come from the intensive margin. The country has not much room for growth in the extensive margin of primary agriculture since its exports are diversified. However, another important dimension of South Africa's position in the extensive margin is to what extent its exports consist of a domestic or an import component. In other words, how much of its diversification is due to re-exports and how much is due to exports of domestic production. Analyses reveal that the following shares of products exported by South Africa have a negative trade balance[9]:

i. 56 percent of primary agricultural products;
ii. 53 percent of processed food products;
iii. 78 percent of processed non-food products;
iv. 73 percent of forestry products; and
v. 81 percent of agricultural inputs;

It is evident from these shares that South Africa is reliant on imports for the majority of its agricultural export products. Consequently, the country is an important trade hub for agricultural products, but the domestic component in its agricultural exports needs

[9] For the period 2009 to 2011

improvement as this will lead to a more structural agricultural-led growth path. Within this more nuanced context, South Africa's growth in the intensive margin has to come from those agricultural products with a positive trade balance, and growth within the extensive margin has to come from an increase in the domestic content of those agricultural products with a negative trade balance (i.e. import substitution).

Apart from growth from products, the performance in the intensive- and extensive margin of agricultural export markets is another important element of export growth. Section 2.1.5 already showed that South Africa has a relatively high market diversification of its agricultural exports. Figure 2.17 elaborates on this by plotting the trend in the intensive and extensive margin in agricultural export markets for South Africa and the eight peer countries for the period 2002 to 2011. The intensive margin in this figure is the accumulation of those in Figure 2.16.

The position of South Africa in the extensive margin of agricultural export markets shows that its market diversification captures a considerable proportion of the global market. Therefore, there is not much potential for expansion in the extensive margin of markets. South Africa experienced some growth in its number of agricultural export markets (see also Figure 2.7), but since South Africa already captured a large share of the global markets in 2002, the growth in the extensive margin was marginal (see Figure 2.17). Similarly, most of the developing peer countries did not experience much growth in their extensive margin in markets as they already had a significant proportion of the global markets in their agricultural export portfolio. Only France, the USA and Brazil recorded a relatively large increase in their extensive margin in agricultural export markets.

South Africa's agricultural export markets are diversified against the background of having low trade intensity in 65 percent of the markets. Therefore, growth in the extensive margin of agricultural trade has to come from the export of existing products to new markets.

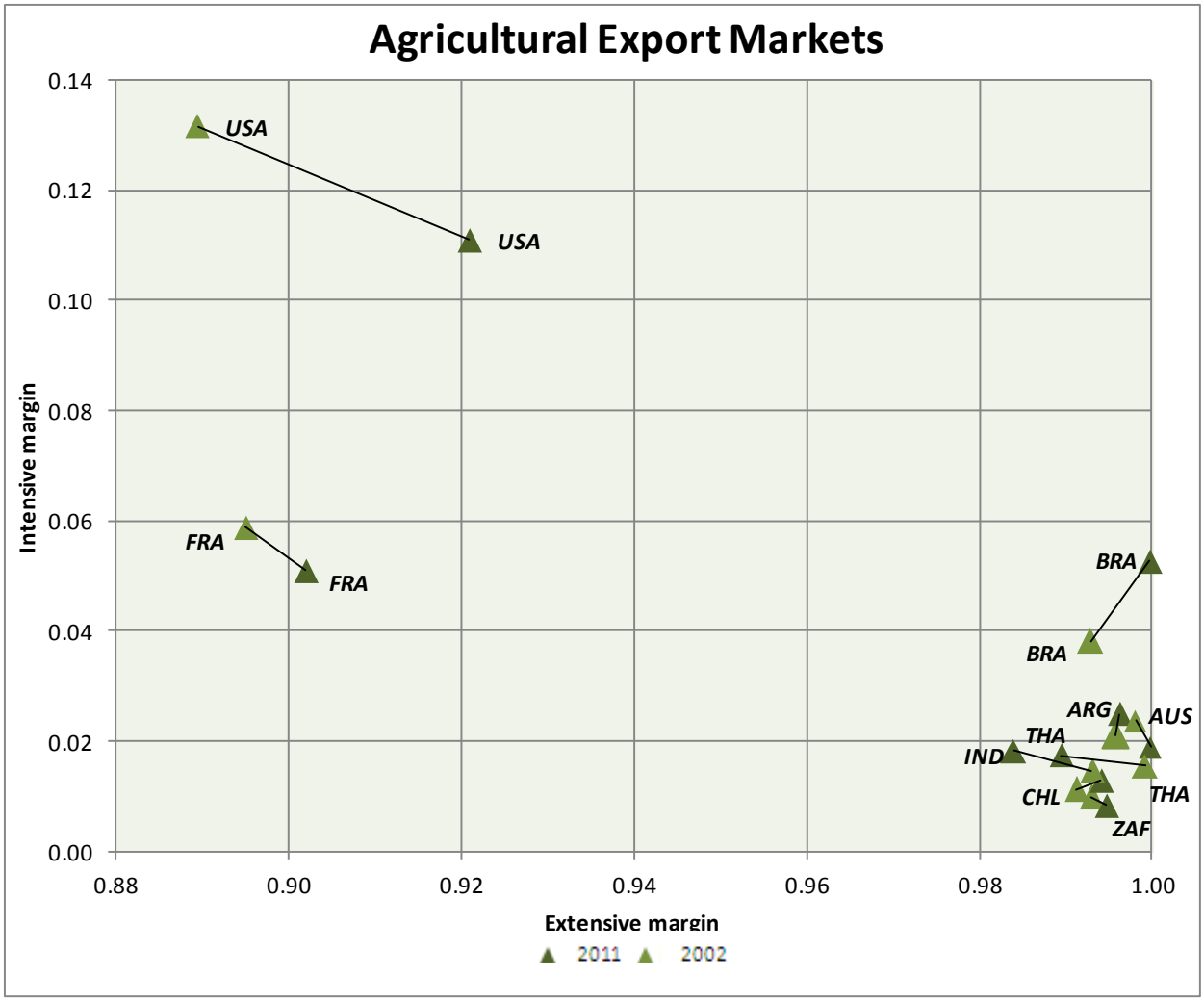


Figure 2.17: Intensive and extensive margin in agricultural export markets (2002-2011)
Source: Own calculations based on data from UN Comtrade (2013)

2.3.3 Market reach of agricultural exports

This section will briefly discuss South Africa's future potential for agricultural export market expansion by analysing how many markets are reached by each export product. This is done by calculating Brenton and Newfarmer's (2009) Index of Export Market Penetration (IEMP) for each of the five agricultural product clusters. The IEMP is estimated by dividing the number of product-country combinations of South Africa (at HS6 level) by the total possible (global) product-country combinations for its exports. This therefore provides the maximum number of

potential export relations that South Africa can exploit given its current agricultural export portfolio.

Figure 2.18 shows the IEMP for the five clusters for the period 2009 to 2011. Although there is not much difference between the clusters, the export of primary agricultural products has the highest exploitation of its export market potential. The export products in this cluster reached 14 percent of its potential markets. No country ever exports all its products to all the countries that import them. One of the most successful exporters, Germany, exploits only 50 percent of its potential and Korea only 28 percent (Reis & Farole, 2012). Therefore, against those benchmarks, there is room to improve the market reach of South Africa's agricultural exports.

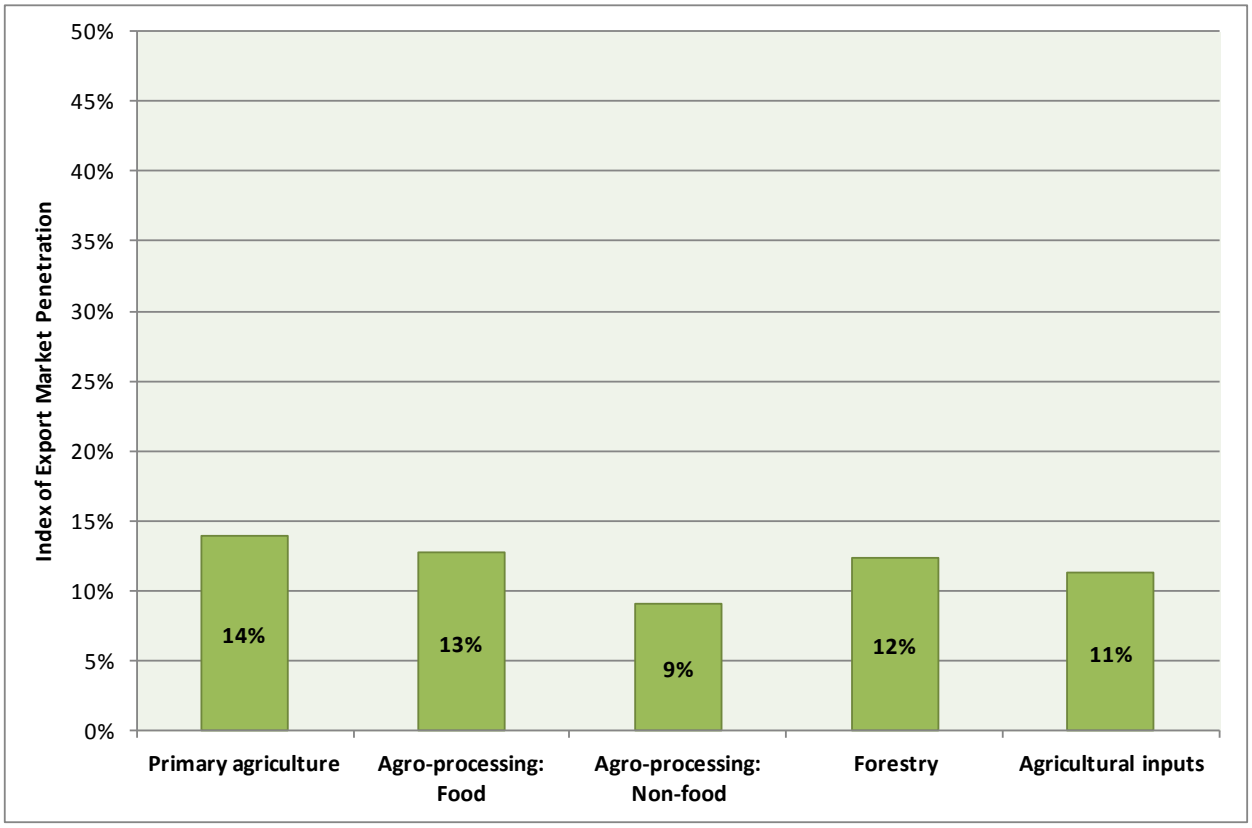


Figure 2.18: Indices of Export Market Penetration for South Africa's agricultural exports (2008-2011)

Source: Own calculations based on data from UN Comtrade (2013)

Unlike the extensive margin, the exports in the IEMP are not weighted against their relative importance in global trade. Therefore, Figure 2.19 shows the number of export markets of the 1 246 South African agricultural export products for the period 2009 to 2011. Each of the export products is plotted against its export value (y-axis) and its total number of export markets (x-axis). The figure clearly shows that the majority of South Africa's agricultural export products are of relatively low value, but are relatively successful in reaching a diversity of markets. Approximately 59 percent of the products (734) are exported to more than ten markets and approximately seven percent of the products (85) are exported to more than 50 markets. Wine (in containers > 2 l.), for example, has a relatively high export value and is exported to 139 markets. However, there is potential to expand the market reach for the 38 percent of products (474) that only reach less than ten markets.

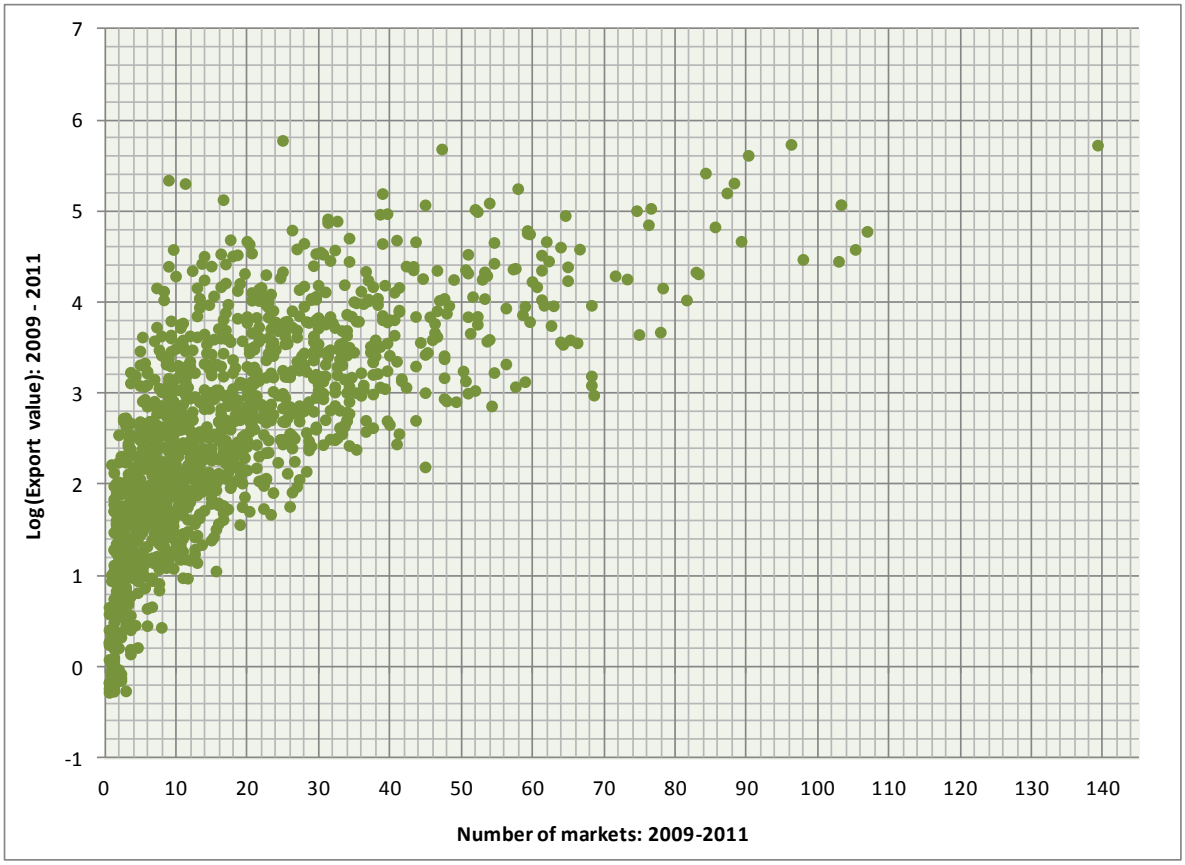


Figure 2.19: Market reach of South Africa's agricultural exports (2009-2011)

Source: Own calculations based on data from UN Comtrade (2013)

2.4 Quality and sophistication

The sophistication and quality margin of products reveals the level of advancement of factor endowments, technologies and capabilities used in its production. The transformation of a country's export basket in terms of the sophistication and quality margin of the products therein provides a great deal of information on structural development and growth of an economy. Rich countries tend to produce more complex products (Hausmann, Hwang & Rodrik; 2006).

2.4.1 Complexity of agricultural export products

Instead of predetermining the broad classification of products in technology content as published by the World Bank in their World Development Indicators (WDI), differences in complexity of exports can also be measured at the product level. Hausmann, Hwang and Rodrik (2006) estimate the sophistication of products on the basis of the income levels of the countries that produce those products. In this way, products that are predominantly produced by rich countries would be revealed as sophisticated. This outcome-based measure of product-level sophistication is called PRODY[10]. This is therefore the weighted average, based on the RCA, of the per capita GDP of countries producing that good.

Another measure developed by Hausmann, Hwang and Rodrik (2006) is EXPY[11]. This is the sum of the PRODY of all products weighted by the value share in total exports of a country. Consequently, the EXPY measures the income content of a country's export basket and is regarded a more inclusive measure of complexity than that technology intensity. The EXPY captures the wages and productivity supported by the production of a good. Hausmann, Hwang and Rodrik (2006), as well as Hausmann and Klinger (2007) show empirically that a high EXPY is

[10] $PRODY_k = \sum_j \frac{(x_{jk}/X_j)}{\sum_j (x_{jk}/X_j)} Y_j$ Where *j* is a country, *Y* is GDP per capita, *k* is an export product, *x* is exports, and *X* is total exports. The weight of the index corresponds to the RCA of each country in good *k*.

[11] $EXPY_i = \sum_l \left(\frac{x_{il}}{X_i}\right) PRODY_l$ Where *l* is a product and *i* a country

a significant predictor of economic growth in the future. Furthermore, Felipe (2010) estimates that a 10 percent increase in EXPY raises growth by half a percent. Therefore, countries become what they export by converging to an income level implied by their export basket. In general, a country with a higher EXPY than expected from its income will see growth from existing exports, whereas a country with a lower EXPY than expected from its income would see growth from developing new products.

Figure 2.20 shows the total EXPY and the agricultural EXPY (Y-axis) for South Africa and the eight peer countries plotted against their respective per capita income levels (x-axis). The agricultural EXPY was calculated using the Hausmann, Hwang and Rodrik (2006) dataset of PRODY for at the six-digit level of the HS nomenclature.

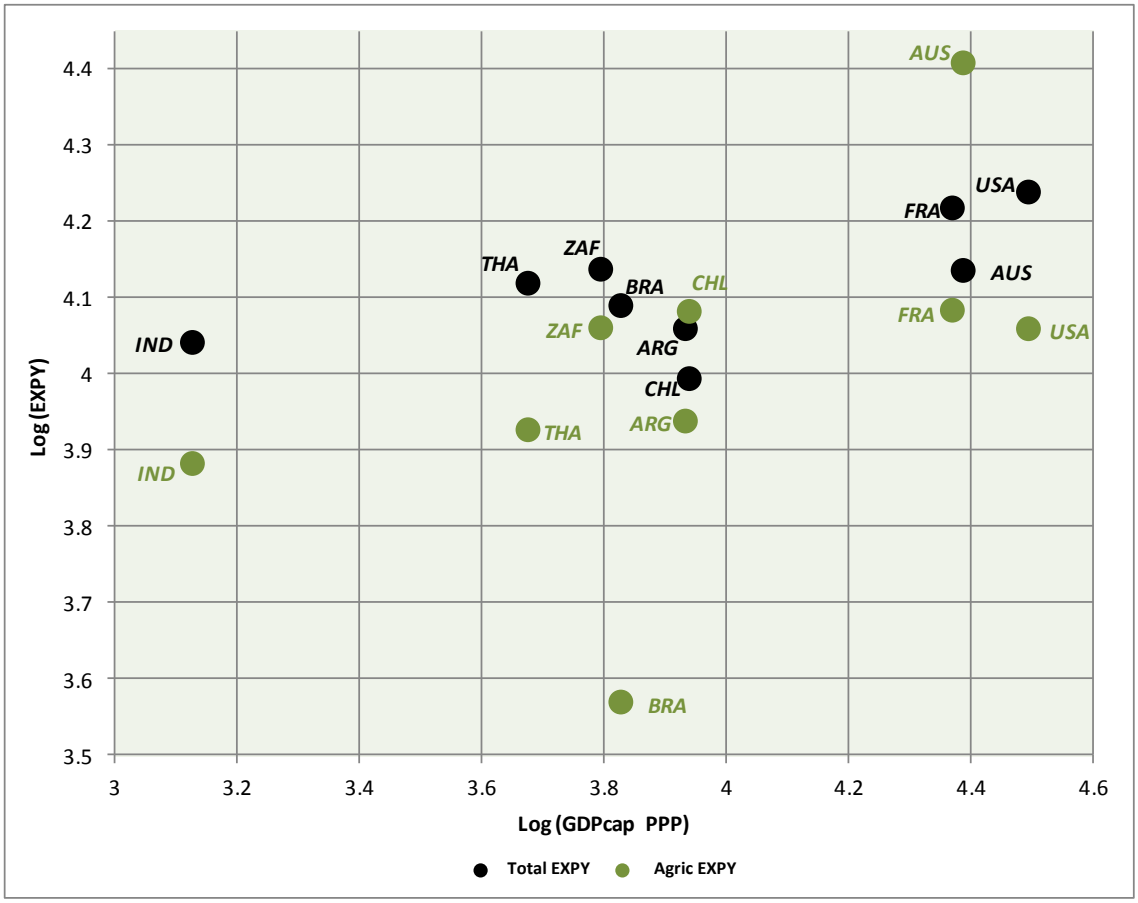


Figure 2.20: Overall EXPY and agricultural EXPY of South Africa and the peer countries
Source: Own calculations based on data from UN Comtrade (2013)

Due to the general lower income content of agricultural products compared to other goods, the agricultural EXPY is generally lower than the related total EXPY. Although South Africa's income is lower than other middle-income countries such as Brazil, Argentina and Chile, the sophistication of its export basket is higher. Furthermore, the country's agricultural export basket is on par with the export sophistication of a high-income country such as the USA.

The main conclusion from Figure 2.20 is that, given its income level, South Africa has a corresponding complexity of both its agricultural and total export basket. It seems that the country has reached convergence between its level of income and its (agricultural) export sophistication. Therefore, South Africa should focus on discovering new export activities to boost its EXPY while consolidating growth from existing exports.

Figure 2.21 (A-E) takes a more in-depth look at the agricultural export sophistication by comparing the five agricultural product clusters. South Africa is performing significantly well pertaining to the sophistication of its processed non-food and forestry export products. These sub-sectors can serve as best-practices for upgrading within the agricultural sector. There is some limited scope for increasing the EXPY of primary agricultural products and agricultural inputs by discovering new export activities within these clusters. Australia and Chile can serve as a benchmark for primary products, whereas Australia and France can serve as a benchmark for agricultural inputs. Most potential exists for the increase of the complexity of processed food products, as South Africa is outperformed on EXPY by all its peers. Therefore, structural growth within the agricultural sector will have to come from increasing the complexity within this cluster by discovering new export activities with a relatively high PRODY.

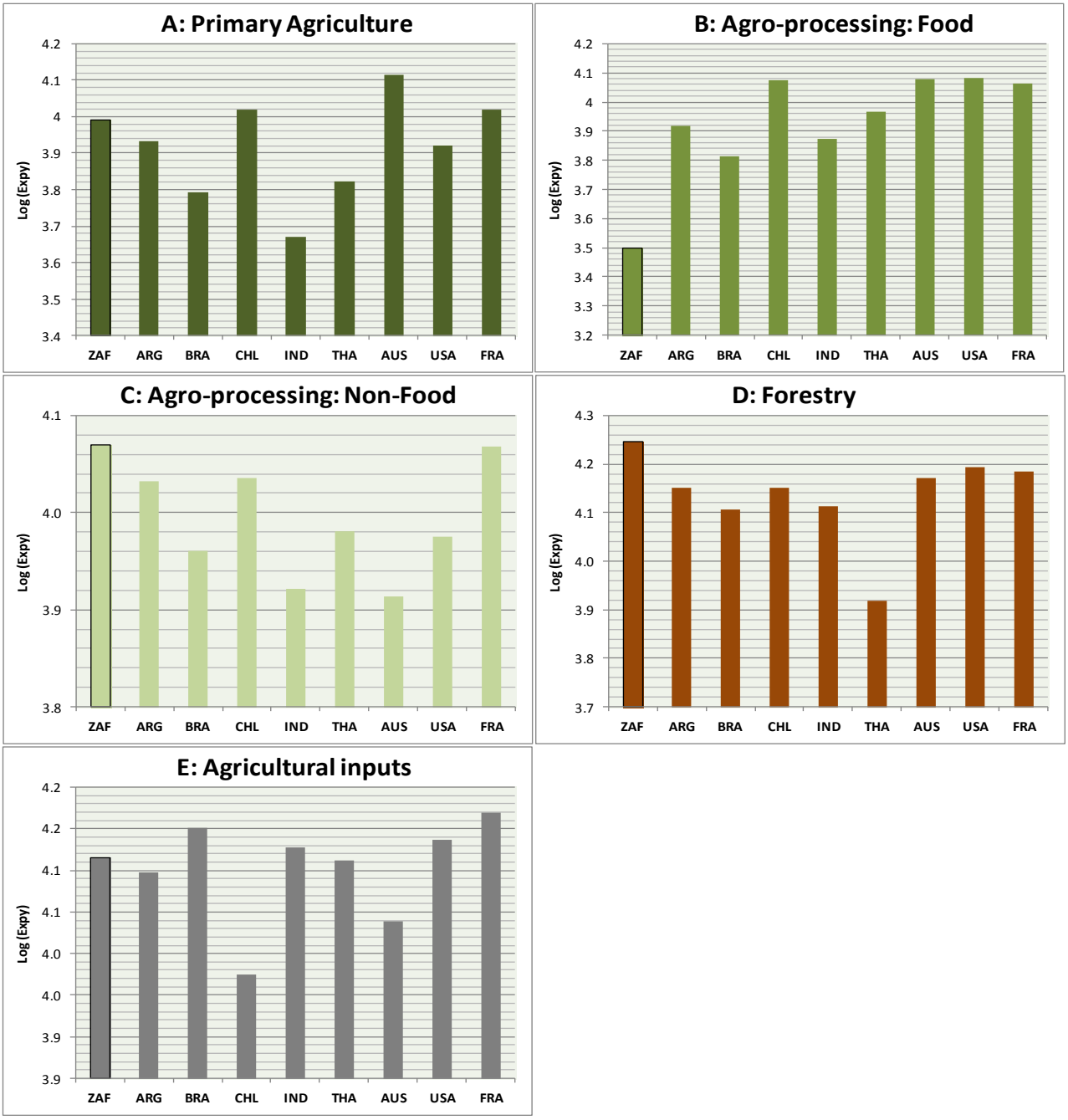
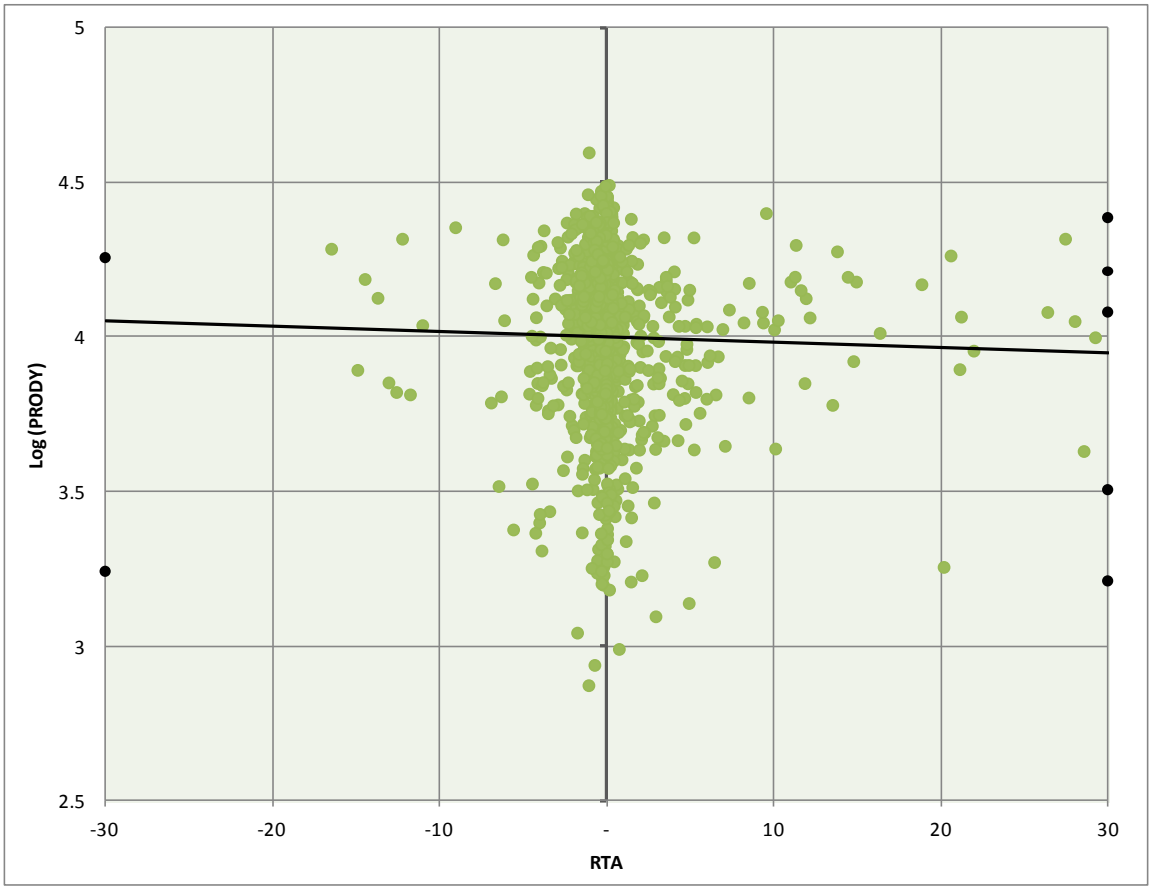


Figure 2.21: (A-E): Export sophistication of agricultural product clusters

Source: Own calculations based on data from Rodrik (2006) UN Comtrade (2013)

The EXPY is relatively export biased since it does not account for imports and possible re-exports; it therefore neglects the domestic content of export products. Therefore, Figure 2.22

plots the position of each of South Africa's agricultural export products with regard to its PRODY (y-axis) as well as its respective RTA index (x-axis). The latter is an indicator of product-level trade competitiveness accounting simultaneously for a country's imports and exports. Evoke that only 34 percent of South Africa's agricultural exports have a relative trade advantage. The trend line in the figure clearly shows that the sophistication of South Africa's agricultural export basket declines with an increasing RTA. Consequently, structural growth in South Africa's agricultural sector should come from an increase in the domestic content of those existing export products with a relatively high level of sophistication (i.e. PRODY).



Note: black dots represent outlier products

Figure 2.22: Sophistication and competitiveness of South Africa's agricultural export products

Source: Own calculations based on data from Rodrik (2006) and UN Comtrade (2013)

2.4.2 Factor intensity of agricultural export products

The PRODY and EXPY reveal the income intensity of trade portfolios, but do not consider the factor content of traded goods as underpinned by the Hecksher-Olin theory of comparative advantage in relative factor endowments. Therefore, Shirotori *et al.* (2010) developed indices of revealed factor intensity of traded goods based on the factor endowments of the countries that export them. These indices reflect the intensity of human capital, physical capital and land in exports and are estimated by substituting the income data in the PRODY calculation. Human capital is measured by the average years of schooling, the physical capital by real capital stock per worker, and the land endowment is measured by the amount of arable land per worker.

Figure 2.23 (A-C) shows the revealed factor intensities of the total agricultural exports of South Africa and its peers. These aggregated revealed factor intensities were calculated by assigning a weight to the indices according to the value share in total exports per product. Each country is plotted against its revealed human capital intensity (RHCI), its revealed physical capital intensity (RCI), and its revealed land resource intensity (RLRI) (y-axis), as well as their respective actual factor endowments (x-axis). The respective trend lines show the relationship between actual and revealed factor endowments, which is positive in all cases.

It is evident from Figure 2.23A that the RHCI of South Africa's agricultural exports is relatively high in comparison with both the high- and middle-income peer countries. Considering the country's actual human capital endowment, as well as the trend line of the country sample, South Africa's agricultural trade patterns reveal much higher human capital intensity. This difference implies that its agricultural export portfolio puts significant pressure on the current human capital endowment. Furthermore, this situation may prove not to be sustainable on the long run if there is no positive shift in South Africa's human capital endowment. Cadot (2010) shows, within this context, that there is a small but significant negative relationship between a country's export survival and the distance between a country's revealed and actual factor intensity (i.e. its comparative disadvantage).

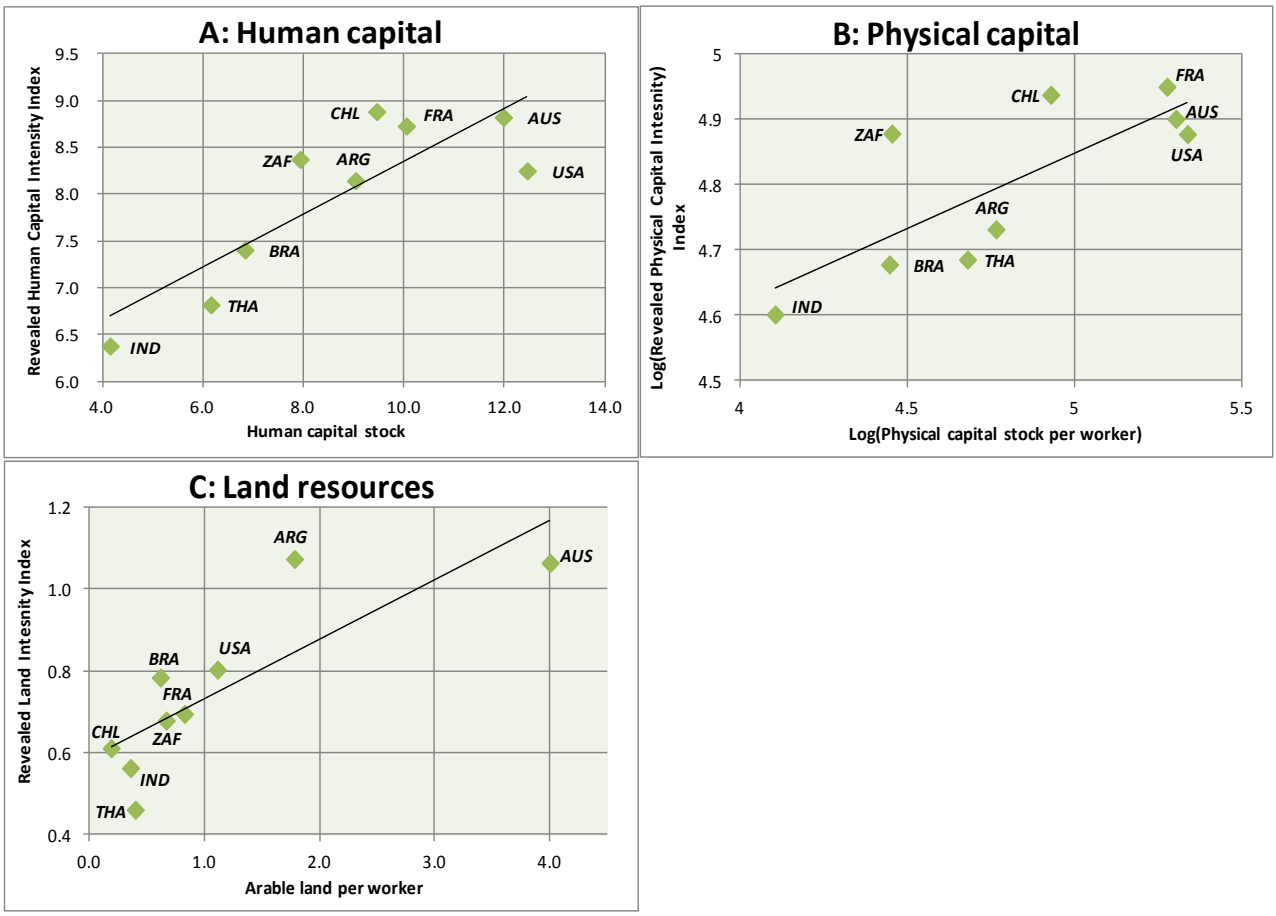


Figure 2.23 (A-C): Revealed factor intensities of agricultural exports

Source: Own calculations based on data from Shirotori (2010) and UN Comtrade (2013)

South Africa's revealed human capital intensity is comparably high in its primary agricultural-, forestry- and agricultural input export clusters. Most of the peer countries have the highest RHCI in their food processing clusters.

Similar to the RHCI, South Africa also has a comparatively high revealed capital intensity (RCI) (See Figure 2.23B). The gap with its actual capital stock endowment per worker is significant as well as its gap with the average trend of the peer countries. Correspondingly to the RHCI, this agricultural trade pattern may not be sustainable in the long run and some convergence between the actual and revealed capital endowment needs to occur. After Australia, South Africa has the highest revealed capital content of primary agricultural export products. The

capital intensity of processed non-food products, forestry products and agricultural inputs is also proportionally high. The revealed capital intensity of processed food products contributes the most (34%) to the total capital content of South Africa's agricultural products. However, this share and its total sum compare relatively mediocre with the peer countries.

The first part of this chapter already discussed South Africa's natural resource limitations for agricultural production, especially the availability of arable land. However, on a per worker basis, the amount of arable land still compares well with the other developing peer countries (see Figure 2.23C). The revealed land resource intensity (RLRI) of South Africa's agricultural export products is on par with the average trend of its peers, but is smaller than its actual arable land endowment per worker. This may be attributed to the quality of arable land or other local agro-climatic conditions that limit its productivity. consequently, South Africa's average productivity of crop land is lower than the global average (FAOSTAT, 2013).

The weighing method used for Figure 2.23 may be biased towards exports without considering the limiting effects of the considerable amount of re-exports on the domestic content of the country's agricultural portfolio exports. However, weighing South Africa's revealed factor indices according to the respective RTA index (i.e. trade competitiveness) per product only yielded slightly lower indices for the RHCI (-4.3%), and the RCI (-3.9%), but a considerably lower revealed land resource intensity index (-18%). Therefore, a large proportion of South Africa's re-exports consists of agricultural products with a relatively large land resource intensity.

The revealed factor intensity of South Africa's agricultural export products is shown in Figure 2.24. Each product is plotted against its RHCI (y-axis) and its RCI (y-axis). The size of the bubble reflects the proportion of the product in South Africa's total agricultural exports. The dotted lines reflect the actual factor endowments of South Africa. Consequently, the black dot depicts the country's endowment point (i.e. its comparative 'advantage'). The figure clearly shows that South Africa's major export products are well diversified with regard to their respective human- and physical capital intensities. It is, however, cumbersome that most of the products are

located in the upper-right quadrant, which implies that they are typically exported by countries with higher factor intensities. Most agricultural products are not located too far from South Africa's human capital endowment, but there are some significant gaps with regard to its capital endowment. As mentioned, some convergence needs to occur to ensure the sustainability of this agricultural export portfolio with regard to its factor content.

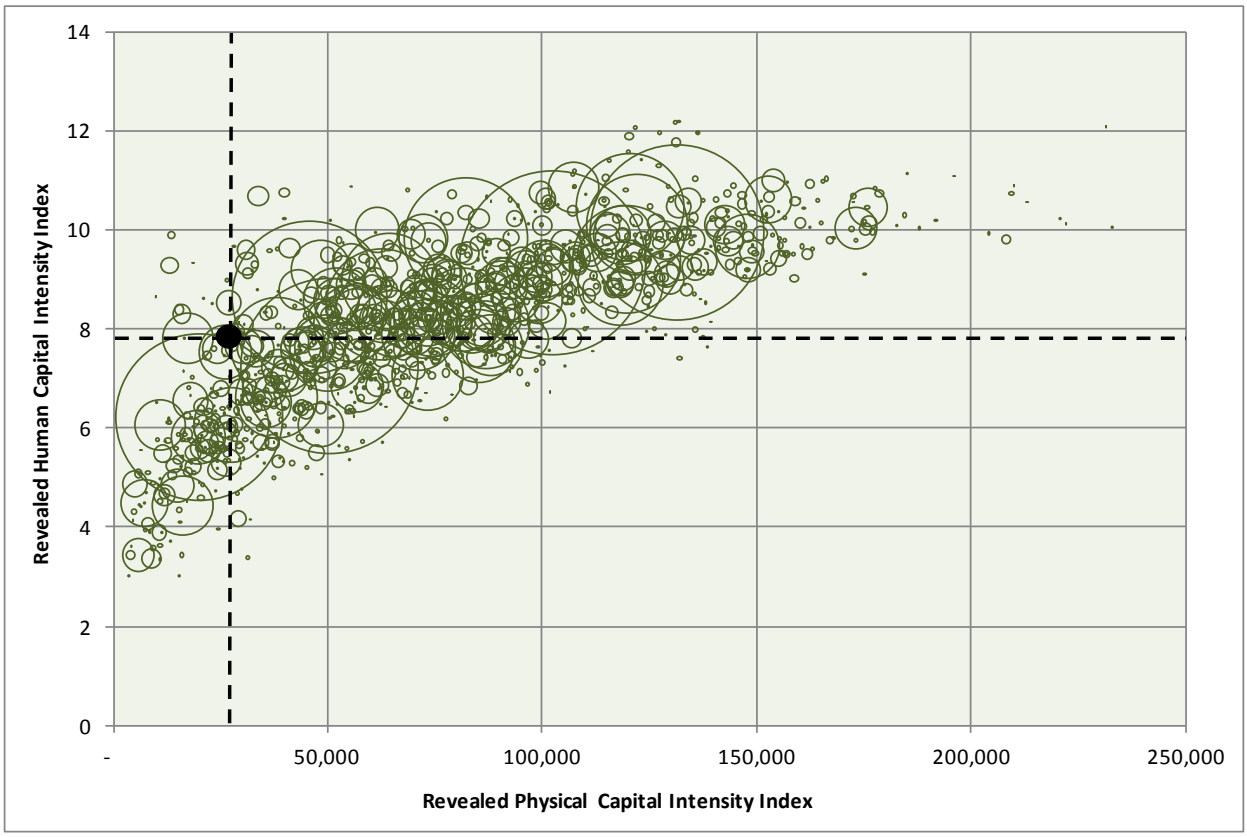


Figure 2.24: Revealed human and physical capital intensities for South Africa's agricultural export products

Source: Own calculations based on data from Shirotori (2010) and UN Comtrade (2013)

2.5 Entry and survival

The performance of South Africa's agricultural export portfolio largely depends on its ability to sustain export flows over a longer period of time. Most new product-country export relationships of developing countries do not survive more than a few years (Reis & Farole, 2012). This section will briefly assess the dynamics of South Africa's agricultural export survival in order to understand the sustainability margin of its trade competitiveness. This is done by decomposing South Africa's agricultural export growth for the period 2002 to 2011 at the level of the product-market pairs for both the intensive and extensive margins following the methodology of Brenton and Newfarmer (2009). Figure 2.25 illustrates this growth decomposition for South Africa's agricultural exports.

