The status of Agro-Logistics in South Africa

FEBRUARY 2006

agriculture

Department:
Agriculture
REPUBLIC OF SOUTH AFRICA

The Status of Agro-Logistics in South Africa

Directorate: Marketing
Department of Agriculture

2006

Published by

Department of Agriculture

Design and Layout

Directorate Agricultural Information Services

And obtainable from

Directorate Agricultural Information Services

Private Bag x 144

Pretoria

0001

South Africa

Printed in the Republic of South Africa

ISBN

For further information contact
Directorate: Marketing
Private Bag x15
Arcadia
0007
Tel (012)319- 8455/8071
Fax (012)319 8077/8131

Executive Summary

The demands that the agricultural industry places on the national logistics infrastructure and service provision are complex, ranging from the mass movement and storage of bulk commodities, to the just-in-time movement of time-sensitive freight both within and outside of our borders. The importance of the industry exceeds its 6% contribution to the GDP, with indirect impacts that affect approximately 25%[1] of the economy through input industries, downstream processing, food security, employment creation and other backward and forward supply chain linkages. While the direct economic impact is small relative to sectors such as mining, the number and varied nature of role players and stakeholders involved in the industry implies that "one-size-fits-all" solutions will not suffice.

Nationally, strategies regarding optimisation of the freight logistics system are currently being translated into investment plans. This creates an opportunity for Agriculture to clearly define a logistics strategy that will now and in future ensure that its unique demands are met. This study was designed to clarify the investment requirements of Agriculture in this respect, and provides the following inputs into the development of an agro-logistics strategy:

- An overview of the current state of agro-logistics;
- A quantitative assessment of the logistics needs of agriculture; and
- Recommendations with respect to areas of investment.

The study comprised a survey of industry and logistics service provider views, an assessment of the status of emerging farmer logistics issues, case studies of initiatives undertaken in development nodes and scenario development and modelling.

The current state of agro-logistics is characterised by:

- Systemic issues in the national logistics system that need to be resolved by long-term investment in new infrastructure;
- Key bottlenecks, many of which could be resolved by short-term investment in efficiency improvement;
- Agricultural freight being carried on the two most dense general freight corridors i.e. Gauteng-Durban and Gauteng-Cape Town;
- Fragmented service provision, with some industries subjected to service provider monopolies;
- Limited industry organisation to address logistics inefficiencies; and
- Significant investment in emerging farmer development, but little evidence of successful economically sustainable interventions.

The study identified the following critical areas of investment, for the agricultural industry:

---

[1] Johan Willemse, "Wat van die Platteland?", page 35, Beeld, Wednesday 15 February 2006.

[http://152.111.1.251/argief/berigte/beeld/2006/02/15/B1/35/02.html], accessed 23 February 2006.

- Exploring economically sustainable models for infrastructure ownership;
- Establishing ongoing intra- and cross-industry initiatives to develop innovative solutions to infrastructure congestion;
- Pro-actively participating in developing solution for problems on the most dense freight corridors, as well as for the key regional areas of Kwazulu Natal, Free State and Mpumalanga; and
- Encouraging information initiatives for improved decision-making.

Critical areas of investment, specific to emerging farmers, include:

- Creating a means of reporting on development initiatives in specific development nodes in order to, in the long run, enable integration of agriculture specific development initiatives and other development initiatives w.r.t. planning of and investment in logistics infrastructure;
- Piloting innovative solutions for deep-rural freight transport; and
- Enabling market access by making value-adding logistics services available to emerging farmers.

Availability of information pertaining to the status and utilisation of agro-logistics infrastructure is vital to the ability of government and industry to direct investment decisions. This study highlighted the lack of availability of such information in this industry, and underscores the need for a coordinated and ongoing initiative to collect and share such information across service provider and industry boundaries.

There will always be a lag between infrastructure investment and needs of industry. International best practice shows that industry and government utilises this as an opportunity to innovate with the aim of optimising operations within such constraints. This approach should form an integral part of a long-term approach to agro-logistics investment.

Table of contents

1 Introduction

The national Department of Agriculture (DoA) has identified the need to improve the competitiveness of the agricultural sector as a whole through the development of a strategy leading to recommendations for the improvement of the logistics systems supporting the agricultural sector. A strategy needs to be developed that will inform investment in agro-logistics infrastructure. Based on such recommendations, the DoA needs to develop an agro-logistics strategy, which will form part of agriculture's response to the implementation of the National Freight Logistics Strategy (NFLS). The latter has been developed by the Department of Transport in consultation with other key economic departments, and has been accepted by Parliament during 2005. The Directorate Marketing of the DoA is coordinating a process which will culminate in the development of the agro-logistics strategy. This process includes the establishment of a task team to develop the strategy, as well as the development of terms of reference for an investigation to assess the effectiveness of current agro-logistics networks and to develop recommendations. As part of this process, the Directorate Marketing commissioned a project (see Terms of Reference in Appendix I) aimed at:

- Identifying the national agro-logistics and infrastructure requirements;
- Assessing the effectiveness of the current agro-logistics networks in terms of these requirements and the identifications of shortcomings (gaps); and
- Developing scenarios to understand agriculture's future demand on the national logistics system.

The current National Freight Logistics System has a strong focus on the export economy and hence on the main corridors. This investment focus needs to be contrasted with a focus on infrastructure that allows rural enterprises sufficient access to the mainstream logistics system. This aspect is particularly relevant to the agricultural industry, both from a commercial perspective, and from the perspective of enabling emerging farmers to link to major markets.