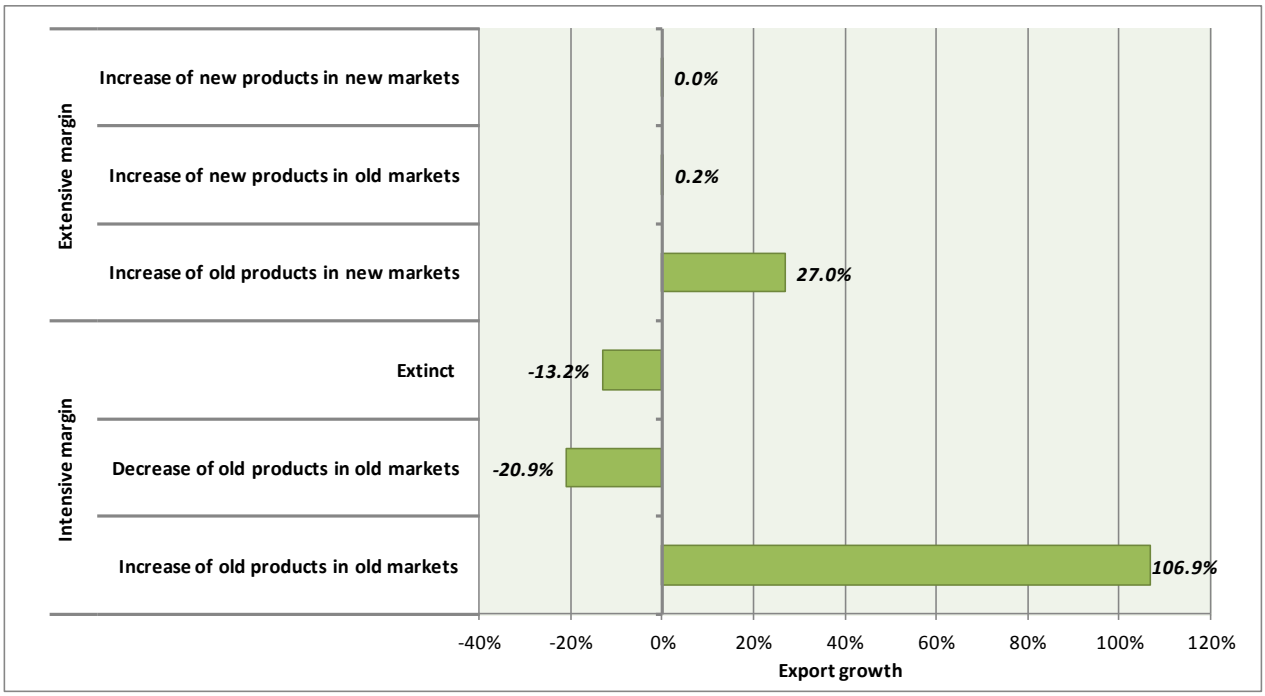


Figure 2.25: Decomposition of South Africa's agricultural export growth (2002-2011)
Source: Own calculations based on data from UN Comtrade (2013)

It is evident from the figure that most growth in South Africa's agricultural exports comes from existing export flows to existing markets (i.e. the intensive margin). This is the case for most

mature exporters. Furthermore, the decreases in exports of existing products to existing markets as well as the extinction of exports are relatively high. In the extensive margin, most growth is derived from exporting existing products to new markets. The contribution of new export discoveries within the agricultural export growth is very low. An analysis by Brenton and Newfarmer (2009) on the decomposition of total export growth in 99 developing countries shows a somewhat similar pattern, although the average extinction of exports was lower. In aggregate, 72.8 percent of growth in agricultural exports is attributed to the intensive margin and only 27.2 percent is attributed to the extensive margin.

The relatively high share of extinctions in exports relates to the survival rate of agricultural exports. In absolute terms, there were 9 997 product-country combinations that became extinct in the period between 2002 and 2011. Furthermore, a total of 146 agricultural export products became extinct in that same period. Products that recorded the most 'export deaths' between 2002 and 2011 include: uncoated paper and paperboard, partly stemmed/stripped tobacco, insecticides, other wooden furniture, and ammonium nitrate. South Africa's agricultural trading partners that experienced the largest decline in product-level export relationships in that same period are: Angola, Australia, the United Kingdom, the USA, and the Seychelles.

3. COMPETITIVENESS DIAGNOSTICS

Following the trade outcomes analysis in the previous section, the competitiveness diagnostics move through a logical approach of desktop analysis to assess how various supply-side and market factors contribute to South Africa's current agricultural trade performance. The diagnostics include four broad areas of analysis, namely: market access, incentives, factor conditions, and trade promotion infrastructure. Existing quantitative indicators will be used for the diagnostics from a variety of renowned national and international sources. In other to provide perspective, the performance of South Africa will be benchmarked with the same group of peer countries as used in the previous section (e.g. Australia, USA, Chile, Argentina, Brazil, Thailand, India and France).

3.1 Market accessibility

Trade policies adapted by trading partners as well those implemented by South Africa affect how competitive its agricultural exports are in the world market. Market access is a broad concept referring to all measures that restrict a country's export in foreign markets. This study looks even broader by also including trade restrictive conditions such as port handling and shipping time.

Steenkamp (2011) developed a market accessibility index for South Africa on an HS 6-digit level for all products in 101 countries. This section will include a summary of the results of this study for the agricultural sector. Firstly, the various constraints to market access into international markets were identified from the literature. Trade time, trade cost, logistical obstacles to trade, and tariff and non-tariff barriers were used to measure market accessibility. These constraints to market access were included in a principle components analysis to construct a market accessibility index (MAI) for South Africa. Three factors were identified that measure the market accessibility of a market. These include:

i. international factors: international shipping time and cost;
ii. domestic factors: domestic time and cost, logistics performance index (LPI) of importer; and
iii. barrier factor: *ad valorem* equivalent of tariff and non-tariff barriers

These were combined[12] to calculate a market accessibility index for each product-country combination. For more detail on the methodology, see Steenkamp (2011). The market accessibility index provides a score for each product-country combination relative to all other product-country combinations included in the analysis.

The index revolves around "0", with zero being the average for all products and countries. A positive index value therefore indicates an above average value, while the opposite applies to a negative value. Each index value is therefore not very meaningful on its own. It places each product or country in position relative to all other product and country combinations. The top 15 agricultural product groups (at HS4 level) with the most favourable average market accessibility index for South Africa are shown in Figure 3.1. A comprehensive list of the market accessibility index per product group can be found in Table A3.1 in the Annexure.

From Figure 3.1, it is evident that the agricultural product groups that are most easily exportable (with the highest score in the market access index) from South Africa include pesticides, cotton, wood pulp, medicinal plants, forage crops, natural rubber, wood and articles thereof, lac, resins and gums, plaiting products and finally paper, paperboard and products thereof. These products' average tariff rates vary from 1.3 to 5.7 percent of product value, and the average NTBs vary between 0.03 and 7.7 percent of product value. Most of these products are currently not exported in significant quantities by South Africa.

[12] As longer times to import, higher cost to import, higher tariffs and non-tariff barriers affect market accessibility negatively and a higher logistics performance index affects market accessibility positively, the signs of these variables were taken into consideration in the addition of the factor scores to calculate a market accessibility index value.

The comprehensive list in Table A3.1 (see Annexure) shows that the agricultural products most difficult to export (with the lowest score in the market access index) include semi-processed fruit, meat and meat products, cereal and bakery products, prepared vegetables and fruits, meat preparations, deciduous fruit, tobacco, sugar, beverages, dairy, eggs and honey and finally tobacco products. These products' average tariff rates vary from 11.5 to 47.86 percent of product value and the average NTBs vary between 11.6 and 53.8 percent of product value. Most of these products that have an unfavourable average market accessibility index are exported in significant quantities by South Africa. Therefore, the current situation whereby small agricultural exports face high market accessibility and large agricultural export face low market accessibility is limiting South Africa's agricultural competitiveness.

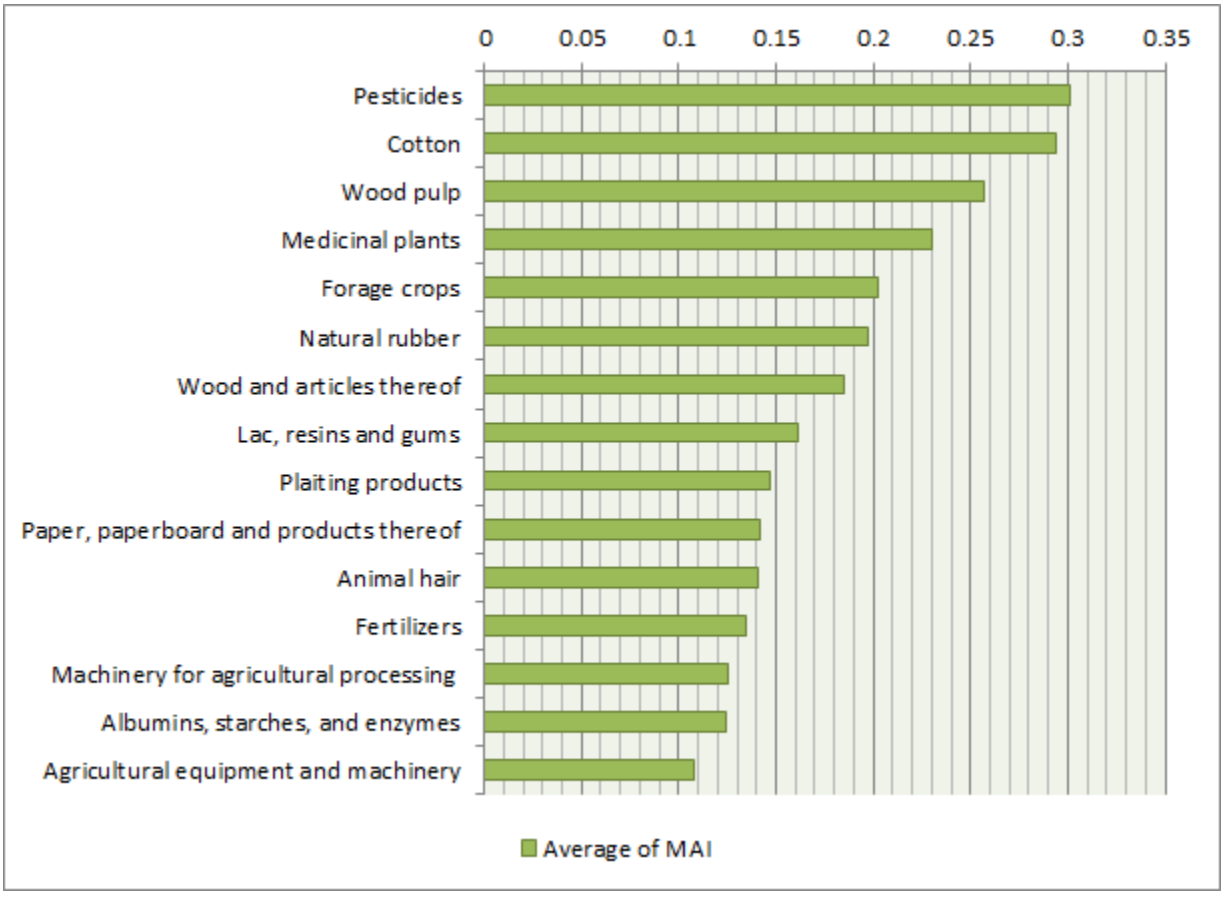


Figure 3.1: Agricultural product groups with the most favourable market accessibility

Figure 3.2 indicates the 15 markets in terms of the highest and lowest average market accessibility for South African agricultural products. A more comprehensive list can be found in Tables A3.2 and A3.3 in the Annexure. It is interesting to note from the figure that the top four countries with the highest MAI scores for South African agriculture exports are all Asian countries: Hong Kong (3.17), Singapore (3.03), Brunei (2.14) and South Korea (1.68). Within these countries, Singapore is also the country that has the lowest average shipment cost, international shipment time, domestic time to import and domestic costs. South Korea has the lowest average NTB (0.70 per cent), Hong Kong and Macao have the lowest average tariff rates (0 percent) and finally Germany (4.11), Singapore (4.09) and the Netherlands (4.07) have the highest LPI scores. The four countries with the worst performing MAI scores for South African agriculture exports according to Figure 3.2 include: Uzbekistan (-4.2), Venezuela (-4.05), Mexico (-3.48) and Angola (-3). Uzbekistan also has the highest average domestic costs (USD 4 600) and the highest average domestic time to import (92 days), followed (not in consecutive order) by Azerbaijan, Angola and Venezuela in both categories. Egypt has the highest average NTB (35.5 percent), and the highest average tariff rate (35.3 percent). Mexico has the longest average international shipping time from South Africa (57 days), and Suriname has the highest average shipping costs from South Africa (USD 6 200), followed by Barbados, Venezuela and Trinidad and Tobago (all USD 6 100).

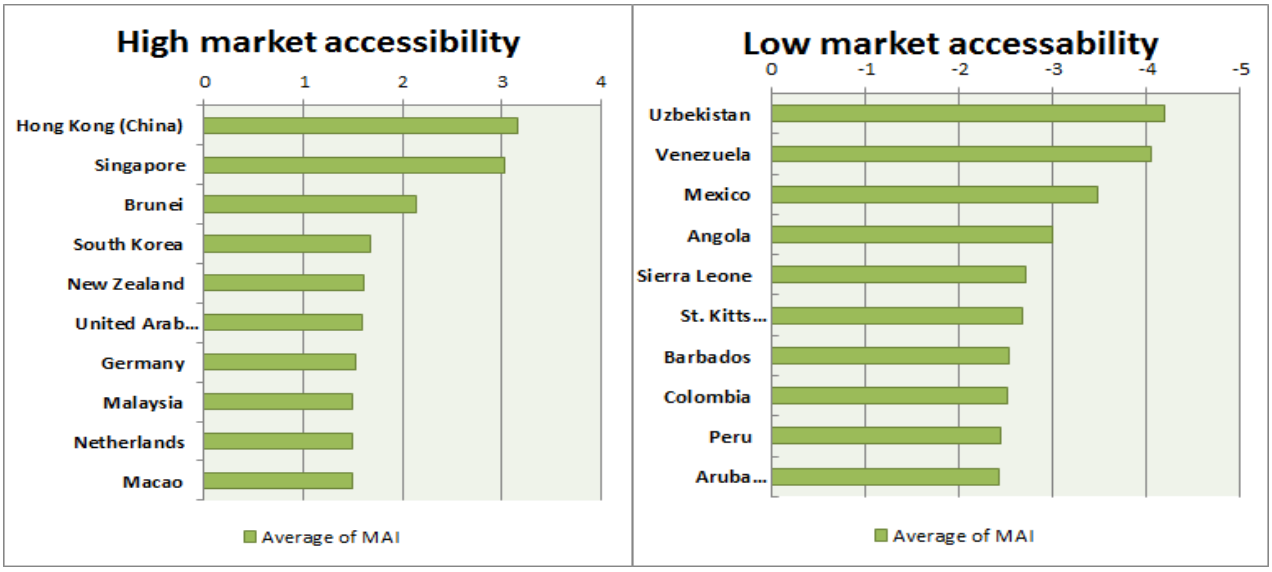


Figure 3.2: High- and low market accessibility for South African agricultural products

3.2 Trade and investment policy

Countries raise barriers against importers for several reasons. Firstly, import tariffs are an important source for government revenue, especially in developing countries. Secondly, non-tariff measures (NTMs), such as technical restrictions, are often raised to protect the health and safety of consumers. However, most importantly, tariffs, quotas and NTMs are all employed as part of industrial policies designed to support local (infant) industries. However, a country's barrier against imports to protect the development of local industries can discourage its own export competitiveness by increasing the cost of inputs and final goods as well as reducing the availability of imports. Furthermore, trade barriers distort producer and consumer prices and choices, which often translate into the misallocation of resources and the protection of inefficient local industries (Reis & Farole, 2012).

3.2.1 Import restrictions on agricultural products

This section will highlight and benchmark some of the import restrictions implemented by South Africa, with a special focus on agricultural products. Table 3.1 provides a summary of the import tariffs on agricultural products for South Africa and the peer countries. When considering simple average final bound tariffs, South Africa is in the higher point of the scale at 39.5%, the only country with a higher final bound tariff is Thailand. Final bound tariffs are the legally binding ceilings after reductions have been made as a result of trade negotiations. South Africa's average MFN applied tariffs are at a similar level than that of Argentina and Brazil, which are also major competitors in terms of South African agricultural exports. When comparing the trade weighted average tariff, South Africa is third highest after Thailand and Brazil, indicating a relatively strong protection for imports of agricultural products. South Africa also rates relatively high in terms of tariff rate quotas (TRQs), and the highest when comparing special safeguards. It can therefore be concluded that South Africa has higher import restrictions compared to its peers in this case.

Table 3.1: Summary of agricultural import tariffs of South African and the peer countries

Tariff	*Year*	ARG	AUS	BRA	CHL	EU	SA	THA	USA
Simple average final bound (%)		32.4	3.4	35.4	26.0	13.5	**39.5**	40.6	5.2
Simple average MFN applied (%)	*2009*	10.3	1.3	10.2	6.0	13.5	**8.9**	22.6	4.7
Trade weighted average (%)	*2008*	7.8	2.9	10.6	6.1	9.8	**10.0**	12.5	4.1
Imports in billion USD	*2008*	2.8	8.3	7.5	4.2	124.1	**4.8**	7.5	83.1
Ag: Tariff quotas (in %)		0.0	1.2	0.3	0.1	15.1	**10.2**	4.6	9.5
Ag: Special safeguards (in %)		0.0	0.9	0.0	0.0	23.8	**37.5**	7.7	2.9

Source: WTO, ITC and UNCTAD (2013)

Table 3.2 summarises the average final bound duties per product group. As is evident from the table, South Africa is above the peer country average for all products. Bound duties for animal and especially dairy products are exceptionally high compared with the peer countries. This indicates a strong potential for import protection for local agricultural producers keeping in mind that South African agricultural producers do not receive any direct support from government.

Table 3.2: Average final bound duties (in %) in South Africa and the peer countries per agricultural product group

Agricultural product group	ARG	AUS	BRA	CHL	EU	SA	THA	USA	Ave
Animal products	26.5	1.5	37.8	25.0	24.1	**41.2**	29.9	2.6	23.6
Dairy products	35.0	4.2	48.8	29.2	52.3	**93.2**	33.0	21.1	39.6
Fruit, vegetables, plants	33.8	3.7	34.1	25.0	10.3	**27.0**	55.3	5.5	24.3
Coffee, tea	34.2	3.9	34.1	25.0	6.6	**65.4**	55.5	3.7	28.6
Cereals & preparations	32.8	2.7	42.9	25.2	21.3	**47.7**	33.0	3.7	26.2
Oilseeds, fats & oils	34.6	3.1	34.7	29.2	5.1	**47.5**	37.9	4.7	24.6
Sugars and confectionery	33.9	7.5	34.4	43.3	26.4	**73.4**	47.8	15.0	35.2
Cotton	35.0	1.2	55.0	25.0	0.0	**60.0**	4.5	4.8	23.2
Other agricultural products	31.0	2.1	28.9	25.0	4.3	**12.7**	28.0	1.1	16.6

Source: WTO, ITC and UNCTAD (2013)

Table 3.3 shows the Most Favoured Nation (MFN) applied duties per product group. The MFN import duty reflects the import tariff faced by exporting countries that are not part of a Free Trade Agreement (FTA) with the trading partner. South Africa has the third highest MFN applied duties for animal products (13%) after the EU and Thailand; for all other products except for

oilseeds, fats and oils, and cotton South Africa's MFN applied duties are below the average of the peer countries.

Table 3.3: MFN applied duties of South Africa and the peer countries per agricultural product group

Agricultural product group	ARG	AUS	BRA	CHL	EU	SA	THA	USA	Ave
Animal products	8.9	0.4	8.9	6.3	23.2	**13.0**	28.7	2.5	11.5
Dairy products	15.1	3.6	15.1	6.0	49.4	**9.0**	24.8	16.2	17.4
Fruit, vegetables, plants	9.8	1.6	9.7	6.0	11.3	**9.6**	30.5	4.9	10.4
Coffee, tea	13.3	1.0	13.3	6.0	6.6	**7.8**	28.3	3.6	10.0
Cereals & preparations	12.2	1.3	11.8	6.0	17.5	**9.6**	18.1	4.0	10.1
Oilseeds, fats & oils	8.5	1.6	8.0	6.0	5.5	**7.7**	10.0	4.2	6.4
Sugars and confectionery	17.5	1.9	16.5	6.0	27.5	**3.9**	22.3	9.1	13.1
Cotton	6.4	0.0	6.4	6.0	0.0	**4.8**	0.0	2.5	3.3
Other agricultural products	7.5	0.3	7.6	6.0	4.7	**1.8**	9.4	1.1	4.8

Source: WTO, ITC and UNCTAD (2013)

3.2.2 Export restrictions of agricultural products

Export control measures, such as export taxes, licences, quotas, or permits, penalise exporters of restricted products. By affecting the price and quantity of trade, export control measures cause trade distorting effects in the same way as import restrictions.

South African agricultural export products have to comply with local legislation such as the Agricultural Product Standards Act (No. 119 of 1990), the Agricultural Pests Act (No. 36 of 1983), the Standards Act (No. 8 of 2008) and the Consumer Protection Act (No. 68 of 2008). The compliance with these standards as well as market specific standards is conducted by the Perishable Products Export Control Board. Therefore, apart from local standards, agricultural export standards have to comply with mandatory and voluntary product and process standards as specified by the import market.

South African export control measures applicable to agricultural exports are summarised in Table 3.4. From the table, it is evident that most export control measures for agricultural

products evolve around compliance with international treaties (e.g. CITES), export permits and inspection certificates that have limited cost effects on exports. Consequently, no export quotas, taxes, and levies are in place that could significantly raise the cost of agricultural exports. Moreover, the vast majority of agricultural products are not subject to any export restrictions. It can be concluded that export restrictions do not negatively impact on South Africa's agricultural trade competitiveness.

Table 3.4: Broad overview of South Africa's export control measures on agricultural products

Product group (HS chapter)	Export control measure
01: Live animals	• Compliance with CITES • Export permit DAFF / DEA
02: Meat	• Not prohibited if exported to ship's stores / as canned products • Export permit DAFF • Compliance with CITES • Exports of dried meat (biltong) to Zimbabwe / Malawi subject to the production of an import permit
03: Fish	• Live fish: export permit DEA • No exports from KZN • Salted snoek: inspector approval / not required for ship's stores • Crustaceans, molluscs: export permit DEA • Perlemoen: CITES / MLRA permits DEA • Compliance with CITES
04: Dairy	• Butter, cheese and curd: prohibited from exportation except to ship's stores or to BLNS / inspection certificate • Fowl eggs: prohibited from exportation except to ship's stores or to BLNS / inspection certificate • Ostrich eggs: prohibited from exportation except under permit
05: Products of animal origin	• Compliance with CITES
06: Live trees, plants, bulbs flowers	• Compliance with CITES • Export permit DAFF
07: Vegetables	• Potatoes: prohibited from exportation except to ship's stores, to BLNS or less than 20 kg • Frozen vegetables: inspection certificates • Dried vegetables: inspection certificate
08: Fruit	• Export certificate PPECB • Sweetened/cooked fruit and nuts: inspection certificate • Dried fruit: prohibited from exportation except to ship's stores or to BLNS / inspection certificate

(Table 3.4 continued)

09: Coffee, tea	None
10: Cereals	• Wheat, rye, barley, oats, maize, sorghum, buckwheat, miller (unworked): prohibited from exportation except to ship's stores, to BLNS or less than 20 kg / export permit
11: Products of the milling industry	• Maize products, starches: prohibited from exportation except to ship's stores, to BLNS or less than 20 kg / export permit • Flour to which any foreign substance has been added: prohibited from exportation
12: Oil seeds / -fruits and fodder	• Ground nuts: agricultural products standard certificate • Sunflower seed, other oil seeds: prohibited from exportation except to ship's stores, to BLNS or less than 20 kg / export permit • Green wattle: export permit ITAC • Seeds used for sowing: certificate DAFF • Plants used for perfumery: certificate DoH • Apricot, peach and palm kernels: inspection certificate • Hay , straw used for packing: certificate proofing 4 month storage / sterilization • Fodder crops: prohibited from exportation except to ship's stores, to BLNS or less than 20 kg / export permit
13: Lac, gums, resins, vegetable saps and extracts	• Opium and other habit forming drugs: prohibited:
14: Vegetable products nes	• Silver wattle bark, blaarbas: prohibited except on written permission from DEA:
15: Animal, vegetable fats and oils	None
16: Preparations of meat / fish	• Beef sausages: not prohibited if exported to ship's stores / as canned products • Canned meat: inspection certificate • Compliance with CITES • Perlemoen: CITES / MLRA permits DEA
17: Sugar and sugar confectionary	• Cane sugar, lactose, glucose: export permit DTI
18: Cacao and cacao preparations	None
19: Preparations of cereal, flour, starch, milk, pastry	• Pasta: inspection certificate
20: Preparations of vegetables and fruit	• Prepared tomatoes, mushrooms: inspection certificate • Other vegetables prepared other than by vinegar: inspection certificate • Jams, fruit jellies, marmalade: inspection certificate • Canned apricots, peaches, pineapples, pears and loganberries: inspection certificate / prohibited if exported to any country other than BLNS, Zimbabwe, Malawi • Fruit juices: inspection certificate
21: Food products nes	• Extracts of coffee: not prohibited if exported to ship's stores • Soups: inspection certificate • Food additives: not prohibited if exported to ship's stores /quantity < 70 kg
22: Beverages	• Grape must: sample must be extracted under excise supervision / authorization of shipment by Institute for viticulture and Denology • Wine: prohibited if exported to EU except with export permit DAFF

(Table 3.4 continued)

23: Residues and waste from food industry	• Perlemoen: CITES / MLRA permits DEA • Pet food: export permit DAFF
24: Tobacco an tobacco products	• Raw tobacco: inspection certificate
50: Silk	None
51: Wool, animal hair	• Compliance with CITES
52: Cotton	None
53: Vegetable fibres	None

Source: SARS (2012)

3.2.3 Exchange rate

According to Auboin and Ruta (2011), exchange changes can have strong effects on the economy, as they may affect the structure of output and investment; lead to inefficient allocation of domestic absorption and external trade; influence labour market and prices; and alter external accounts. Therefore, exchange rate shifts affect international trade in both direct and indirect ways.

Local currencies of South Africa and the peer countries are compared to the USD in Figure 3.3. Compared to the European Union, Australia, Brazil and Argentina, the South African rand performed the weakest against the USD from 1995 to 2013. This has a negative effect on the purchasing power of South Africa. Although South Africa has a disadvantage in purchasing power compared to above-mentioned countries, it has an advantage when compared to India, Thailand and Chile.

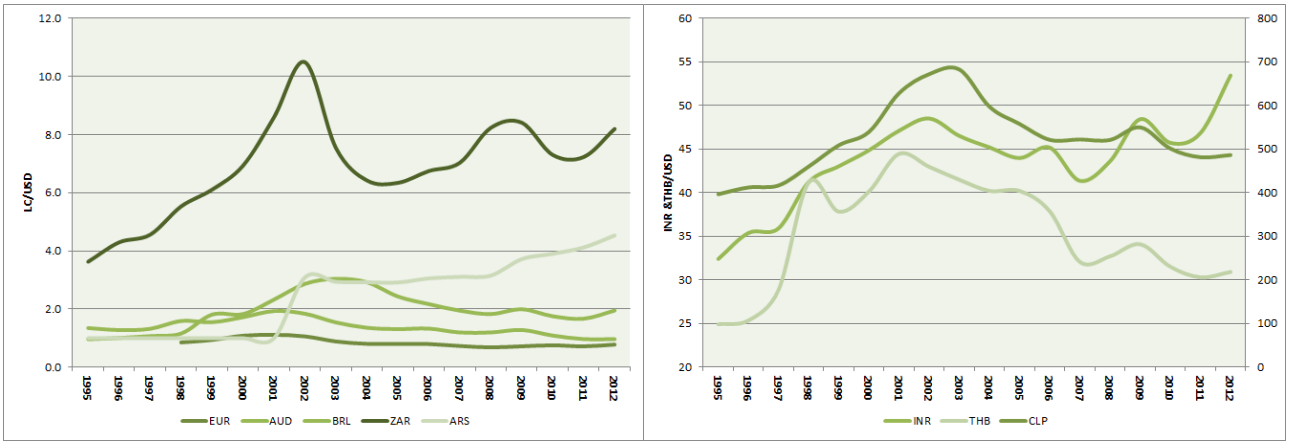


Figure 3.3: Exchange rate of the local currencies of South Africa and the peer countries to the USD

Source: IMF (2013)

The real effective exchange rate (REER) can be defined as the weighted average of a specific country's currency relative to an index of other major currencies adjusted for inflation. The weights are determined by comparing the relative trade balances. The REER is often a key variable when considering macro-economic interactions between economies. The REER plays an important role when comparing competitiveness between countries. Exchange rate depreciation will typically stimulate exports and curtail imports, while appreciating exchange rates are detrimental to export and will encourage imports.

Figure 3.4 depicts the REER for South Africa and selected peer countries[13]. The figure shows that South Africa experienced a relatively large volatility in the REER, which is not constrictive for its international agricultural trade. Until 2008, it experienced a drop, making exports relatively expensive and imports relatively inexpensive. Between 2008 and 2010, the REER increased rapidly, after which it stabilised.

[13] No data was available for Brazil, Argentina, India and Thailand.

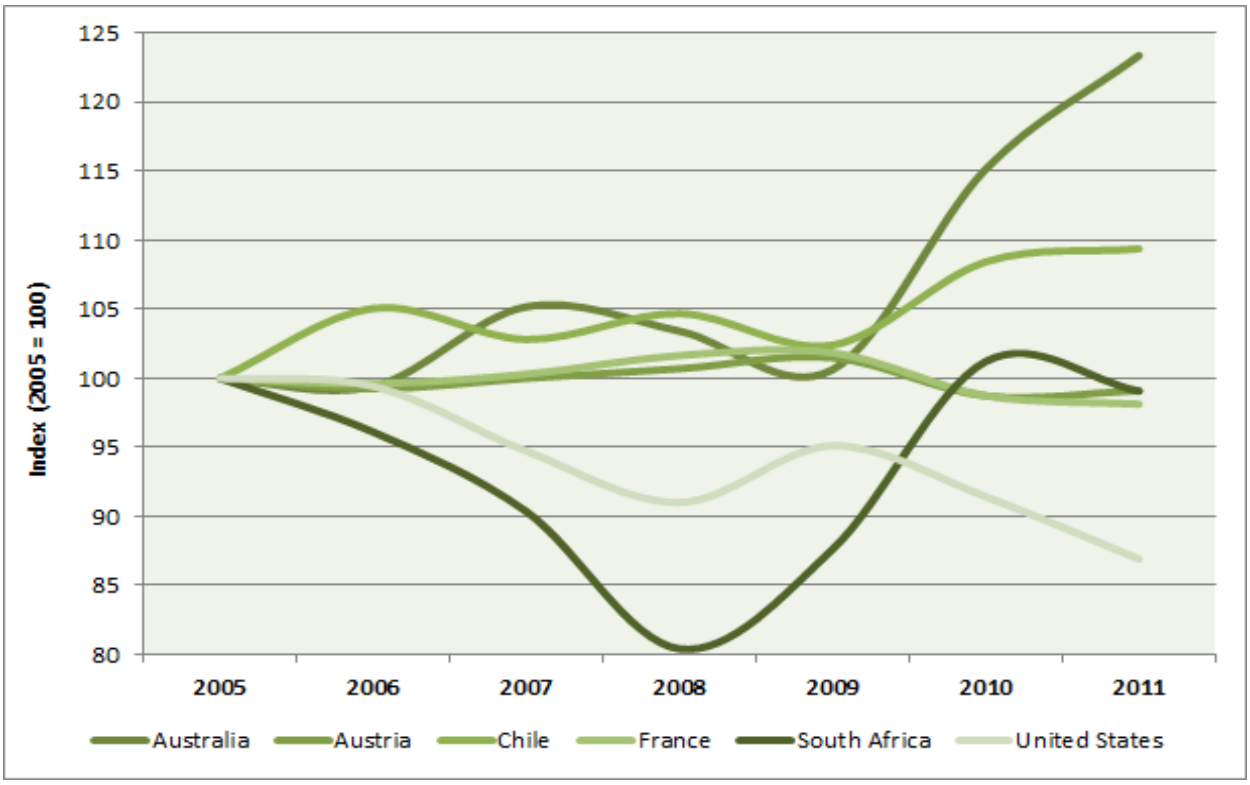


Figure 3.4: Trend in the REER of South Africa and the peer countries (index, 2005 = 100)
Source: World Bank (2013b)

3.2.4 Foreign investment policy

In simple terms, foreign direct investment (FDI) is investment into production or business in one country by a company from another country. Foreign investment and trade have strong links as foreign investors tend to be overrepresented in the export sector. Foreign investors in the agricultural sector can play a critical role in introducing greater competition in local markets, improve input competitiveness, and enhance the anti-export bias. Therefore, foreign investment policy can enhance the competitiveness of South Africa's agricultural exporters.

To reflect the effectiveness of foreign investment policy, Table 3.5 shows the foreign equity ownership indices for a number of sectors in South Africa and the peer countries. An index score of 100 indicates that full foreign ownership is allowed. When considering foreign investment in the agriculture and forestry sector, only India and Thailand limit foreign ownership. According to the World Bank, Thailand is among the world's most restrictive

economies when it comes to foreign investment. South Africa only has restrictions in the mining, oil and gas, telecom and media sectors. Countries that restrict foreign ownership will typically not attract as much FDI as countries with open sectors. Apart from the media sector (68), the global average foreign equity ownership index is relatively open. Therefore, it is evident that South Africa's foreign investment policy is not limiting the trade competitiveness of its agricultural sector.

Table 3.5: Foreign equity ownership index in South Africa and the peer countries

Sector	ARG	BRA	CHL	FRA	IND	SA	THA	USA	IAB global average
Mining oil and gas	100	100	100	100	100	74	49	100	92
Agriculture and forestry	100	100	100	100	50	100	49	100	95.9
Light manufacturing	100	100	100	80	81.5	100	87.3	100	96.6
Telecom	100	100	100	100	74	70	49	100	88
Electricity	100	100	100	100	100	100	49	100	87.6
Banking	100	100	100	100	87	100	49	100	91
Insurance	100	100	100	100	26	100	49	100	91.2
Transport	79.6	68	100	59.6	59.6	100	49	85	78.5
Media	30	30	100	20	63	60	27.5	62.5	68
Construction, tourism and retail	100	100	100	100	83.7	100	66	100	98.1
Health care and waste management	100	50	100	100	100	100	49	100	96

Source: World Bank (2010)

3.2.5 Starting a foreign business

Apart from regulations on foreign ownership, FDI in the agricultural sector is also determined by the processes and bureaucracy faced by non-resident investors when setting up a local business in South Africa. Therefore, this section will benchmark some of these requirements.

It takes eight procedures and 65 days to establish a foreign-owned limited liability company (LLC) in Johannesburg, South Africa; this is slower than both Investing Across Borders' (IAB) regional average for Sub-Saharan Africa and the IAB global average. In addition to the procedures required of domestic companies, a foreign company establishing a subsidiary and

wishing to engage in international trade must obtain a trade license from the Department of Trade and Industry (DTI), which usually takes 38 days. An authorised dealer (one of the four biggest commercial banks in South Africa) must endorse as 'non-resident' the parent company's share certificate for shares held in the subsidiary. This process takes five days. The business registration documents are available online, but the application process is not yet available online. In South Africa, there are no regulatory restrictions on the composition of the boards of the directors or on the appointment of managers. The Broad-Based Black Economic Empowerment (BBBEE) initiative, while not enforceable, affects the type of business a company may be entitled to engage in. BBBEE urges companies to have meaningful representation of previously disadvantaged groups. If a foreign company is involved in import and export transactions as well as services, it is allowed to hold a Customer Foreign Currency (CFC) account. Only authorised dealers may initiate transactions on a CFC account. Foreign currency accruals from exports may be held in the CFC account for a maximum of 180 days, during which the amount can be set off against an import transaction. At the end of the 180-day period, any unutilised balance must be converted to rand. There is no minimum capital requirement for South African companies, only a nominal fee of USD 1.

Table 3.6 compares South Africa and the peer countries based on the ease of the processes and time it requires to establish a company or business in the foreign country. Generally, it will take longer to start a business by a non-resident than for a resident. A country's regulatory environment can be a deciding factor in whether an international company will choose to invest in that particular country. Apart from Brazil, it takes the longest to start a foreign business in South Africa (65 days), despite the lower number of procedures (eight). Regardless of the lengthy time, South Africa has a relatively high ease of establishing a foreign business index of 79, above the international average of 65. The access to land in South Africa is currently an issue that will get more complicated in the future rather than improve. This is due to the sensitive land issues rooted in historical traditions that drive the current land redistribution and ownership policies of agricultural land.

Table 3.6: Comparison of starting a business

Indicator	ARG	BRA	CHL	FRA	IND	SA	THA	USA	IAB Global Average
Starting a foreign business-ease of establishment index	65	62.5	63.2	77.5	76.3	78.9	60.5	80	64.5
Time (days)	50	166	29	9	46	65	34	11	42
Procedures (number)	18	17	11	7	16	8	9	8	10
Strength of lease right index	79.3	85.7	85.7	99.9	92.9	84.5	80.7	100	N/A
Strength of ownership rights index	100	100	100	100	87.5	100	62.5	100	N/A
Access to land information index	44.4	33.3	33.3	47.4	15.8	47.4	27.8	50	N/A
Availability of land information index	85	75	80	90	85	85	70	95	N/A
Time to lease private land (days)	48	66	23	91	90	42	30	44	N/A
Time to lease public land (days)	112	180	93	142	295	304	128	92	N/A

Source: World Bank (2010)

3.3 Domestic policies and institutions

Domestic policies and institutions that collectively form an integral part of the business environment in which individual firms in the agricultural sector operate, play an important role in either enabling or inhibiting their ability to be competitive in international markets. The domestic business environment affects export competitiveness in two ways. Firstly, via distortions of the micro-economic incentives of firms, this ultimately affects their decisions on producing and exporting. Secondly, the business environment can affect the fixed and variable cost of firms (World Bank, 2013a). The focal point of the following sub-sections will be on evaluating the business environment of the broader agro-food sector at the hand of potential distortions to microeconomic incentives and costs. These are measured according to a variety of indicators that will be benchmarked between South Africa and the selected peer countries.

3.3.1 Business regulatory environment

Business regulations are central to the business environment provided that they affect a company through the different stages of development; that is, from starting the business and hiring and firing workers to paying taxes, dealing with customs, and complying with licenses and permits requirements (World Bank, 2013a). Most of the distortions to microeconomic incentives and additional cost inflicted onto local firms are normally a result of an ineffective or over-regulated business environment.

The Doing Business Report of the World Bank (2013a) provides a ranking for the 'effectiveness' (i.e. the ease of doing business) of 184 countries. The ranking is based on a set of indicators that measure and benchmark business regulations of one country against others. These indicators can be grouped into two types, namely:

i. Indicators related to the strength of institutions relevant to business regulation
ii. Indicators related to the complexity and cost of regulatory processes.

The first set of indicators focuses on the legal and regulatory framework for getting credit, protecting investors, enforcing contracts and resolving insolvency. The second set of indicators focuses on the cost and efficiency of regulatory processes for starting a business, dealing with construction permits, getting electricity, registering property, paying taxes and trading across borders (World Bank, 2013a).

According to the latest Doing Business Report of 2013, South Africa is ranked 39th in terms of the ease of doing business out of the 185 countries, measured from June 2011 to June 2012. This is a significant improvement on the previous position of 59th measured from June 2010 to June 2011. The ranking of South Africa compared to the peer countries for 2011/2012 is shown in Figure 3.5. Among its developing peer countries, South Africa ranks relatively favourably; only Chile and Thailand rank higher.

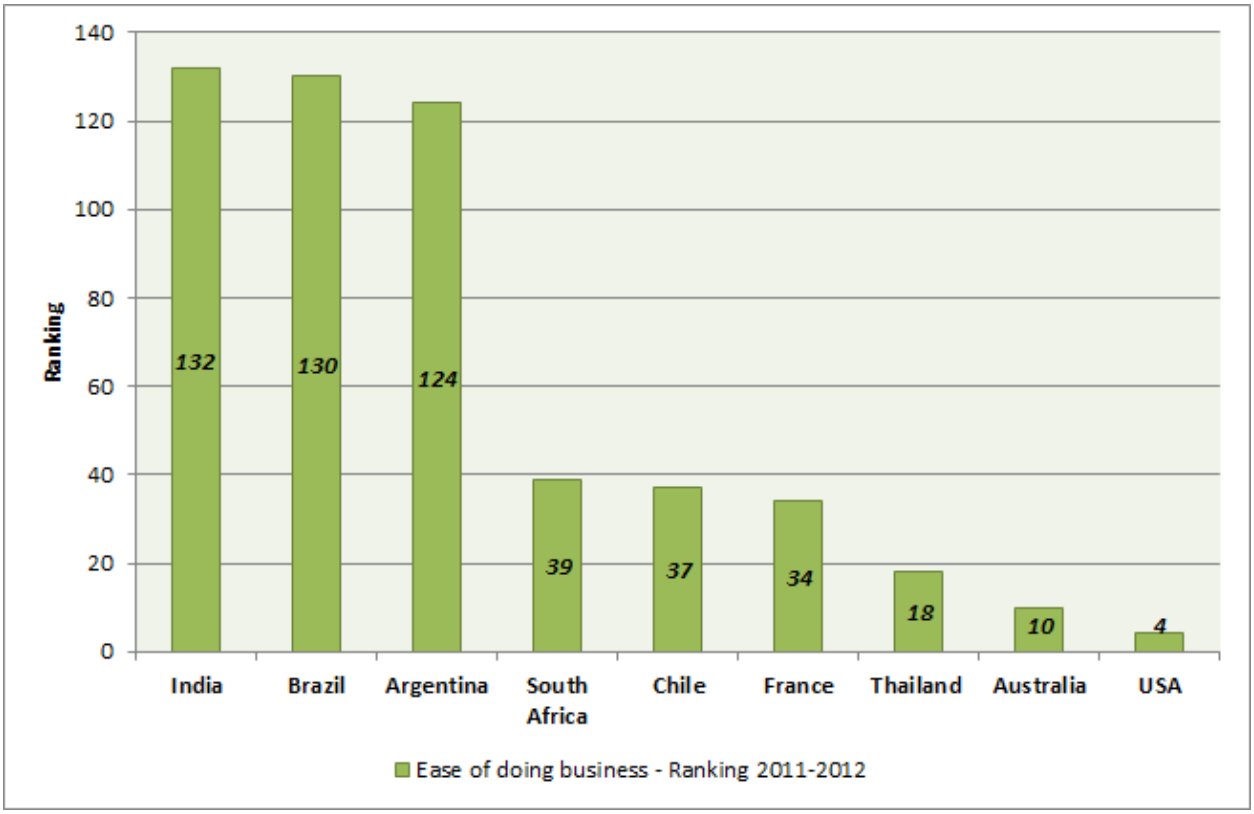


Figure 3.5: Ranking for "ease of doing business" of South Africa and the peer countries
Source: World Bank (2013a)

South Africa's position in the ease of doing business index can be ascribed to a good relative global performance with regard to getting credit (ranked 1st) and protecting investors (ranked 10th). On the counter side, the country performs comparatively poor on getting electricity (ranked 150th) and trading across borders (ranked 115th).

The indicators in the Doing Business Report capturing the cost and efficiency of regulatory processes consist of the administrative process of starting a business, dealing with construction permits, getting electricity, registering property and resolving insolvency. Table 3.7 shows that South Africa's performance of these indicators declined in 2011/2012 compared to 2010/2011. Especially the ranking on getting electricity and starting a business decreased; and both can be attributed to the slow improvement in the number of days it takes to start a business or get electricity. Table 3.7 also shows the relative performance of South Africa compared to the

selected peer countries. South Africa ranks relatively mediocre overall. However, compared to the developing peer countries, South Africa's regulatory processes are (apart from getting electricity) efficient and relatively inexpensive.

Table 3.7: Indicators of cost and efficiency of regulatory processes

Indicator	Ranking									
	SA			CHL	BRA	ARG	AUS	US	THA	IND
	2010-2011	2011 - 2012	Dif.	2011-2012						
Starting a business	44	53	+9	32	121	154	2	13	85	173
Dealing with construction permits	31	39	+8	84	131	171	11	17	16	182
Getting electricity	124	150	+26	40	60	74	36	19	10	105
Registering property	76	79	+3	55	109	135	37	25	26	94
Resolving insolvency	77	84	+7	98	143	94	18	16	58	116

Source: World Bank (2013a)

Slight improvements in the strength of legal institutions relevant to the regulation of business also made a positive contribution towards South Africa's overall improvement in terms of the ease of doing business ranking in 2011/2012 compared to 2010/2011. Table 3.8 shows that the largest improvement was recorded by the indicator for paying taxes, which moved from the 44th to the 32nd position. The other two indicators on the strength of legal institutions, namely getting credit and the enforcement of contracts, remained almost unchanged. The table also shows a comparison of the strength of institutions between South Africa and the peer countries and reveals that the country compares comparatively well with regard to the strength of its institutions. However, from a global perspective, there is room for significant improvement with regard to South Africa's institutional strength around enforcing contracts.

Table 3.8: Comparison of the strength of institutions

Indicator	Ranking									
	SA			CHL	BRA	ARG	AUS	US	IND	THA
	2010-2011	2011-2012	Diff	2011/2012						
Paying taxes	44	32	-12	36	156	149	48	69	152	96
Enforcing contracts	81	82	+1	70	116	48	15	6	184	23
Getting credit	1	1	0	53	104	70	4	4	23	70

Source: World Bank (2013a).

It should be noted that the countries that rank the highest in the ease of doing business index are not those where there is no regulation, but those where governments have managed to create rules that facilitate interactions in the marketplace without needlessly hindering the development of the private sector (World Bank, 2013a). In other words, it can be concluded that South Africa, despite improving, is still lagging behind most of the selected peer countries in terms of combining efficient and regulatory processes with strong legal institutions.

3.3.2 Agricultural producer support

Various policies and programmes positively impact on agricultural production in the form of direct and indirect monetary transfers. These support measures can result in an unlevelled playing field in international agricultural trade and are therefore distorting competitiveness. The indicator capturing these transfers to agriculture for a large number of countries is the Producer Support Estimate (PSE) of the Organisation of Economic Cooperation and Development (OECD). The PSE is reflected as the transfers from consumers and taxpayers represented as a percentage of total gross farm receipts[14]. This section will compare the support to agriculture measured by the PSE in South Africa and the selected peer countries[15].

[14] For a complete overview of the PSE methodology, please see: http://www.oecd.org/agriculture/agricultural-policies/producerandconsumersupportestimatesdatabase.htm.

[15] No PSE data is available for Brazil, Argentina, Thailand and Chile.

Important and wide ranging reforms liberalising domestic and foreign trade and lowering support to agriculture were implemented in the 1990s. Figure 3.6 shows that the current level of agricultural support in South Africa (PSE of 5%) is low relative to the OECD average and is comparable to the level of support in Australia, Brazil, Russia and China. The majority of the support in South Africa was due to government payments towards land redistribution

Border protection has been significantly relaxed, which is consistent with an emphasis on new regional trade agreements. The level of support is uneven across commodities and sugar is by far the most supported commodity. Budgetary payments have been reduced and there has been a shift in payments away from established commercial farms to the development of the small farm sector that is emerging from the land reform.

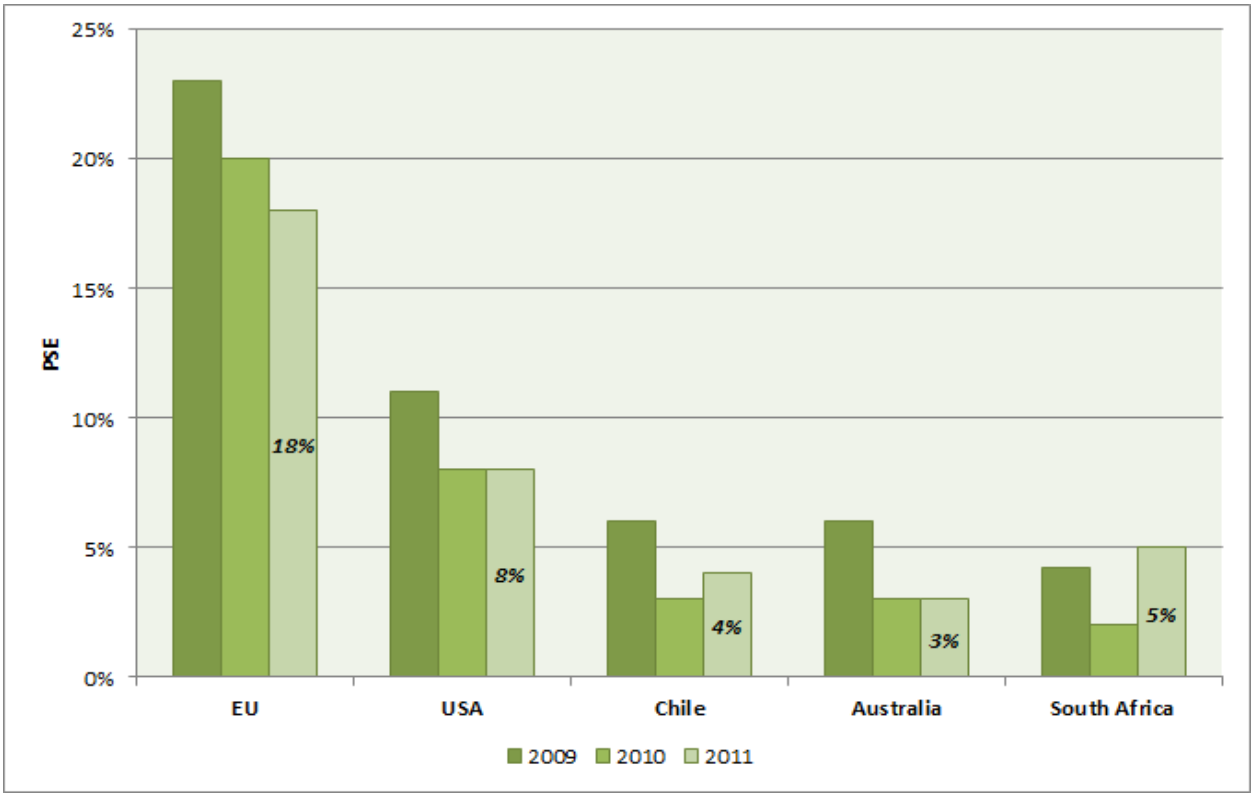


Figure 3.6: Trends in Producer Support Estimates of South Africa and selected peer countries
Source: OECD (2013)

3.3.3 Taxation

Although taxation is necessary in all countries, it can have a negative impact on the export competitiveness of the agricultural sector by effectively raising the costs at which exporters must sell in the export market. Furthermore, excessive tax rates can create a disincentive to invest or an incentive to invest in capital over labour (Reis & Farole, 2012). This section will provide a brief overview of the main taxes imposed on South Africa's agricultural sector.

Income tax:

- Income tax is imposed on profits derived from agricultural operations. The rate of tax is determined by the vehicle that the operations are carried on through. If the farming operations are carried on by a natural person as a sole proprietor, a progressive tax rate of up to 40% may apply. In the case of farming operations carried on in a trust, the profits derived are taxed at 40%, unless it vests in another person in which case the profits will be taxed at the rate applicable to the beneficiary. Lastly, if the activities are conducted in a company, the profits are taxed at 28%, while distributions of the profits in the form of dividends may be subject to dividends taxed at 15%.
- Livestock and produce are treated as trading stock and must be taken into account at standard values for tax purposes. This has the effect that natural increases and losses will be reflected in the tax calculation, irrespective of whether it has realised in cash or not.
- Disposals of farming assets (including farming land) are subject to capital gains tax at a rate that depends on the vehicle that the farming operations are carried on through.

Value-added tax:

- The supply of agricultural products would constitute the supply of goods and would be subject to VAT at a rate of 14%.

Given the nature of the activities undertaken by the agricultural sector, this sector may also indirectly be affected by income tax and value-added tax imposed on other industries, such as

the insurance industry and the financial intermediary industry (in particular those entities involved in providing production financing and hedging facilities). In addition to income tax and value-added tax, farming activities in South Africa may be subject to other taxes, for example customs and excise taxes (on cross-border transactions), property taxes and transfer duties.

Tax incentives or concessions can create a competitive edge for South Africa's agriculture sector. These measures include the following:

Income tax:

- In determining taxable income, expenditure of a capital nature will generally not be deductible. The First Schedule to the Income Tax Act, however, allows a deduction in determining taxable income of a farmer where certain expenditure is incurred in respect of development of the farming infrastructure, such as expenditure related to the building of roads used in connection with farming operations, which would otherwise not have been deductible due to its capital nature.
- Accelerated allowances are available in respect of certain capital assets used for carrying on farming operations. This includes a 50/30/20 allowance in respect of machinery, implements, utensils and other articles owned and used for farming operations that is available in terms of section 12B of the Income Tax Act.
- Farmers (natural persons or executors of deceased estates) may elect to be taxed at a special rate of tax that is based on the average rate over the preceding five-year period. Extraordinary levels of profit realised during years of assessments could therefore be taxed at the rate that ordinary levels of profit were taxed.
- Certain measures are available to provide relief from taxation when livestock is sold on account of drought, stock disease or damage to grazing by fire or plague to defer the tax implications of such disposals.
- In some instances, a reduced value may be placed on the bona fide land for purposes of determining capital gains tax on its disposal, resulting in a reduction in capital gains tax.

Value-added tax:

- Given the cyclic nature of farming operations, concessions are available as to the timing of VAT payments to be made by persons whose enterprise consists of agricultural, pastoral or other farming activities.
- Certain supplies made to a person to be used or consumed for agricultural, pastoral or other farming purposes (for example, animal feeds and fertilisers) are zero-rated. This would have the effect of reducing the input costs related to the farming operations.
- In addition, the supply of certain basic foodstuffs (such as dried silo screened mealies) may be zero-rated when supplied by a farmer. This would mean that the farmer is not required to charge output tax on the supply made by him, but would be entitled to deduct input tax in respect of his input costs to produce the goods supplied.
- Rebates and refunds of fuel levies and road accident fund levies are available in respect of distillate fuel (generally known as diesel rebates) used for, among others, farming purposes. These diesel rebates can be off-set against the VAT liability of the farmer.

As was discussed in section 3.3.1, South Africa's performance with regard to paying taxes was comparatively low. Figure 3.7 elaborates on this by making a comparative analysis of tax rates in South Africa and the selected peer countries. Although the tax rate is often not of concern to large multinationals, as they use various instruments to reduce their tax burden, it is of great importance of small to medium-sized local agricultural businesses. The figure clearly shows that the tax burden for firms in South Africa is comparatively low; only Chile has a lower taxation. Therefore, taxation seems not likely to have a negative impact on South Africa's agricultural trade competitiveness.

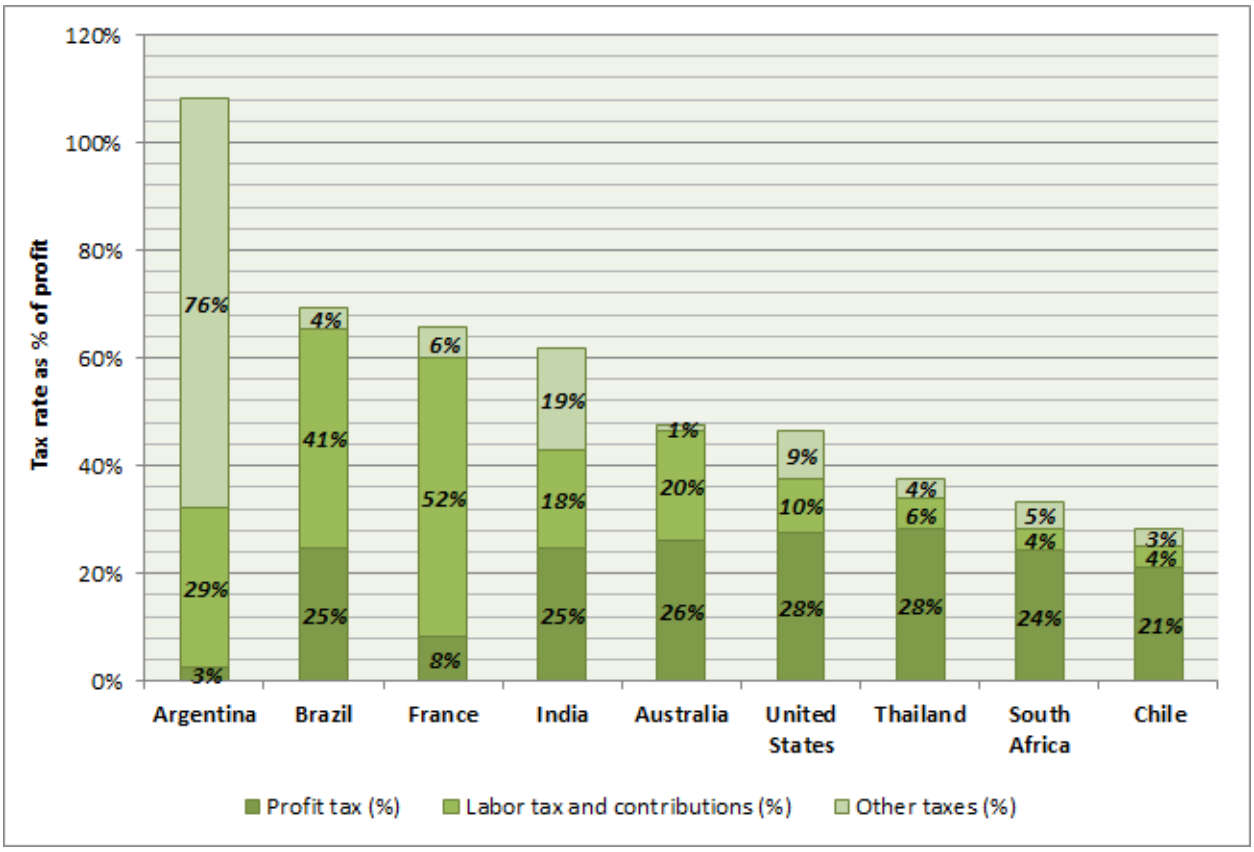


Figure 3.7: Comparison of taxation in South Africa and selected peer countries
Source: World Bank (2013b)

Apart from the level of taxes, the administrative processes involved with paying taxes are also very important in determining its impact on competitiveness. Consequently, extensive and bureaucratic tax processes can also imply a significant raise of the cost for firms in the agricultural sector. Figure 3.8 shows the time in hours per year it takes to prepare, file and pay taxes in South Africa and the selected peer countries. It is evident from the figure that the administrative burden of paying taxes in South Africa is relatively low and even lower than in all the developing peer countries. Generally, South Africa's corporate tax regime has a relative positive impact on South Africa's agricultural trade competitiveness.

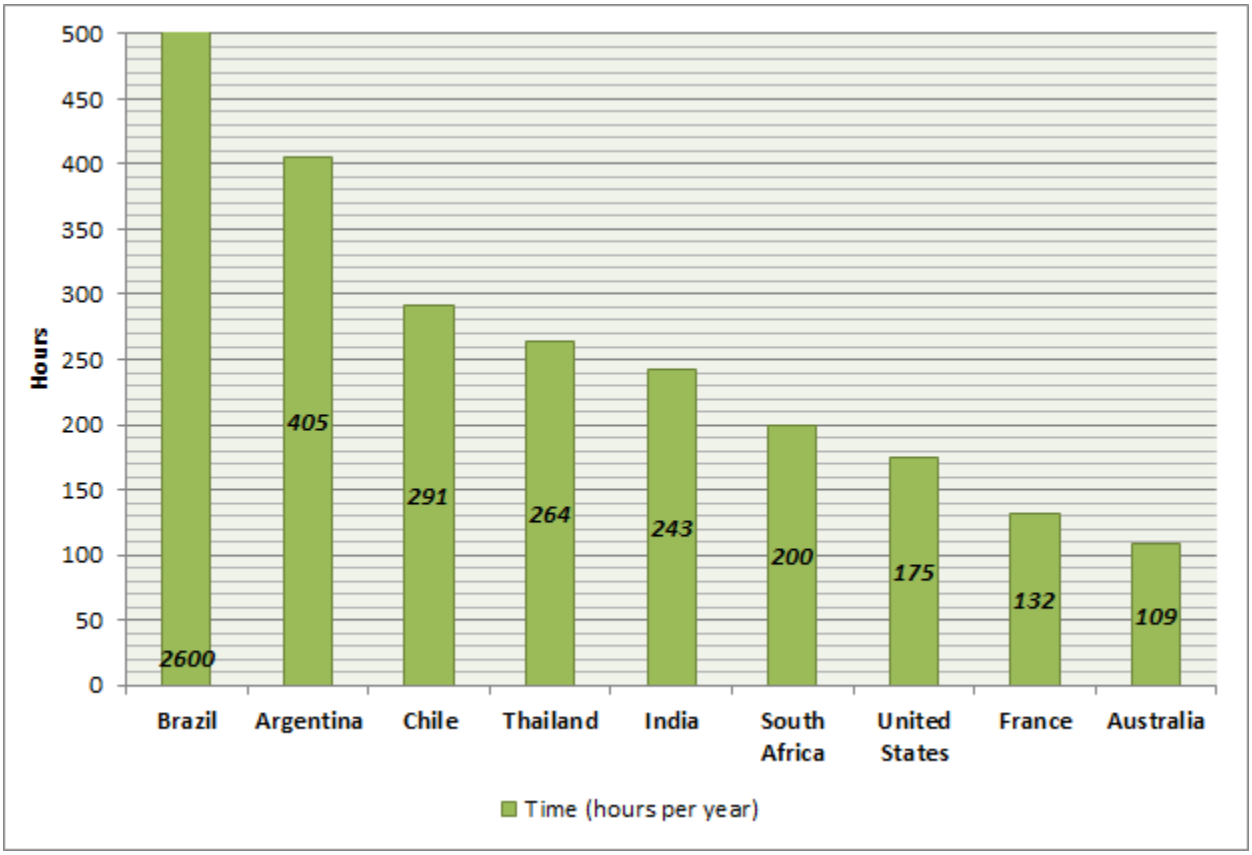


Figure 3.8: Comparison of the time required to prepare, file and pay taxes in South Africa and selected peer countries

Source: World Bank (2013b)

3.3.4 Competition

Uncompetitive business practices constrain the export competitiveness of domestic agricultural firms. This can be through domestic import cartels, monopolies, control over import and export facilities, vertical market restraints, private standard-setting activities, and uncompetitive practices of industry associations. Robust competition in the home market positively contributes to the international competitiveness of agricultural businesses by (Reis & Farole, 2012):

i. Driving prices towards marginal cost;
ii. Ensuring that firms produce at the lowest attainable cost; and
iii. Providing incentives for firms to innovate and introduce new products and production methods

Furthermore, transparent and effective competition policies can enhance the attractiveness of an economy to foreign investors. Therefore, this section will discuss and compare the market efficiency in South Africa and the peer countries. Figure 3.9 shows the market efficiency rating for each country according to the latest Global Competitiveness Index (WEF, 2013). It is evident that South Africa compares relatively well, even compared to developed peer countries. This is a positive indication for its agricultural trade competitiveness.

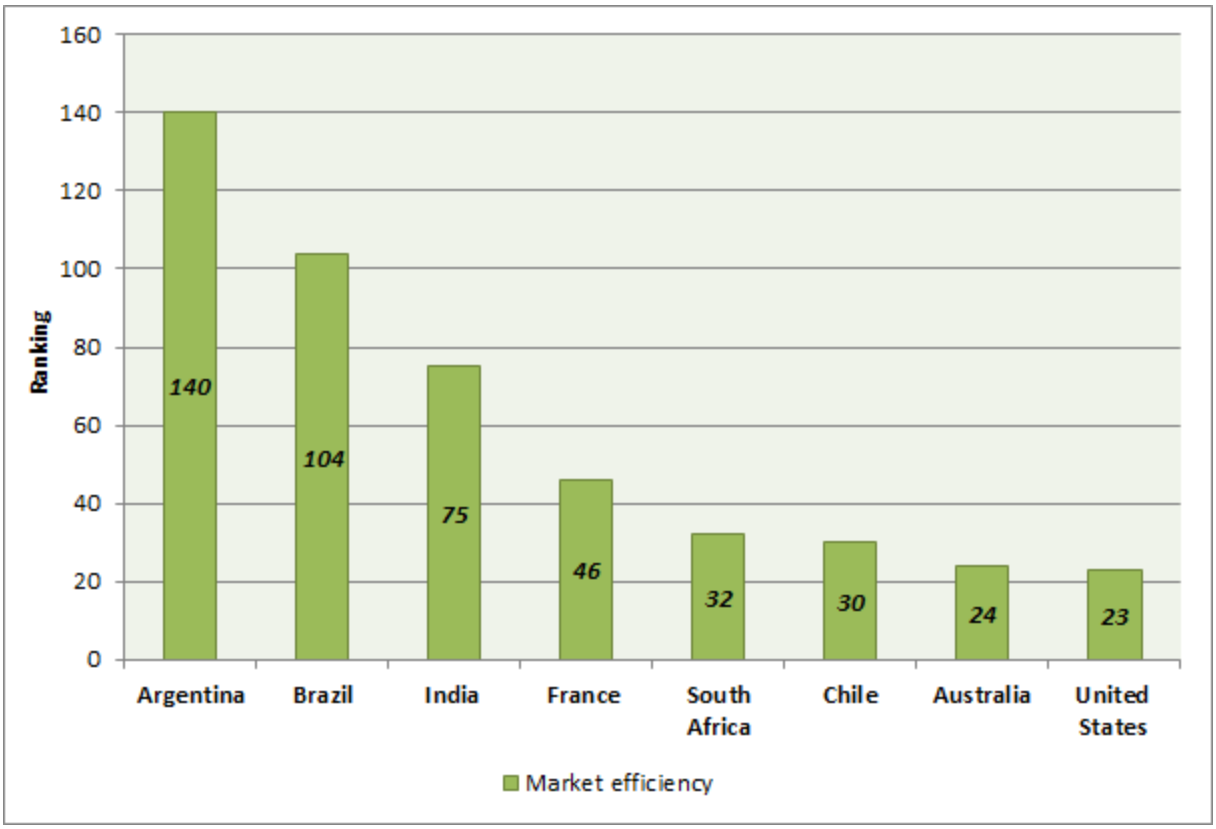


Figure 3.9: Comparison of the market efficiency in South Africa and selected peer countries
Source: WEF (2013)

The market efficiency rating consists of three individual elements, namely the intensity of local competition, the extent of market dominance, and the effectiveness of anti-monopoly policy. Table 3.9 provides the ranking for these three elements for each of the selected countries. A higher ranking indicates a positive contribution to market efficiency. South Africa performs comparatively poorly with regard to the intensity of local competition; only the competitive

intensity in Argentina and Thailand is lower. With regard to the extent of market dominance, the country performs on an average level. This is remarkable, since the effectiveness of South Africa's anti-monopolistic policy is rated as among the best in the world.

Table 3.9: Market efficiency indicators for South Africa and selected peer countries

County	Intensity of local competition	Extent of market dominance	Effectiveness of anti-monopoly policy
South Africa	51	39	6
United States	18	19	17
Australia	6	35	18
France	28	33	20
Chile	39	112	25
Brazil	45	31	32
India	34	27	34
Argentina	117	101	136
Thailand	54	79	80

Source: WEF (2013)

3.3.5 Governance

Policy-makers play an important role in shaping future developments on competitiveness. One of its most important roles is the protection against private diversion, including factors such as the rule of law, bureaucratic quality, corruption, the risk of expropriation by the state and the enforcement of contracts (Hall & Jones, 1999). The institutional framework provides the foundation for individuals, companies and government to interact and produce goods. Consequently, if the rights of agriculture are not guaranteed, the risk of necessary investments and innovations will be too high. Against this background, this section will evaluate and benchmark the performance of South Africa with regard to a variety of governance indicators on the judicial system, rule of law, and corruption.

In the latest Global Competitiveness Index (WEF, 2013), South Africa is ranked 27th globally in terms of the independence of its judiciary. Figure 3.10 shows that it performs comparatively

well in relation to the selected peer countries. Only Chile and Australia have a more independent judiciary system.

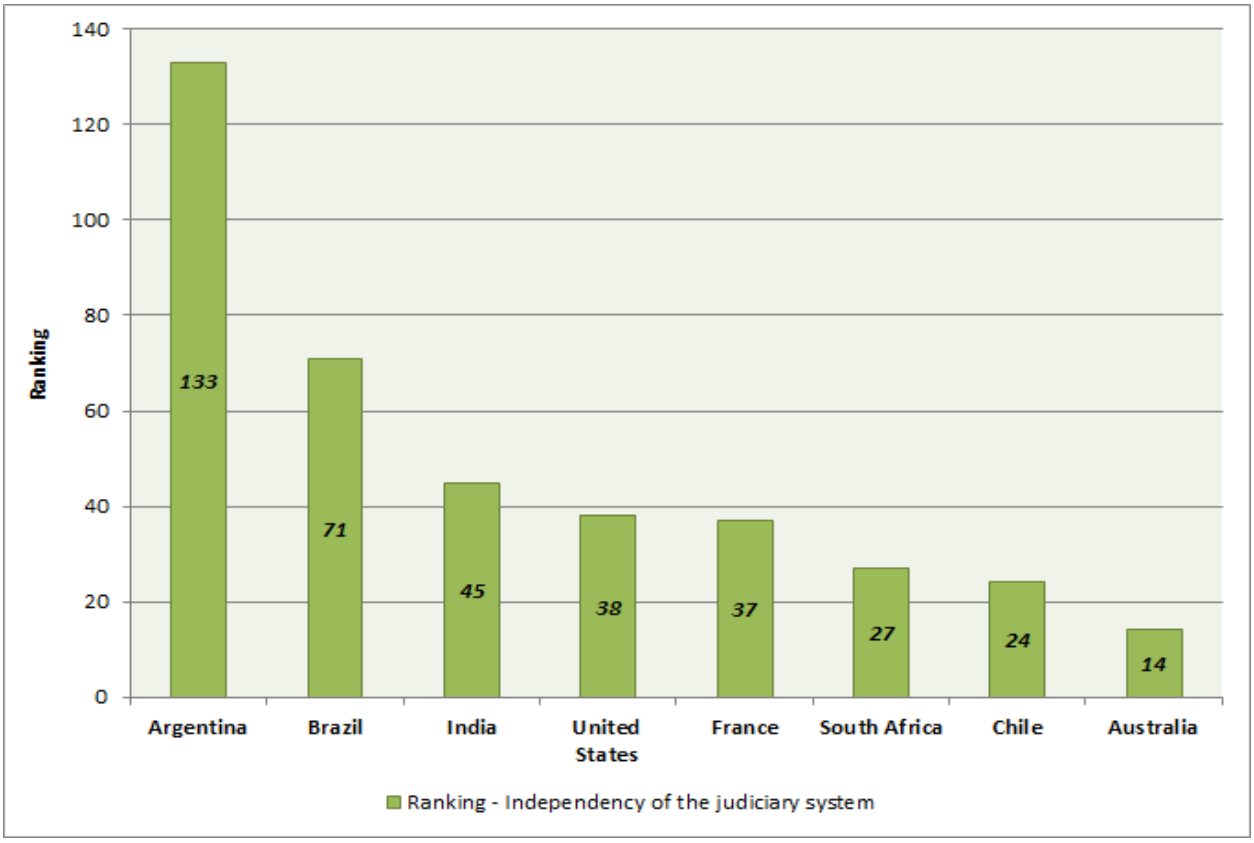


Figure 3.10: Independency of the judiciary system in South Africa and selected peer countries
Source: WEF (2013)

The strength of the rule of law can be measured by the exposure to criminal activities of local firms. South Africa's poor security situation is reflected by Figure 3.11. Its ranking with regard to the cost of business due to crime is significantly poor as well as its ranking with regard to the efficiency of the police service. This therefore has a serious negative impact on the agricultural trade competitiveness in terms of additional security costs and risk management of investments.

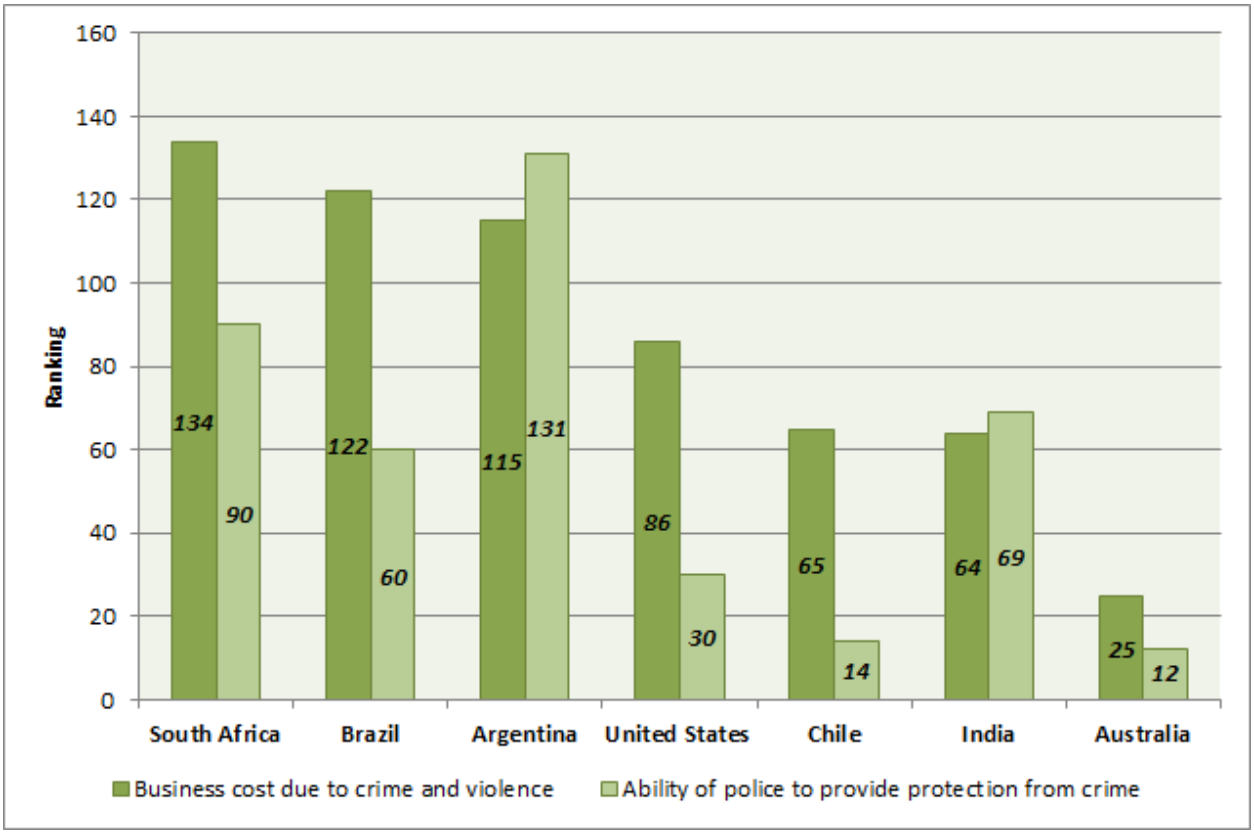


Figure 3.11: Strength of the rule of law in South Africa and the selected peer countries
Source: WEF (2013)

The effects of a relatively weak rule of law are also evident from results reported in the Enterprise Survey (World Bank, 2013c). According to the survey, South African firms lose 0.8 percent on average of product value when supplying the local market, due to theft, compared to Brazil (0.7%), Argentina (0.5%) and Chile (0.5%). Unfortunately, no statistics are available for the other peer countries.

Another indicator used to gauge the level of governance is the accountability of the public sector, measured by the perception of corruption. The Corruption Perception Index, as published by the Transparency International (2012), ranks South Africa 69th out of 176 countries in terms of the perceived public sector corruption. Figure 3.12 makes a comparison of the global rankings of selected countries according to this index. This figure shows that South Africa performs relatively average with regard to the perception of public sector corruption.

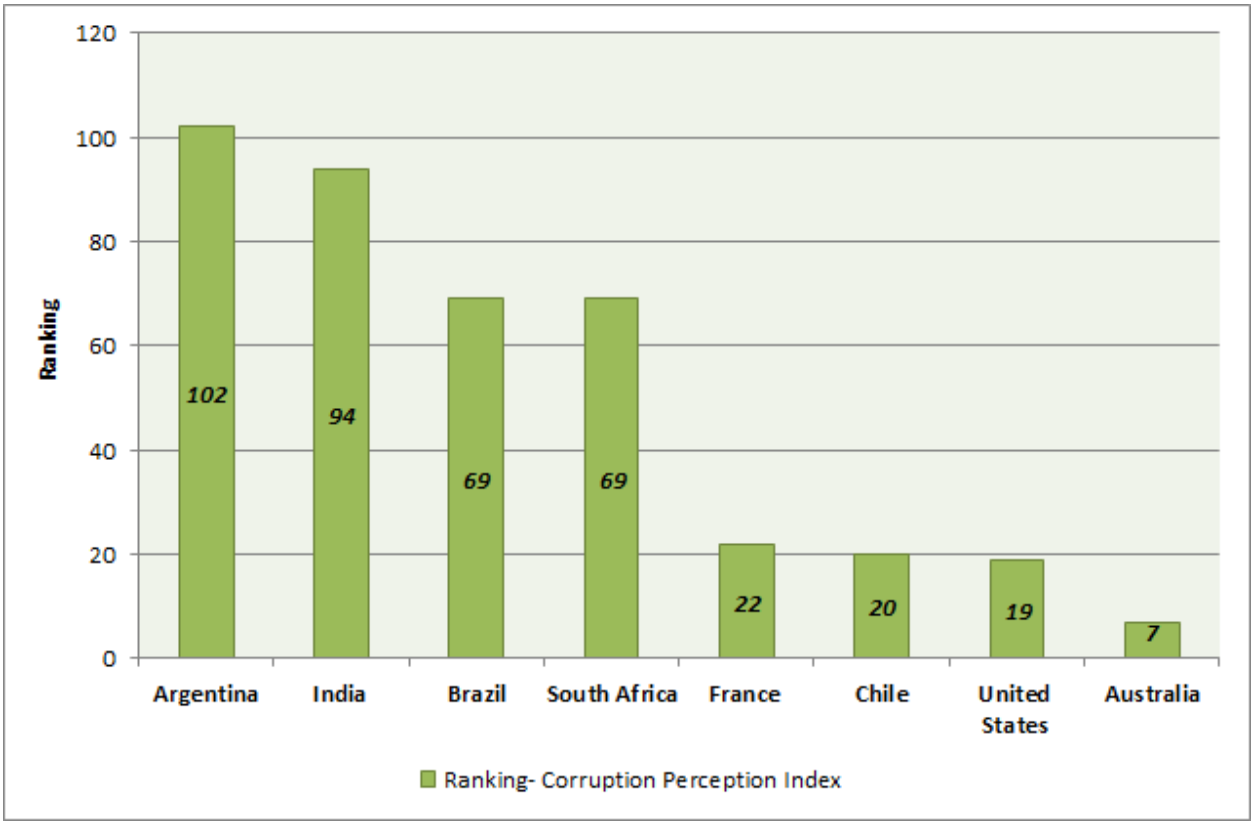


Figure 3.12: Ranking of South Africa and the selected peer countries according to the Corruption Perception Index

Source: Transparency International (2012)

Table 3.10 provides an indication of the key corruption indicators for South Africa and the peer countries. Although South Africa has the highest proportion of firms paying bribes to obtain government contracts, only 16.9 percent of all firms are of the opinion that corruption in South Africa is a major constraint. In other words, one may argue that firms in South Africa regard the payment of bribes as part of doing business and not as a constraint to their competitiveness.

Table 3.10: Main corruption indicators for South African and selected peer countries[16]

Indicator	SA (2007)	ARG (2010)	BRA (2009)	CHL (2010)	IND (2006)	World (2010)
	% of firms					
Bribes to public officials 'to get things done'	15.1	18.1	11.9	0.7	47.5	24.8
Bribes to secure government contracts	32.2	10.3	0.7	0.7	23.8	22.9
Value of bribe to secure government contract (% of contract value)	1.7	0.7	1.2	0	1	2.2
Bribes to get import license	2.7	7	1.2	0.3	46	13.3
Identifying corruption as a major constraint	16.9	57.1	69.9	17.5	25.6	36.3

Source: World Bank (2013c)

3.4 Access to finance

Capital is regarded as the most important input to the agricultural production process. At the same time, it is also one of the largest barriers that agricultural businesses face in their everyday operations. In most cases, it is not 'access' itself that poses a problem, but rather the cost of credit, i.e. the actual interest charged and the collateral requirements. In other words, high actual interest rates or collateral requirements may result in the available credit not being a 'feasible' option given the greater risk and often longer payment terms involved in exporting. This directly impacts on South Africa's agricultural trade competitiveness. For example, firms that are unable to finance working capital will most probably discontinue production and participation in the export markets or the lack of affordable finance will lead to lower investments and subsequently non-optimal production structures (Reis & Farole, 2012).

The following sub-sections will focus on the cost and collateral requirements of capital and the potential impact thereof on South Africa's agricultural trade competitiveness

[16] The USA, France and Australia were excluded due to data limitations.

3.4.1 General investment capital

The trend in the cost of capital for South Africa and the peer countries[17], which can be measured by the real interest rate[18], is shown in Figure 3.13. The figure shows that the cost of capital for firms in South Africa and the peer countries is more or less similar in the period from 2009 to 2011. Only Brazil experienced exceptionally high real interest rates. Consequently, the cost of investment capital is not a limiting factor in South Africa's agricultural trade competitiveness.

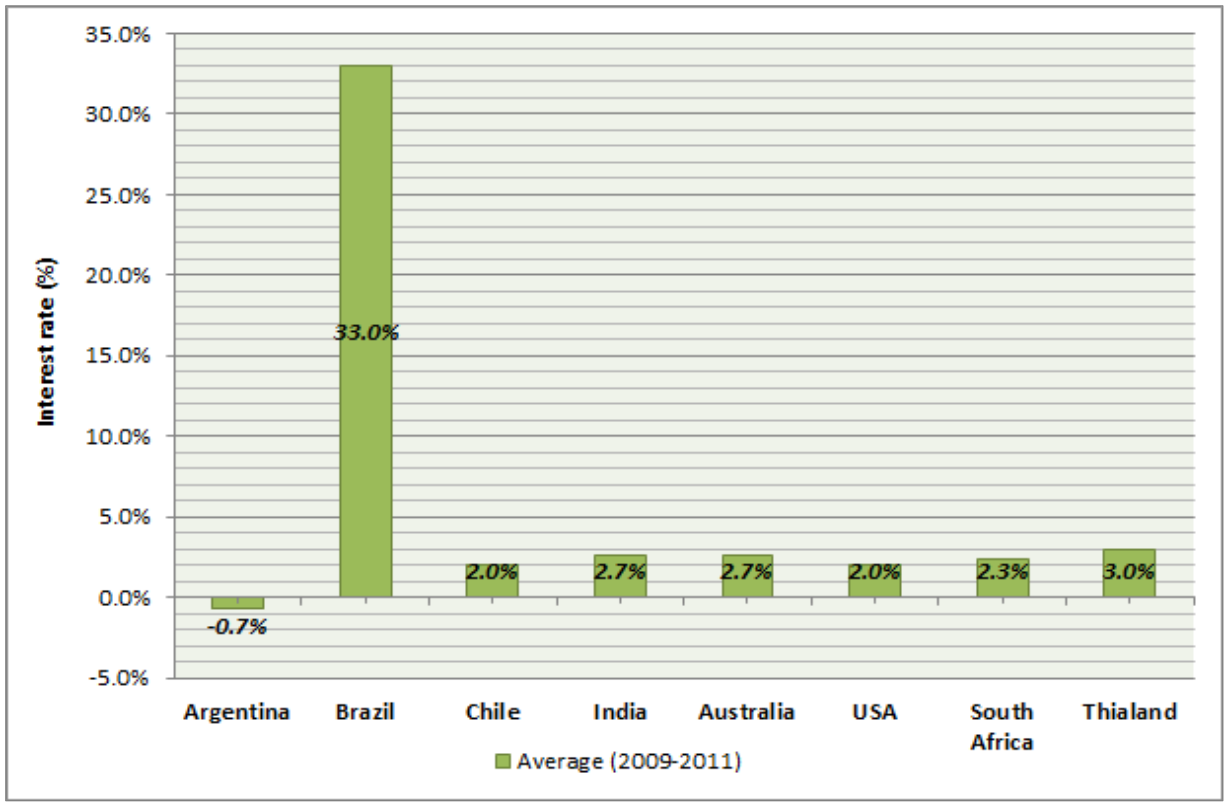


Figure 3.13: Real interest rates in South Africa and the selected peer countries (2009-2011)
Source: World Bank (2013b)

However, access to credit is not only determined by the cost of the loan, but also by the collateral requirements. Table 3.11 shows a comparison of the collateral requirements for loans

[17] France and Thailand were excluded from the comparison due to data limitations.
[18] Real interest rate is the lending interest rate adjusted for inflation as measured by the GDP deflator.

in South Africa and the selected peer countries[19]. The table shows that 71 percent of all loans in South Africa are collateral loans. In other words, seven out of every ten applicants are required to provide a form of security to recover potential losses should the applicant default. This is relatively high compared to most of the selected peer countries, with only India (74%) reporting a higher proportion of collateral loans. Moreover, the amount of collateral required by financial institutions in South Africa amounts to 104 percent on average of the value of the loan that is applied for. Compared to the peer countries, South Africa's collateral requirements (i.e. value as percentage of loan) is rather low (see Table3.11). As a result, it may be argued that the loan requirements in South Africa are fairly similar to that of the peer countries, i.e. a relatively higher proportion of collateral loans, but a relatively lower collateral value is required. Therefore, South Africa does not have a comparative disadvantage in terms of obtaining capital for investment.

Table 3.11: Cost of capital indicators for South Africa and the selected peer countries

Indicator	SA (2007)	BRA (2009)	ARG (2010)	CHL (2010)	IND (2006)	World (2010)
	%					
Loans requiring collateral	71.2	31.6	65.3	51.1	74.3	77.9
Value of collateral needed (% of loan amount)	103.6	71.0	181.3	209.5	126.0	167.9

Source: World Bank (2013c)

3.4.2 Working capital

In addition to the traditional credit lines obtainable through traditional financial institutions, capital factoring can also be pursued as a way of obtaining working capital. Capital factoring is the process whereby companies are forwarding cash against their debtor's books. The fees associated with factoring normally range between 15 and 20 percent of the invoice value and may differ from one company to another and between countries. Specific statistics on the fees are unfortunately not available for comparison. However, businesses who find it difficult to establish a line of credit with a bank often make use of capital factoring as a viable alternative.

[19] The USA, France and Australia were excluded from the comparison due to data limitations.

According to the Factors Chain International's Business Day Survey conducted in 2011, capital factoring in South Africa is growing as an alternative to bank credit. This is also evident from Table 3.12, which depicts the trends in capital factoring in South Africa and the peer countries. Compared to the peer countries, South Africa reported the highest average growth rate in terms of capital factoring between 2005 and 2011. It should be noted that, although local capital factoring is growing at a notable rate, it remains relatively small compared to most of the peer countries. Nonetheless, the availability of capital factoring provides agricultural firms with an alternative that can contribute towards financial sustainability and improved trade competitiveness over the long run.