CSIR, Agri-Africa Consultants and the University of Stellenbosch Business School Executive Development Ltd (USB-ED) - the consortium - designed a project that was aimed to achieve the above project objectives by combining a quantitative and a qualitative analysis of the current status of agro-logistics, and generated recommendations for consideration by the Department of Agriculture. The scope and nature of agricultural activity that require efficient logistics support is complex and varied, and spans varying levels of sophistication. The status thereof is best expressed by reviewing views of role players in conjunction with a formal analysis and representation of quantitative information. The process considered the current state of play, and incorporated industry opinion in the development of future scenarios with respect to production and consumption, and hence the load on the logistics network.

Industry was consulted with respect to their views on gaps in the current system and proposed improvements, and these views were combined with an analysis of the strategic environment as well as experience from emerging farmer development in particular, to develop a framework within which investment recommendations can be structured and evaluated. The intention of the DoA was that the

study must be an effort by the industry for the industry. Hence, the involvement of industry has formed a cornerstone of the project.

In the initial proposal by the Consortium as well as in subsequent meetings with the role players, it was indicated that, whereas many sections of the study would focus on the entire agricultural industry, certain sectors need to be prioritised and information aggregated in such a manner that the most meaningful impact on logistics requirements can be defined. The selection of industries was based on a number of criteria. It was aimed at including a balanced mix of industries reflecting the various logistical challenges and peculiarities that occur in agriculture such as perishable vs. non-perishable freight, bulk vs. smaller quantities, long value chains vs. short value chains, etc. The following criteria were used:

- Volume of production, imports and exports;
- Value of production, imports and exports;
- Future potential/importance in the entire agricultural landscape;
- Importance of commodity in emerging farmer development;
- Commodities with a large share and high output growth; and
- Availability of information.

Based on this, the following priority industries were identified:

Animal Husbandry	Field Crops	Horticulture	Agricultural Inputs
Poultry: broilers and eggs	Oilseeds: sunflower	Deciduous fruit	Fertilizer
Dairy: milk and products	Summer cereals: maize	Vegetables	Animal feed
Red meat	Winter cereals: wheat	Citrus	Fuel
		Viticulture	
		Subtropical fruit	

A general questionnaire was also sent to all the other agricultural industries, and responses were received from the vast majority of them.

This report makes recommendations with respect to infrastructure investment in the context of the current and anticipated status of agro-logistics. It firstly outlines the current strategic environment within which investment decisions need to be made (section 2). This is followed by an overview of the current state of agro-logistics, followed by a sectoral view on the constraints that are experienced. A number of different scenarios were considered in order to assess the future load on the network, and these scenarios as well as the results of the modelling exercise are described in section 5. Finally, information is integrated into a framework of recommendations, which are described in the context of strategic alignment with the National Freight Logistics Strategy (section 6).

2 The National Strategic Environment

2.1 Macroeconomic Strategy

Agricultural production contributes a small percentage to the South African GDP by value and weight, is plagued by seasonality and irregular production patterns (caused by meteorological factors) and is probably the most spatially challenged upstream commodity provider in South Africa. None of these challenges are improving. Issues around the ideal balance of the most important commodities, by weight, remain unresolved and the debate around what plantings should be optimal (or at least best, given the general circumstances) has not been finalised. It seems as if we remain ambiguous around crop forecasts, what the country's buffer stock should be and the future flows that will be required within SADC. Simultaneously, the spatial challenges continue, due to the increasing urbanisation of consumption in an industry where it is almost impossible to relocate areas of production.

These challenges are at a different level compared to other upstream (primary) industries such as mining. Highly concentrated mining companies increase the level of "virtual" concentration through collaborative logistics projects at a time where agriculture is only beginning to compensate for the fragmentation that followed from the deregulation of the marketing boards.

Globally, many of South Africa's competitors have solved these issues. Producers in the Southern Hemisphere, such as Australia, Chile, Argentina and Brazil integrate more at the beginning of the value chain, collaborate downstream and develop supportive logistics infrastructure that facilitates effective entry into lucrative markets. A case in point is the Australian wine and tourism industries, which have over the past two decades been transformed from net importers into exporters that generate almost $20 billion a year in export revenue (see Appendix D for more detail).

In South Africa we find the traditional commercial agricultural industry under threat and are simultaneously challenged by the necessity of land reform and market access requirements of remote traditional farmers. The playing field is also polarised around traditional viewpoints, making an integrative and commercially viable approach even more difficult to achieve.

The traditional industry changed from a politically, economically and physically protected industry to one where land reform issues strain traditional relations, the deregulation of the marketing boards has removed price protection and the problem of farm violence has not been resolved yet. Many farmers in the medium commercial category that reported consistent profits a few decades ago struggle to survive today. Traditionally "wealthy" and high profile farming activities such as wine, fruit and game farming are, in some instances, increasingly becoming a hobby for the rich rather than a serious economic and commercial activity. In the less high profile areas, such as maize farming, few highlights remain. Cases exist where fruit farms with a capital worth of more than R 10 million have seen their valuations drop as low as R 2 million in a very short space of time. Production inputs such as water and labour are also becoming increasingly regulated and therefore more expensive while a stronger rand places a further damper on the competitiveness of export industries.

Most of South Africa's 3.3 million farmers are *subsistence farmers and are significantly dependent* on what they do, i.e. they have little other alternative to improving their livelihood (see Fig 2.1 below). Similarly, very few alternatives exist for the million workers employed by commercial agriculture in South Africa.