Table 3.12: Size and growth of working capital factoring in South Africa and the selected peer countries (2005-2011)

		2005	2006	2007	2008	2009	2010	2011
SA	Value (EUR '000)	5.5	7.8	9.7	12.1	13.5	15.1	21.3
	Growth (%)		29	20	20	10	11	29
AUS	Value (EUR '000)	23.1	27	33	32.5	39.4	44.9	57.4
	Growth (%)		14	18	-2	18	12	22
CHL	Value (EUR '000)	9.5	11.3	14.6	15.8	14.5	16.4	21.5
	Growth (%)		16	23	8	-9	12	24
BRA	Value (EUR '000)	20	20	21	22	29	49	45
	Growth (%)		0	5	5	24	41	-9
FRA	Value (EUR '000)	89	100	121	135	128	153	174
	Growth (%)		11	17	10	-5	16	12
ARG	Value (EUR '000)	89	100	121	135	128	153	174
	Growth (%)		17	8	-2	-6	4	26
THA	Value (EUR '000)	36	40	42.5	48.7	33.8	67	79
	Growth (%)		10	6	13	-44	50	15
USA	Value (EUR '000)	94.1	96	97	100	88.5	95	105
	Growth (%)		2	1	3	-13	7	10

Source: Factor Chain International (2012)

3.5 Labour market, skills and technical efficiency

At the heart of competitiveness in the agricultural sector is the productivity of farms and processors in producing food, feed and fibre. According to Porter (1990), productivity is the

only meaningful concept of competitiveness at national level. Trade can affect a country's productivity by affecting firm-level productivity directly, or by distorting the allocation of resources across the economy (Reis & Farole, 2012). A firm's productivity depends on two important factors, namely the cost and quality of inputs as well as the efficiency at which these inputs are employed (Reis & Farole, 2012). Therefore, this section will discuss both these factors from an agricultural perspective.

3.5.1 Agricultural labour market and skills

One of the main determinants of the cost of producing food is labour, including both cost and skills (Reis & Farole, 2012). The agricultural sector is one of the most labour intensive sectors of the South African economy and is one of the more labour intensive agricultural sectors globally. Figure 3.14 shows the trend in agricultural employment since 1970. The figure shows that the number of employees in the agricultural, forestry and fishery sector remained more or less stagnant until 2000, but dropped significantly from 1 799 000 to 750 000 by 2011. A major driver for this decline in employment numbers is the increase in labour cost combined with the availability and adoption of more capital intensive agricultural production systems. The aforementioned is especially prevalent in the crop production sector, as the horticultural sector is labour intensive during harvesting activities.

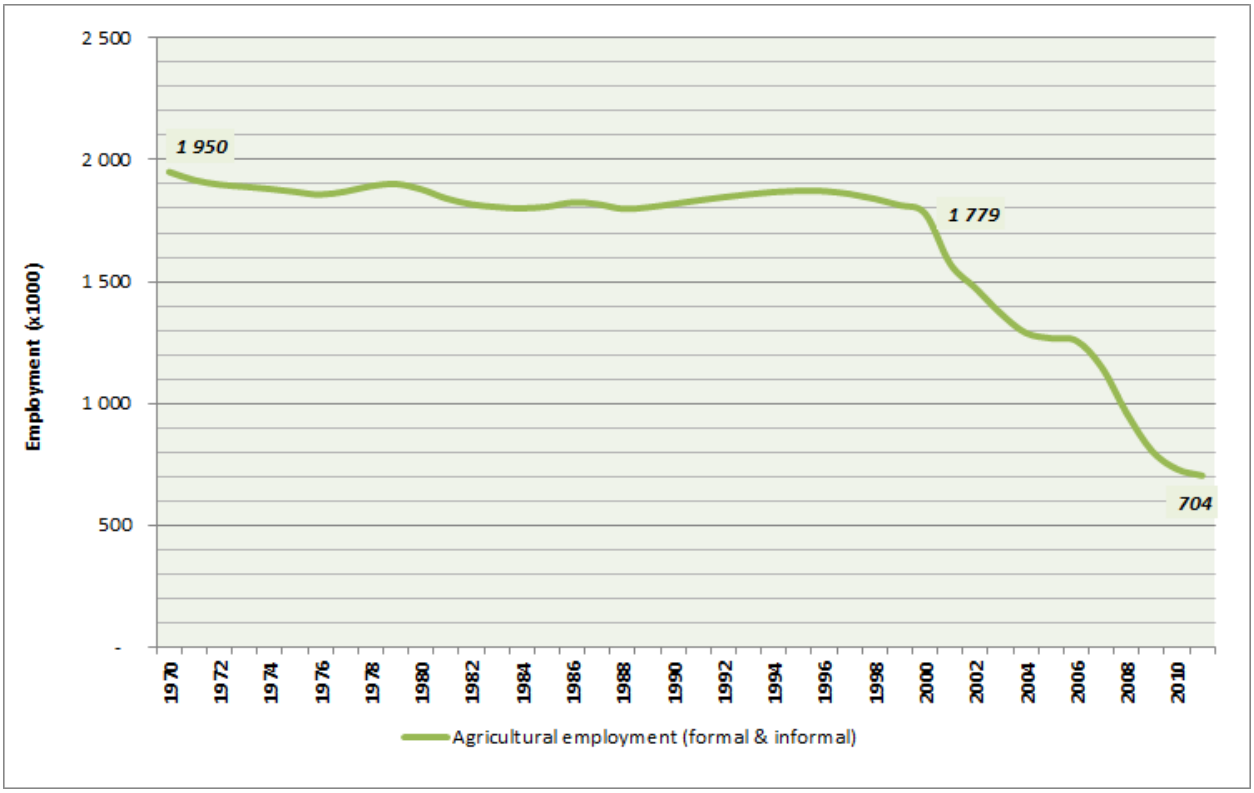


Figure 3.14: Employment in South Africa's (primary) agricultural, forestry and fisheries sector
Source: Quantec (2013)

Table 3.13 presents the distribution of labour categories in the agricultural, forestry and fishery sector for the period 2008 to 2012. This provides a good indication of the level of skills prevalent in the sector. It is evident from the table that approximately 73 percent of employment in the sector is unskilled. The share of high-skilled labour in agriculture is very small and this is cumbersome for the competitiveness of the South African agricultural sector as they drive innovation and efficiency.

Table 3.13: Distribution of labour categories in agriculture, forestry and fisheries

Labour categories	Average proportion: 2008-2012
Elementary occupations	72.5
Skilled agricultural and fishery workers	9.5
Plant and machine operators and assemblers	7.6
Legislators, senior officers and managers	3.7
Craft and related trade workers	2.5
Technicians and associate professionals	1.1
Service workers and shop and market sales workers	1.1
Clerks	1.4
Professionals	0.5
Total	**100**

Source: BFAP (2012)

An important determinant of the cost of production is labour cost. Figure 3.15 provides an overview of the minimum wages in South Africa and the peer countries. These are not agricultural specific, but do provide an indication of the relative differences in labour cost. The figure shows that labour cost in South Africa is relatively high compared to the developing peer countries. Because of the relatively large labour component in the production cost of primary agriculture products, this may imply that South Africa is less cost effective than other global producers. Therefore, this will have a negative impact on its trade competitiveness.

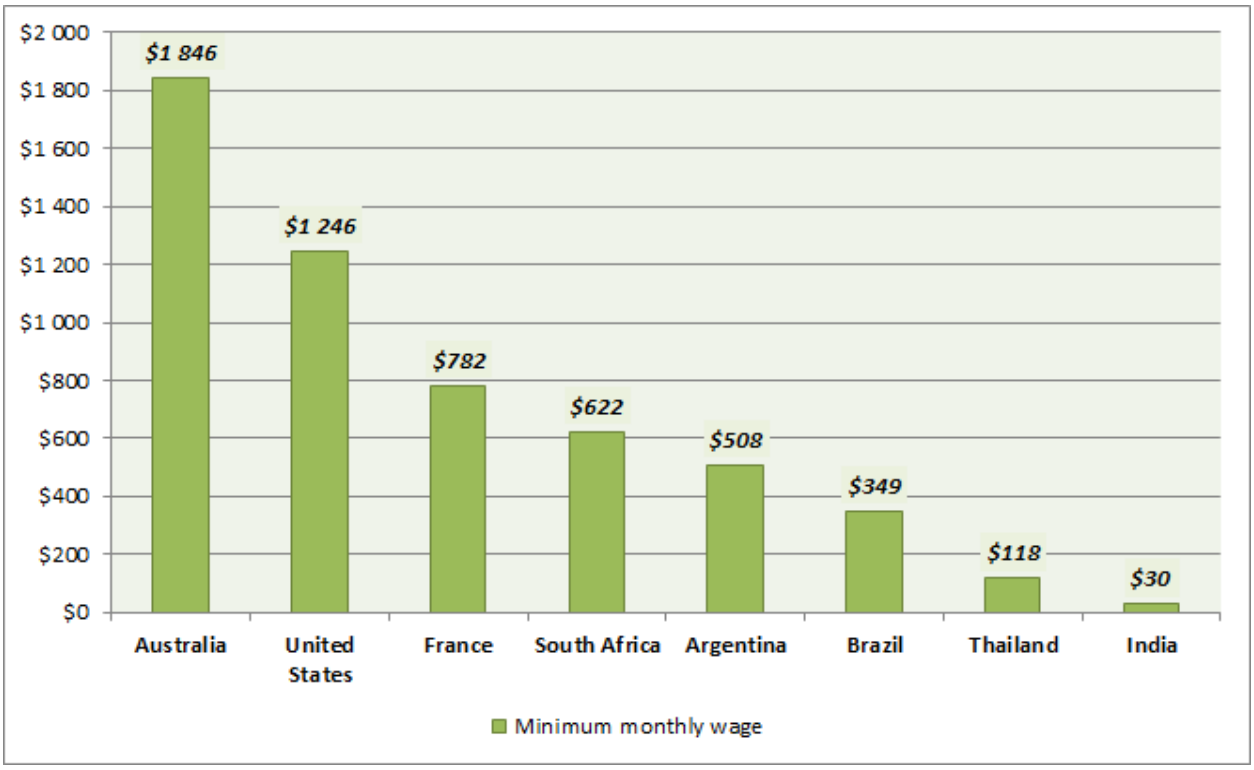


Figure 3.15: Minimum monthly wage in South Africa and peer countries (2012)
Source: ILO (2013)

Figure 3.16 shows the trend in nominal and real wage rate in the agriculture, forestry and fishing sector since 1970. In both nominal and real terms, there has been a strong growth phase since 2006. Since the introduction of the minimum wage at the beginning of 2003, the minimum wage of farm workers has increased in real terms by just more than 10% for workers in the farming areas contiguous to urban areas and by a more substantial 50% for workers in the more remote rural areas. Wages in the agricultural, forestry and fishery sector averaged R2 289 per month, which is higher than the minimum wage requirement of R2 274 per month for 2013.

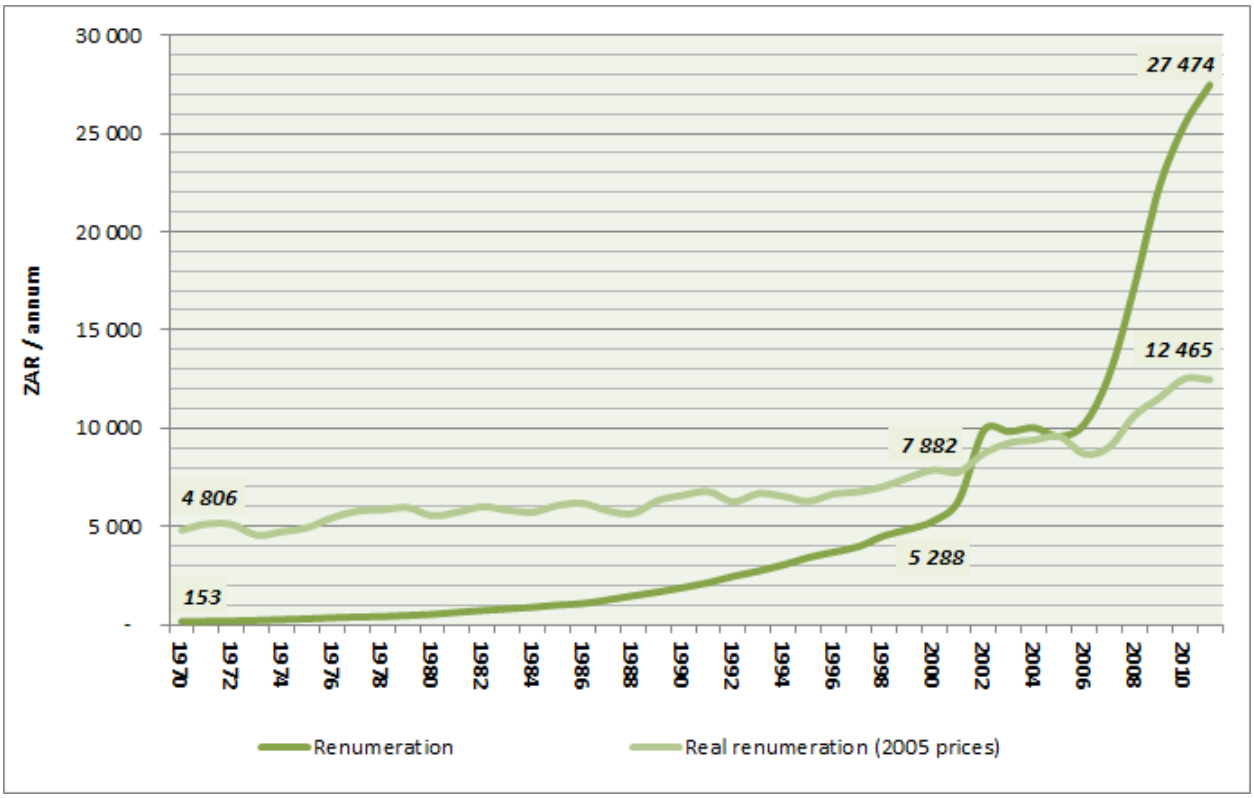


Figure 3.16: Nominal and real remuneration in South Africa's agricultural sector
Source: Quantec (2013)

3.5.4 Agricultural productivity

There are two common ways to measure productivity, namely total factor productivity (TFP) and labour productivity. Kohli (2004) showed that total factor productivity is an essential component of labour productivity. He further states that labour productivity is influenced by capital intensity; and within an open economy context, also by terms of trade and the real exchange rate.

Growth in TFP represents output growth not accounted for by the growth in inputs, i.e. growth in productivity. Figure 3.17 shows the trends in overall TFP for South Africa and the peer countries for the period 2000 to 2012. The figure clearly shows that South Africa recorded the

largest decline in TFP. Since productivity is one of the most important indicators of competitiveness, this trend is very cumbersome.

Figure 3.17: Trends in Total Factor Productivity in South African and the peer countries
Source: The Conference Board (2013)

Economic growth in a country can be due to either increased employment or more effective work by those who are already employed (productivity increase). Labour productivity can be defined as output per unit of labour input and is a key indicator of economic performance. Output is measured as gross domestic product (GDP), which represents the compensation for input of services from capital and labour directly engaged in production.

Figure 3.18 provides an overview of the overall labour productivity in South Africa and the peer countries based on the GDP per person engaged. The figure shows that South Africa has the lowest labour productivity among its peer countries. Compared to its developing peers, Chile

and Argentina, South Africa's labour productivity is twice as low. Labour productivity in Australia and France is four times higher and five times higher in the USA. This is a worrying signal for the country's agricultural trade competitiveness. Table 3.14 elaborates on the labour productivity in the selected countries by providing an overview of the trends since 1990. The table shows that South Africa is the only country with a decline in labour productivity since 1990.

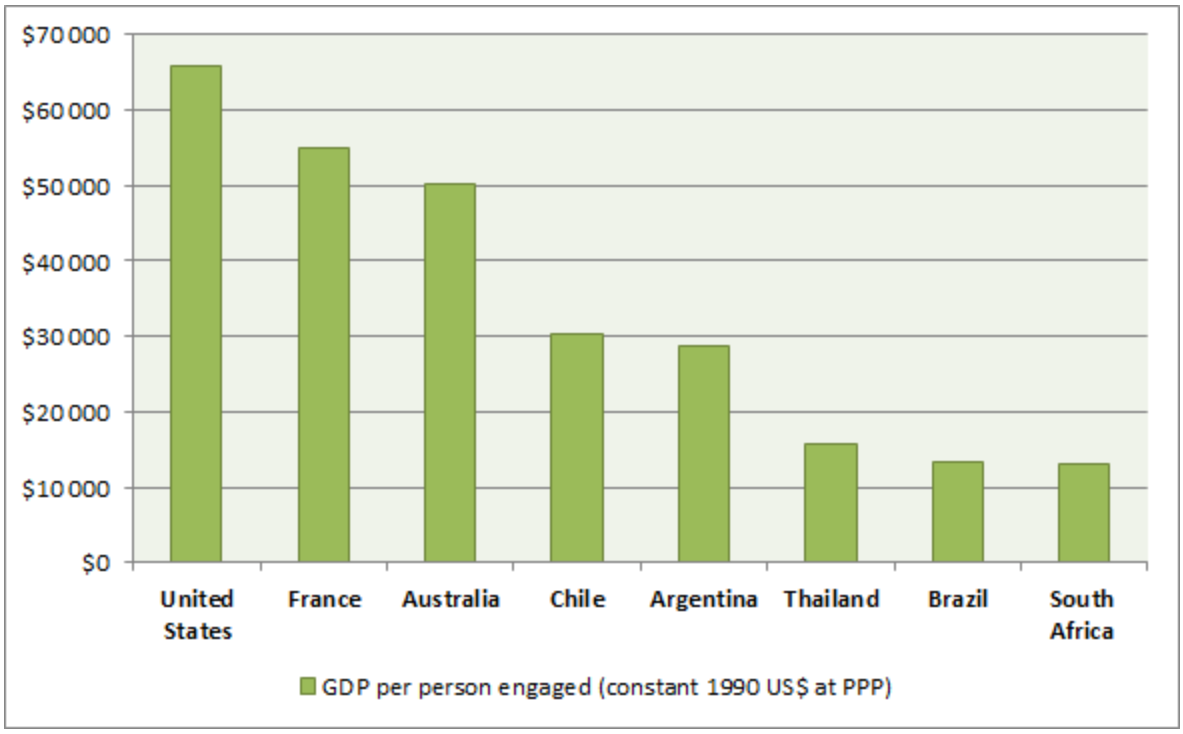


Figure 3.18: Labour productivity in South Africa and the peer countries (2010[20])
Source: ILO (2013)

[20] USA = 2009 data

Table 3.14: Trends in labour productivity in South Africa and the peer countries

Country	Index: GDP per person engaged (1990=100)	GDP per hour worked (constant 1990 US$ at PPP)	Index: GDP per hour worked (1990=100)
Argentina	165.7	15.58	166.5
Australia	133.7	29.29	141
Brazil	128.1	7.29	130.9
Chile	160.2	14.41	150.6
France	122.6	35.26	133.9
South Africa	92.5	-	-
Thailand	184.4	-	-
United States	137.5	39.18	141

Source: ILO (2013)

Figure 3.19 shows the trend in the relationship between the labour productivity and wages in the non-agricultural sectors of South Africa. No such data on specifically the agricultural sector is available, but these trends can be extrapolated. The figure reveals that, in contrast to TFP, labour productivity did show a positive trend between 2007 and 2010. However, the figure also shows that wages grow faster than labour productivity, which puts pressure on the wage expenses of businesses. This is therefore a trend of relatively more remuneration for relatively less work. Consequently, this is not a sustainable situation and may seriously hamper South Africa's trade competitiveness.

Figure 3.19: Trends in wages and productivity in the non-agricultural sectors of South Africa
Source: Klein (2012)

Figure 3.20 shows the long-term trends in labour productivity and unit cost in South Africa's agricultural sector since 1970. The figure shows a significant increase in the agricultural labour productivity since 2006. This is mainly attributed to a replacement of labour by capital, increasing the total output per worker. South African agricultural producers have been faced by very severe wage increases recently (2012 and 2013), which caused real wage increases to outpace productivity increases, which, in turn, suppressed employment creation. These wage trends and disrupted labour relations may pose a threat to the country's agricultural trade competitiveness.

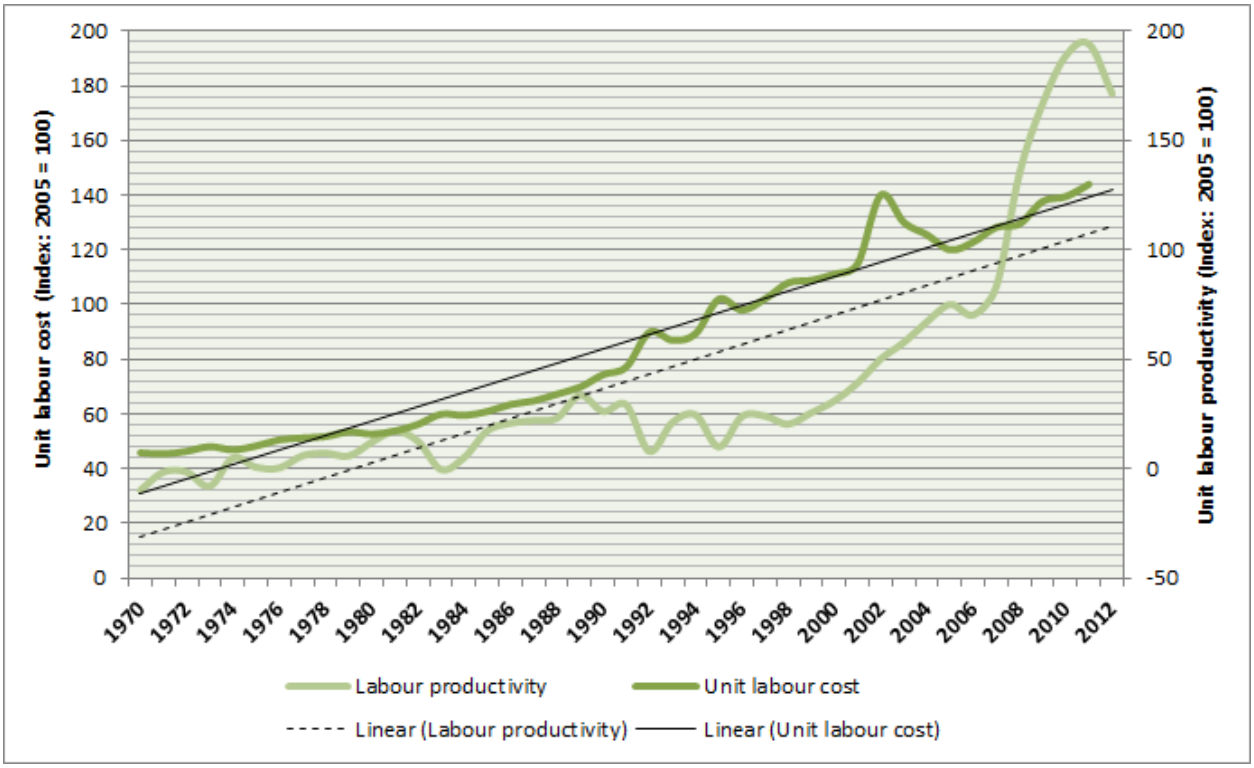


Figure 3.20: Trends in labour productivity and unit labour cost in South Africa's agricultural sector

Source: Quantec (2013)

3.6 Intermediate inputs and backbone services

Labour and firm productivity is a function of the physical capital that is employed in the production process, which includes the cost and quality of land and facilities, capital equipment, intermediate inputs, and utilities. It also includes the financial costs of employing these resources. Access to high-quality, efficiently priced intermediate inputs and backbone services can strengthen the export response to market opportunities by lowering the costs of production and exports.

3.6.1 Agricultural inputs

The price of agricultural inputs relative to the agricultural producer price is an important determinant of the profitability and therefore the competitiveness of the primary sector. Figure 3.21 depicts the trends in the agricultural producer price (PPI) versus the weighted price indices of machinery and implements (e.g. tractors, trucks, implements, irrigation) and intermediate goods (e.g. fuel, fertiliser, feed, animal medicines, crop protection, packing material). The producer price increased with 83 percent in the period from 2005 to 2011, where the prices of capital inputs increased with 75 percent and the prices of non-capital inputs increased with 119 percent. Therefore, the terms of trade for South African agricultural producers are deteriorating mainly due to the stronger price increases of non-capital inputs. The rising input cost since 2005 is due to price increases of especially: fertiliser (+170%), farm feed (+135%), animal health and crop protection (+96%), tractors (+96%) and fuel (+93%). This trend has a negative impact on the competitiveness of the sector.

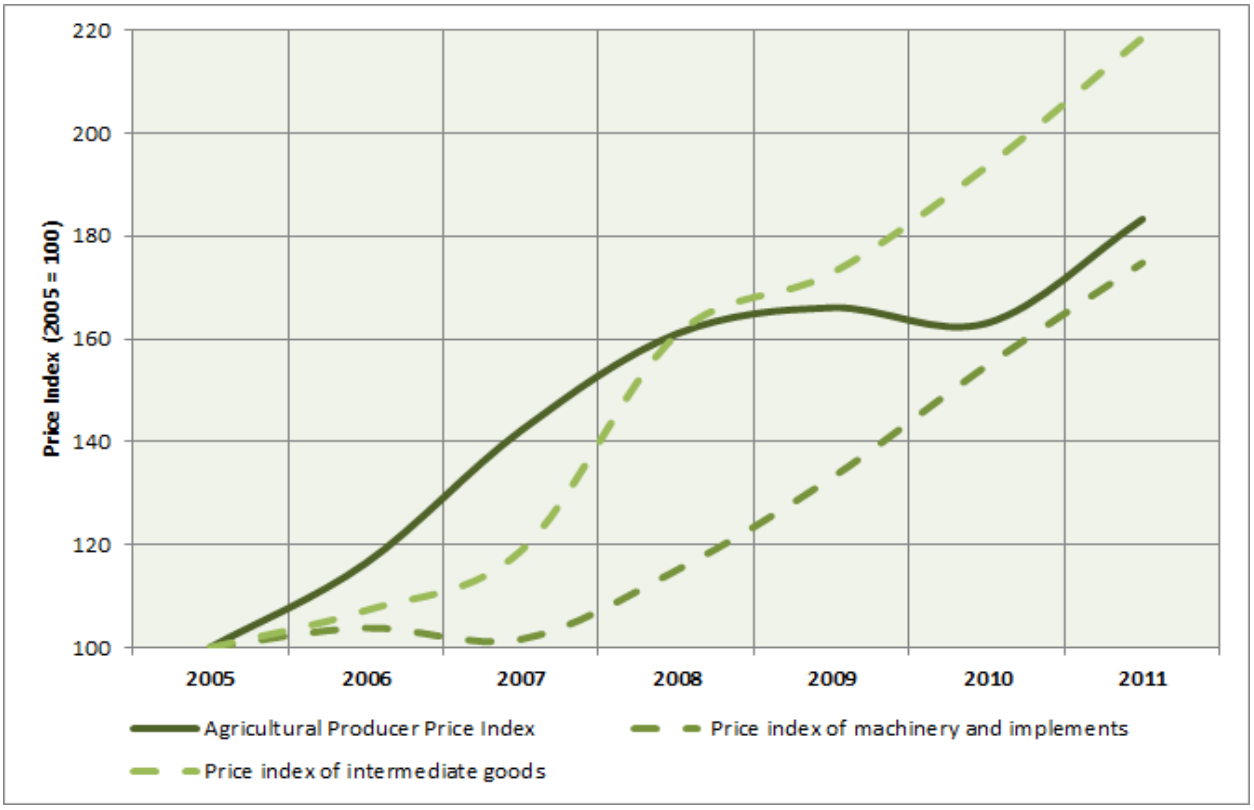


Figure 3.21: Trends in South Africa's agricultural Producer Price Index and price indices for inputs

Source: DAFF (2012)

Figure 3.22 illustrates the agricultural PPI for South Africa and the peer countries (with 2005 as base year). The figure represents the average change in the price of primary agricultural products received by the producer. Although the South African agricultural PPI showed the least growth from 2009 to 2011, the total price increase since 2005 is still ranked as the fourth best. Argentina recorded the largest growth in agricultural PPI (+138%), while Australia showed the lowest growth in agricultural PPI (+130%).

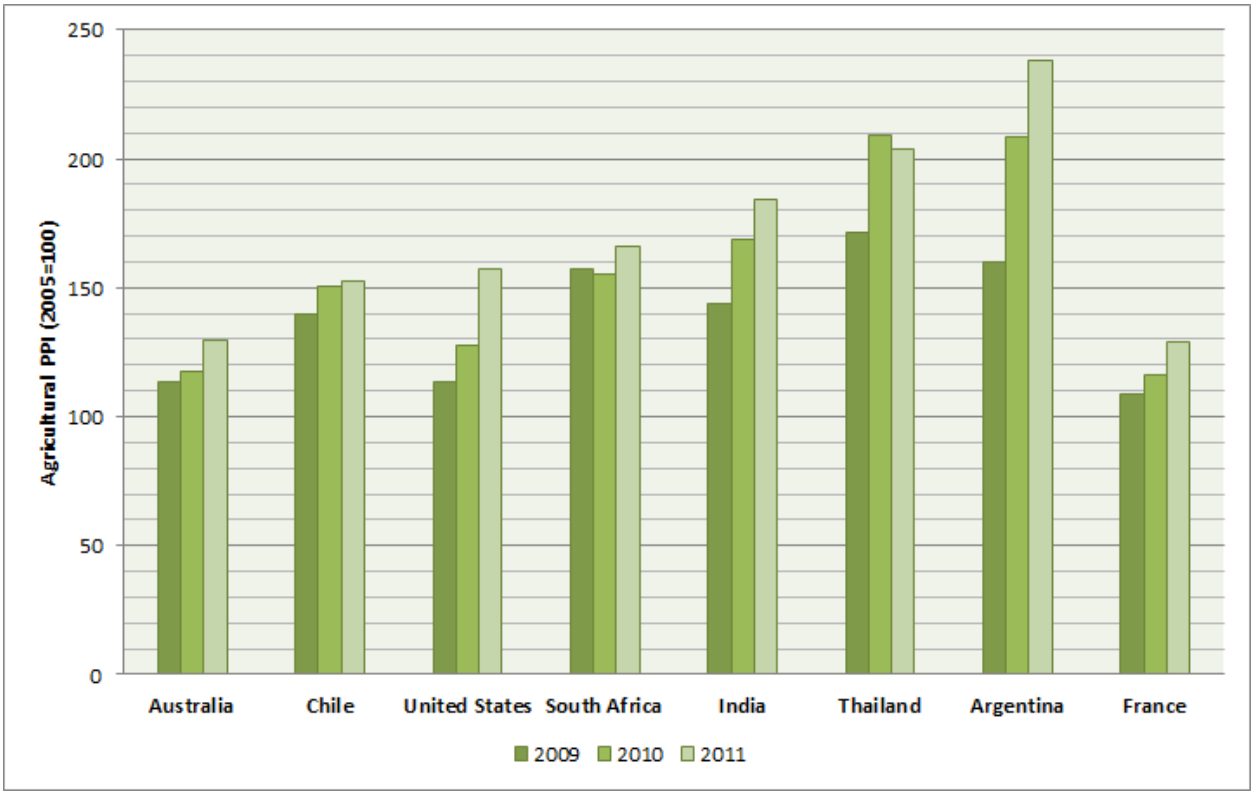


Figure 3.22: Producer Price Index for agricultural products (2005=100)
Source: UNSD (2013)

The local availability of inputs for South Africa's agro-food sector can to a great extent affect the degree in which firms can access them cost effectively. Whether inputs are produced locally or have to be imported can be a significant determinant of input cost. Therefore, the cost of imported inputs may be inflated by tariffs, shipping cost and exchange rates. Literature shows that an increase in the imports of intermediate goods boosts productivity and economic growth (Lee, 1995; Eaton & Kortum, 2001). Furthermore, an increase in the diversification of imported inputs also leads to an increase in the variation of domestically produced goods (Cadot, Carrère & Strauss-Kahn; 2011)

In order to determine the dependency on foreign supply, Figure 3.23 illustrates the trends in South Africa's imports of 14 different inputs for its agro-food sector. It is evident from the figure that capital equipment such as tractors, harvesters as well as herbicides/fungicides/

pesticides and potassic fertiliser are the most important imported inputs. The local production of specifically these inputs seems limited, which may have a negative impact on the cost effectiveness of South Africa's agricultural firms.

The total imports of inputs for the agro-food sector only increased with three percent in the period from 2008 to 2012. The largest increases in imports were recorded by animal/vegetable (organic) fertilisers, harvesting machines, and machines for grain sorting/cleaning. Imports of all mineral and chemical fertilisers showed a decreasing trend. Most capital equipment recorded an increase in imports in the depicted period. This development seems to reflect a favourable business confidence and technology adaptation in primary and secondary agriculture as these machines require relatively large capital investments.

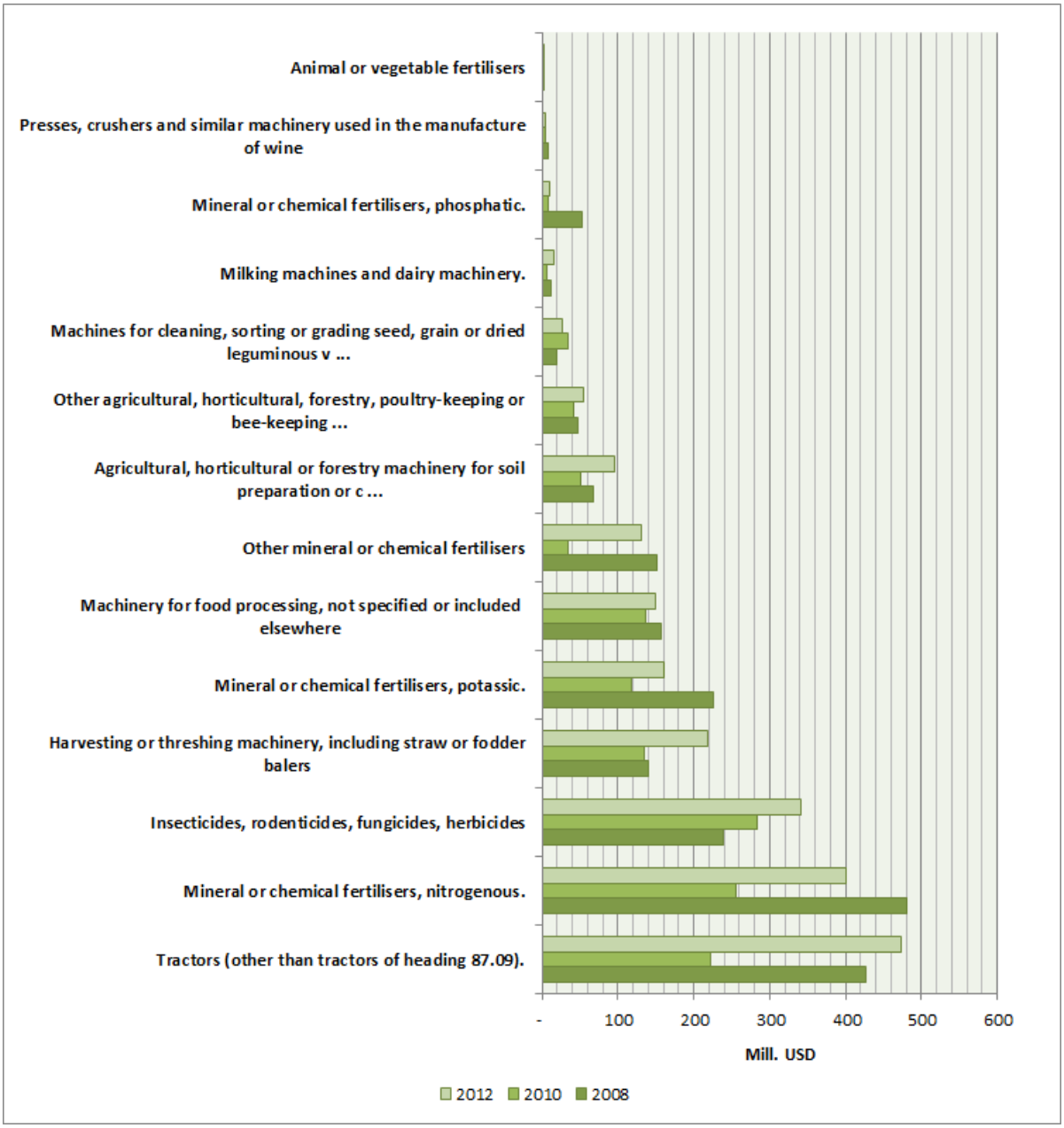


Figure 3.23: South Africa's imports of inputs for the agro-food sector (2008/2010/2012)
Source: UN Comtrade (2013)

Figure 3.24 shows the total import value of inputs for the agro-food sectors in South Africa and the peer countries. The countries with larger agricultural sectors, such as the USA, India and Brazil, also have the highest imports of agro-food related inputs. South Africa ranks 8th in total

agricultural output among the selected peer countries and also ranks correspondingly with regard to total value of agro-food related inputs.

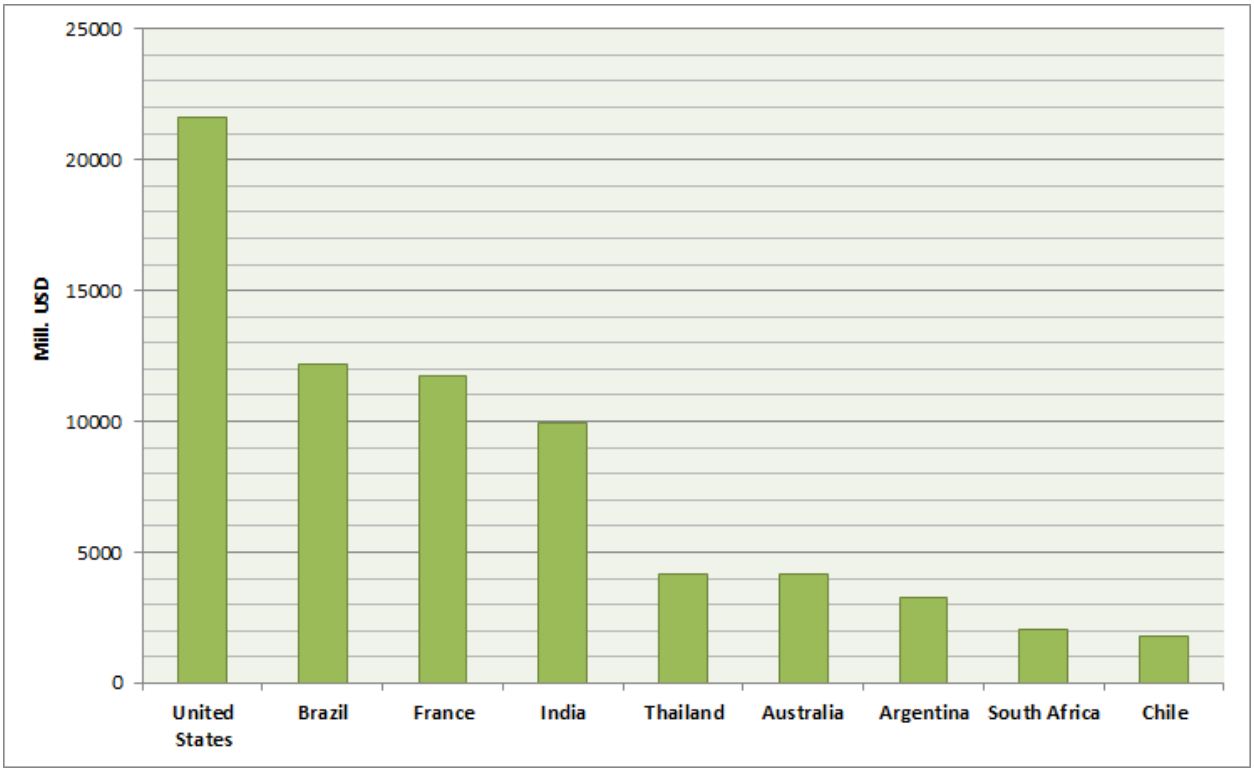


Figure 3.24: Total import value of inputs for the agro-food sector (2011)
Source: Own calculations based on data from UN Comtrade (2013)

Import tariffs on inputs for the agro-food sector imply additional cost and increases local production cost. Furthermore, cases were import tariffs protect local producers of inputs from international competition can lead to inefficiencies and quality reductions. Figure 3.25 shows the total average weighted import tariff[21] on agro-food inputs levied by South Africa and its peer countries (see also Figure 3.24 for an overview of these inputs). The figure clearly shows that compared to the peer countries, South Africa's import duties on inputs for the agro-food sector are relatively low. Only the average weighted import tariff of the USA is lower.

[21] Since the goal of the exercise is to provide a broad indication of the import restrictions the Most Favoured Nation (MFN) tariff was used for the calculations. Hence, tariffs under Free Trade Agreements were not considered.

Therefore, the additional cost resulting from trade policy is relatively low and not limiting South African firms from accessing inputs in a cost effective way.

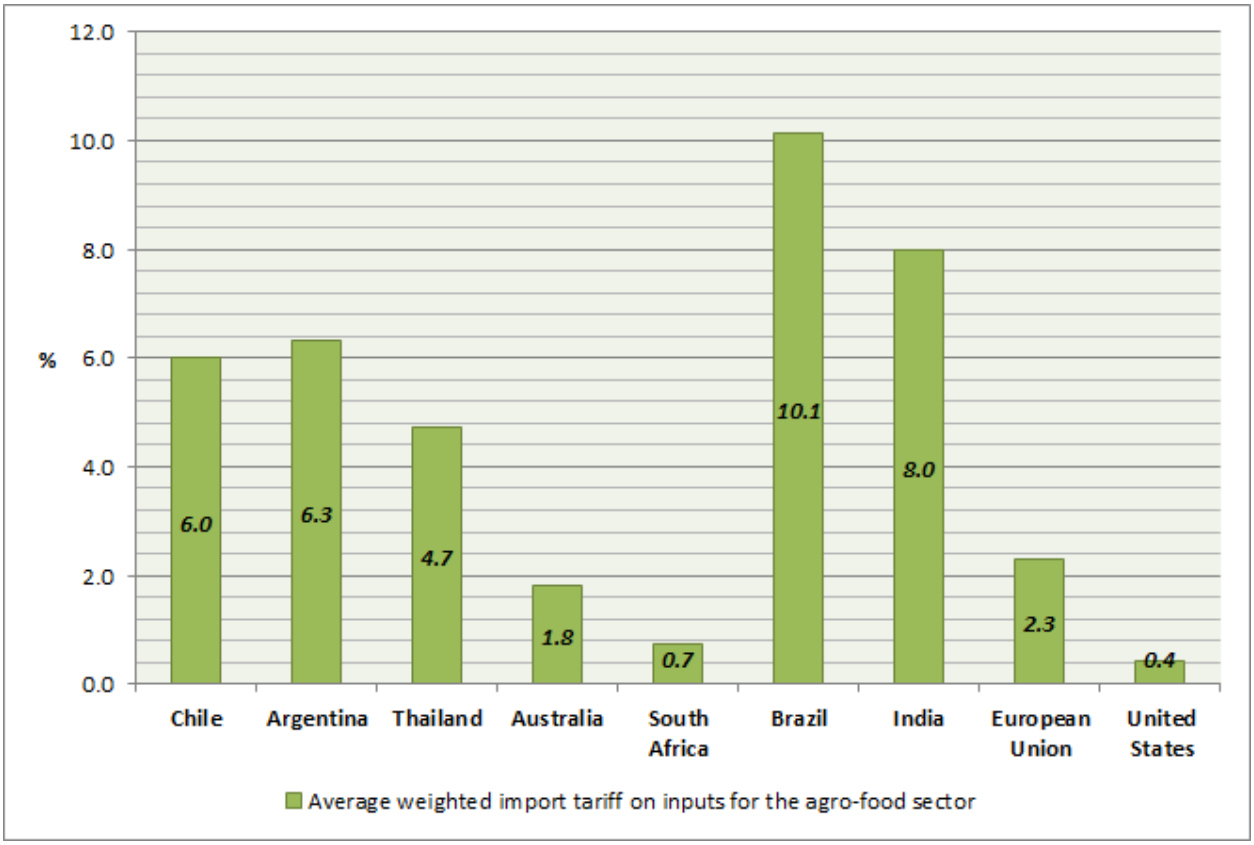


Figure 3.25: Simple average import tariff on inputs for the agro-food sector (2011)
Source: Own calculations based on data from ITC (2013)

Table A3.4 in the Annexure provides a more detailed overview of the import duties on inputs for the agro-food sectors in South Africa and the peer countries. The table shows the weighted average import tariff for all 14 major inputs for the latest year available. For South Africa, the highest import tariff is levied on the imports of tractors (7.4%). This is the fourth largest import duty on tractors compared to the eight peer countries.