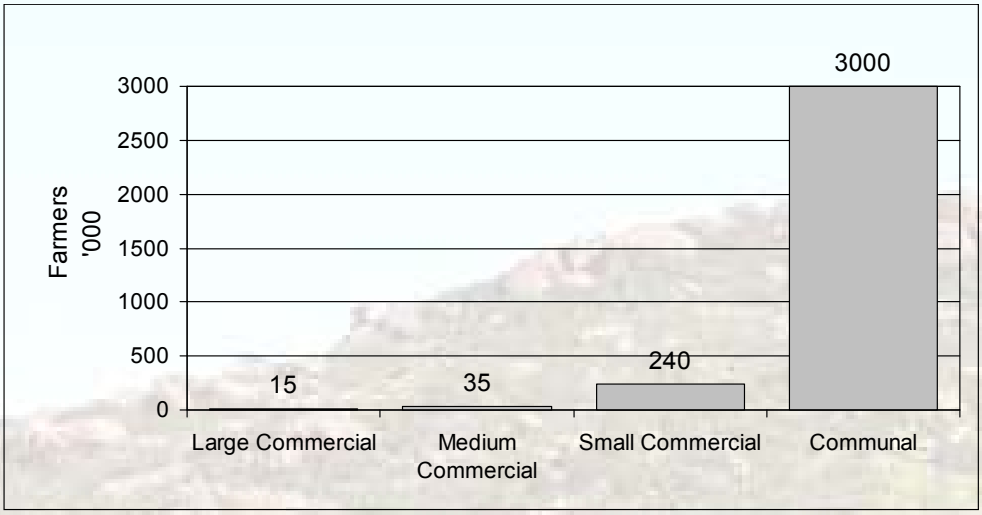


Figure 2.1 Number of farmers in RSA[2]

Despite these challenges, all stakeholders want to see our agricultural community succeed, as it is a cornerstone of our future.

2.2 National Freight Logistics Strategy

Not surprisingly, a large portion of the vision of the National Freight Logistics Strategy (NFLS) and obstacles to achieve that vision, for agriculture, relates to logistics and supply chain issues.

This is in a sense unfortunate, as agriculture's house is in a relative disarray in an area of South Africa's economy, namely freight transport, which is in turn slowly emerging from a state of disarray. The National Freight Logistics Strategy that was launched by the Department of Transport in 2005 is described by the Department as a "response to the freight system's inability to fulfil the demand for cargo movement at prices, levels of service, quality of service, and at acceptable levels of reliability in a manner that supports the national developmental strategies." This point of departure *states* logistics as a problem, but *assumes* knowledge of an underlying developmental strategy, which in the case of agriculture, might not yet exist on an explicit level.

The National Freight Logistics Strategy seeks to improve development through some specific overarching objectives. These must be seen against the backdrop of agriculture as a heterogeneous industry (by sector, region, typology and ownership), with a particularly high exposure to market and climatic risk.

[2] OECD Study and Policy Review

Specific objectives are:

- The *vertical separation* of infrastructure and operations with *open access* to infrastructure by competing operators and more ownership and control of logistics infrastructure. This strategy will enable the government to ensure that infrastructure development supports development ideals – an opportunity that agriculture could miss, should the current fragmented approach continue.

- The *normalisation of the regulatory environment* applying effective economic, safety and environmental and security regulation. Better organised industries will have an advantage over industries that are in disarray.

- The establishment of a multidisciplinary *National Logistics Centre* that will ensure local content in study material, job creation and skills enhancement. This creates an opportunity for agriculture to ensure that specific logistics requirements are addressed.

The development of a *freight system master plan* for integrated planning, information collection and forecasting on a freight database with the ability to track performance, especially on corridors, is another opportunity for the agricultural sector to ensure that its own objectives for development are met, especially as specific interventions in the plan talk about linking the first and second economies with *rural initiatives* and an optimised *corridor* approach. If agriculture can contribute to *guaranteed corridor volume* which is efficiently aggregated and consolidated, the cost of corridor transport and required investment could be reduced. This could in turn *unlock investment potential in rural areas*, thereby decreasing corridor costs and increasing rural efficiencies. For agriculture to be successful, the implementation strategy should be properly and effectively planned.

2.3 Regulatory environment

2.3.1 General

The term “regulation” is often used in a narrow sense to primarily refer to legislation and sub-ordinate legislation such as regulations and by-laws. Viewed from this perspective, a regulatory review would concentrate on what legislation is in place and how it affects agricultural logistics.

However, in a wider sense any action that does not occur naturally within a value chain and is introduced or maintained artificially can also often be regarded as some or other form of “regulation”[3]. By its very nature these activities are more difficult to describe as it is often not vested in legislation, but can originate from almost anywhere. For example, if Government introduced a subsidy scheme aimed at

3 Including self-regulation

logistics it is also in a sense a form of "regulation", as it is an outside influence on the regime that would otherwise apply.

Similarly, if a monopoly applies monopolistic prices because of an absence of competition, or refuses third party access to scarce infrastructure under its control, it also in effect "regulates" the area in which it operates. Other examples are agreements between two or more parties of a regulatory nature[4], or even practices that are applied for no particular reason other than that "this is the way that things have always been done"[5].

Accordingly an attempt is made to not only look at the regulatory framework that governs agro-logistics from a legislative perspective, but also from a somewhat wider regulatory perspective and to take some of these other factors into account. This approach would be more useful than simply concentrating on legislation alone, especially in those areas where informal influences and practices are perhaps more important than legislation on its own.