3.6.2 Scale of the agricultural sector

The potential to produce at an economically efficient scale can play an important role in determining productivity of the agricultural sector. The availability of natural resources and the capital intensity are usually good indicators of scale economies in agriculture. The potential to operate at a certain level of scale can be influenced by both structural and policy reasons. In general, larger countries are often in a better position to have firms operating on a large scale than smaller countries.

Figure 3.26 provides an overview of the land available for agricultural production for South Africa and the peer countries. Thailand, Chile and South Africa are the smallest countries in terms of total land size as well as total land available for agriculture. Australia, Brazil and the United States have the most land available for agricultural purposes. Although South Africa is a relatively large nation, approximately 80 percent of the total surface area is available for agricultural production, which is comparably high. India has the second highest proportion of total land available for agriculture (60 percent), while Chile has the lowest proportion of land available for agricultural production (20 percent).

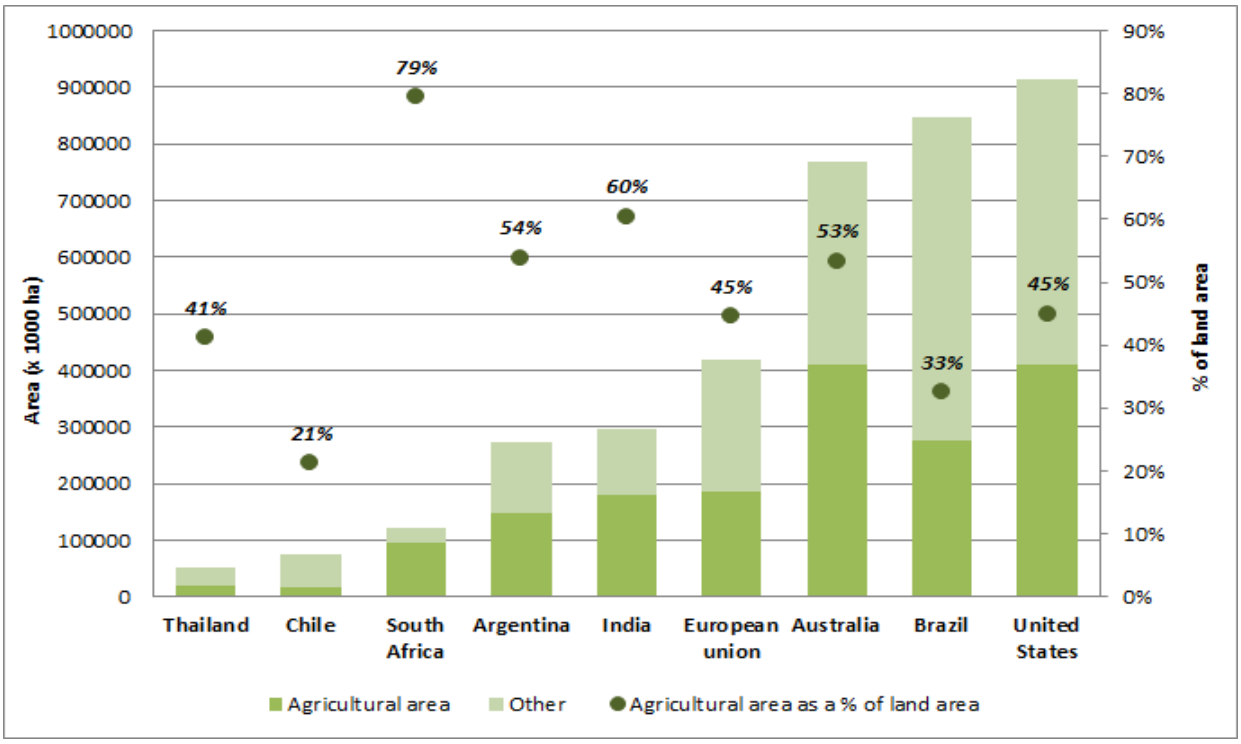


Figure 3.26: Agricultural area of South Africa and the selected peer countries

Source: Own calculations based on data from FAOSTAT (2013)

Figure 3.27 illustrates the proportion of agricultural area in South Africa and the peer countries that can be used for grazing and crops. This reflects the natural resource endowment for agriculture of each of the selected countries (e.g. soil quality and climatic environment). Countries that have more crop land available (e.g. Thailand and India) reveal a higher natural resource endowment for agriculture. Chile, Australia and South Africa have the smallest proportion of crop land, implying that these countries have a comparably low natural resource endowment for arable agriculture.

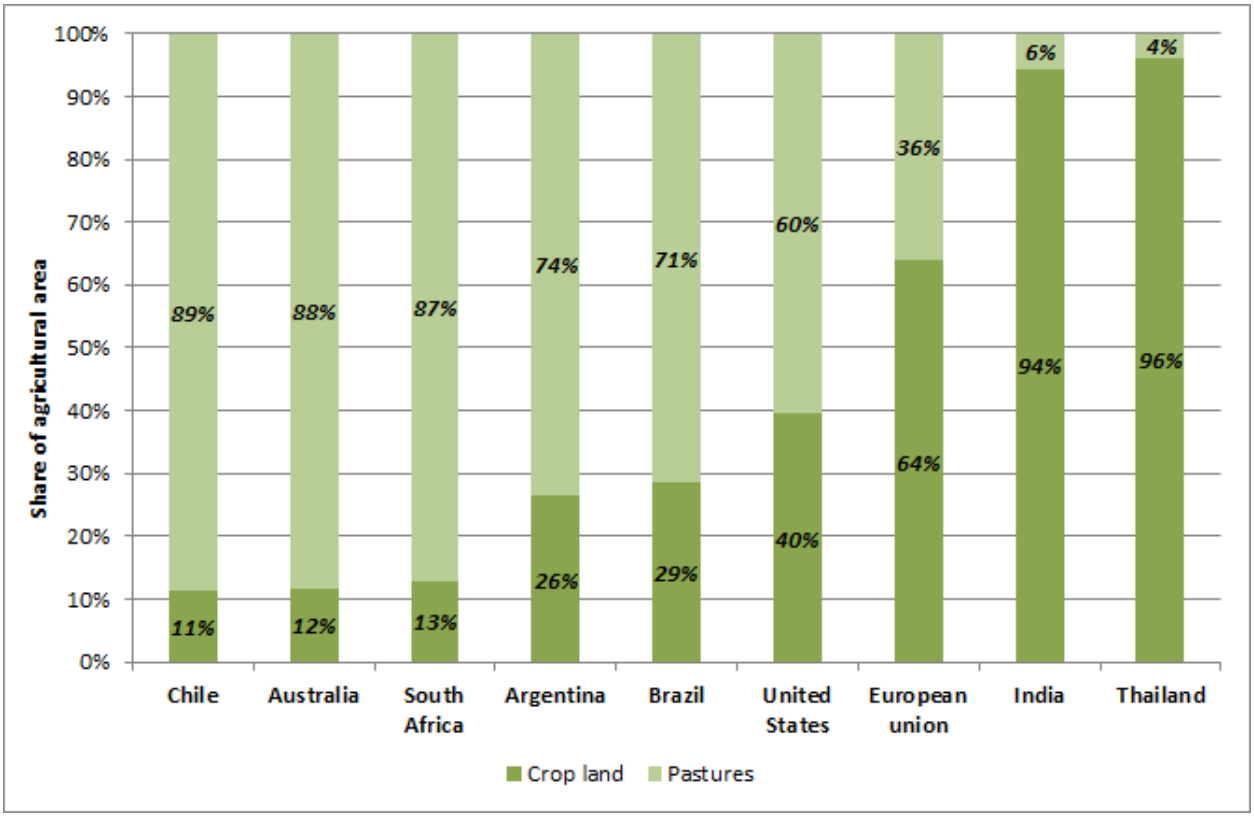


Figure 3.27: Proportion of agricultural area suitable for grazing and crops

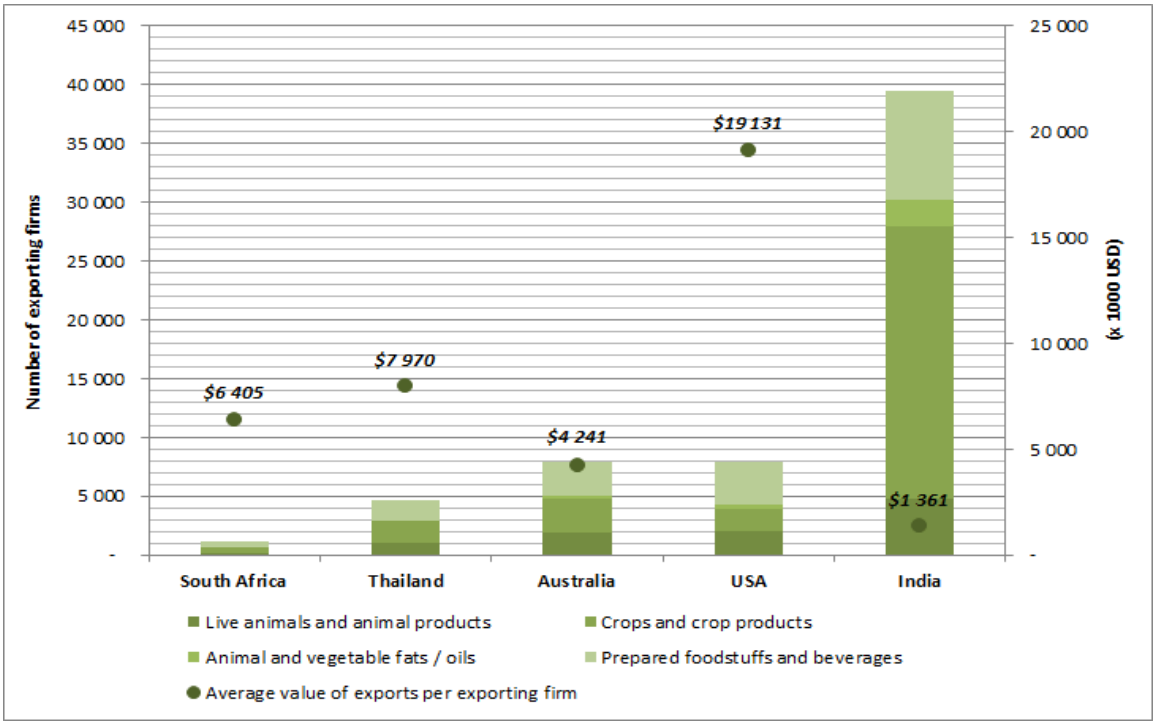
Source: Own calculations based on data from FAOSTAT (2013)

Apart from the natural resources available to agricultural production, the number of firms exporting agricultural and food products is a good indicator of the scale of the agricultural export sector. Figure 3.28 shows the number of firms in South Africa and the peer countries[22] that export agricultural and food products. The figure shows that South Africa has the smallest number of exporting firms in the agro-food sector (1 109). Approximately 42 percent of South Africa's agro-food exporters are involved in the exports of prepared food stuffs and 35 percent are involved in the exports of crop products.

The figure also provides a comparison of the scale of the exporting firms reflected by the average value of exports per firm. The figure shows that the average size of the exporting firms is the highest in the USA and the lowest in India. South African exporting firms in the agro-food

[22] No data available for France, Chile, Argentina and Brazil

sector are of a comparative medium size in an averagely concentrated agro-food export sector. Consequently, there seems some potential for increased economies of scale in the agro-food export sector in order to enhance its productivity and efficiency.



Note: the average value of exports per exporting firms is plotted on the secondary y-axis

Figure 3.28: Number of exporting firms in the agro-food sectors of South Africa the peer countries

Source: ITC (2013)

3.6.3 Backbone services

Backbone services, such as water, electricity and communications, are an important element in determining the productivity of the agricultural sector, as they can strengthen the export response to market opportunities by lowering the costs of production and exports.

It is generally assumed that access to mobile phones and Internet can improve international communication and coordination, and is therefore essential for international trade. Therefore, Figure 3.29 shows the share of the population that has a mobile telephone subscription and

uses the Internet in South Africa and the selected peer countries. The figure shows that South Africa has a comparatively high penetration of mobile phones, but lags behind in terms of Internet use. Consequently, data telecommunication needs to be improved in terms of physical and financial accessibility in order for it not to be a constraint to trade competitiveness.

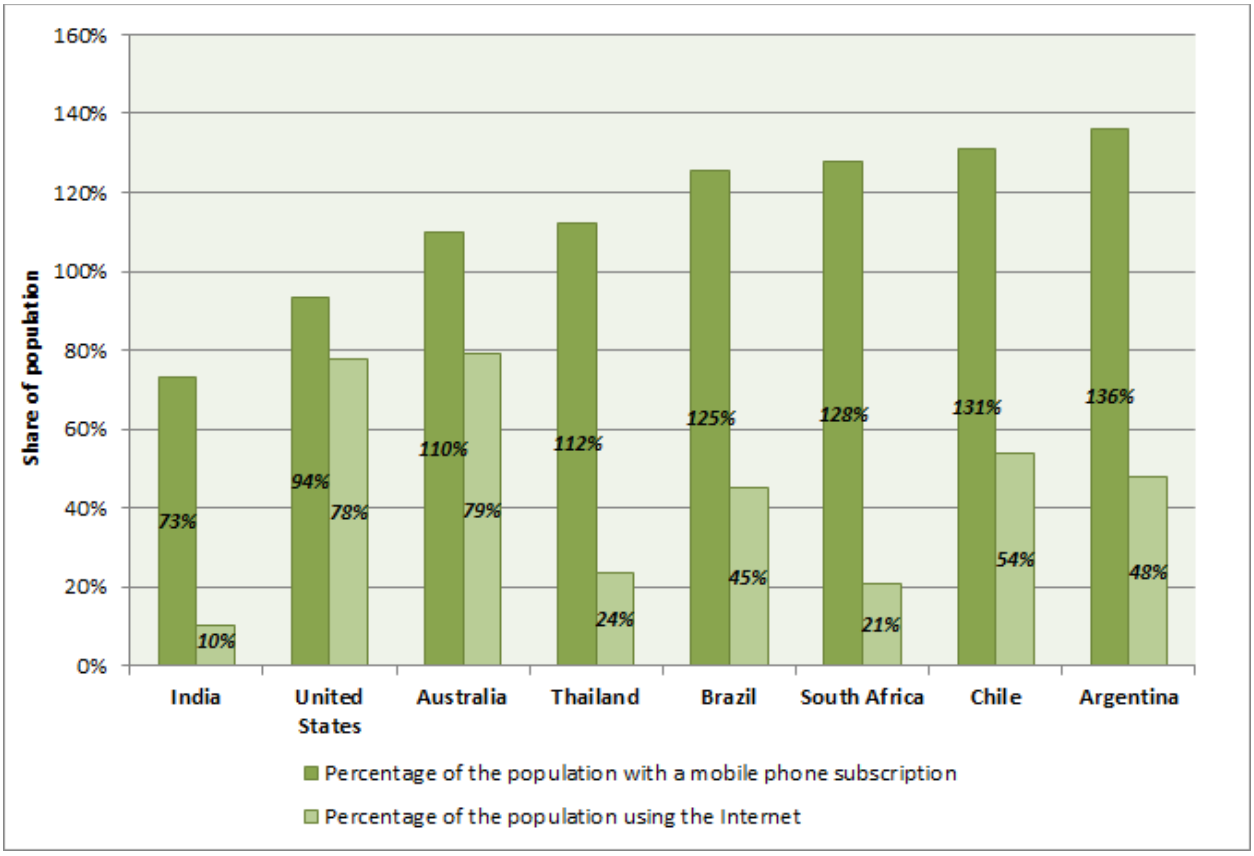
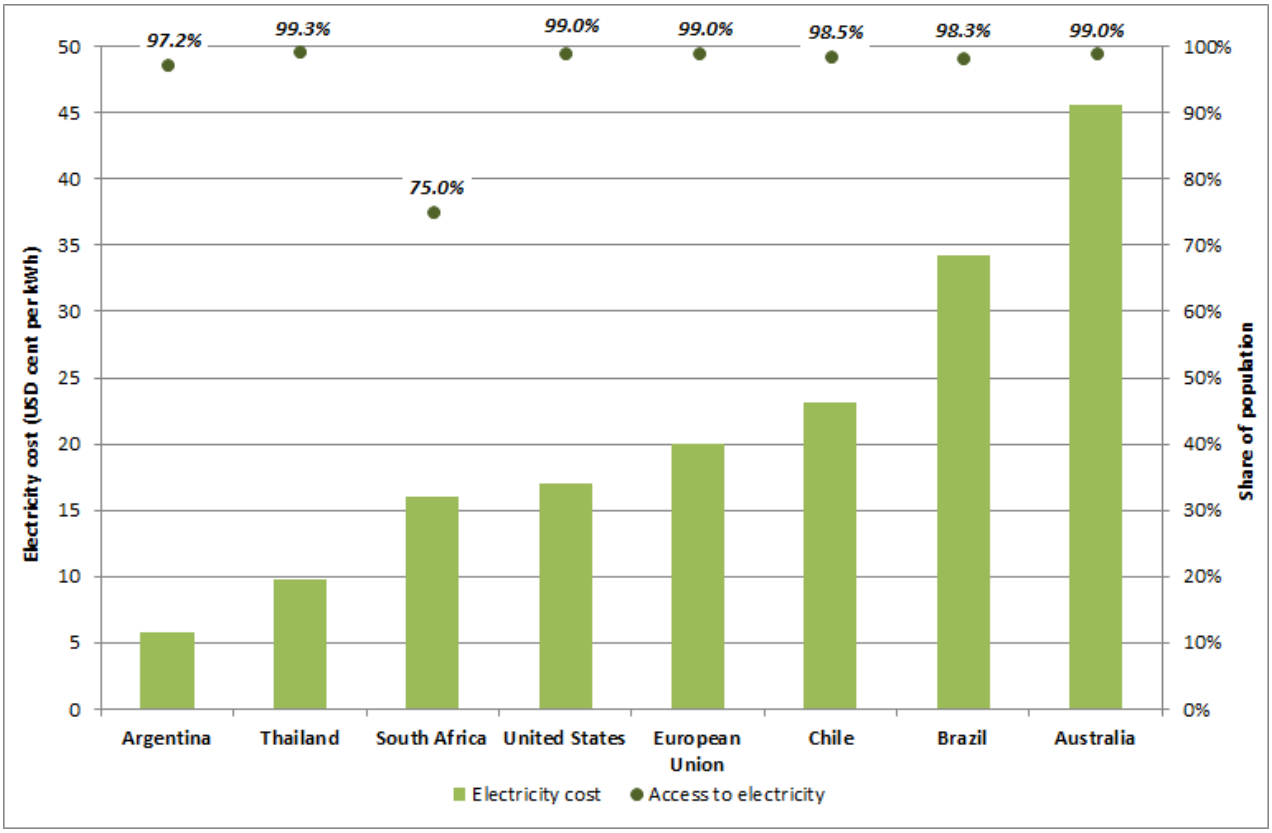


Figure 3.29: Telecommunication use in South Africa and the peer countries (2011)
Source: World Bank (2013b)

Access and cost of electricity are one of the major constraints facing firms in developing countries. Therefore, Figure 3.30 shows the electricity cost and the proportion of the population that has access to electricity in South Africa and the peer countries. The figure clearly shows that South Africa's electricity is relative inexpensive; however, with regard to access to electricity, the country performs particularly poor. The former provides South African agriculture, especially the more energy-intensive sub-sectors involving cold-chains and irrigated

agriculture, a competitive edge over most of the peer countries. However, it is envisaged that electricity costs will rise significantly in the near future.



Note: The proportion of the population that has access to electricity is plotted on the secondary y-axis

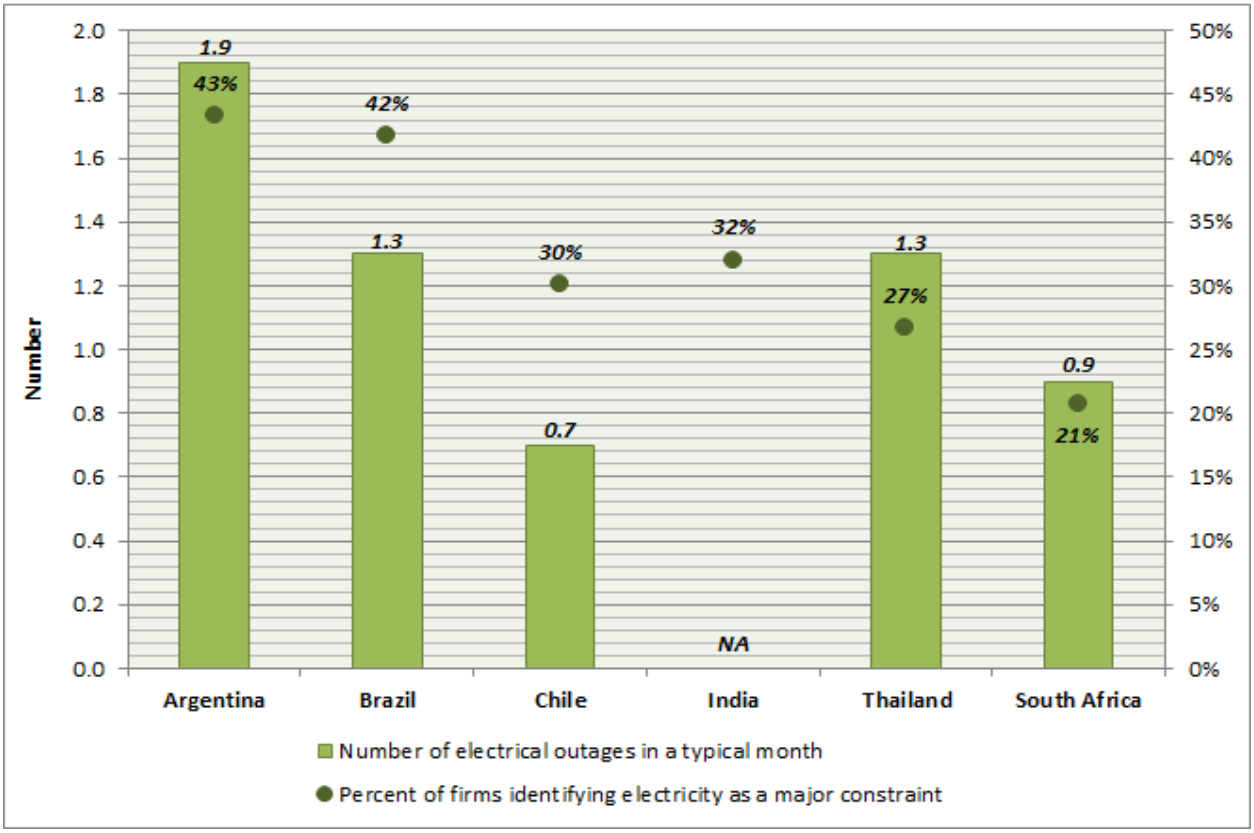
Figure 3.30: Electricity cost and access in South Africa and the peer countries (2011)

Source: World Bank (2013b)

Apart from electricity access and electricity cost, the reliability of power supply is also of crucial importance to the productivity of the agricultural sector. Figure 3.31 makes a comparison of the average number of monthly power outages as well as the proportion of firms that identified electricity as a major constraint[23] in South Africa and the peer countries. Compared to most of its developing peers, South African power supply is relatively reliable; however, there is significant room for improvement. Note, however, that South Africa's data is from 2007, and it

[23] No data was available for the USA, France and Australia.

is reasonable to assume that the current situation would reveal lesser reliability caused by the power shedding and failures since 2009.



Note: The proportion of firms that identify electricity as a major constraint is plotted on the secondary y-axis.

Figure 3.31: Reliability of power supply in South Africa and the peer countries

Source: World Bank (2013b)

Water is a crucial input in agricultural and food production; this is evident from the proportion of freshwater used for agriculture as depicted in Figure 3.32 for South Africa and the peer countries. South Africa is a water scarce country and the significant water usage of 63 percent by the agricultural sector puts significant strain on the total water supply. Other relatively water scarce countries, such as Chile and Australia, have an even higher proportional water usage by their agricultural sectors.

Considering that most of South Africa's major export products, such as fruits and wine, require a significant amount of water in their production; the country's 'virtual exports' of water are eminent. South Africa's water quality and supply will continue to be under serious pressure, urging the agricultural sector to be innovative in the reduction of its water footprint. Concurrently, public water infrastructure should be maintained and upgraded. Only then will water not be a future constraint to the trade competitiveness of the agricultural sector.

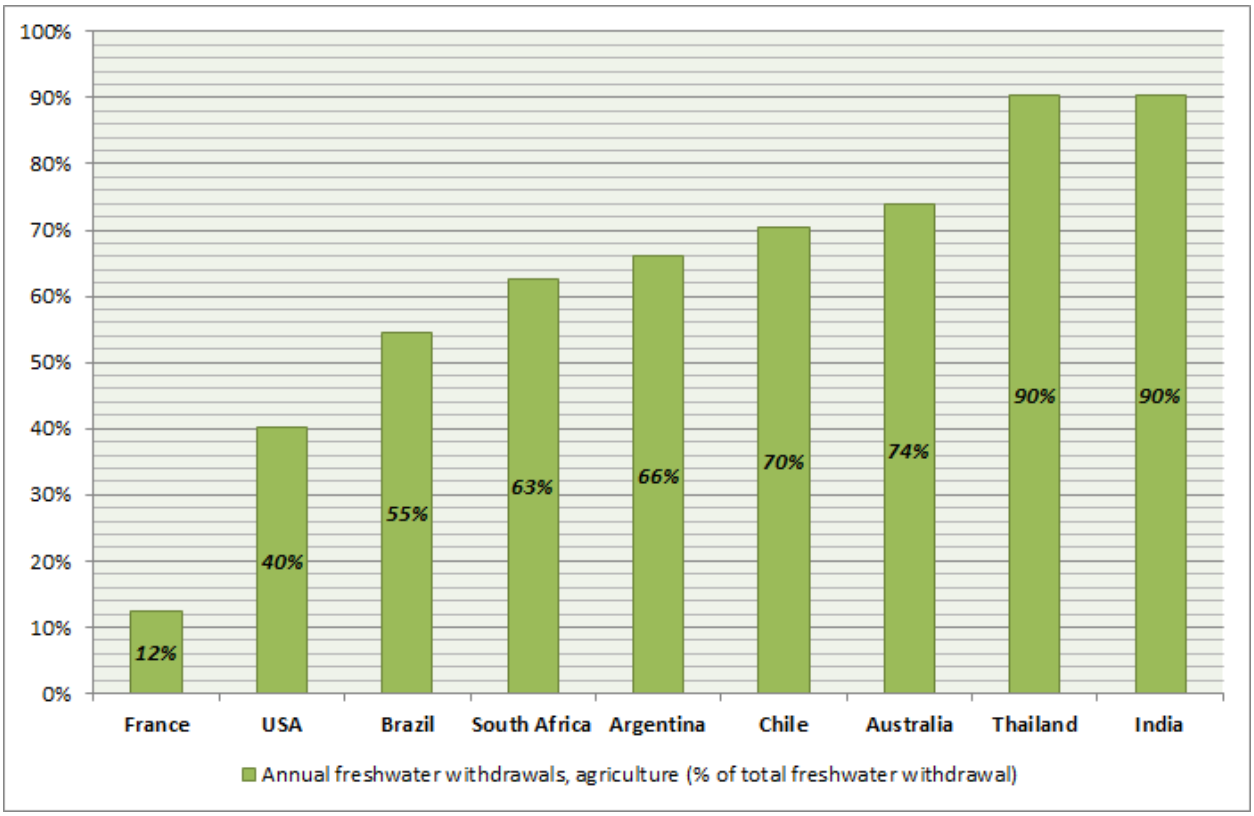


Figure 3.32: Proportional water usage by agriculture in South Africa and the peer countries
Source: World Bank (2013b)

Apart from availability, the quality of water is another important dimension in determining its role in the productivity of the South African agricultural sector. The water quality of South Africa and the selected peer countries can be ranked according to a large number of variables. However, due to data constraints and the relative importance of the included indicators to agricultural production, only three water quality variables were included in the analysis, namely

pH (pH units), conductivity (uS/cm) and suspended solids (mg/L). See Table A3.5 in Annexure for the calculation of the water quality scored for each country

Figure 3.33 shows the calculated scores for water quality for South Africa and the selected peer countries. South Africa was ranked as fourth in terms of water quality with a total score of 13 out of 24. The country therefore has an average score that cannot be considered as a comparative advantage.

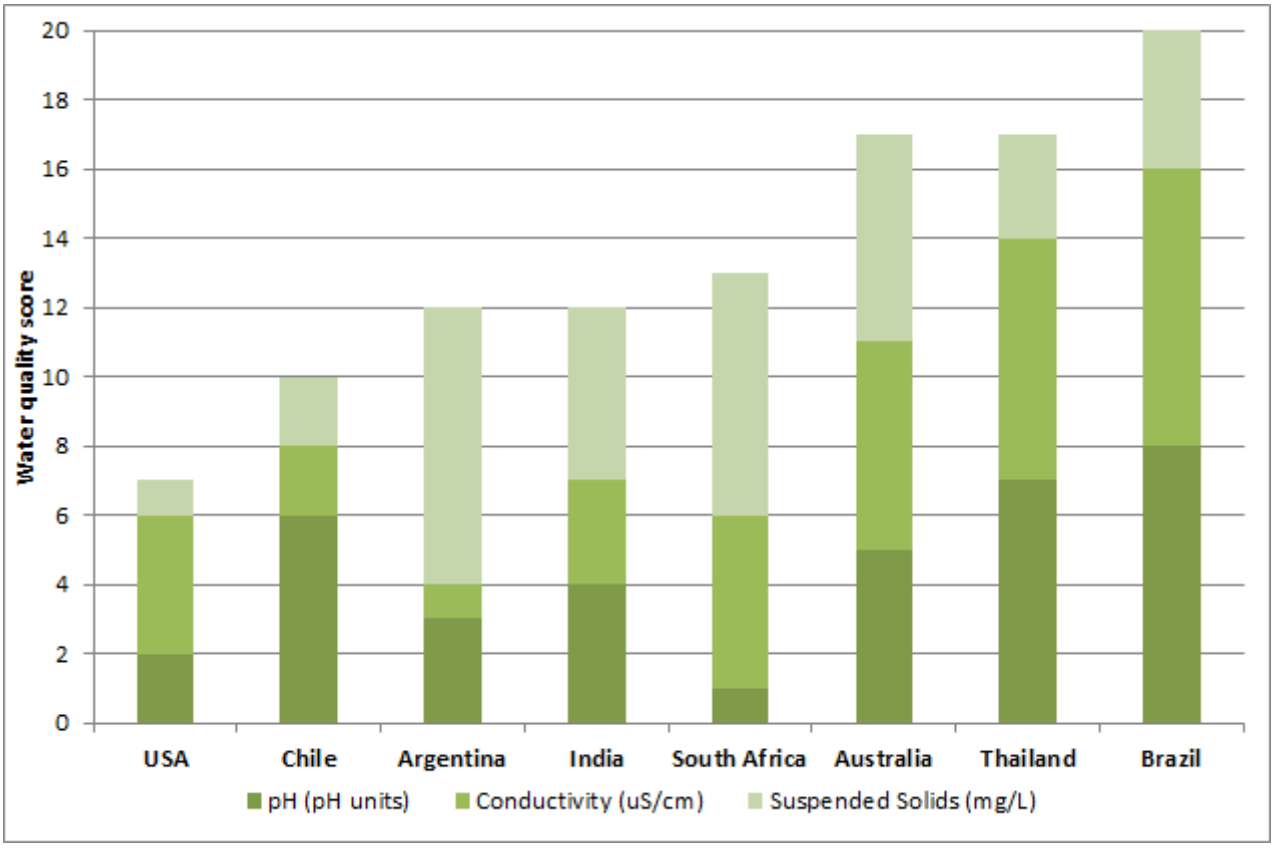


Figure 3.33: Water quality of South Africa and selected peer countries
Source: GEMS (2013)

3.7 Trade facilitation and logistics

The role of trade facilitation and logistics as a source of trade competitiveness has increased substantially over the last decades. This is due to, firstly, the increased importance of transaction cost over tariffs, and secondly, the emergence of highly integrated global supply chains and the shortening of product-life-cycles have urged the need for timely and cost-effective logistics. Therefore, the cost and quality of the logistics environment often play an important role in determining firm-level decisions about where to locate production, where to source supplies, and how to serve markets (Reis & Farole, 2012). Empirical studies on trade facilitation show a significant impact of time and cost on specifically exports of perishable agricultural products (Djankov, Freund & Pham, 2006) and the composition of trade (Li & Wilson, 2009).

3.7.1 Trade cost

The World Bank's Doing Business report includes a section on *Trading Across Borders* in which information on the documents (number) to export and import, time (days) to export and import and cost (US dollar per container) to export and import for most countries around the world is provided. This information was gathered by the World Bank from freight forwarders, shipping lines, customs brokers, port officials and banks.

The cost to export and import for each country includes the cost associated with all documentation, inland transport and handling, customs clearance and inspections, port and terminal handling and official costs (no bribes) (World Bank, 2013a). In calculating the cost to import for each country, the fees levied on a 20-foot container in US dollars was used. The cost does not include tariffs or costs related to ocean transport.

Figure 3.34 compares the domestic cost to export and import for South Africa to South Africa's main competitors in the international agricultural market. From the figure, it is evident that Thailand and Chile have the lowest export and import costs, while Brazil has the highest export

and import costs. South Africa has the second highest cost to export (USD 1 531) among the peer countries. Its export and import costs exceed the average costs (USD 1 175 for exports, USD 1 298 for imports) of the peer countries. This therefore implies a comparatively high transaction cost for South Africa's agricultural exporters, hampering their competitiveness.

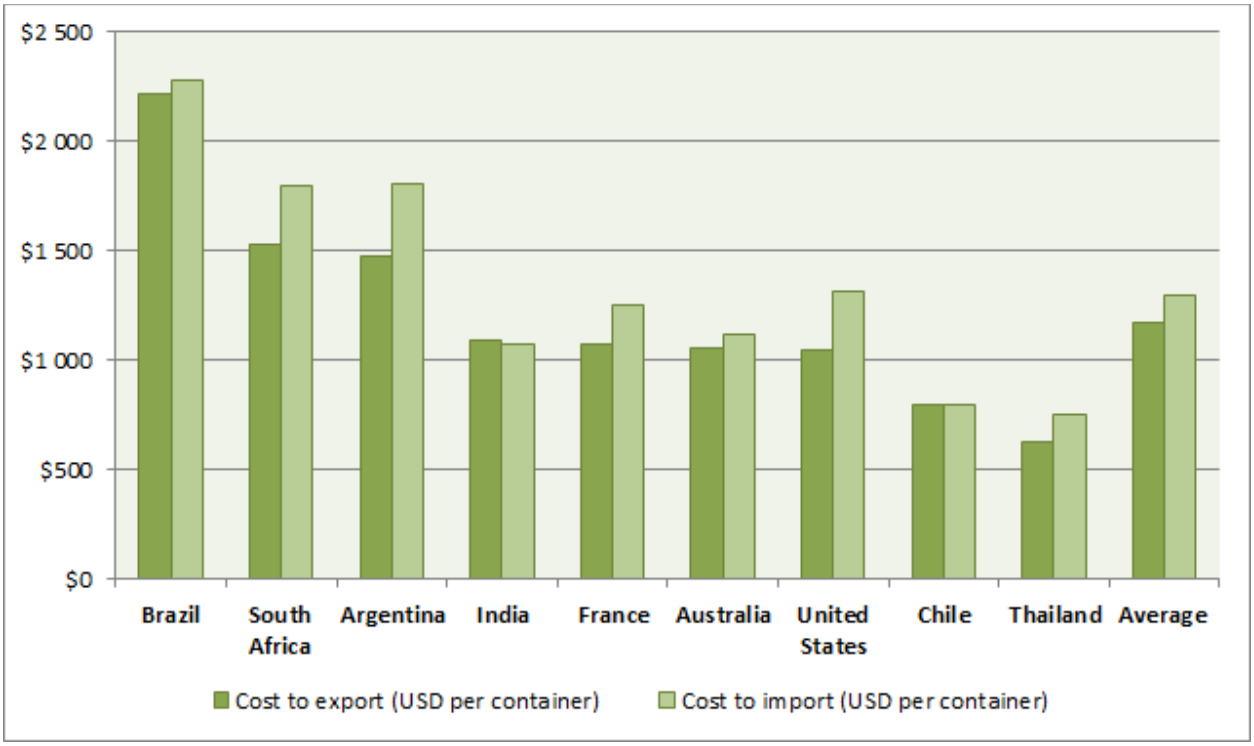


Figure 3.34: Domestic cost to export and import in South Africa and the peer countries
Source: World Bank Doing Business (2012b)

3.7.2 Time and reliability

The World Bank's Doing Business report was used to report on the d*ocuments and time needed to export and import* by the peer countries. The *time to export and import* for each country measures the time required to obtain all necessary documents, inland transport and handling, customs clearance and inspections and port and terminal handling (World Bank, 2013a). Time is recorded in calendar days and the assumption is made that no time is wasted and the completion of procedures is without delay, procedures that can be completed in parallel are

measured simultaneously and the waiting time between procedures is included. Table 3.15 compares the documents and time to export and import for South Africa and the selected peer countries.

Table 3.15: Documents and time to export and import in South Africa and the peer countries

Country	Documents to export (number)	Time to export (days)	Documents to import (number)	Time to import (days)
South Africa	8	30	8	32
Argentina	7	13	7	16
Australia	6	9	5	8
Brazil	7	13	8	17
Chile	6	21	6	20
France	2	9	2	11
India	8	16	9	20
Thailand	5	14	5	13
United States	4	6	5	5
Average	**6**	**13**	**6**	**14**

Source: World Bank (2013a)

From the table, it is evident South Africa takes the most time to arrange documentation and transport for both exports and imports (India exceeds South Africa's time for import documentation by a day). The average time taken to arrange export and import documentation among the peer countries is six days (South Africa exceeds this by two days). The average time to export and import is 13 and 14 days, respectively (South Africa exceeds this by 17 and 18 days, respectively). This result corresponds with South Africa's high cost of exporting and importing, as discussed in the previous section and therefore provides a rationale for the limited competitiveness with regard to export cost.

3.7.3 International shipping cost

International shipping costs are reported and compared in this section instead of physical distance for two main reasons. Firstly, shipping time and cost are considered to encapsulate

distance and are considered better measures because it takes routing, e.g. lower transport cost and times associated with main routes (Hoffmann, 2002), transhipment, dwell costs, e.g. time and cost of loading, unloading, waiting in the port (Coughlin, 2004) as well as time and costs associated with distance into account. Additionally, sections 3.7.1 and 3.7.2 also considered the domestic time and cost incurred in the importing country, which, as opposed to distance, takes the time and cost of infrastructure, documentation, inland transport and handling, customs clearance and inspections as well as port and terminal handling into consideration.

Figure 3.35 shows the ocean freight cost of a 20-foot full container load of agricultural products from South Africa and the peer countries to South Africa's top 20 agricultural export destinations. A more comprehensive overview of the freight cost per destination is provided in Table A3.6 in the Annexure.

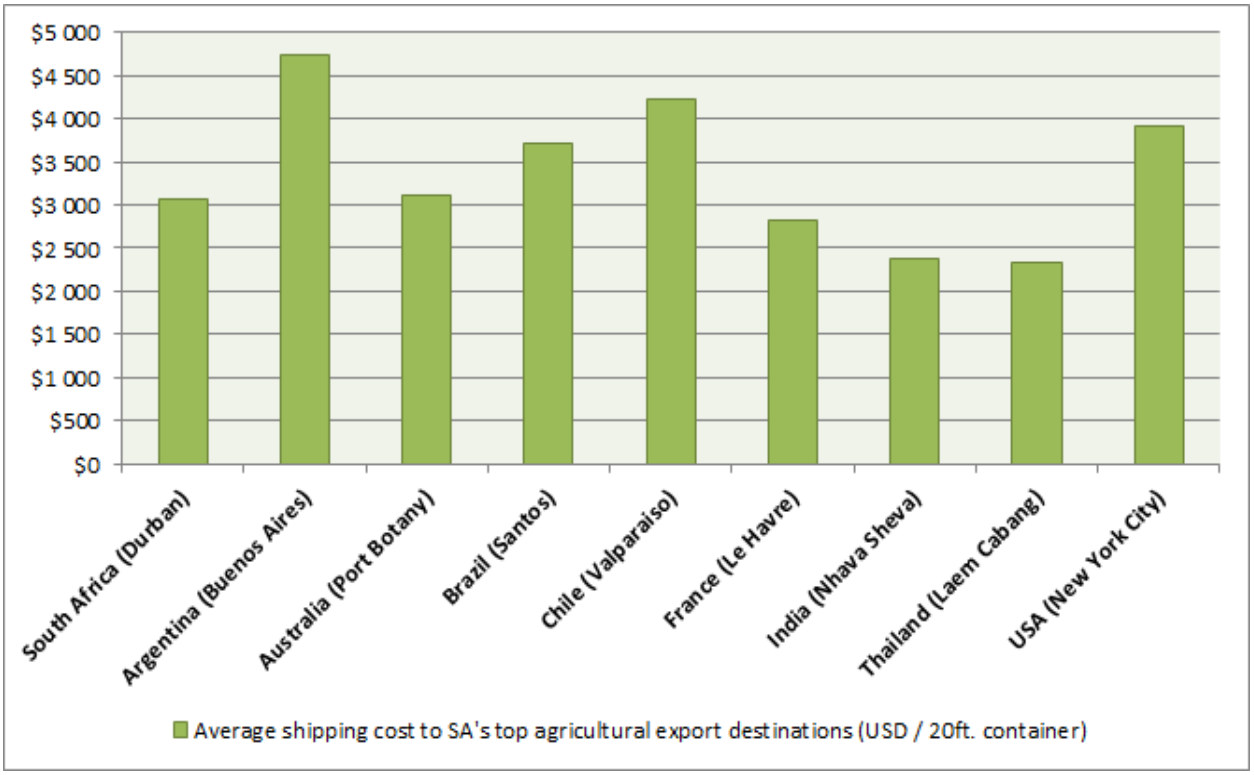


Figure 3.35: Average shipping cost to South Africa's top 20 agricultural export destinations per peer country

Source: World Freight Rates (2012)

From Figure 3.35 (and Table A3.6), it is evident Thailand has the average cheapest ocean freight costs to South Africa's top export destinations (USD 2 333), followed by India and France. South Africa only has the fourth lowest ocean freight costs to its top export destinations (average cost of USD 3 070). Argentina has the highest average freight rates (USD 4 735) to South Africa's top export destinations. Table A3.6 shows that South Africa comparatively has the highest ocean freight costs to some of its top exporting destinations, i.e. the Netherlands (USD 3900), UK (USD 3 900), Germany (USD 3 900) and Russia (USD 4 900). These high prices can possibly be associated with South Africa's weak bargaining power with shipping lines to the respective destinations, due to lower volumes of exports compared to South Africa's peer countries. However, the country's international shipping costs to the growing agricultural markets in Asia are competitive in comparison to the peer countries. Therefore, overall, the rate of international shipping costs seems not to hamper South Africa's agricultural trade competitiveness.

3.7.3 Connectivity

Containerisation of trade and access to containerised transport services are also important for a country's agricultural trade competitiveness. UNCTAD's Liner Shipping Connectivity Index (LSCI) is generated from five components, namely:

i. number of ships supplying the country;
ii. total container-carrying capacity of those ships;
iii. maximum vessel size;
iv. the number of services; and
v. the number of companies that deploy container ships on services from and to a country's ports.

An index is generated for each of the five components by dividing the value of each component per country by the maximum value for the particular component. Then the average of the five components is calculated for each country and divided by the maximum average over all the

countries and multiplied by 100. This gives an index value between 0 and 100, with a value of 100 for the country with the highest component average. Figure 3.36 depicts the LSCI for South Africa and the peer countries as well as the trend in this index since 2004.

From the figure, it is evident that South Africa's LSCI compares well with its developing peer countries. India, Brazil and Thailand have only a slightly higher index. The country also recorded a significant increase of 59 percent in the LSCI since 2004, reflecting its increased connectivity with trading partners. The degree of global connectivity is especially of importance for perishable agricultural exports. However, compared to developed countries, there is room for improvement with regard to the LSCI; the availability of international transport should not be a limiting factor to South Africa's agricultural trade competitiveness.

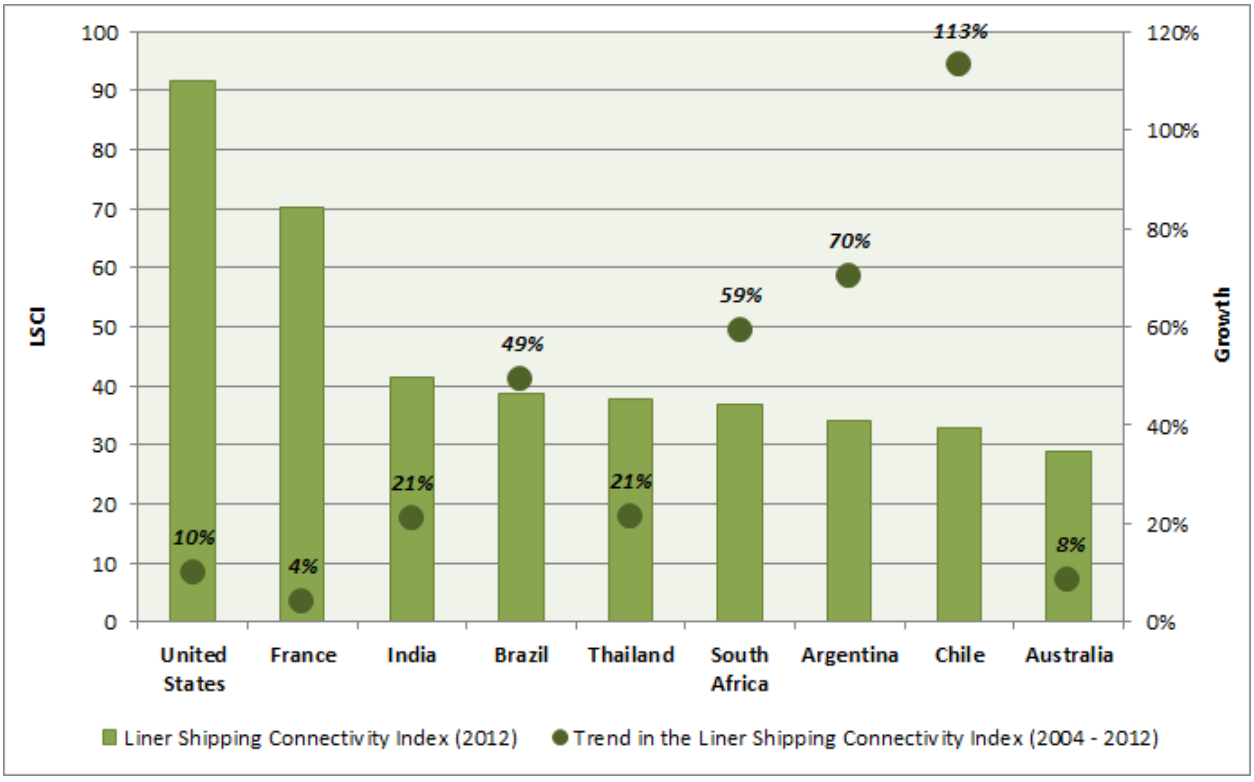


Figure 3.36: Liner Shipping Connectivity Index for South Africa and the peer countries
Source: UNCTAD (2013)

3.7.4 Logistical performance

Arvis *et al*. (2012) have constructed a Logistics Performance Index (LPI) for 155 countries. The LPI measures the performance of these countries in six important aspects of the current logistics environment. These include:

i. the efficiency of the customs clearance process;
ii. quality of trade and transport-related infrastructure;
iii. ease of arranging competitively priced shipments;
iv. competence and quality of logistics services;
v. ability to track and trace consignments; and
vi. the frequency with which shipments reach the consignee within the scheduled or expected time.

Online questionnaires were used to survey nearly 1 000 logistics professionals from international logistics companies in 130 countries (Arvis *et al.*, 2012). According to Arvis *et al.* (2012), the LPI is specifically focused on the 'friendliness' of countries' trade and transport facilitation and is considered the first international benchmarking tool that specifically measures the critical factors of trade logistics performance. Table 3.16 compares different aspects of the Logistics Performance Index (LPI) for South Africa and the selected peer countries.

Table 3.16: Logistics Performance Index of South Africa and the peer countries

Country	LPI Score (2)	Customs (3)	Infra-structure (4)	Intern. shipments (5)	Logistics compe-tence (6)	Tracking & tracing (7)	Timeliness (8)
South Africa	3.67	3.35	3.79	3.5	3.56	3.83	4.03
Argentina	3.05	2.45	2.94	3.33	2.95	3.3	3.27
Australia	3.73	3.6	3.83	3.4	3.75	3.79	4.05
Brazil	3.13	2.51	3.07	3.12	3.12	3.42	3.55
Chile	3.17	3.11	3.18	3.06	3	3.22	3.47
France	3.85	3.64	3.96	3.73	3.82	3.97	4.02
India	3.08	2.77	2.87	2.98	3.14	3.09	3.58
Thailand	3.18	2.96	3.08	3.21	2.98	3.18	3.63
United States	3.93	3.67	4.14	3.56	3.96	4.11	4.21

Source: Arvis et al. (2012)

Table 3.16 shows that South Africa has the fourth highest LPI score among the peer countries. The country has a better score than all of its developing peers. A further breakdown of this performance shows that together with the United States, France and Australia, South Africa has the highest overall quality of trade and transport-related infrastructure (see column 2). South Africa ranks fourth when it comes to the customs clearance process among the peer countries (column 3), and third with regard to the frequency with which shipments reach the consignee within the scheduled or expected time (column 8). With regard to the ease of arranging competitively priced shipments (column 5), competence and quality of logistics services (column 6), and the ability to track and trace consignments (column 7), the United States, France, Australia and South Africa are also the leading among the peer countries. Therefore, border logistics are relatively not limiting South Africa's agricultural trade competitiveness.

3.8 Export and investment promotion

Trade promotion support is designed to help existing and potential exporters to understand the requirements of export markets and to identify and exploit markets for their products (Reis & Farole, 2012). In most countries, including South Africa, this is rendered through Export Promotion Agencies (EPA) that have as their main activities: country-image building, lobbying, targeted marketing, export support services and market research (Reis & Farole, 2012). Lederman, Olarreaga and Payton (2009) found that EPAs generally have a positive and statistically significant impact on national exports. Furthermore, the link between EPA activities and trade competitiveness is derived from supporting 'export discovery' as well as by improving the exporter's technical capabilities to participate in export markets. Trade promotion reduces start-up costs and lowers risks, and subsequently facilitates higher quality and lower cost exports (Reis & Farole, 2012)

Attracting Foreign Direct Investment (FDI) is an important component of export development strategies in most countries, because FDI contributes to economic growth through the provision of capital and employment and its dynamic effects. There is a widely shared view that FDI promotes exports of receiver countries or regions by (a) domestic capital enlargement for exports, (b) helping the transfer of technology and new products for exports, (c) simplifying access to new and large foreign markets, and (d) upgrading technical and management skills by providing training for the local labour force.

In most countries, investment promotion is facilitated by investment promotion agencies (IPA). In many instances, EPAs and IPAs are combined in a single agency (e.g. Trade and Investment South Africa). The functions of IPAs include: national image building, investment generation, servicing investment and policy advocacy (Wells & Wint, 2001). Investment promotes trade competitiveness primarily by attracting competitive investors. Their contribution to South Africa's trade competitiveness can be either by diversifying its export portfolio or by providing competitive inputs, technology and knowledge (Reis & Farole, 2012). The following sub-sections

will briefly discuss and assess the export and investment promotion framework of South Africa's agricultural sector.

3.8.1 Export promotion agencies

In South Africa, the following government institutions are involved in the export promotion of agricultural products:

- The National Agricultural Marketing Council (NAMC) plays an important role in advising the Ministry of Agriculture and servicing this dynamic industry on market access issues. Its four strategic objectives are: increasing market access for all market participants; promotion of efficiency in the marketing of agricultural products; optimisation of export earnings from agricultural products; and the enhancement of the viability of the agricultural sector.
- The Directorate: International Trade of the Department of Agriculture, Forestry, and Fisheries (DAFF) has been tasked to increase market access for South African and African agricultural, forestry and fish products domestically and internationally. Consequently, this directorate undertook the implementation of the Trade Strategy as well as the implementation of the regional cooperation agreements.
- The Department of Trade and Industry (DTI) plays a critical role in the promotion of economic development and meaningful participation in the global economic and trade environment. It achieves this by working to build an equitable multilateral trading system that facilitates development, strengthens trade and investment links with key economies. The Directorate: Export Sector Promotion encourages the industry, especially those involved with cluster formation, to include an export strategy and ultimately an export council in their future plans. A financial assistance scheme makes provision for financial contributions to industry. The DTI currently has 53 economic representatives in 44 offices situated in over 40 strategically selected countries and they are active participants in the process of helping the exporters reach their targets
- Trade and Investment South Africa (TISA), a division of the DTI, aims to increase export capacity and supports direct investment flows via the implementation of strategies

directed at targeted markets, and effectively manages the DTI's network of foreign trade offices. A significant feature of the DTI's international engagement also involves work to support African regional economic integration and development co-operation. The DTI focuses on encouraging exports in order to leverage global growth for the development of the South African economy through the establishment of collaborative agreements with existing trading partners and dynamic fast-growing emerging markets. The Trade and Investment South Africa (TISA) Export Promotion unit is responsible for the development and implementation of regional export promotion strategies based on market research and the identification of export opportunities; reviewing the National Export Strategy by assimilating inputs from relevant stakeholders to ensure a targeted and focused approach; and rendering export support services such as providing export information and advice as well as administering an incentive scheme (EMIA) that partially compensates exporters for certain costs incurred in marketing their products and services in foreign markets.

Although some producer organisations and industry associations in the agricultural sector also undertake generic marketing activities in overseas markets (e.g. Hortgro), or promote the interest of exporters and importers (e.g. Association of Meat Importers and Exporters), most of the sector's export promotion activities are clustered within specific export councils. Of the 19 export councils in South Africa, seven focus specifically on agricultural products. These are:

- Fresh Produce Exporters Forum / Fruit South Africa
- Farmed Abalone Export Council
- SA Flower Export Council (ASSO Flowers)
- Wines of South Africa
- SA Equine Trade Council
- SA Fruit and Vegetable Canners' Export Council
- SA Ostrich Business Chamber

3.8.2 Investment promotion agencies

South Africa's main investment promotion agency is TISA. Their Investment Promotion and Facilitation unit is responsible for attracting foreign direct investment (FDI), as well as developing and promoting local direct investment. This is achieved via the identification, packaging and marketing of potential investment opportunities, and the identification of potential investors. The unit facilitates investment in South Africa, provides general information on the investment and domestic business climate, and offers dedicated aftercare services to investors. The unit organises inward/outward trade missions, and facilitates funding and Government support for trade- and investment-related activities.

The Global Investment Promotion Benchmarking Report of the World Bank (2009) provides a benchmark of the performance of the different national investment promotion agencies. The performance is assessed on the basis of the website and enquiry handling by national IPAs. Table 3.17 shows the results for South Africa and the selected peer countries. It is evident that the performance of South Africa's IPA is on par with that of its developing peers. However, lessons from IPA best practices, such as in France, should be applied to boost its performance.

Table 3.17: Comparison of IPA performance in South Africa and selected peer countries

Country	IPA performance score: website and enquiry handling
Argentina	average
Australia	good
Brazil	good
Chile	average
France	best practice
India	very weak
South Africa	average
Thailand	average
USA	good

Note: The scoring range is: best practice – good – average – weak – very weak

Source: World Bank (2009)

There are several sector-specific financial incentives in place to attract (foreign) investment in South Africa. These include:

- Aquaculture Development and Enhancement Programme (ADEP): An incentive programme available to South African registered entities engaged in primary, secondary and ancillary aquaculture activities in both marine and freshwater (fish hatcheries and fish farms) and (production, processing and preserving of aquaculture fish).
- The Agro-Processing Linkage Scheme if the Industrial Development Cooperation (IDC) incentivises agro-processors to source raw material directly from resource-poor farmers.
- The Agro-Processing Competitiveness Fund of the IDC, with as focus areas: internationalisation (globalising SA brands and incorporation of SA companies into global supply chains), value addition (horticultural and grain surplus value addition), import replacement (seed oils and oil cake; malt production), emerging industries (marine aquaculture, rural/poor linkages), and the rural agricultural linkage scheme (one-stop, agri-business support initiative).
- Technical assistance grants and loan funding of agricultural infrastructure by the Development Bank of Southern Africa (DBSA).

Investment promotion is also conducted at the provincial level by Provincial Investment Promotion Agencies (e.g. PIPAs). These are: Free State Development Corporation, Gauteng Economic Development Agency, Trade and Investment KwaZulu-Natal, Limpopo Business Support Agency, Limpopo Economic Development Enterprise, Trade and Investment Limpopo, Mpumalanga Economic Growth Agency, Invest North West, Northern Cape Economic Development Agency, Eastern Cape Development Corporation and WesGro (Western Cape Province).

3.8.3 Foreign Direct Investment in agriculture

The effectiveness of IPA in marketing South Africa as an attractive destination for foreign investment in agriculture can be reflected by the amount of FDI inflows in the sector.

Therefore, this section briefly provides some background on FDI in agriculture and a comparison of foreign investment in the agricultural sectors of South African and the selected peer countries.

FDI refers to investment in which a firm in one country directly controls or owns a subsidiary in another country. If a foreign company invests in at least 10 percent of the stock in a subsidiary, the two firms are typically classified as Multi-National Enterprises (MNEs) (Krugman & Obstfeld, 2009). There are two main forms of FDI: Greenfield investments and Mergers and Acquisitions (M&As). Van Marrewijk (2007) highlighted that a company becomes an MNE by operating and controlling foreign affiliates, which require FDI in the form of either Greenfield investments or M&As. Greenfield investments refer to the investing company starting a new enterprise in the host country. M&As refer to a parent company acquiring existing enterprises as either a merger or an acquisition (Liu & Zou, 2008).

Attracting investments in the agricultural sector is mostly resource-seeking FDI, which is vertical in nature. Resource-seeking FDI is investment undertaken to gain access to natural resources in particular countries. This type of investment seeks to acquire factors of production that are more accessible in the host country. The investment seeks access to existing resources (ITC, 2011). The vertical investment strategy of MNEs connotes that it divides different stages of the production process among geographical locations to minimise production costs. For most, vertical FDI investors are, however, somewhat uncommitted between alternative locations. This is why the role of Investment Promotion Agencies is so important, as this may be the critical aspect required for a smaller economy in getting the attention of potential FDI. Investment promotion supports trade competitiveness primarily by attracting competitive investors (Reis & Farole, 2012). Bezuidenhout and Naudé (2008) indicated that FDI has become a major source of capital flows in many developing nations.

The total FDI net inflows[24] in agriculture from 2006 to 2011 for South Africa and the selected peer countries are shown in Figures 3.37. The figure also indicates the FDI inflows relative to the size of the agricultural sector of the respective countries. It is evident that in absolute terms South Africa recorded the lowest inflow of FDI in its agricultural sector among the selected countries. However, South Africa, followed by Argentina and Brazil, showed the largest average annual increase in agricultural FDI inflows.

In relative terms, South Africa performs relatively poorly; its proportional FDI in agriculture lags behind other developing countries such as Brazil, Argentina and Chile. Therefore, South Africa's IPAs should put more emphasis on attracting FDI in agriculture.

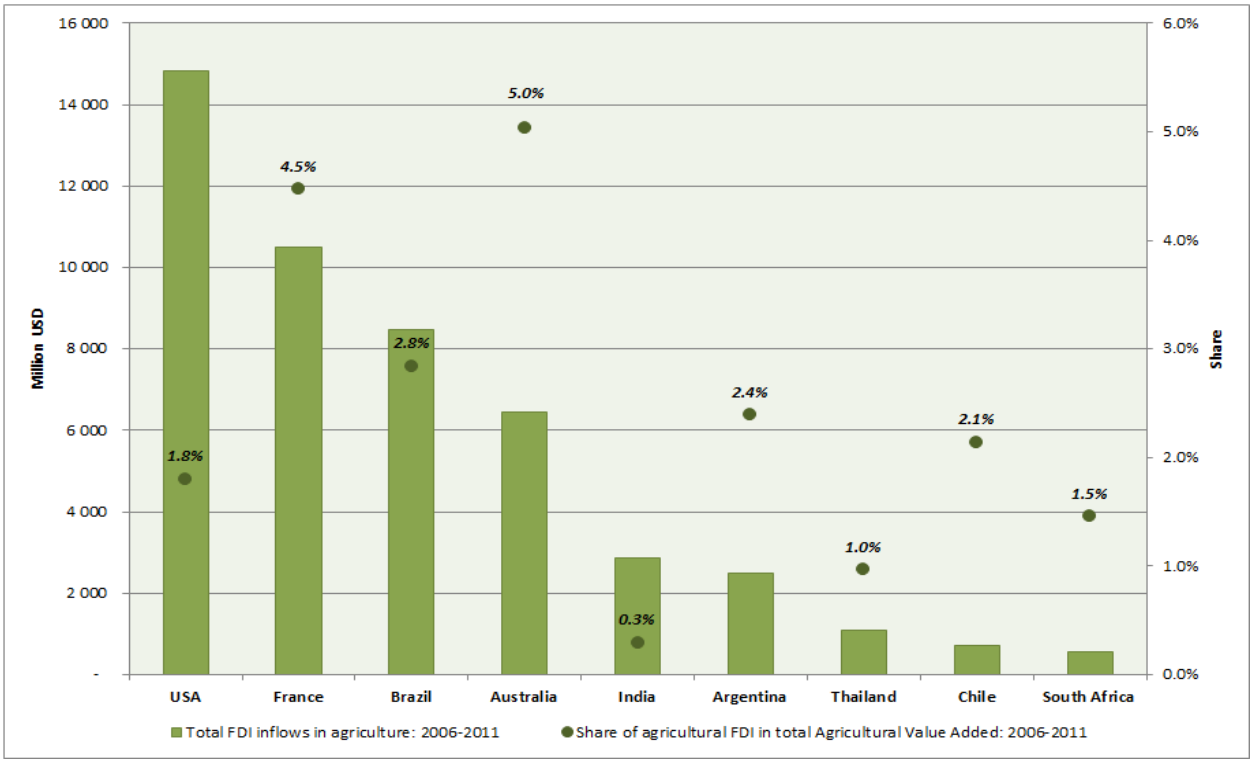


Figure 3.37: FDI inflows into the agricultural sectors of South Africa and the peer countries (2006-2011)

Source: Own calculations based on data from Financial Times (2013), Bureau van Dijk (2013) and UNCTAD (2013)

[24] The flow of funds from one country to another in an FDI transaction.

3.9 Standards and certification

3.9.1 Local standard-setting

Increasing regulatory stringency can have negative effects on trade flows. For instance, stricter requirements in the use of antibiotics in animal production practices can result in decreasing trade volumes in certain countries. These stricter production requirements can also result in increasing production costs. It is therefore important that policy-makers balance consumer safety issues on the one hand, and sustainable trade flows and market access for developing nations on the other. Like all countries, South African producers have to comply with applicable national and international standards.

According to the Department of Trade and Industry (DTI), quality and standards are important in order to facilitate market access and sustainable export growth. The DTI singled out the development of systems for Standardisation, Quality Assurance and Metrology (SQAM) as an important platform for sustainable long-term competitiveness (Wilson & Abiola, 2003). Figure 3.38 illustrates the South African SQAM framework for mandatory local standards. These role-players perform different functions related to regulations and standard-setting, as well as policing and accreditation. It is evident from the diagram that South Africa's local standard-setting framework is well-developed.

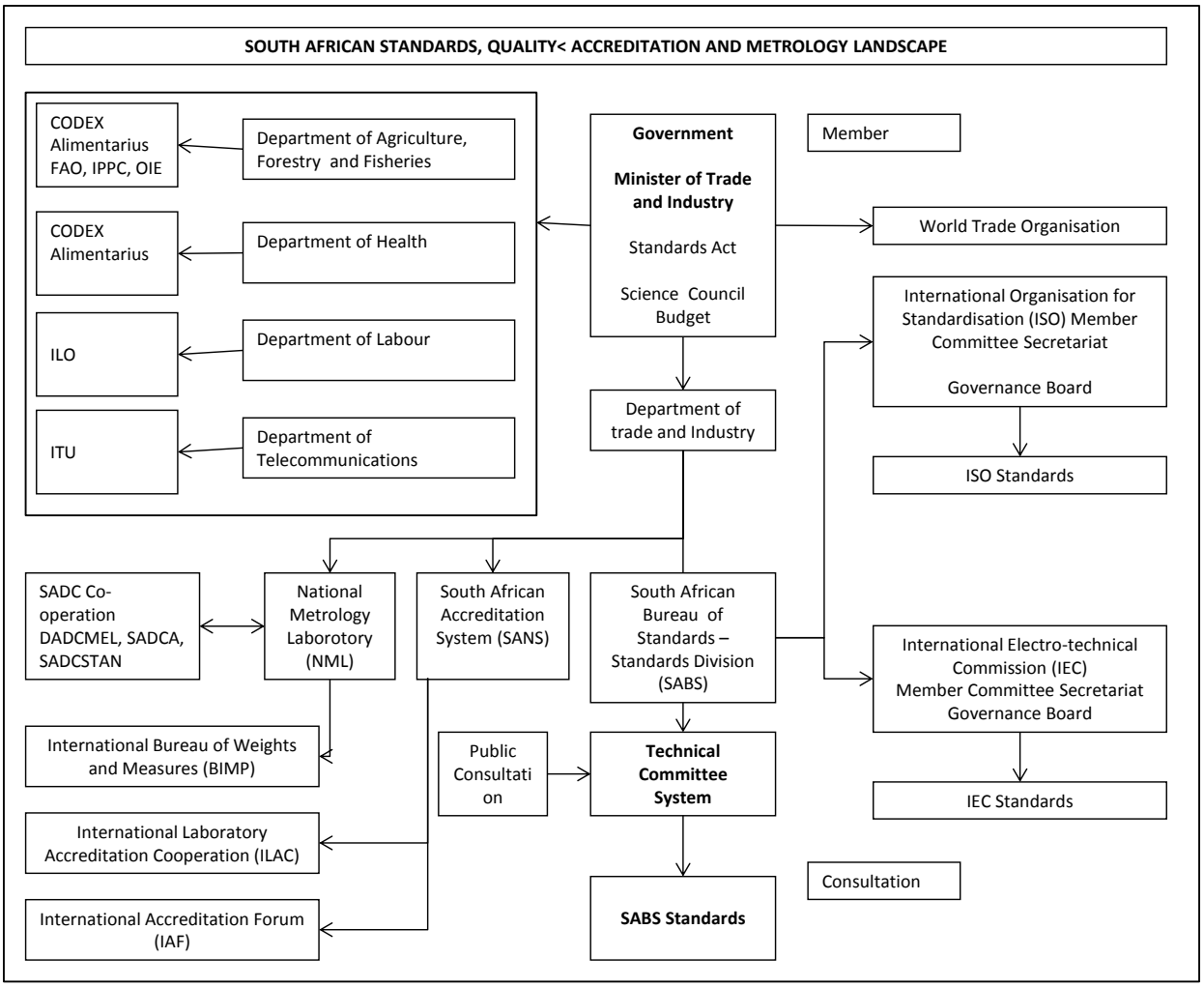


Figure 3.38: South Africa's framework for mandatory standards

Source: Wilson and Abiola (2003)

3.9.2 International standards

South African (agricultural) exports have to comply with several requirements in the respective importing country. This can be voluntary (i.e. industry-driven) or mandatory (i.e. government-driven) standards for production processes and products. Especially 'voluntary' standards imposed by foreign retail groups (e.g. BRC, HACCP, GlobalGAP and ISO) are of significant importance to South Africa's agricultural exports. Proofing compliance with these standards in the form of accreditation or testing increases transaction costs for exporters.

Specific information of the proportion of South African agricultural firms that comply with certain standard schemes is not available. However, international data on the proportion of firms that are certified by a standard scheme of the International Standards Organisation (ISO) provides a good proxy for compliance with international product and process standards. Figure 3.39 makes a comparison of the rate of ISO certification of South African and selected peer countries[25]. The figure shows that South Africa compares relatively well with its developing peer countries; however, to increase competitiveness, the rate of compliance should be higher.

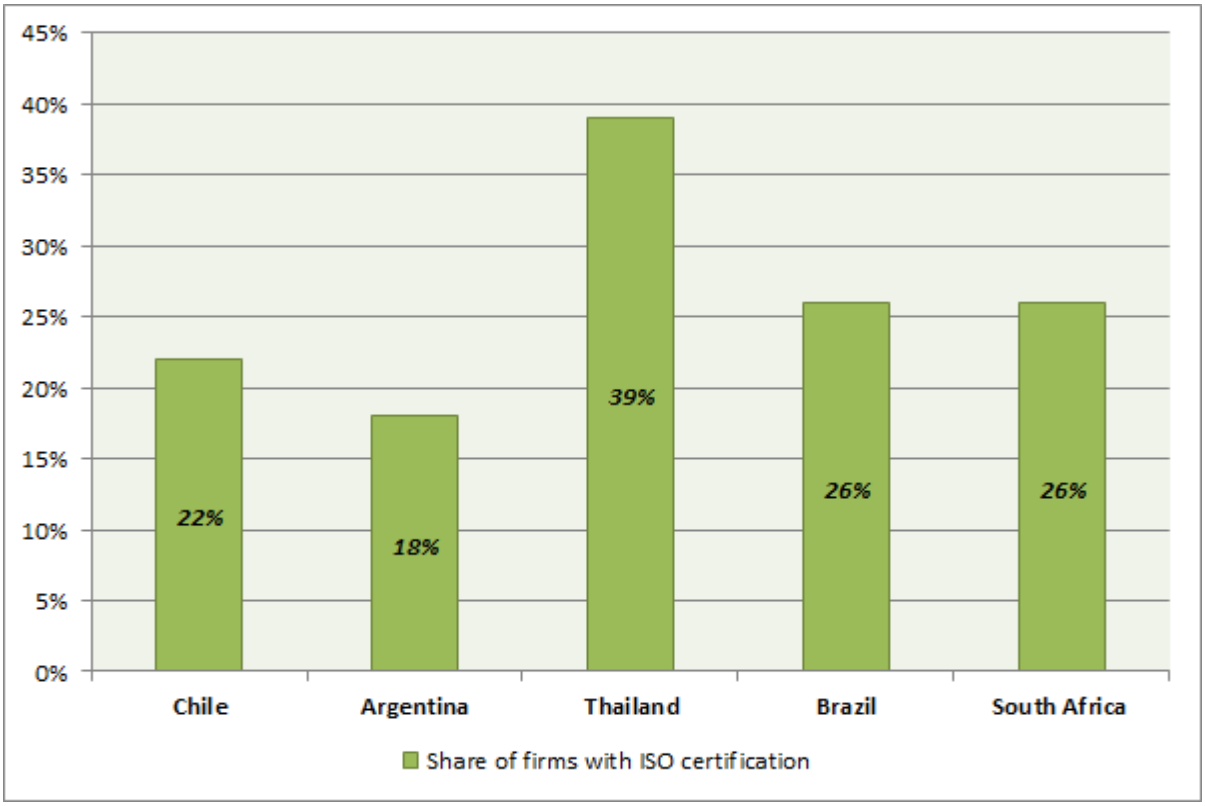


Figure 3.39: Share of firms in South Africa and the peer countries with ISO certification
Source: World Bank (2013b)

The Rapid Alert System for Food and Feed (RASFF) of the European Union (EU) records all instances of non-compliance with the EU's food safety standards for imports from third parties. In most cases, these notifications involve border rejections, alerts, and information follow-ups.

[25] No data available for the USA, France and Australia.

The amount of notifications does depend on the composition (i.e. risk profile) of the agricultural export flows between third parties and the EU. However, the number of border rejections, as reported to the RASFF, still forms a good proxy of the rate of compliance with food safety standards in the EU by the exporting countries. Figure 3.40 shows the total number of border rejections of agricultural exports into the EU for South Africa and the peer countries for the period 2008 to 2012. The figure shows that South Africa performs significantly well with regard to its compliance with EU food safety standards.

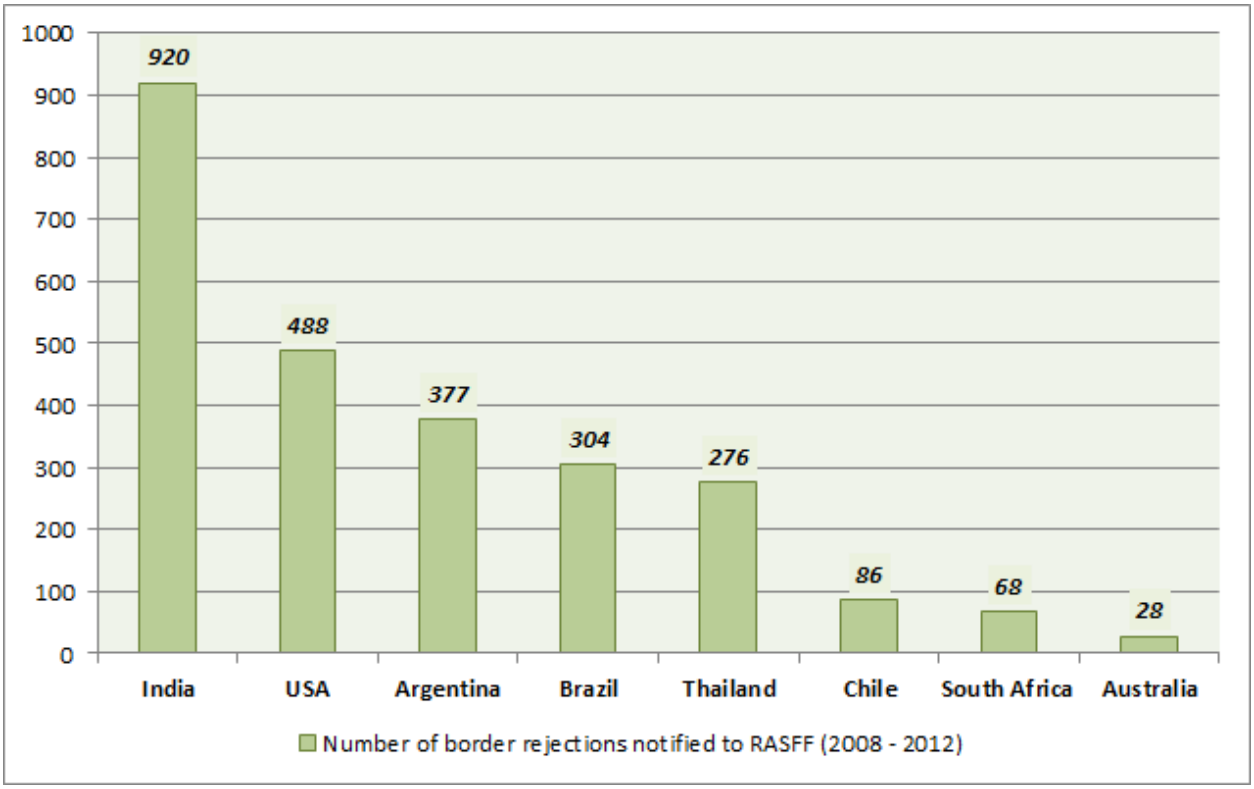


Figure 3.40: Total number of border rejection in the EU for agricultural exports from South Africa and the peer countries (2008-2012)

Source: RASFF (2013)

Since the volume of agricultural exports affects the number of border rejections by the EU, a relative measure of border rejections is a more accurate indicator of compliance with EU food standards. Figure 3.41 plots the average number of border rejections per million USD of agricultural imports by the EU sourced from the peer countries in the period from 2008 to

2012. The figure shows that South Africa has a proportionally low quantity of border rejections compared to the peer countries. Only Brazil and Australia perform better. Therefore, South Africa's relatively sound compliance with international food safety standards implies a comparative advantage of its agricultural sector, which is supportive to its agricultural trade competitiveness.

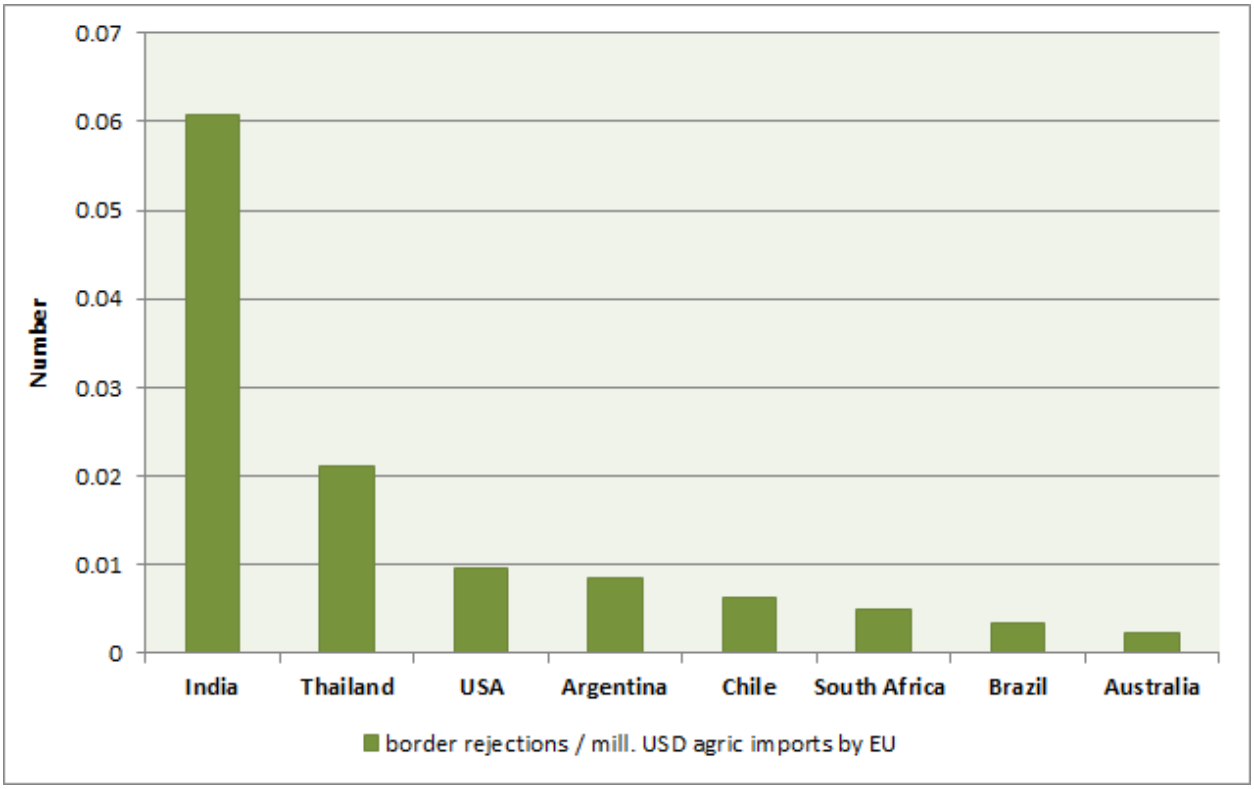


Figure 3.41: Trade-weighted border rejection for agricultural exports to the EU from South Africa and the peer countries (2008-2012)

Source: RASFF and UN Comtrade (2013)

3.10 Industry coordination and sector support

Government provides a range of support targeted at the development of the agricultural sector. Globally, sector-specific government support has moved to a cluster approach. A cluster is an agglomeration of companies, suppliers, service providers and institutions operating in the same broad field, usually located within a specific geographic area (World Bank, 2009). Government support can enhance trade competitiveness by creating a sector-specific enabling environment for agricultural business.

Industry coordination deals with the degree of organisation within the agricultural sector that is important for sharing knowledge; increased coordination and cooperation; and lobbying and promoting the sector's interest. These functions are essential to develop agricultural trade competitiveness.

3.10.1 Government departments

The Department of Agriculture, Forestry and Fisheries (DAFF) is responsible for the agricultural sector and works with various organisations to promote the interests of the sector. The following public entities report directly to the Minister of Agriculture:

- Agricultural Research Council (ARC): public funded research in agriculture
- Ncera Farms (Pty) Ltd: farm management, training and support services
- Marine Living Resources Fund: monitoring, research, marine resource management
- Onderstepoort Biological Products Ltd: prevent and control of animal diseases
- National Agricultural Marketing Council (NAMC): agricultural marketing advisory services
- Perishable Products Export Control Board (PPECB): inspection, accreditation and testing services
- Agricultural Sector Education Training Authority (AgriSETA): vocational training in farming practices

3.10.2 Industry associations in agriculture

South Africa's agricultural sector is relatively well organised and coordinated with a large number of farmer-, industry- and commodity organisations that are promoting and servicing the interest of the sector. Figure 3.42 provides a broad overview of the organisational structure in the agricultural sector.

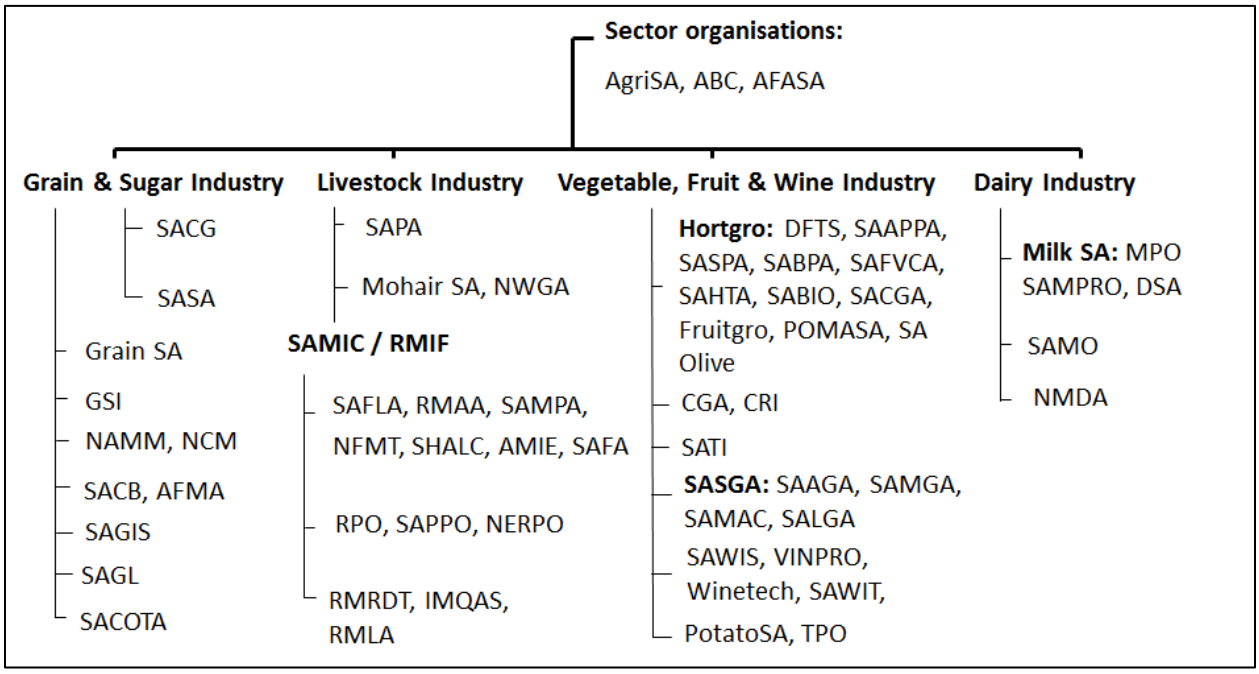


Figure 3.42: Broad organisational structure of the South African agricultural sector

The industry organisations depicted in the figure are as follows:

- Sector organisations: AgriSA, Agricultural Business Chamber (ABC), African Farmers Association of South Africa
- Grain and Sugar industry: South African Cane Growers (SACG), South African Sugar Association (SASA), Grain SA, Grain Silo Industry (GSI), National Association of Maize Millers (NAMM), National Chamber of Millers (NCM), South African Chamber of Baking (SACB), Animal Feed Manufacturers Association (AFMA), South African Grain Information Services

(SAGIS), South African Grain Laboratory (SAGL), South African Grain Arbitration Association (SACOTA).

- Livestock industry: South African Poultry Association (SAPA), MohairSA, National Wool Growers Association (NWGA), South African Meat Industry Council (SAMIC), Red Meat Industry Forum (RMIF), South African Federation of Livestock Auctioneers (SAFLA), Red Meat Abattoir Organisation (RMAA), South African Meat Processors Organisation (SAMPA), National Federation of Meat Traders (NFMT), Skins, Hides and Leather Council (SHALC), Association of Meat Importers and Exporters (AMIE), South African Feedlot Association (SAFA), Red Meat Producer's Organisation (RPO), South African Pork Producer's Organisation (SAPPO), National Emerging Red Meat Producer's Organisation (NERPO), Red Meat Research and Development (RMRD), International Quality Assurance Services (IMQAS). Red Meat Levy Admin (RMLA).
- Fruit industry: Hortgro, Dried Fruit Technical Service (DFTS), South African Apple and Pear Producer's Association (SAAPPA), South African Stone Fruit Producer's Association (SASPO), South African Berry Producer Association (SAPBA), South African Vegetable and Fruit Canner's Organisation (SAVFCA), South African Honeybush Tea Association (SAHTA), South African Bee Industry Association (SABIO), South African Cherry Growers' Association (SACGA), Fruitgro, the Pomegranate Association of South Africa (POMASA), SA Olive, Citrus Growers' Association (CGA), Citrus Research International (CRI), South African Table Grape Industry (SATI), South African Subtropical Growers' Association (SASGA), South African Avocado Growers' Association (SAAGA), South African Mango Growers' Association (SAMGA), South African Macadamia Growers' Association (SAMAC), South African Litchi Growers' Association (SALGA), South African Wine Information Service (SAWIS), Vinpro, the Wine Industry Network for Expertise and Technology (Winetech), South African Wine Industry Trust (SAWIT), PotatoSA, Tomato Producers' Organisation (TPO).
- Dairy industry: Milk Producers' Organisation (MPO), South African Milk Processors Organisation (SAMPRO), Dairy Standard Agency (DSA), South African Milk Organisation (SAMO), National Milk Distributor's Association (NMDA)

It is evident from the figure that the level of organisation in the tree nut and vegetable sub-sectors is lagging behind.