By the very nature of the subject it is somewhat difficult to compile a complete list of legislation and regulations that would apply to agricultural logistics, as logistics *per se* is such an intricate part of the functioning of our society. Virtually all areas of human activity impact on logistics in one sense or another – and so would the associated legislation, ranging from human resources and labour legislation right through to the local by-laws of small rural towns.

It would be a formidable task to list all such legislation, and even if done, it would be of limited use in itself as it would be little more than a list of legislation with no indication to the uninitiated of the relative importance or impact thereof. Hence the decision to peruse the responses from industry players and from there to try and determine what legislation (or lack thereof) seems to be of major concern and consequently, of relative importance in the logistics chain.

For most respondents by far the most important legislation which directly affects logistics are rail and road transport related issues. This is followed by issues directly associated with these, such as storage and ports. Of relatively less importance seems to be the more "indirect" influences of issues such as labour legislation. However, to some extent this is also commodity dependant. For example, fruit standards and the effect logistics have on these (and vice versa) is obviously more important to the fruit industry than, say, grains that can be stored and transported over longer periods of time with less effect on quality.

---

4 Including agreements with Government

5 A simple example of this is working hours – perhaps it is more efficient to load products at night, but if a firm only works normal working hours it is in effect inadvertently "regulating" this aspect of logistics. Where there is competition this is normally not a problem as the competitors would quickly benefit from this "regulatory" lapse – however, where there is a monopoly player it can easily lead to inefficiencies. A good example in agriculture is fresh produce markets – these are not open on weekends and do not keep long working hours. However, most of the bigger ones are monopolies established under by-laws prohibiting the establishment of competitive markets. Hence this surely must have an effect on logistics.

For ease of use the legislation is divided into legislation that would generally apply to all industries, and legislation at the individual industry level. Note that only legislation that in the opinion of the consortium had a major impact or the potential to have a major impact, are listed. Relative "importance" has been attached to each piece of legislation in order to get some idea of the potential impact thereof on agricultural logistics.

The full overview which covers the very important role of the Constitution and Agriculture-specific legislation is provided in Appendix C. In this section a summary of Transport legislation is provided.

2.3.2 Transport legislation

There is a bewildering amount of legislation dealing with transport, and related information is not easily obtainable. This illustrates that there are serious issues that need to be addressed in the transport sector as such a number of Acts with corresponding institutional set-ups, lines of authority and differing responsibilities could be an indication of a fragmented policy with no real direction.[6] This sense of fragmentation is reinforced by a lack of consistency in regulatory approach, with some areas extensively covered while others are not dealt with at all. For example, there is no economic regulatory legislation in place for the huge State-owned Transnet monopoly[7] , but for railway safety there is a fully-fledged, independent, National Railway Safety Regulator that *only* looks at *railway safety* aspects.

The more important transport-related legislation is as follows.

2.3.2.1 Legal Succession to the Transport Services Act, 1989

This Act establishes the former government transport services[8] into a state-owned company with different divisions. In itself the Act is not remarkable at all, as it essentially only deals with the institutional and shareholding set-up of the organisation, Transnet, and its operating divisions[9].

Hence it is perhaps more remarkable in terms of what it does *not* say, being that:

- It establishes a state-owned monopoly with no checks and balances on potential predatory practices, safeguarding of other players' interests and issues such as third party access to infrastructure;
- It only deals with the monopoly from a shareholder perspective, and not from a regulatory perspective;

---

[6] As legislation should follow policy, i.e. "fragmented" legislation that deals with the industry on a piecemeal basis is often an indication that policy (unfortunately) either is not in place, or is not coherent in its application.

[7] Which has a huge effect on the economy

[8] Rail, Communications, Harbours, Pipelines, Airlines

[9] E.g. Spoornet, Portnet etc.

- It is completely silent on the approval of tariffs and price structures that have a major effect on the South African economy; and
- It does not deal with potential competition in the transport sector at all.

To date, as far as known, there is no formal legislation dealing with these aspects on the *rail* side. On the harbour side, however, a new Act has recently been introduced that deals with both harbour authorities and the regulation of tariffs.

2.3.2.2 National Ports Act, 2005

This Act deals with national ports and has recently been introduced. Of importance to agriculture, it provides for:

- A national port authority that will own, operate, maintain and provide new port infrastructure;
- An advisory committee consisting of role players who use ports to interact with the authority, *inter alia* on port tariffs; and
- A regulator that approves port tariffs.

In essence it would seem that the new dispensation would provide some avenues of discussion for industry role players, which bode well, as well as an independent regulator to oversee prices[10], which is also encouraging.

2.3.2.3 National Road Traffic Act, 1996

This Act deals with road traffic and the regulation thereof. In essence this is the one act with which all people using roads on a daily basis are familiar, dealing with aspects such as maximum axle weights, road traffic signs, licenses etc. As such it has a major impact on road transport and the type of vehicles being used, the maximum allowable mass of the transport, resting periods for drivers etc. It does *not* deal with the provision and maintenance of infrastructure *per se*. By its very nature it has a huge impact on the logistics chain, e.g. if maximum axle masses are changed it has a major impact on the number of vehicles that must be used with corresponding impacts on fuel usage etc. Also note that municipalities have their own traffic legislation in addition to the above.