3.10.3 Clusters in the agricultural sector

Due to agro-climatic conditions prevailing in a certain geographic area, primary agricultural production is implicitly clustered in specific regions of South Africa. Figure 3.43 provides an overview of the agricultural regions in South Africa.

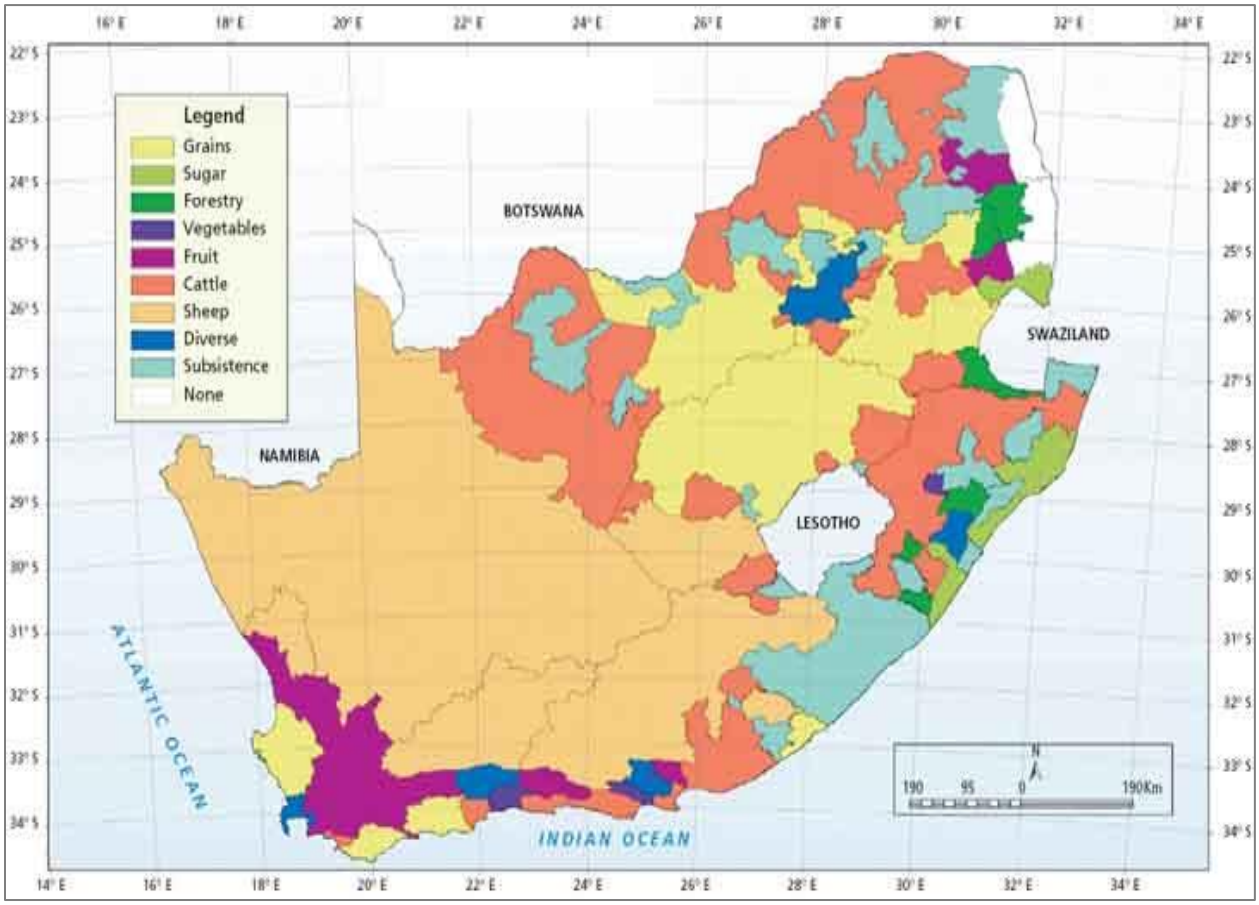


Figure 3.43: Overview of the agricultural production regions in South Africa
Source: ARC (2013)

To date, there has been no significant clustering taking place in the processing of agricultural products. Given that approximately 65 percent of the output of the primary agricultural sector is used as inputs in other sectors (Quantec, 2013), the potential of cluster development is evident.

The key South African policy stimulating cluster development in the secondary agricultural sector is the Industrial Policy Action Plan (IPAP) of the Department of Trade and Industry (DTI). The 2012 industrial Policy Action Plan: IPAP 2012/2013-2014/2015 (IPAP2) is a key policy instrument within the New Growth Paths' (NGP) job-creation strategy. The policy provides an action plan for the implementation of the NGP, highlighting necessary interventions and key stakeholders that need to be engaged. IPAP 2 has classified their target sectors into three clusters. These are listed below along with the agriculture-related sub-sectors:

Cluster 1: Qualitatively new areas of focus:

- Agro-processing (linked to food security and food pricing imperatives)

Cluster 2: Scaled-up and broadened interventions in existing IPAP sectors:

- Biofuels: establish regulatory framework and support agricultural and refining investment
- Forestry, Paper & Pulp, Furniture: unblock water licences and promote further processing
- Business Process Services: broaden and deepen SA's product offerings

Cluster 3: Sectors with potential for long-term advanced capabilities

- No direct linkages with the agriculture sector.

Key Action Programmes in the IPAP

1. *Development of a Food-processing Strategy and Action Plan:* The food-processing CEOs' Forum has been established and a number of company-specific initiatives to accelerate growth, transformation and job creation are underway.

2. *Development of a small-scale milling industry:* This intervention will facilitate the entry of small-scale maize millers into the South African market. The intervention consists of the packaging of a range of support measures from the dti to facilitate the market entry of small-scale maize mills.
3. *Enhancement of Competition in the Fruit and Vegetable Canning Industry:* Implementation of a PPP fruit canning initiative designed to raise competitiveness for the long-term sustainability of the fruit canning industry.
4. *Development of a Soybean Action Plan promoting market linkages between primary agricultural producers and processors:* Facilitate the development of business and strategic alliances between existing and new soybean producers and processors to increase the manufacturing capacity of the sector and reduce dependency on imports.
5. *Development of the organic food sector:* Implementation of the Organic Produce Strategy.
6. *Supporting the Public-Private Partnership for Food Security:* The PPP for Food Security is being co-ordinated by the DRDLR and DAFF. The DTI's role is to develop the market for the products produced by the (mainly) smallholder farmers.

3.11 Innovation

Innovation lies at the heart of diversification and sophistication of agricultural exports; two factors that have proved to grow both exports and output in developing countries over the past few years. According to the World Bank (2013a), innovation in the form of new products increases diversification, whereas sophistication is fostered by quality upgrading. However, the competitive edge that can be obtained through innovation, whether by means of diversification or sophistication, is to a large degree driven by investment, capacity or access to timely and accurate research and development (R&D).

3.11.1 Research and development in agriculture

Research and Development (R&D) is regarded as a significant source of economic growth, especially for the agricultural sector (Thirtle & Van Zyl, 1994). This statement is supported by the work of Liebenberg and Pardey (2010) who argue that science and technology are inextricably intertwined with South Africa's long-run economic growth and development performance. The authors elaborate by arguing that science and technology policies are also interconnected with trade policies and that the technical changes that agricultural R&D brings about are critical for maintaining competitive advantages in international markets. However, before placing R&D indicators in a comparative international setting, a brief description of major local R&D policy and institutional changes in terms of conduct and funding will be provided, since these changes had an impact on the competitiveness of the local agricultural sector and its international trade position. These changes were adequately captured by Pardey *et al*. (2010), and are summarised here.

At first, much of South Africa's public agricultural R&D was decentralised and performed in a set of department-bases research institutes distributed across the country. The department-based research institutes had comparatively close links to publicly supported extension officers and researchers at various universities, with a legal framework to advance physical and institutional integration. However, in the late 1980s, the science system was reorganised into a set of Science Councils organised around scientific disciplines or fields of science. The present nine statutory Science Councils are each constituted through their own act of parliament and report to different ministers. The Agricultural Research Council (1992) was the last of the Councils to come in being; however, the establishment of the Agricultural Research Council (ARC) was followed by the subdivision of the former seven Agricultural Development Institutes into nine provincial Departments of Agriculture. As a result, institutes that formerly operated within broadly defined agro-ecological zones were now structured according to provincial boundaries, which in most cases do not reflect suitable agro-ecological boundaries to conceive and target agricultural R&D. This resulted in the severe disruption of farmer study groups that were formerly linked with adaptive research and extension activities, and so too were the

institutional arrangements designed to coordinate local initiatives with national research agencies such as the ARC institutes.

Moreover, changes in the public funding of R&D towards a more competitive parliamentary grant system left the ARC exposed to severe budgetary cuts due to a perceived lack of performance. The budgetary cuts not only negatively influenced the ARC's ability to conduct research, but also privately funded R&D initiatives/institutions that had informal co-funding agreements with the ARC at the time.

The above-mentioned spurred significant developments with regard to private sector funded agricultural R&D. Nowadays, most large agricultural companies, industry bodies, institutes etc. have their own research and extensions divisions aimed at bridging the gaps presented by performance and funding developments within the public agricultural R&D system; all in a quest to remain competitive. However, the extent of private sector engagement in agricultural R&D is relatively unknown, as data quantifying private sector agricultural R&D is limited. Therefore, indicators on public R&D, i.e. public spending, number of researches etc., will be used to put South Africa's R&D into a comparative international setting.

Table 3.18 shows total R&D spending as percentage of GDP for South Africa and the peer countries. The data reflects spending on all R&D activities and not only in agriculture. South Africa's R&D expenditure was on average 0.87 percent of GDP from 2000 to 2009. Compared to the peer countries, South Africa's spending as percentage of GDP is lagging behind that of the developed countries, whereas it is slightly above most of the developing countries. The fact that South Africa's R&D expenditure as a percentage of GDP has declined since 2006 compared to the growth reported by the majority of the peer countries and is a concern for competitiveness in general.

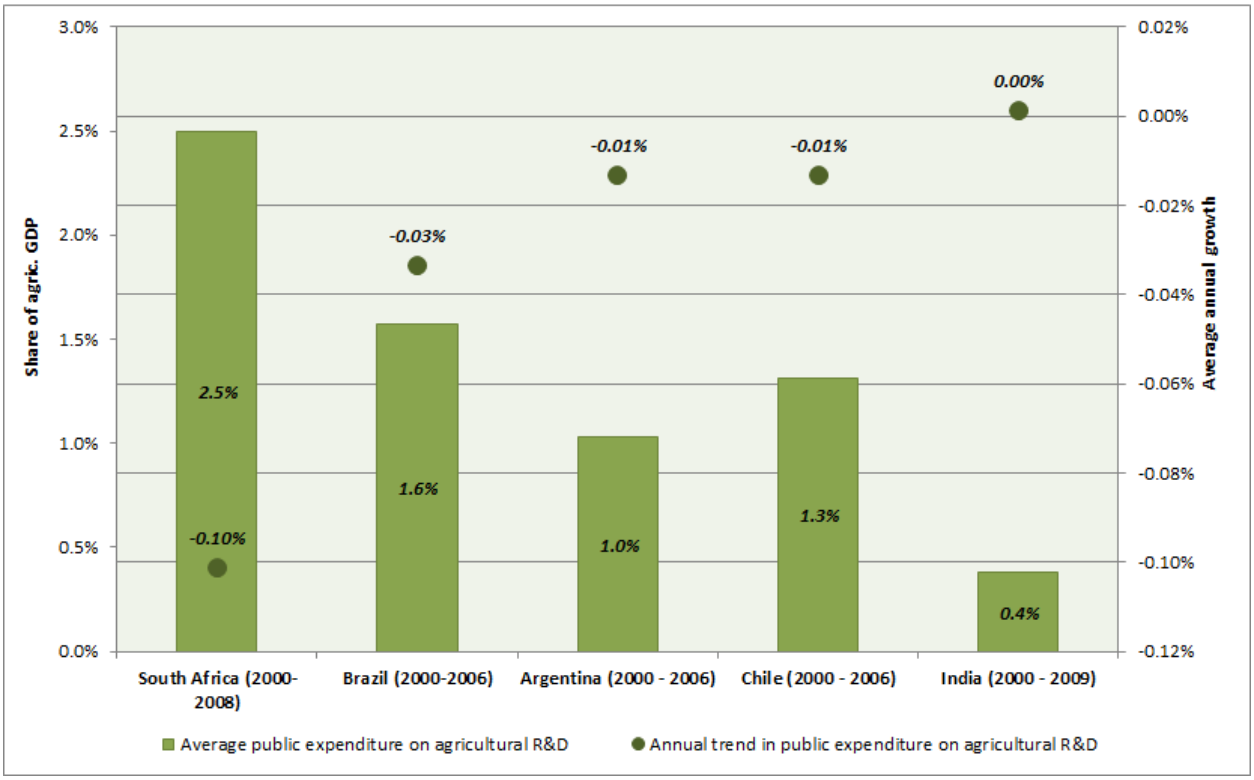
Table 3.18: R&D expenditure as percentage of GDP for South Africa and the peer countries (2000-2009)

Country	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	Average
	% of GDP										
US	2.71	2.72	2.62	2.61	2.54	2.57	2.61	2.67	2.79	-	2.65
AUS	1.57	-	1.74	-	1.85	-	2.18	-	2.35	-	1.94
EU	1.80	1.86	1.83	1.86	1.83	1.82	1.85	1.85	1.95	2.04	1.87
BRA	1.02	1.04	0.98	0.96	0.90	0.97	1.00	1.07	1.08	-	1.00
SA	**-**	**0.73**	**-**	**0.79**	**0.85**	**0.90**	**0.95**	**0.92**	**0.93**	**-**	**0.87**
IND	0.77	0.75	0.74	0.73	0.74	0.78	0.77	0.76		-	0.75
CHL	0.53	0.53	0.68	0.67	0.68	-	-	0.33	0.39	-	0.54
ARG	0.44	0.42	0.39	0.41	0.44	0.46	0.49	0.51	0.52	-	0.45
THA	0.25	0.26	0.24	0.26	0.26	0.23	0.25	0.21	-	-	0.25

Source: World Bank (2013b)

Figure 3.44 depicts the average public[26] expenditure on agricultural R&D, as well as its trends for South Africa and selected peer countries[27]. The figure shows that although South Africa relatively has the highest public expenditure on agricultural R&D, it has declined significantly since 2005. According to IFPRI (2013), the decline in public agricultural R&D expenditure in South Africa is mainly due to shifts in the government funding model for the ARC. Government contributions continue to be the primary source of funding for agricultural R&D in South Africa, supplemented by the sale of goods and services and R&D support from producer/commodity organisations. Donor contributions are minimal by comparison with other funding sources. It is of concern that peer countries such as Brazil, Argentina and India are reporting a more or less stagnant public expenditure and as a result to increased funding and expenditure rather than a decline in agricultural GDP (IFPRI, 2013).

[26] Data on private expenditure on agricultural R&D in South Africa is not available.
[27] The USA, EU, Australia and Thailand have been excluded from comparison due to data limitations.



Note: The respective time-period of the plotted data is depicted in brackets

Figure 3.44: Agricultural R&D expenditure in South Africa and selected peer countries

Source: IFPRI (2013)

Figure 3.45 shows the number of agricultural researchers in the public sectors of South Africa and selected peer countries[28]. Similar to South Africa's agricultural R&D spending, its number of agricultural researchers also declined significantly since 2000. South Africa reported the largest loss in human capacity in terms of the number of agricultural researchers, while countries such as Brazil and Argentina reported an increase in the number of agricultural researchers from 2001 to 2006.

[28] The USA, EU, Australia and Thailand have been excluded from comparison due to data limitations.

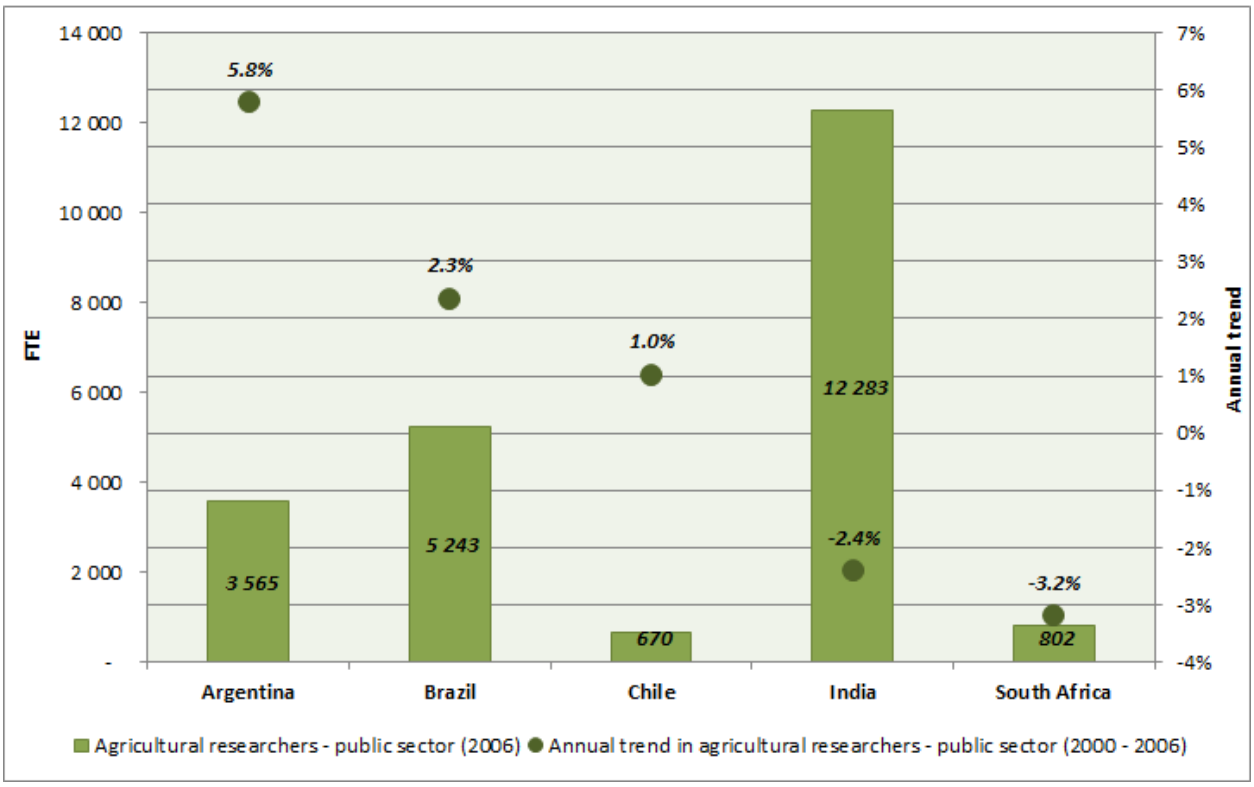


Figure 3.45: Agricultural researchers in the public sectors of South Africa and the peer countries

Source: IFPRI (2013)

3.11.2 Trademarks and patents in agriculture

Patents and licenses are an important part of the innovation framework of a country as they ensure the protection and rights of local inventions that can provide a competitive edge in the global market. Therefore, the number of agricultural trademarks and patents are a good indication of innovation and scientific capacity of a country. Furthermore, they are essential for the diversification of exports, the upgrading of products and cost efficiency.

- Trademarks

A trademark is a distinctive sign that identifies certain products or services as those produced by a specific person or enterprise. It provides protection to the owner by ensuring the exclusive right to use it to identify goods or services or to authorise another to use it in return for

payment. Trademark applications are filed to register a trademark with a national or international intellectual property (IP) office.

The Madrid system for the international registration of marks, established in 1891, functions under the Madrid Agreement (1891) and the Madrid Protocol (1989). It is administered by the International Bureau of the World Intellectual Property Organization (WIPO). The Madrid system offers a trademark owner the possibility to have his trademark protected in several countries by simply filing one application directly with his own national or regional trademark office. An international mark so registered is equivalent to an application or a registration of the same mark effected directly in each of the countries designated by the applicant. If the trademark office of a designated country does not refuse protection within a specified period, the protection of the mark is the same as if it had been registered by that office. The Madrid system also greatly simplifies the subsequent management of the mark, since it is possible to record subsequent changes or to renew the registration through a single procedural step. Further countries may be designated subsequently.

An overview of the total trademark applications in South Africa and the peer countries is provided in Figure 3.46. The figure clearly shows that South Africa is lagging behind in total trademark applications compared to the peer countries. Its annual average growth in trademark applications was 3.1 percent for the period 2000 to 2001. This was the third lowest growth rate of the peer countries; South Africa is only surpassing the USA and France in this regard. Consequently, the level of overall innovation in South Africa may pose to have a negative impact on its trade competitiveness.

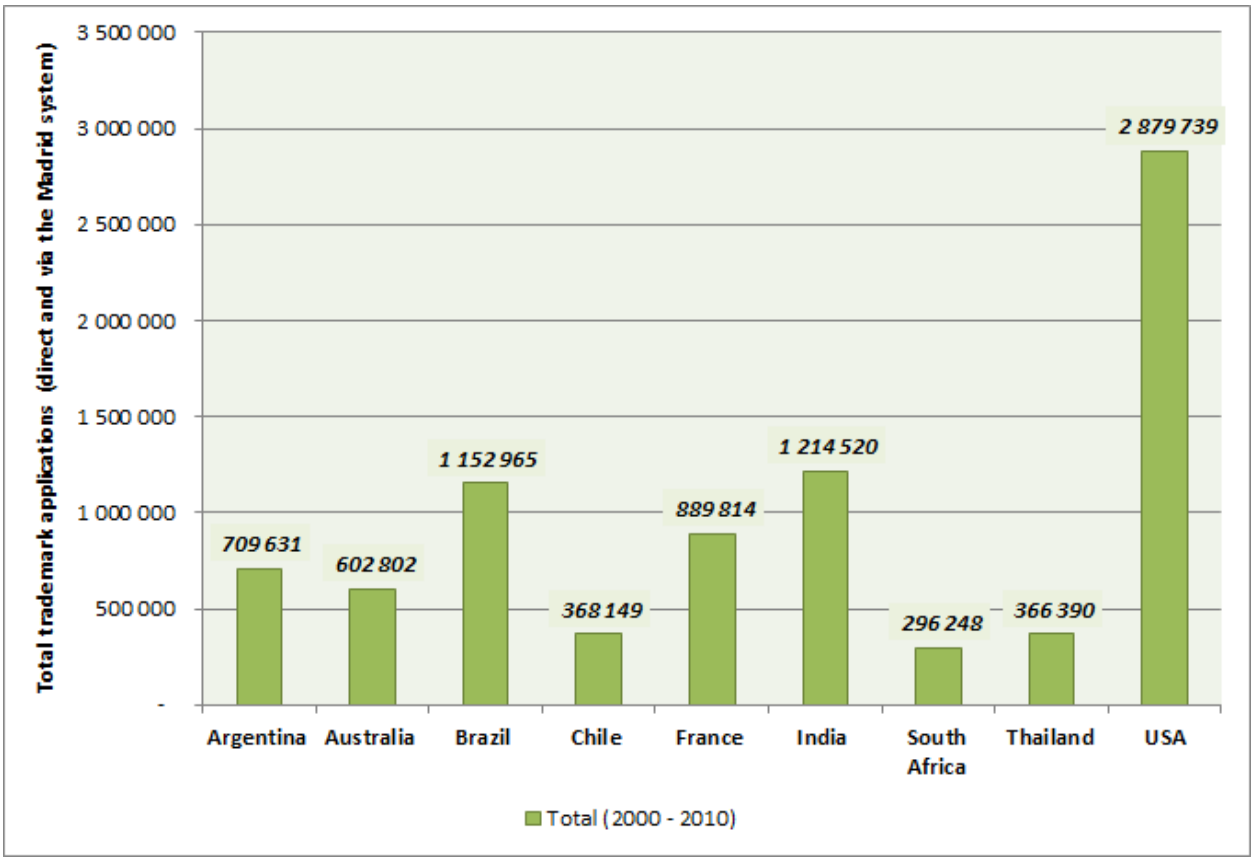


Figure 3.46: Total trademark applications in South Africa and the peer countries (2000-2010)
Source: WIPO (2013)

Agriculture-related trademark applications of South Africa and selected peer countries[29] are shown in Table 3.19. Most of South Africa's trademark registrations were in chemicals (Class 01) and automated agricultural implements (Class 07). It is evident from the table that South Africa lags behind its peer countries in terms of agricultural-related trademark registrations. This may be an indication of limited competitive branding or labelling of South African agricultural innovations.

[29] No data available for Argentina en Brazil.

Table 3.19: Registration of agricultural related trademarks in South Africa and selected peer countries (2011)

WIPO classification	AUS	CHL	FRA	IND	SA	THA	USA
Class 01: Chemicals used in industry, science and agriculture	1712	1621	916	3517	587	2296	5174
Class 06: Metal binding thread for agricultural purposes	1950	1179	1044	3213	409	554	3766
Class 07: Automated agricultural implements	2330	1381	875	5704	600	962	5962
Class 08: Non-automated agricultural implements	783	674	385	1001	207	353	2152
Class 11: Irrigation equipment	2585	1260	1579	4979	584	850	6473
Class 17: Plastic sheeting for agricultural purposes	852	706	554	2445	222	400	1990
Class 22: Metal binding thread for agricultural purposes	348	417	242	575	78	80	882
Class 44: Veterinary services	2625	1166	2172	3207	454	352	9777
Total	**13 185**	**8 404**	**7 767**	**24 641**	**3 141**	**5 847**	**36 176**

Source: WIPO (2013)

- Patents

Patents govern the exclusive rights of an invention. The worldwide patent application filed through the Patent Cooperation Treaty or a national patent office provides protection to the patent owner for a limited time period, generally 20 years. Figure 3.47 shows the total number of registered agricultural-related patents registered in South Africa and the peer countries. The figure shows that South Africa has the fifth largest number of registered agricultural-related patents out of the selected countries. It seems that the degree of endogenous innovation in South Africa's agricultural sector is of a relatively good standard.

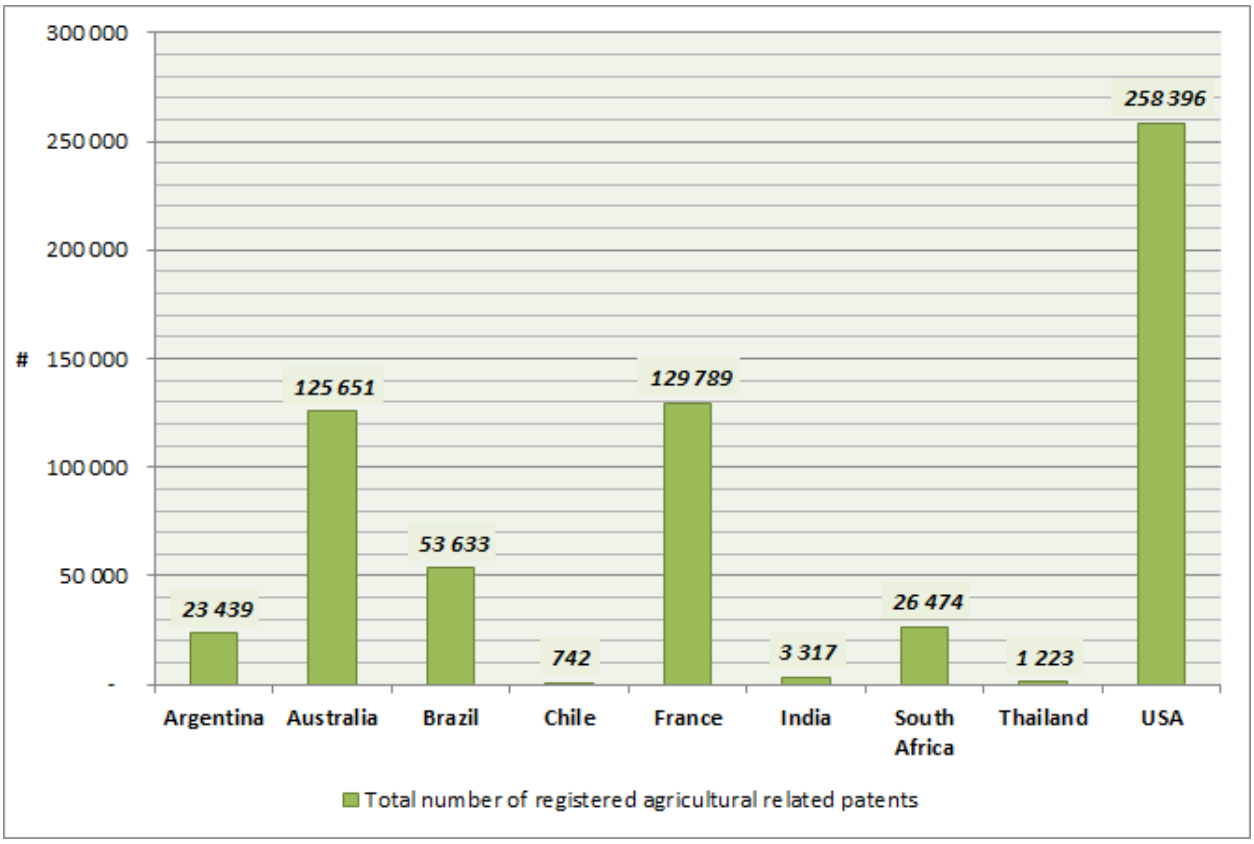


Figure 3.47: Total number of registered agricultural related patents in South Africa and the peer countries

Source: WIPO (2013)

Table 3.20 provides a more detailed overview into the types of agricultural-related patents registered in South Africa and the peer countries. The table shows that the country is performing relatively well with regard to innovations in the field of animal preservation (taxidermy) and animal breeding. With regard to innovation in dairy products, plant reproduction, and the processing of harvested produce, South Africa is lagging behind most of its peer countries.

Table 3.20: Detailed overview of registered agricultural related patents registered for South Africa and selected peer countries

International Patent Classification (IPC)	ARG	AUS	BRA	CHL	FRA	IND	SA	THA	USA
A01B: soil working in agriculture or forestry; parts, details, or accessories of agricultural machines or implements, in general	587	4460	1686	1	11481	51	386	144	6351
A01C: planting; sowing; fertilising	547	2945	1825	11	5477	59	498	114	4213
A01D: harvesting; mowing	663	5230	2452	4	12807	69	450	213	10110
A01F: processing of harvested produce; hay or straw presses; devices for storing agricultural or horticultural produce	286	1829	845	2	4256	45	162	49	2864
A01G: horticulture; cultivation of vegetables, flowers, rice, fruit, vines, hops, or seaweed; forestry; watering	486	6181	1972	15	9921	123	848	259	10571
A01H: new plants or processes for obtaining them; plant reproduction by tissue culture techniques	1461	4135	1479	48	1314	28	873	6	30572
A01J: manufacture of dairy products	88	1870	198	28	3067	29	63	0	1696
A01K: animal husbandry; care of birds, fishes, insects; fishing; rearing or breeding animals, not otherwise provided for; new breeds of animals	771	11146	3313	0	12669	85	975	0	23685
A01L: shoeing of animals	15	192	66	0	594	1	31	5	474
A01M: catching, trapping or scaring of animals	480	3223	1367	5	3994	69	409	0	5400
A01N: preservation of bodies of humans or animals or plants or parts thereof; biocides, e.g. as disinfectants, as pesticides, as herbicides	6365	25263	12971	258	13042	1065	8627	0	43407
A01P: biocidal, pest repellent, pest attractant or plant growth regulatory activity of chemical compounds or preparations	869	2669	1624	7	1155	124	582	57	192

Source: WIPO (2013)

3.11.3 Production capabilities

A country's production capabilities are influenced by the quality of the business networks as well as the quality of individual firms' operations and strategies. Combined, these two factors reflect the level of overall business sophistication within a specific country that is conducive to higher efficiency in production process. The business sophistication is determined by the state of cluster development, availability of research and training facilities, university-industry collaboration and production process sophistication (WEF, 2013).

According to the 2012-2013 Global Competitiveness Report (WEF, 2013), South Africa is ranked 38th out of 144 countries in terms of business sophistication. Table 3.21 shows that although this ranking is relatively good, South Africa is still on the lower end when compared to the peer countries. Its ranking can mainly be ascribed to relatively 'weak' scores with regard to the state of cluster development (ranked 47th) and the sophistication of the production process (ranked 43rd).

Table 3.21: Business sophistication in South Africa and the peer countries (2011-2012)

Country	Overall	State of cluster development	University-industry collaboration	Quality of scientific research institutes	Production process sophistication
	Ranking (out of 144 countries)				
USA	10	12	3	6	11
FRA	21	30	33	15	19
AUS	30	37	13	7	24
BRA	33	28	44	46	30
SA	38	47	30	34	43
IND	40	29	51	39	46
CHE	48	27	39	42	36
ARG	89	93	57	47	58

Source: WEF (2013)

3.11.4 Use of technology in agriculture

The use of technology in agriculture has been one of the main drivers for productivity growth in the last decades. Since agricultural productivity is strongly linked with trade competitiveness, this section will briefly discuss the comparative use of tractors and fertilisers in South Africa and the selected peer countries. Figure 3.48 shows the use of tractors per 100ha for the latest year available[30]. The figure shows that South Africa has the lowest proportion compared to its peer countries.

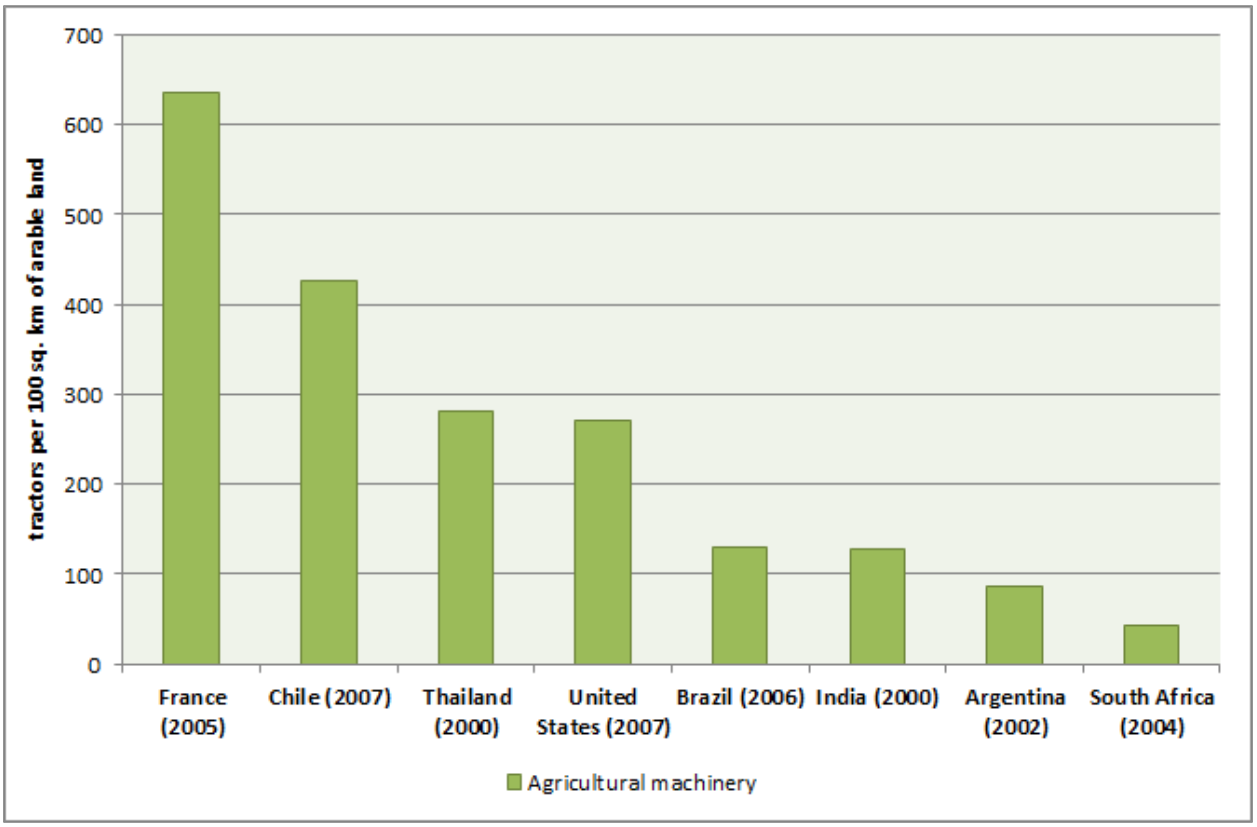


Figure 3.48: Relative use of tractors in South Africa and the peer countries (latest)
Source: World Bank (2013b)

Figure 3.49 shows the long-term trend in the number of tractors per 100ha in South Africa since 1961. This trend in proportional tractor use has declined since 1981, whereas the amount of

[30] No data for Australia was available

arable land did not change significantly during this period. The selected peer countries show a similar trend. Consequently, South Africa's current relatively low rate of tractors per 100ha is due to the introduction of more efficient tractors rather than a decrease in technology adoption in agriculture.

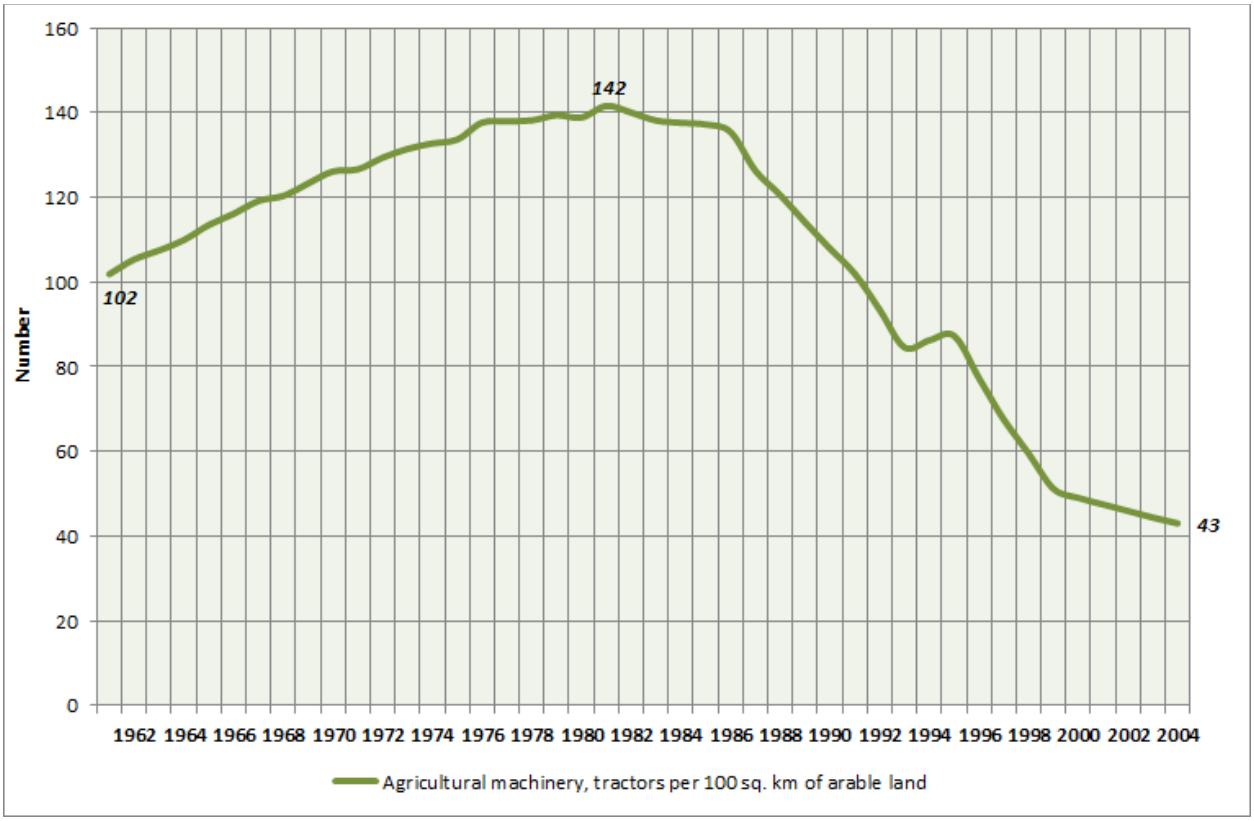


Figure 3.49: Trends in the relative use of tractors in South Africa (1961-2001)
Source: World Bank (2013b)

Another indicator of technology adoption in agriculture is fertiliser use. Apart from technology adoption, the use of fertilisers is also dependent on the local natural soil fertility, fertiliser prices, and the introduction of more sustainable and less fertiliser-intensive production practices. Figure 3.50 makes a comparison of the average fertiliser consumption per hectare for South Africa and the peer countries. South Africa's relatively low use of fertilisers can be mainly ascribed to the removal and controls and subsidies in the local fertiliser industry, a slight reduction in the cropping area, increased dependency on more expensive imports and adoption

of new production practices. Fertiliser consumption in South Africa showed a decreasing trend since the early 1980s; therefore, the relatively low use does not reflect a lower rate of technology adoption, but rather a structural change in production practices.