2.3.2.4 The South African National Roads Agency Ltd and National Roads Act, 1998

This Act sets up the National Roads Agency as the body in charge of providing and maintaining a system of national roads. As such it is instrumental in meeting road logistic problems on national roads. However, it should be noted that its primary jurisdiction *only* extends to national roads, and that it does not deal with roads under provincial authority and those under the authority of municipalities. In short,

[10] With players being able to complain to the regulator about prices etc. However, the regulator does *not* deal with anti-competitive behaviour, for example sharing of infrastructure or compulsory third party access.

whilst there would seem to be a “one-stop” approach possible for infrastructure related aspects of national roads[11], such an approach would not be possible where provincial or local roads are concerned, as these would depend on the different provinces and/or local authorities.

2.4 National Agricultural Strategy

South African agriculture is of a highly dualistic nature. It has a developed sector of predominantly “white” commercial farmers oriented both to domestic and external markets, contrasting with the predominantly “black” small scale and subsistence farming sector. Agricultural policy faces the dual challenge of addressing the imbalances and injustices domestically, but also ensuring an efficient and world competitive industry.

The agricultural sector has undergone major policy changes in the past ten years. The centralised control of agricultural markets has been removed, trade liberalised, while the deepening of democracy put forward promotion of equitable access to services and resources for all groups of the population. These reforms pursued multiple objectives, in particular, the broadening of access to agriculture; poverty reduction; improving food security; and increasing of productivity and profitability in the sector.

Several key policy documents define the main agricultural policy objectives in the context of the broad economic reforms in South Africa. The *White Paper on Agriculture* (1995) stated the following main objectives:

- To build an efficient and internationally competitive agricultural sector;
- To contribute to the objectives of the Growth, Employment and Redistribution Strategy (GEAR), aimed at achievement of economic growth by reduction of income inequalities and elimination of poverty;
- To support the emergence of small and medium-sized farms side by side with large scale commercial farms; and
- To preserve agricultural natural resources and to develop supporting policies and institutions.

These main policy objectives were later confirmed in the *Strategic Plan for South African Agriculture* (2001). The government’s vision for the sector implies sustained profitable participation in the South African agricultural economy by all stakeholders. It recognises the importance of maintaining and developing commercial production and strengthening international competitiveness, but at the same time it stresses the need to address the historical legacies and biases that resulted in skewed access and representation. Overall, the main objectives defined in the *Strategic Plan* fall under the three main groups:

- Equitable access and participation;
- Global competitiveness and profitability; and

[11] Under the auspices of the Council

- Sustainable resource management.

A number of tools have been introduced to make this possible, amongst which:

- Marketing of Agricultural Products Act (1996);
- Land Reform policies and legislation;
- Comprehensive Agricultural Support Programme (CASP);
- The Reconstruction and Development programme (RDP), and its application to agriculture as the Broadening of Access to Agriculture Thrust (BATAT);
- Integrated Sustainable Rural Development Strategy (ISRDS);
- Provincial Growth and Development Strategy;
- Integrated Food Security and Nutrition Programme (IFSP); and
- Broad-based Black Economic Empowerment Framework for Agriculture (AgriBEE).

2.4.1 Basic policy instruments

The status of policy instruments that are in place, as well as some gaps in the current environment, are outlined below.

Market price intervention

There have been no interventions on domestic markets to support producer prices in South Africa since 1996. The only notable exception is the sugar market, where a price pooling system is applied and the South African Sugar Association (SASA) is the only exporter of sugar. Also, the local price is fixed at a level to allow for export losses.

Trade policy instruments

INSTRUMENT	STATUS
Border measures	**Protection against unfair external competition is a major concern of both the government and the farming sector**
International Trade Agreements	**South Africa was a founding member of the General Agreement on Tariffs and Trade (GATT) and the subsequent World Trade Organisation (WTO). South Africa is involved in several regional trade agreements of which the Trade, Development and Co-operation Agreement with the European Union was the most recently signed (11 October 1999). The Southern African Customs Union (SACU) and the Southern African Development Community (SADC) are interlinked with international trade involving South Africa.**
Export measures	**No export subsidies have been applied since the 1996 reform.**

Table 2.1 Trade policy instruments

Direct payments to farms

There are no policies providing regular direct payments based on output, area or numbers of animals. Limited support is provided in the form of ad hoc disaster (drought) payments, and payments for losses due to notifiable diseases.

Rural credit

The government is promoting the availability of financial services to small scale and resource-poor farmers in obtaining access to formal financial markets, while ensuring that measures which assist poorer farmers to gain access to credit and other financial services do not inhibit the development of commercial, competitive financial services in the rural areas.

Tax concessions

There was an amendment of the tax treatment for agriculture, whereby capital purchases could now be written off over three years (at rates of 50%, 30% and 20% per annum respectively), instead of the more generous one-year capital cost allowance. This reduced the implicit subsidy for capital equipment although there is still some implicit support to agriculture as capital purchases in the other sectors have a five-year write-off period. In addition, capital improvements on farms are fully tax deductible. From 2001, a diesel rebate has also been applied on 80% of fuel consumption in agriculture.

Regulatory measures

South Africa has a well developed set of regulatory requirements for agro-food production and trade. The main areas where the state applies its regulatory functions are *food safety* (e.g. sanitary and phytosanitary measures, and veterinary measures), *animal improvement* (*e.g*. animal breeding, registration, animal disease control and animal welfare), *plants quality and protection* (e.g. legislation on plants, seeds – including genetically modified organisms, plant protection and plant quality control, *etc*.).

Public Institutions

The key public institutions involved with agriculture are the National and Provincial Departments of Agriculture and the Departments of Land Affairs, with a lesser role attributed to the Departments of Water Affairs and Forestry, Environmental Affairs, and Trade and Industry. Other agricultural institutions involved in supplying products and services include the Agricultural Research Council (ARC), the National Agricultural Marketing Council (NAMC), financial institutions such as the Land and Agricultural Bank (Land Bank), Development Bank of South Africa (DBSA), commercial banks and agricultural cooperatives. The main stakeholders representing the agro-food sector are Agri SA, the National African Farmers Union (NAFU), Transvaal Agricultural union (TAU), the South African Food Processors Association (SAPA) and the Agricultural Business Chamber.

The table below depicts the complex web of departments serving agriculture. These Departments are particularly affected by the concurrent national and provincial legislative competence. The Government has adopted an inter-governmental planning system, which includes the Medium-Term Strategic Framework (MTSF) at a national level, the Provincial Growth and Development Strategies (PGDS's) and the municipal Integrated Development Plans (IDP's).

	LAND AFFAIRS	**AGRICULTURE**	WATER AFFAIRS & FORESTRY ENVIRONMENTAL AFFAIRS TRADE & INDUSTRY
NATIONAL	Policy formulation Regulatory framework Strategies allocation Budget	Policy formulation Regulatory framework Budgeting Design Institutional framework	**Policy formulation** **Regulatory framework** **Strategies allocation** **Budget**
PROVINCIAL	Adapt strategy Setting of operational targets Implementation	Design provincial strategy Manage implementation Budgeting Export services Extension, research, training, finance	**Adapt strategy** **Setting of operational targets** **Implementation**
LOCAL	**Management, design and implementation of integrated development plans**		

Table 2.2 Role of different departments in agricultural policy and strategy

2.5 Development-related strategies

2.5.1 Agricultural strategies for development

South African agriculture faces the challenge of empowering the previously disadvantaged groups to play a meaningful role. This requires a rejuvenation of agriculture in the former *homelands*, including a progression from the present system of communal tenure. It also requires transformation in commercial farming.

The ideal of a united and prosperous agricultural sector requires upgrading the previously disenfranchised black agriculture. The main affected groups are:

- Previously disadvantaged people who wish to engage in farming;
- Landless people or people with limited access to land;
- Farm workers;
- Labour tenants, and other persons who need long term security of tenure;
- Individuals and communities who wish to secure tenure;
- Successful claimants of land restitution cases; and

- Land restitution, following forced removals under the previous dispensation.

2.5.1.1 Government initiatives and policies[12]

Government policies that contribute to social goals include land reform, various types of support to small farmers, food security and Agri BEE. The National as well as Provincial Departments of Agriculture all have programmes and policies aimed at empowering the emerging agricultural industry.

Of particular importance at present are:

Land Reform Policies and Initiatives

This includes a number of initiatives and programmes aimed at restoring land rights, allocating land to previously disenfranchised individuals, managing and ensuring land tenure rights and assisting in obtaining the necessary means to farm.

The Comprehensive Agricultural Support Programme **(CASP)**

It was introduced in 2004, and is currently being implemented at the provincial level. The aim of CASP is to enhance the provision of support services for agricultural development. CASP targets beneficiaries of the Land Reform and Agrarian Reforms programmes, dealing with the allocation of agricultural support to various groups of beneficiaries including the hungry and vulnerable, subsistence and household food producers, emerging farmers and entrepreneurs. To date millions have been spent on supplying rural infrastructure and this will continue.

Broadening of Access to Agriculture Thrust **(BATAT)**

The main objective is to improve access to agriculture for those who were previously excluded by racial laws.

Integrated Sustainable Rural Development Strategy **(ISRDS)**

Its objective is to: "Attain socially cohesive and stable rural communities with viable institutions, sustainable economies and universal access to social amenities, able to attract and retain skilled and knowledgeable people, who are equipped to contribute to growth and development." The programme's overall goal is to maximise the effectiveness of expenditure and investment in meeting developmental challenges. The ISRDS objectives are to: eradicate poverty and under-development; enhance local government capacity to deliver services; promote integrated planning and budgeting across the three levels of government (cooperative governance); and promote sustainable development.

[12] OECD Study and Policy Review

2.5.1.2 Private initiatives and policies

A host of other organisations are also involved with the development of the emerging agricultural sector. These range from foreign Governments to national and international Development Agencies, to Donor Organisations to Agricultural Industry Bodies and private enterprise. All these institutions have specific areas of involvement and their efforts are driven by strategic plans. Despite resistance in some quarters, a number of commercial farmers and farmers' organisations have become involved with the agricultural transformation process.

2.5.2 National Rural Transport Strategy

The National Rural Transport Strategy (released in draft form in 2002, and finally in 2005) sets out an integrated approach to rural passenger and freight transport, as well as motorised and non-motorised transport. Seen from a rural freight and logistics perspective, the relevant implementation actions include:

- Facilitation of transport and/or logistics brokering services;
- Piloting of combined passenger and freight services – subject to addressing the safety requirements for rural/ multi-purpose vehicles;
- Development of guidelines for establishing *integrated rural logistical services*, giving attention to complementary actions such as extending the logistical role of MPCCs, developing storage and communications facilities, and introducing mini-containers; and
- Involvement of organised agriculture (cooperatives, etc), in the establishment of logistics support services for small farmers.