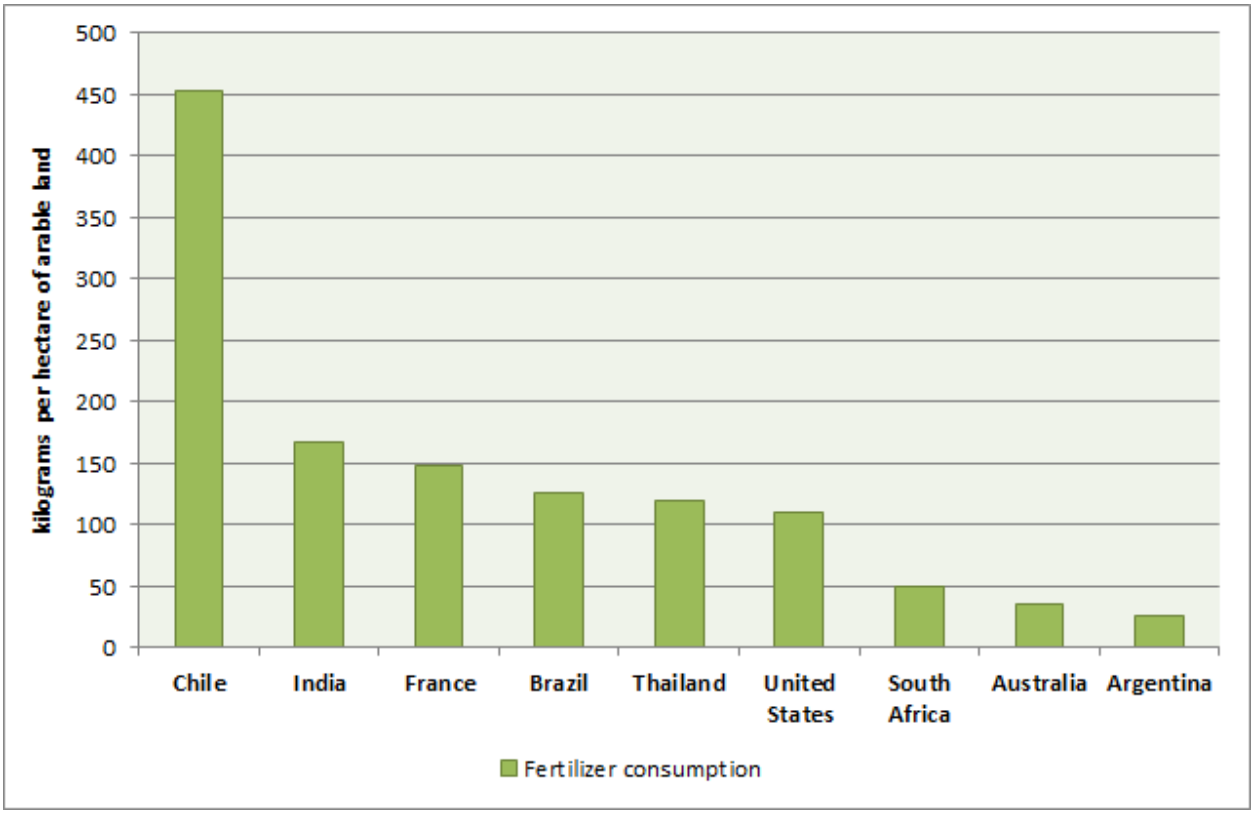


Figure 3.50: Relative use of fertilisers in South Africa and selected peer countries (2009)
Source: World Bank (2013b)

3.11.5 Exposure to external technology

Exposure to external technology is very important for innovation in South Africa's agricultural sector, especially with regard to adopting new products (e.g. cultivars), upgrading existing products, adopting new methods of production and enhancing the cost efficiency of the sector. Foreign Direct (FDI) and imports of capital goods are important channels in which external technology becomes available to South African producers. However, using technologies from abroad diminishes the first-mover advantage, but makes large investments in local R&D

redundant. Given the disinvestment in public agricultural R&D in South Africa (see section 3.11), external technology will have to be the main source of innovation in the sector.

- Foreign Direct Investment

Section 3.8.3 already compared the inflows of FDI in South African agriculture with the peer countries. The comparison revealed that, in relative terms, the sector is underperforming in attracting FDI. Table 3.22 shows the broader picture of South Africa's performance in attracting FDI. The table shows that South Africa performs relatively mediocre in terms of attracting total FDI inflows and its total FDI stock[31]. Therefore, the low inflows of FDI in South African agriculture seems to be sector specific and not due to an overall unfavourable FDI environment.

Table 3.22: FDI indicators for South Africa and the selected peer countries

FDI indicator	SA	ARG	AUS	BRA	CHL	FRA	IND	THA	USA
FDI flows: share of GDP (2000-2011 average)	2%	2%	3%	3%	7%	3%	2%	4%	1%
FDI stock: share of GDP (2000-2011 average)	32%	29%	35%	23%	67%	38%	8%	35%	23%

Source: UNCTAD (2013)

The rankings for 2005 and 2009,[32] according to the FDI potential index for South Africa and the peer countries, are depicted in Table 3.23. This index evaluates the host country's ability to attract FDI flows vis-à-vis other countries. The FDI potential index is an unweighted average of the normalised values of the GDP growth rate, GDP per capita, the share of exports in GDP, telephone lines per 1000 inhabitants, commercial energy use per capita, share of R&D, expenditures in GNI, share of tertiary students in the population, and country risk. The table shows that South Africa's FDI potential ranking dropped the most compared to the peer countries. Its ranking in 2009 was the second lowest; only India's FDI potential index was lower. South Africa's ranking can be attributed to its low GDP growth rate and prospects, its moderate political risk, and having a relatively low share of tertiary students in the population.

[31] The net worth of total gathered FDI over time.
[32] Latest data available.

Table 3.23: Inward FDI potential ranking for South Africa and the selected peer countries

Inward FDI potential index ranking	SA	ARG	AUS	BRA	CHL	FRA	IND	THA	USA
Ranking 2005	65	61	20	70	49	18	84	64	1
Trend	⬇*10*	⬆*3*	⬆*5*	⬆*8*	⬇*2*	⬇*2*	⬆*5*	⬆*8*	-
Ranking 2009	75	58	15	62	51	20	79	56	1

Source: UNCTAD (2013)

Table 3.24 shows the scores for FDI and technology transfers as published by the Global Competitiveness Report (WEF, 2013). This score measures to what extent FDI brings new technology into a country, with scores ranging from: 1 (not at all) to 7 (FDI is a key source of new technology). The table shows that in 2012 to 2013, Australia, Brazil, Chile, and South Africa were the countries that experienced a more significant influence of FDI in bringing new technologies into the countries. Consequently, this significant score highlights the importance of FDI to innovation in South Africa.

Table 3.24: FDI and technology transfer scores for South Africa and the selected peer countries

FDI and technology transfer	SA	ARG	AUS	BRA	CHL	FRA	IND	THA	USA
2011-2012	5	3.9	5.1	5.1	5.2	4.9	5	5	4.9
2012-2013	5	3.6	5	5.2	5.1	4.8	4.9	4.9	4.9

Source: WEF (2013)

By nature, annual trends in FDI inflows fluctuate significantly. This is also evident from Figure 3.51, which shows the trend of inflows of FDI in South African agriculture for the period 2003 to 2012. Despite the fluctuations, the FDI inflows show a positive trend that is likely to be related to a slight increase in the adoption of external technologies in agriculture.

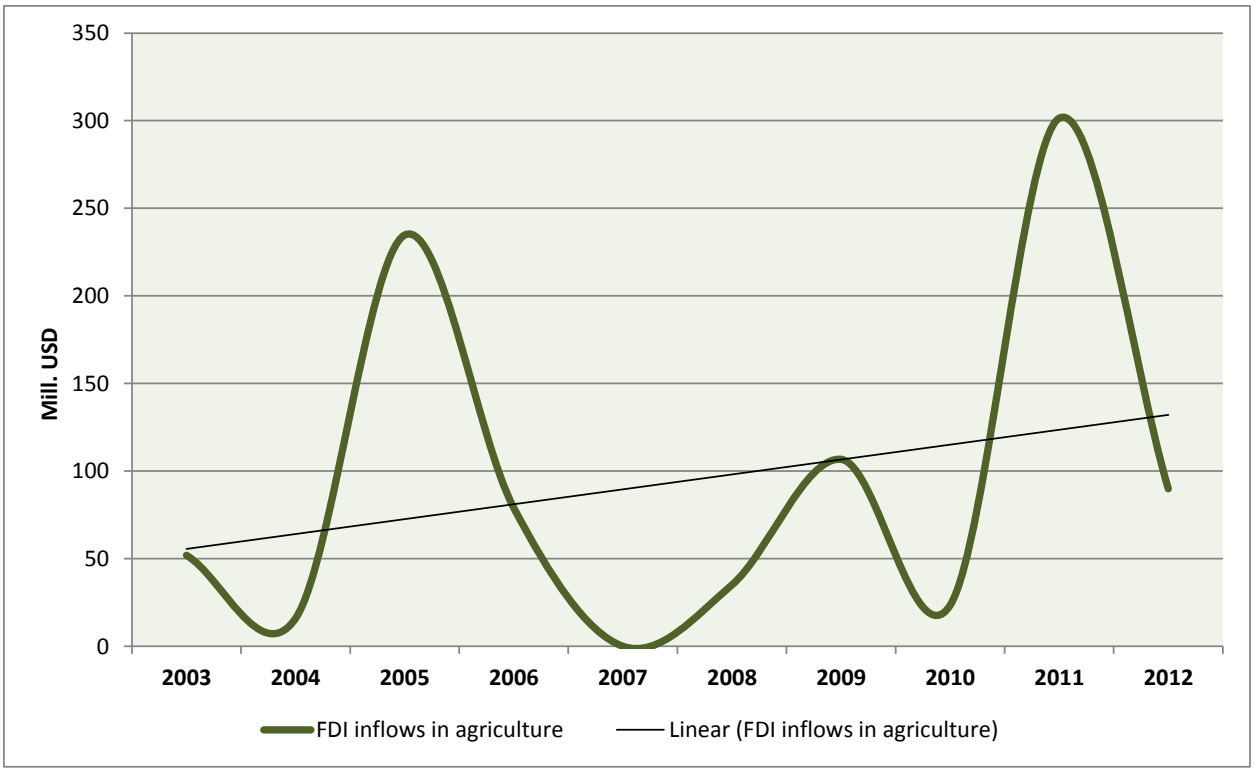


Figure 3.51: Trends in FDI inflows in South African agriculture (2003-2012)

Source: Own calculations based on data from Financial Times (2013) and Bureau van Dijk (2013)

- Imports of capital goods

The imports of a variety of inputs for South Africa's agro-food sector were also briefly discussed in section 3.6.1. The imports of especially capital goods, used as inputs in agricultural and food production, provide a good indication of the exposure to external technology and innovation. Consequently, the long-term trends in South Africa's imports of tractors are depicted in Figure 3.52. Tractors are an important piece of capital equipment in primary agriculture and are used in combination with other technology in several agricultural sub-sectors. Therefore, its trend in imports is a better reflection of the general technology adoption in primary agriculture than looking at the import trends of specialty machinery that is only used in one single agricultural sub-sector (e.g. combine harvester, plough, milking machine). The figure shows that the import of tractors is slightly on the decrease over the last decade. This small decrease is most likely the result of the introduction more efficient tractors and not a decrease in technology adoption (see also section 3.11.4).

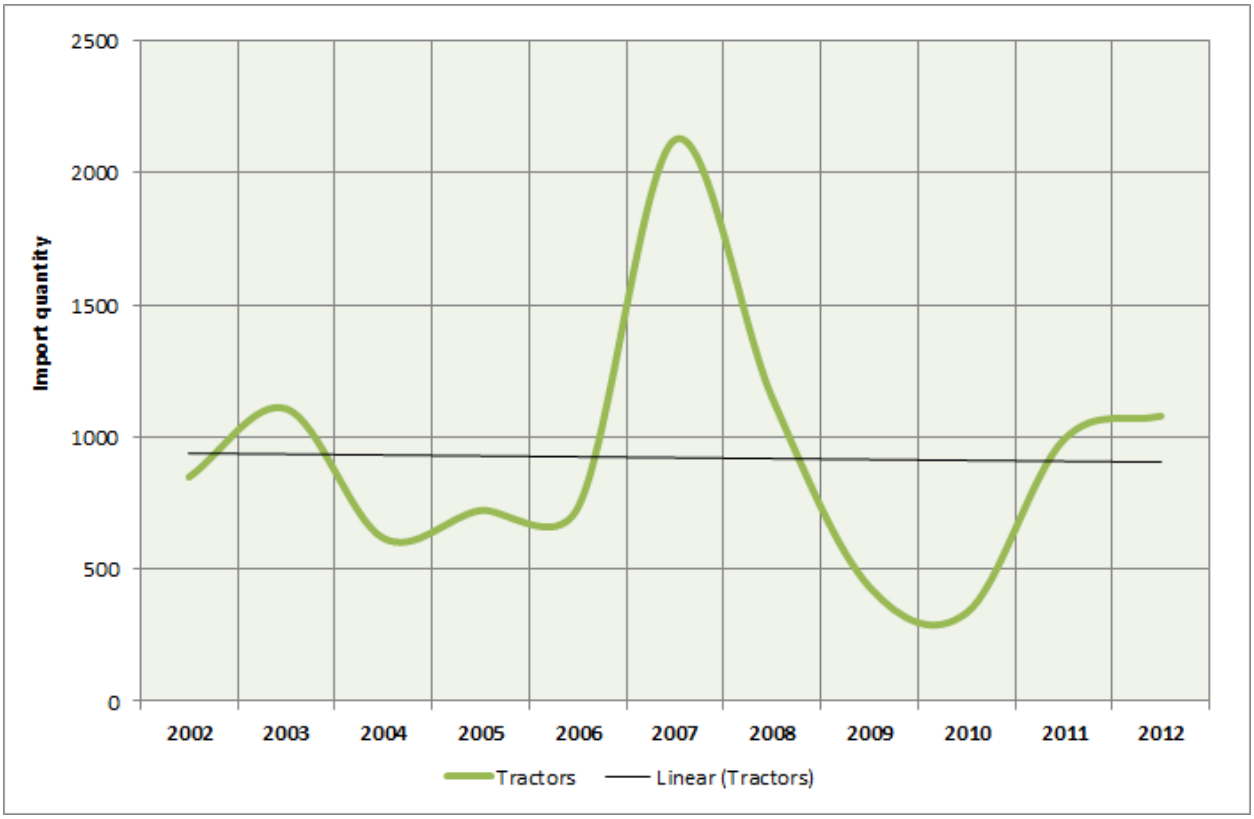


Figure 3.52: Trends in the import quantity of tractors by South Africa (2002-2012)
Source: UN Comtrade (2013)

Exposure to technology in the secondary agricultural sector can be reflected by the imports of machinery for agro-processing. The trend in the total quantity of this machinery imported by South Africa in the period from 2002 to 2012 is shown in Figure 3.53. These imports include a variety of processing equipment, namely: machines for grading/sorting of grains, bakery machinery, machinery for meat processing, machinery for the preparation of fruit/nuts/vegetables, presses used for manufacturing beverages, machinery for sugar manufacturing, and machinery for the manufacturing of confectionary/cacao/chocolate. The figure clearly shows a sharp increasing trend in the imports of these types of machinery. Consequently, innovation by exposure to external technology in secondary agriculture is apparent.

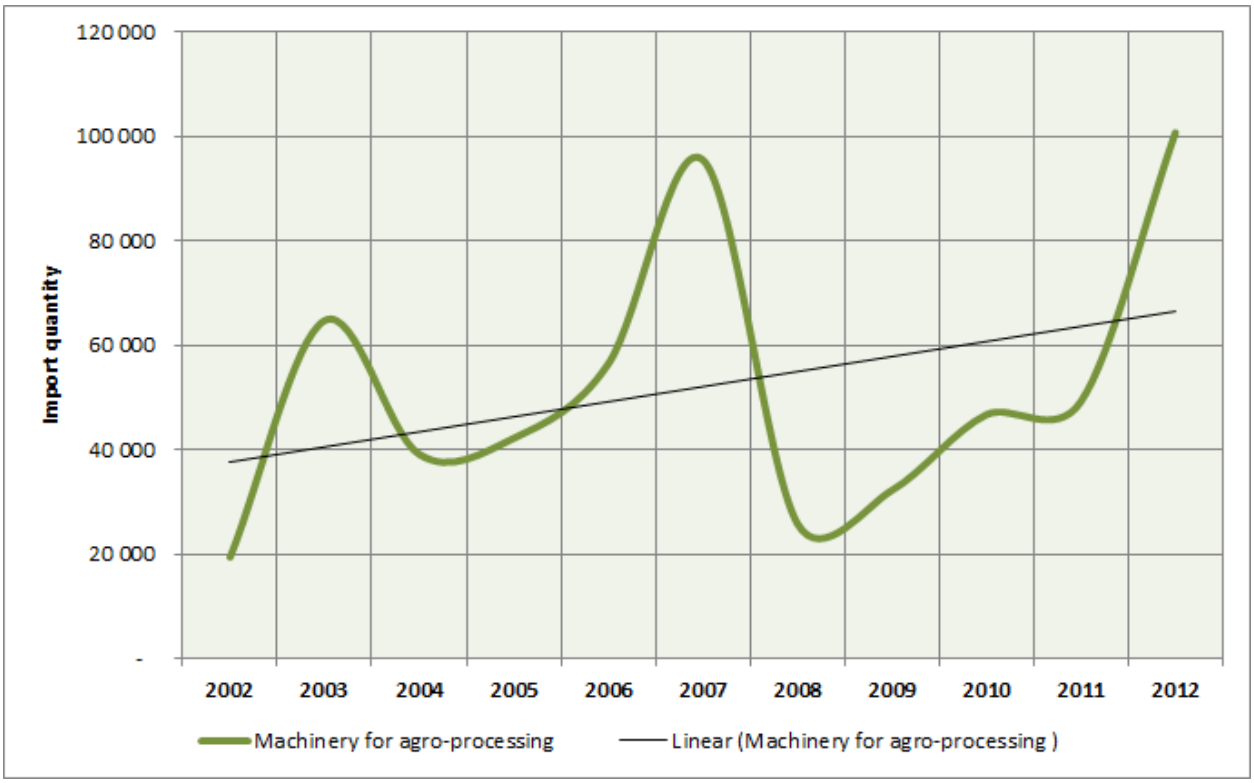


Figure 3.53: Trends in the import quantity of machinery for agro-processing by South Africa (2002-2012)

Source: Own calculations based on data from UN Comtrade (2013)

3.12 Summary of competitiveness diagnostics

Table 3.25 provides a summary of the comparative advantages and disadvantages that shape the current state of trade competitiveness. Note that most of the quantitative indicators used are not specific to the agricultural sector. Furthermore, the categorisation of indicators into either comparative advantage or disadvantage is based on their relative performance compared to the peer countries.

Table 3.25: Overview of the competitiveness diagnostics

Market accessibility *(section 3.1)*	
Comparative advantage	**Comparative disadvantage**
1. Market accessibility relative more favourable for growth markets in Asia	1. Market accessibility relatively more favourable for agricultural products with lower level of exports 2. Market accessibility relatively less favourable for growth markets in Africa
Trade and investment policy *(section 3.2)*	
Comparative advantage	**Comparative disadvantage**
1. High bound tariff rates for agricultural imports enhances the effectiveness of temporary measures on anti-dumping and infant industry protection 2. Amount of export control measures on agricultural products is low 3. No restrictions of foreign ownership in the agricultural sector	1. High import tariffs on agricultural products (especially animal products) 2. High exchange rate volatility 3. Time to start a business by a foreigner
Domestic policies and institutions *(section 3.3)*	
Comparative advantage	**Comparative disadvantage**
1. Ease of doing business 2. Getting credit 3. Protecting investors 4. Low Producer Support Estimate (PSE) in agriculture 5. Tax incentives 6. Low level of taxation 7. Time to prepare, file and pay taxes 8. Effectiveness of anti-monopoly policy 9. Independency of the judiciary system	1. Getting electricity 2. Enforcing contracts 3. Registering property 4. Resolving insolvency 5. Intensity of local competition 6. Costs due to crime 7. Efficiency of police service 8. Corruption perception 9. Bribes for government contracts
Access to finance *(section 3.4)*	
Comparative advantage	**Comparative disadvantage**
1. Low collateral requirements	1. Low rate of capital factoring

(Table 3.25 continued)

Labour market, skills and technical efficiency *(section 3.5)*	
Comparative advantage	**Comparative disadvantage**
1. Increasing agricultural labour productivity due to a higher capital-labour ratio	1. Small share of high-skilled labour in agriculture 2. High minimum wage compared to developing countries 3. Total Factor Productivity (TFP) 4. Low and declining total labour productivity 5. Deteriorating ratio between wages and labour productivity
Intermediate inputs and backbone services *(section 3.6)*	
Comparative advantage	**Comparative disadvantage**
1. Increase in agricultural producer price index 2. Low import tariffs on agricultural inputs 3. Relatively large share of total land area available for agriculture 4. Low electricity cost 5. Reliability of power supply higher than in most developing countries	1. Deteriorating terms of trade between agricultural input and output prices 2. Limited local production of agricultural inputs 3. Relatively small proportion of agricultural land suitable for crop production 4. Concentration of agricultural exporting firms 5. Low internet usage 6. Low access to electricity 7. Reliability of agriculture on freshwater withdrawal
Trade facilitation and logistics *(section 3.7)*	
Comparative advantage	**Comparative disadvantage**
1. International ocean freight cost lower than in most developing countries 2. Low ocean freight cost to growth markets in Asia 3. High and growing shipping line connectivity compared to other developing countries 4. Logistical performance of trade and transport facilities compared to other developing countries	1. Cost and time to export 2. Cost and time to import 3. High ocean freight cost to traditional agricultural export markets
Export and investment promotion *(section 3.8)*	
Comparative advantage	**Comparative disadvantage**
1. Agriculture specific export promotion agencies/councils	1. Average performance of national investment promotion agency 2. No special focus on agriculture in investment promotion 3. Low proportional inflows of FDI in agriculture
Standards and certification *(section 3.9)*	
Comparative advantage	**Comparative disadvantage**
1. Framework for local standard-setting 2. Compliance with international food safety standards	
Industry coordination and government support *(section 3.10)*	
Comparative advantage	**Comparative disadvantage**
1. Degree of organisation in the agricultural sector	1. Limited support to commercial agriculture 2. Policy uncertainty 3. No comprehensive cluster approach for primary agriculture

(Table 3.25 continued)

Innovation *(section 3.11)*	
Comparative advantage	**Comparative disadvantage**
1. Public spending on overall R&D compared to other developing countries 2. High number of registered agricultural-related patents compared to other developing countries 3. University-industry collaboration 4. Use of efficient agricultural machinery 5. Application of efficient production practices 6. Importance of FDI in technology transfer 7. Positive trend in agricultural FDI 8. Increase in imports of machinery of agri-processing	1. Decline in public spending on agricultural R&D 2. Small number of agricultural researchers in the public sector 3. Decline in agricultural researchers in public sector 4. Limited total trademark applications 5. Limited agricultural-related trademark applications 6. Limited registered patents in dairy production, plant reproduction and agri-processing 7. State of cluster development 8. Production process sophistication 9. Low and decreasing FDI potential

4 POLICY BRIEF: KEY AREAS FOR INTERVENTION

4.1 Introduction

Section 2 provided an overview of the current situation of South Africa's agricultural trade from the perspective of growth, diversification, sophistication and sustainability. Section 3 analysed, through the use of several quantitative indicators, the current degree of competitiveness of the agricultural sector and thereby rationalising its current trade performance. Against the background of the revision of the Agricultural Trade Development Strategy of the Department of Agriculture, Forestry and Fisheries (DAFF), this section will briefly discuss the key areas of intervention based on the outcomes presented in the previous sections. These implications can be considered in the revision process of the strategy.

The Agricultural Trade Development Strategy deals with the supportive environment that the South African government should create to ensure trade competitiveness of the agricultural sector. The strategy should inform on the application of trade instruments, trade negotiations, tariff policy, trade remedies, trade and business support services, and regulatory support.

4.2 Policy implications from South Africa's agricultural trade performance

- High trade openness:
  - → Economic importance of export sector should be reflected in policies
  - → Vulnerability to dumping should be reflected by adequate and effective trade remedies

- Comparative low share of agriculture in total exports:
  - → Opening up new export markets via trade agreements
  - → Export promotion activities for agricultural products
  - → Widening of the export basket via sector development policies

- Comparative low share of processed food products in total agricultural exports:
  - → Identification of agri-processing activities that can be competitively executed locally
  - → Alignment of the Agricultural Trade Development Strategy with the South African Trade Policy and Strategy Framework and the Industrial Policy Action Plan (IPAP)

- Only a positive trade balance for primary agricultural and forestry exports:
  - → Import reliance for processed food products, processed non-food products, and agricultural inputs should be reduced by substituting those imports that can be competitively produced locally

- Growth in exports of primary agricultural exports and inputs are comparatively low:
  - → Opening up new export markets that show growth potential for these products

- Revealed competitiveness on the decline for all five agricultural product clusters:
  - → Address comparative disadvantages by policy cohesion through cooperation government departments

- Apart from the primary agricultural products cluster, the majority of the products in the other four agricultural clusters do not show revealed trade competitiveness:
  - → Use best practices from competitive export products in policy formulation

- Presence in larger agricultural world markets is moderate:
  - → Stimulate production and exports of products that the world demands

- Well-diversified agricultural export portfolio and large number of agricultural export markets:
  - → Build on existing trade links for agricultural export development

- No drastic shifts in the composition of agricultural export markets over the last two decades, only a slight diversion of exports from Europe and North America to regional markets:
  - → Increase export focus on growing food markets in Africa and Asia via trade facilitation

- Agricultural trade intensity relatively low with some medium-sized markets that are closely located to existing agricultural export markets:
  - → Use existing trade linkages to explore 'vicinity' markets
  - → Export promotion activities for agricultural products

- Growth orientation of agricultural exports is relatively good as 65 percent of the agricultural export products that recorded an increase in export flows did so to growing global markets. However, 35 percent of the agricultural export products that recorded a decrease in exports flows did so to growing global markets:
  - → Improve the growth orientation of agricultural exports
  - → Stimulate production and exports of products that the world demands
  - → Competitor country analysis to identify best practices

- Relatively high export diversification of processed food products and agricultural inputs, and relatively low export diversification of primary agricultural products, processed non-food products, and forestry products:
  - → Widening of export basket via sector development policies

- Increasing agricultural export concentration:
  - → Apart from wine, no major shifts in the top agricultural export products since 1976, which should be reflected in policy by consolidation of existing export sectors
  - → Specialisation as part of the economic growth path should be supported by policy

- Declining agricultural export market concentration until 2008:
  → Consolidation of existing agricultural export markets and growth from new agricultural export markets

- Limited movement in the intensive- and extensive margin of agricultural exports since 2002:
  → Large agricultural export growth potential from existing products to existing markets

- Negative trade balance for more than half of the agricultural export products in all five clusters:
  → Agricultural growth potential from reducing the level of re-exports in both the extensive and extensive margins

- Agricultural export market penetration at product level is relatively low:
  → Exploiting more possible product-country combinations for exports
  → Use existing trade linkages for new exports

- Level of sophistication/complexity of overall agricultural export basket relatively high compared to other developing countries:
  → Sustain this level by promoting investment in technology and human capital for the sector

- Level of sophistication/complexity of processed food products is comparatively lower:
  → Increase this level by promoting investment in technology and human capital for this cluster

- Higher relative trade competitiveness for agricultural products with a generally lower level of sophistication/complexity:
  → Substituting re-export with domestic production of those products with a relatively high level of sophistication/complexity

- Unsustainable level of revealed factor intensity of agricultural exports compared to the actual factor endowments:
  → Provide policy incentives for increased human capital and physical capital intensity in the agricultural sector

- Most historic growth in agricultural exports has come from exporting existing products to existing markets:
  → Sustaining agricultural exports is as important as diversifying agricultural exports

- Relatively high number of extinct product-country combinations in agricultural exports since 2002. Total value of agricultural exports would be 13 percent higher if these exports were sustained:
  → Continuous monitoring of agricultural export flows on the rate of survival

4.3 Policy implications from the competitive diagnostics

The comparative dynamics as summarised in Table 3.25 have some consequences for policy development with regard to enhancing the trade competitiveness of the agricultural sector by addressing supply-side constraints. Therefore, the comparative advantages need to be sustained and the comparative disadvantages should be addressed. Some of which will fall under the mandate of DAFF, but often also under other government departments. Coordination and cooperation in government are therefore of utmost importance.

- Market accessibility:
  → Increase market accessibility for regional markets and products with higher levels of exports

- Trade and investment policy:
  → Evaluate reduction of import tariffs on agricultural imports to increase local competitiveness and consumer benefits
  → Increase policy efficiency and predictability to reduce exchange rate volatility
  → Increase efficiency in the bureaucratic processes for starting a local business by foreigners

- Domestic policies and institutions:
  → Increase efficiency of public services (getting electricity, registering property, police)
  → Increase accountability of public services (corruption, bribery)

- Access to finance:
  → Stimulate capital factoring as an alternative for obtaining credit

- Labour market, skills and technical efficiency:
  → Stimulate the increase of high-skilled labour in agriculture
  → Develop an efficient system for wage bargaining
  → Stimulate an increase in Total Factor Productivity
  → Improve ratio between labour productivity and wages

- Intermediate inputs and backbone services:
  → Improve the terms of trade by stimulating technical efficiency in agriculture
  → Stimulate local production of agricultural inputs
  → Stimulate efficiency in ICT, power- and water supply

- Trade facilitation and logistics:
  - → Improve cost and efficiency of domestic logistics
  - → Improve time to export/import
  - → Improve transparency of international ocean freight rates

- Export and investment promotion:
  - → Improve performance of national investment promotion agency
  - → Institutionalise agricultural-specific investment promotion to increase FDI in both primary and secondary agriculture

- Industry coordination and government support:
  - → Ensure long-term predictability in policy-making
  - → Develop cluster approach in agricultural development policy

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ANNEXURE

Table A3.1: South Africa's average market accessibility for agricultural products

#	Agricultural product group	Average of MAI	Average of tariff (%)	Average of NTB (%)
1	Pesticides	0.301402724	1.306562259	3.109628243
2	Cotton	0.2935782	2.847478571	0.032313979
3	Wood pulp	0.256513466	2.787722905	2.909606253
4	Medicinal plants	0.229963426	4.833204082	1.557072468
5	Forage crops	0.202667228	5.259795918	2.155333384
6	Natural rubber	0.197533499	3.434356514	4.592801232
7	Wood and articles thereof	0.184467438	3.105978735	5.440288359
8	Lac, resins and gums	0.161120495	2.942959184	7.730417351
9	Plaiting products	0.146876183	5.542132714	3.63339537
10	Paper, paperboard and products thereof	0.141915415	5.744691907	3.251715836
11	Animal hair	0.140698009	3.492515746	6.881116467
12	Fertilizers	0.134773421	2.226631247	9.241223825
13	Machinery for agricultural processing	0.125642	2.834256767	9.071540757
14	Albumins, starches, and enzymes	0.12376991	6.659479632	2.612634795
15	Agricultural equipment and machinery	0.108027117	2.711000133	10.27478772
16	Vegetable saps & extracts	0.080637558	4.584920635	8.890281498
17	Irrigation equipment	0.078715743	3.947755102	9.98164
18	Animal skin products	0.075559973	6.691364958	4.799327889
19	Cork	0.046762419	4.153731778	11.14334929
20	Tanning or dying extracts	0.041057302	3.263010204	12.80934364
21	Seeds for sowing	0.03190279	2.95541744	13.71871484
22	Knitted or crocheted fabrics of natural fibres	0.029945983	7.788731803	4.519103243
23	Essential oils	0.007102665	2.97625727	13.9983197
24	Processed plant fibres	-0.050643151	4.689236213	14.39717739
25	Plant fibres	-0.057811887	2.126064333	18.63463316
26	Vegetable materials and products	-0.077575624	3.311	18.24963539
27	Wooden furniture	-0.082241165	10.13195776	7.019923507
28	Food waste and residues	-0.084619311	7.154191837	12.53335592
29	Wood products	-0.086150239	8.226913355	10.62183624
30	Tractors	-0.093845215	4.202414966	17.60424879
31	Animal products	-0.094570012	5.139910714	16.16364674
32	Grapes	-0.13789104	13.43816327	5.128103707
33	Flowers and ornamental plants	-0.153118482	8.686904762	13.30784487
34	Sub-tropical fruits	-0.158863454	14.00496599	5.211814561
35	Processed wool	-0.178643759	6.969307295	17.1120017
36	Cocoa	-0.203579604	5.028979592	21.40640773

(Table A3.1 continued)

#	Agricultural product group	Average of MAI	Average of Tariff (%)	Average of NTB (%)
37	Woven fabrics	-0.208151319	8.64233803	15.60134737
38	Processed cotton	-0.219337799	6.656632201	19.03718946
39	Citrus fruit	-0.222999663	15.23836735	6.254146522
40	Other textile articles of natural fibres	-0.229774971	9.131501731	15.4810232
41	Carpets and floor covers of natural fibres	-0.229923291	10.76913779	13.12493978
42	Oilseeds	-0.237986139	6.261326531	21.06813722
43	Livestock	-0.266277118	8.521026077	18.82992626
44	Coffee and tea	-0.284732802	9.832857143	17.62502772
45	Berries and other fruit	-0.287653281	11.30335277	15.44833395
46	Clothing and garments of natural fibres	-0.305566557	11.60486104	15.3036343
47	Fish products	-0.397448078	8.752107315	24.56521511
48	Fruit and vegetable juices	-0.461038379	16.8933227	14.71900381
49	Animal or plant fats and oils	-0.466272495	8.609909051	27.98876877
50	Semi-processed vegetables	-0.476962977	11.70013723	23.62615032
51	Cacao products	-0.491000584	9.776959184	27.30318874
52	Herbs and spices	-0.49935959	7.771284787	30.84593182
53	Vegetable crops for plaiting	-0.5019867	4.452653061	36.18691807
54	Tree nuts	-0.506476443	10.41693878	27.01629538
55	Food preparations	-0.551536683	12.55173469	25.75417891
56	Sugar products	-0.602916856	17.04735969	21.07330203
57	Semi-processed cereals	-0.623918448	12.91373601	28.55023321
58	Cereals	-0.625598652	11.47828231	30.88573961
59	Preparations of fish	-0.634118306	13.0335034	28.83613385
60	Vegetables	-0.651307164	11.70771373	31.72022627
61	Semi-processed fruit	-0.710806436	11.51118738	34.79564082
62	Meat and meat products	-0.810826078	22.05838525	22.8595747
63	Cereal and bakery products	-0.839622731	15.35108485	34.74627778
64	Prepared vegetables and fruits	-0.845549051	14.15753601	36.89877746
65	Meat preparations	-1.046932814	20.29526361	36.60981981
66	Deciduous fruit	-1.182627607	13.3617517	53.82240553
67	Tobacco	-1.254244554	37.47615646	19.23014653
68	Sugar	-1.34924703	26.8344898	40.38216325
69	Beverages	-1.442473546	47.86386364	11.64611272
70	Dairy, eggs and honey	-1.49750257	27.15134615	46.77689501
71	Tobacco products	-1.659025528	42.43370748	30.25391854

Table A3.2: Top 20 countries in terms of the average market accessibility for South African agricultural products

Top 20 countries	Average of MAI	Average of international shipment cost (US $)	Average of international shipment time (days)	Average of domestic time to import (days)	Average of Domestic costs (US$)	Average of LPI (1-5)	Average of tariff (%)	Average of NTB (%)
Hong Kong (China)	3.165320948	1600	15	5	583	3.88	0	4.355522
Singapore	3.028621915	1200	2	3	439	4.09	0.134896	47.80019
Brunei	2.143004293	1600	6	19	708	3.44	4.49919	12.22367
South Korea	1.682916779	1800	25	8	742	3.64	15.18848	0.703025
New Zealand	1.615701367	3600	18	9	850	3.65	1.661181	18.8397
United Arab Emirates	1.596666085	3000	22	9	579	3.63	5.729059	17.69836
Germany	1.528755282	3900	20	7	937	4.11	2.942946	25.93668
Malaysia	1.499256875	1300	11	14	450	3.44	10.4819	33.91247
Netherlands	1.492610989	3900	20	6	942	4.07	2.942946	26.8713
Macao	1.490517953	1700	32	5	583	3.49	0	17.69836
Australia	1.481726957	2300	22	8	1119	3.84	2.999581	19.58516
China	1.473297898	1800	20	24	545	3.49	11.21626	5.324258
Thailand	1.389214348	1400	5	13	795	3.29	20.41948	17.594
Indonesia	1.38071294	1300	6	27	660	2.76	6.789918	13.26351
Japan	1.36471228	2000	22	11	1047	3.97	12.98878	20.22106
United Kingdom	1.256875371	3900	21	8	1160	3.95	2.942946	24.38695
Saudi Arabia	1.191381147	3200	16	18	678	3.22	5.139533	4.769391
Czech Republic	1.159521332	3900	20	20	1165	3.51	2.942946	0.885272
Spain	1.157924505	3900	12	10	1221	3.63	2.942946	26.95087
Luxembourg	1.061709787	3900	22	6	1420	3.98	2.942946	29.17545

Table A3.3: Bottom 20 countries in terms of the average market accessibility for South African agricultural products

Bottom 20 countries	Average of MAI	Average of international shipment cost (US $)	Average of international shipment time (days)	Average of domestic time to import (days)	Average of domestic costs (US$)	Average of LPI (1-5)	Average of tariff (%)	Average of NTB (%)
Uzbekistan	-4.199738235	3000	26.5	92	4600	2.79	32.7616	17.69836
Venezuela	-4.052637088	6100	40	71	2868	2.68	16.89532	18.9486
Mexico	-3.484053255	3100	57	17	2050	3.05	16.03041	24.54079
Angola	-2.996305027	2300	25	59	3240	2.25	9.030391	17.69836
Sierra Leone	-2.718062239	3200	23	31	1639	1.97	16.29979	17.69836
St. Kitts and Nevis	-2.673060728	6000	38	13	2138	2.68	10.74694	17.69836
Barbados	-2.537675687	6100	41	26	1100	2.68	23.80663	17.69836
Colombia	-2.521998935	600	43	14	1750	2.77	14.66988	27.87397
Peru	-2.438540817	5882	51	24	895	2.8	6.594361	23.32928
Aruba (Netherlands)	-2.420424396	5911	47	26	1100	2.68	9.819258	17.69836
Bahamas	-2.416689856	5328	29	13	1380	2.75	26.09981	17.69836
Dominican Republic	-2.285764973	5765	45	10	1150	2.82	10.04908	17.69836
Netherlands Antilles	-2.238101511	6000	44	26	1100	2.68	9.819258	17.69836
Chile	-2.161891813	4300	56	21	795	3.09	5.474451	15.7155
Azerbaijan	-2.150390385	2700	28	50	3480	2.64	11.04465	17.69836
Suriname	-2.054551566	6200	45	25	885	2.68	8.865797	17.69836
Russia	-1.92280263	4900	33	36	1850	2.61	11.29101	19.01979
Costa Rica	-1.883273036	5800	51	15	1190	2.91	8.624952	1.336318
Egypt	-1.868316271	3200	28	15	823	2.61	35.30722	35.5247
Trinidad and Tobago	-1.693313551	6100	37	26	1100	2.68	13.15264	5.542967

Table A3.4: Tariff regime on the imports of major agro-food inputs

Input	ZAF (2011)	ARG (2011)	THA (2009)	AUS (2010)	CHL (2009)	BRA (2011)	IND (2009)	EU (2011)	USA (2011)
Animal or vegetable fertilisers	0	4	0	0	6	4	8	0	0
Harvesting or threshing machinery, including straw or fodder balers	0	3.74	5	0	6	1.65	8	6.41	0
Machines for cleaning, sorting or grading seed, grain or dried leguminous v ...	0	5.91	5	0	6	2	8	4.38	0
Insecticides, rodenticides, fungicides, herbicides	0	0.19	5	0	6	0.01	9.63	0	0
Agricultural, horticultural or forestry machinery for soil preparation or c ...	0	1.32	5	0	6	0.46	5	6.46	0
Milking machines and dairy machinery.	1.34	13.22	10.2	4.56	6	13.19	10	6.04	3.72
Other agricultural, horticultural, forestry, poultry-keeping or bee-keeping ...	0	1.94	5.82	0	6	14	8	0	0
Tractors (other than tractors of heading 87.09).	1.37	11.55	5.21	2.62	6	14.1	8.19	0	0
Machinery for food processing, not specified or included elsewhere	0	8.24	1	5	6	14	8	0	0
Other mineral or chemical fertilisers	0	2.09	1	0	6	14	8	1.7	0
Mineral or chemical fertilisers, nitrogenous.	0	0.75	4.74	3.75	6	14	7.79	1.7	0
Mineral or chemical fertilisers, potassic.	0	2.86	5	1.3	6	14	8	1.7	0
Presses, crushers and similar machinery used in the manufacture of wine	0	3.73	1	4.55	6	13.19	5	1.7	0.85
Mineral or chemical fertilisers, phosphatic.	7.38	28.79	12.39	3.59	6	23.36	10	2.23	1.18
Average	**0.72**	**6.31**	**4.74**	**1.81**	**6.00**	**10.14**	**7.97**	**2.31**	**0.41**

Source: UN TRAINS (2013)

Table A3.5: Water quality data for South Africa and the peer countries

Water quality data	Min	Max	USA	Chile	Argentina	India	South Africa	Australia	Thailand	Brazil
pH (pH units)	5.5	7.5	7.8	7.6	7.7	7.7	8.1	7.7	7.6	6.9
Conductivity (uS/cm)	As low as possible		552.4	684.4	1010.0	560.3	503.6	452.7	303.2	136.2
Suspended solids (mg/L)	As low as possible		319.1	276.6	1.2	22.6	14.7	15.4	119.6	57.2
Ranking-score relative to the other nations			**USA**	**Chile**	**Argentina**	**India**	**South Africa**	**Australia**	**Thailand**	**Brazil**
pH (pH units)			2	6	3	4	1	5	7	8
Conductivity (uS/cm)			4	2	1	3	5	6	7	8
Suspended solids (mg/L)			1	2	8	5	7	6	3	4
Rank compared to benchmark nations			**7**	**10**	**12**	**12**	**13**	**17**	**17**	**20**

Source: GEMS (2013)

In order to calculate a single score for water quality, each of the variables was given an equal weight. Each country was then awarded a score out of eight (dependent on the relative quality of the indicator in each country). The individual scores of all three variables were then added to calculate a total score out of 24 points for each country.

Table A3.6: Detailed comparison of international shipping cost to South Africa's top agricultural export destinations

SA's top agricultural export destinations	USD shipping cost of a 20-foot FCL								
	South Africa (Durban)	Argent. (Buenos Aires)	Australia (Port Botany)	Brazil (Santos)	Chile (Valparaiso)	France (Le Havre)	India (Nhava Sheva)	Thailand (Laem Cabang)	USA (New York City)
Netherlands	3 900	3 700	2 900	2 700	3 600	420	1 500	2 300	1 900
Zimbabwe	3 000	6 500	5 000	5 500	6 900	6 500	4 400	4 100	7 200
United Kingdom	3 900	3 700	2 900	2 700	3 700	420	1 600	2 300	1 900
Mozambique	3 600	7 200	5 600	6 200	7 500	7 100	5 000	4 700	7 800
China	1 800	3 900	1 000	2 900	2 700	2 300	1 500	600	3 000
Japan	2 000	4 100	1 200	3 000	2 900	2 500	1 700	850	3 100
Indonesia	1 300	5 400	1 500	4 300	5 700	1 800	1 300	900	4 800
Mexico	3 100	4 400	2 800	3 400	2 300	3 100	4 300	4 200	1 300
Italy	3 800	4 900	2 500	3 900	4 100	940	1 300	1 800	3 000
Zambia	3 000	6 500	5 000	5 500	6 900	6 500	4 400	4 100	7 200
Germany	3 900	3 700	3 700	2 700	3 700	420	1 500	2 300	1 900
Angola	2 300	5 800	4 300	4 800	6 200	5 800	3 600	3 400	6 500
Hong Kong, China	1 600	3 600	1 000	2 600	2 700	2 000	1 200	600	3 200
South Korea	1 800	3 900	1 000	2 800	2 700	2 200	1 500	600	2 900
United States	4 700	3 300	4 800	2 300	2 500	1 900	1 800	2 500	…
United Arab Emirates	3 000	5 200	3 300	4 200	4 000	3 400	1 500	2 700	4 500
Russia	4 900	4 800	3 400	3 700	4 000	1 000	2 600	2 400	2 500
Spain	3 900	5 100	2 600	4 000	4 300	900	1 300	1 800	3 100
Australia	2 300	5 700	-	4 700	2 500	5 100	2 200	1 600	5 400
Nigeria	3 600	3 300	4 600	2 300	5 700	2 200	3 300	2 900	3 100
Average	**3 070**	**4 735**	**3 111**	**3 710**	**4 230**	**2 825**	**2 375**	**2 333**	**3 911**