Implementation of the strategy has been occurring along two channels: a) preparation of aligned provincial and district strategies and plans (in the case of districts, the relevant plans are referred to as Integrated Transport Plans, and the recommended capital projects usually form part of the IDPs for these areas); b) the Department of Transport's IRMA (Integrated Rural Mobility and Access) project.

IRMA implementation projects have been designed for three district municipalities: OR Tambo in the Eastern Cape; Umkhanyakude in KwaZulu Natal, and Sekhukhune Cross-border municipality in Limpopo/ Mpumalanga. Tenders have been, or will soon be, issued for capital projects such as the construction of critical road links and storage facilities, but the Department of Transport still needs to establish appropriate contract models and subsidy mechanisms for the issuing of operating contracts. These include contracts for: a) the provision of mixed patient transport and small freight services (in this case possibly using multi-purpose vehicles that have been commissioned by the Eastern Cape Department of Transport); b) the operation of logistics depots; c) the provision of logistics brokering services and d) the provision of ICT support systems and training.

2.6 Sectoral strategies

A number of sectors have been organising themselves with respect to addressing logistics challenges, and have followed processes that have culminated in sector-specific logistics strategies. Lead-industries in this regard include wine and fruit. Relevant strategies from these industries are briefly summarised below.

2.6.1 Wine industry

The Wine Industry developed a logistics strategy as part of their Vision2020 initiative. The strategy, published in 2000[13], is outlined below.

	Regulatory System	**Information System**	Quality Management System
National level	The legislation that supports SA as a responsible supplier of quality vineyard products	Data warehouse of Registration, Certification and Process Quality Records	**A managed reputation that positions "SA Quality Vineyard Products"**
Industry level	Public sector supplied Audit services to monitor conformance to regulatory requirements (Product, Process and Quality), as well as Technical services to manage and monitor legislative and regulatory requirements.	Industry wide Integrated Information System (Wine-Online)	**SA Wine Industry ISO9000 based Quality Management System that maintains the standards and practices.**
Organisation level	**Public sector analytical facilities and services as well as administrative services required to support the other levels.**	**IT and communications applications and services (ERP, CRM, e-Commerce).**	**All the role players: growers, cellars, logistics service providers and distributors, etc.**

Table 2.3 Elements of the wine industry strategy

The strategy is designed to assist the wine industry to meet its dominant priority, namely to satisfy demands of the consumer for a quality product in a consistent and credible manner. The goal is quality, defined as "A Sustained Experience of Satisfaction for the Customer"[14]. To achieve this requires a total logistics channel, a comprehensive systematic approach, for sustained delivery of a quality product to the right customer at the right time, right place in a profitable manner for the suppliers. The logistics strategy designed to achieve this is a "Three-legged, Three-level" strategy that has a Regulatory

[13] Kruger, B. A Logistics Strategy for the RSA Wine Industry, Final Report, Part One, November 2000.

[14] Ibid. page 20.

System, Information System and a Quality Management System as the three legs that are implemented at three levels: National, Industry and Organisational.
The vision is that the producer delivers a quality product within a framework of legislation and regulatory support, in a transparent and predictable manner enabled by an industry Quality Management System and an Information System.

The information system plays a central role in enabling the sharing of information to ensure supply continuity, enable logistics management and to provide services to expedite the flow of exports (e.g. supporting electronic certification by the regulatory authorities). The Logistics strategy document refers to a process simulation that showed that the average time for evaluation, export certification, containerisation and loading could be reduced from 21 days to 7 days if e-certification was introduced[15]. This would reduce the total ordering delay for exports to Europe by 21%, hence reducing working capital.

The industry has implemented elements of this strategy such as the Industry Wide Integrated Information System (Wine-Online). One of the current focus areas, as indicated by industry participation in this study, is an ongoing process to speed up export flows, primarily through refinement of the Wine-Online system and via innovation regarding export processes. Some of the current activities and proposals include:

- Integration of Wine-Online with Customs and Excise processes has been initiated;
- The certification for origin, etc. has progressed to 24/7 availability to keep delays to the minimum and full integration with Wine-Online is in progress to further streamline processes for producers;
- The electronic issuing of documents in export markets is problematic, but is under investigation and discussion;
- Regulations for certification of wine for export need to be streamlined and incorporated in Wine-Online; and
- Reducing time delays by improving the performance of the DoA certification laboratories or privatising these services.

Regarding the regulatory environment, a current issue is the differing production and labelling requirements from country to country. Bilateral and multilateral international agreements, which mutually accept the requirements of the signatories, are invaluable, especially in respect of production requirements. The industry is awaiting government's signature to such an agreement with several countries under the auspices of the WWTG (World Wine Trade Group). A central information system containing all the production and labelling requirements is also proposed.

[15] Ibid, page 30

2.6.2 Fruit industry

The fruit industry developed a logistics and infrastructure strategy as part of the Fruit Industry Plan[16]. The strategy is outlined below.

The primary strategy was defined as follows:

"A non-racial and prosperous fruit industry that is supported by a state of the art and efficient logistical and infrastructure system that increases competitiveness of local fruit internationally and domestically, and that results in increased returns to investments on a sustainable basis."

The following secondary strategies were identified to support the primary strategy:

- Establish and identify mechanisms to co-ordinate fruit logistics and infrastructure planning on a regional, national and international level.
- Revisit and critically evaluate current packaging and palletising regimes.
- Establish mechanisms to increase logistical efficiency at ports.
- Establish mechanisms to improve efficiency at pack houses and cold storage.
- Revisit and critically evaluate current tracking/monitoring regimes and make amendments where necessary in a coordinated manner.
- Establish logistical information and communication protocols at the different levels of the value chain.
- Foster good labour relations in the logistical chain.
- Investigate and agree on mechanisms to increase efficiency of shipping logistics.
- Establish service level protocols/accreditation.
- Develop and institute appropriate capacity delivery mechanisms to address training and development needs in the logistics chain.
- Development of proper and efficient regimes to document all aspects of logistics and the timely dissemination thereof to the relevant role players.
- Establish and/or adapt, as well as promote, internationally recognised fruit handling protocols at ports where South African fruit enter overseas markets.

Each sub-strategy was described in terms of its objective(s), actions, outcomes, time frame and responsibilities.

[16] Fruit Industry Plan Project team, 2004. The future strategy of the fruit industry in South Africa.

2.6.3 Grain industry

The Strategic Plan for the Grain Industry, released in 2004, identified the following objectives[17]:

An industry that is profitable and sustainable, internationally competitive and that has equitable participation and equal access to resources.

Six strategic programmes were defined in order to implement the plan, namely:

- Black economic empowerment in the grain industry;
- International market access and trade policy;
- Information and Communication;
- Technological development and transfer of new technology;
- Technical Standards; and
- Human resource development.

Various factors that constrain the development of the grain industry, were identified, some of which are related to logistics, such as poor support services. Specific logistics issues that are of concern include poor infrastructure and other logistics constraints.

The importance of logistics to the grain industry is underscored by their active participation in the establishment of agro-logistics initiatives in conjunction with the Agribusiness Chamber and the National Department of Agriculture.

2.7 Implications of the strategic environment for the state of logistics

The strategic environment outlined in this section underlines that the agriculture sector and the transport sector are currently influenced by major strategic interventions. This creates a complex strategic environment for agro-logistics due to the interplay between the two sectors in terms of demand and supply.

On the demand side, the Strategic Plan for Agriculture poses a dual challenge to agro-logistics through two of its main objectives, namely:

- Equitable access to agriculture; and
- Global competitiveness and profitability.

Equitable access implies that the agro-logistics infrastructure and services need to be flexible enough to accommodate all sizes of enterprises and that the reach of the infrastructure and services be extended to rural areas. Simultaneously, global competitiveness demands sophisticated and highly efficient supply chains that can satisfy the requirements of a diversity of exporters with widely divergent product

[17] http://www.grainsa.co.za/

characteristics. In addition, the changing commercial environment is increasing the demand on agro-logistics due to a proliferation of overseas and local markets and a fragmentation of logistics services providers in some industries, while in others market forces have already brought about consolidation.

On the development front there are a multitude of fragmented initiatives with different focus areas. The Comprehensive Agricultural Support Programme (CASP) is an example of an integrated initiative that intends to invest significantly in rural infrastructure – both on-farm and off-farm. It is not clear how broader-based strategies such as the Integrated Sustainable Rural Development Strategy (ISRDS) with its goal of maximising the effectiveness of expenditure and investment in meeting developmental challenges and the Rural Transport strategy can be combined with this to make an impact on agro-logistics in rural areas.

The National Freight Logistics Strategy provides substantial opportunities and challenges. The first overarching objective, namely the *vertical separation* of infrastructure and operations with *open access* to infrastructure, will enable the government to ensure that infrastructure development supports development ideals and could therefore be a great opportunity for agriculture. It is also a threat since agriculture could miss this opportunity if it does not become more organized to lobby with government for increased support and by internal co-operation and co-ordination facilitate better government support.

The second objective, the *normalisation of the regulatory environment* with effective economic, safety and environmental and security regulation, also requires industry to organise itself in order to understand the regulatory contexts and play an active role in the drafting and implementation of regulations to minimise the impact on agro-logistics.

The Freight System Master Plan provides an opportunity for the agricultural sector to ensure that its own objectives for development are met, particularly as the plan talks about linking the first and second economies with *rural initiatives* and an optimised *corridor* approach. If agriculture can contribute to *guaranteed corridor volume*, aggregated and consolidated efficiently, the cost of corridor transport and required investment could be reduced.

In summary, some implications:

- The collaboration requirement:

  The opportunities that could be provided by the National Freight Logistics Strategy, hinge on one overarching requirement – collaboration. This talks to a critical ability for the total sector to increase intra-commodity and inter-commodity integration at the front end of the value chain, co-operation through the value chain to beneficiated products and across the country, region and globally into value networks. Without this and without the ability to consolidate effectively and rapidly to stop the current fragmentation, many opportunities will be lost. Agriculture could, in fact, be the one industry that stands to gain the most by the implementation of the Freight System Master Plan provided it

gets its house in order and contributes intelligence, participates effectively and co-ordinates and integrates upstream freight.

- It is becoming an imperative for an industry to have a well-developed logistics strategy in order to deal with the complexity of the environment (there are a few examples of industries that have developed these strategies, e.g. wine).

- Industries with shared agro-logistics interests (e.g. wine and fruit), could benefit from developing joint logistics strategies.

- The multitude of development initiatives requires cross-industry collaboration at a regional level in order to define and scope agro-logistics related investments for funding.

3 The State of Agro-Logistics

3.1 National Status: infrastructure

3.1.1 Infrastructure elements

For the purposes of this study, agro-logistics infrastructure includes transport networks, storage and handling facilities. In the map below, the road and rail networks and facilities such as silos, the National Fresh Produce Markets, abattoirs and wine cellars are shown in order to demonstrate the interrelationship between the agriculture specific facilities and the transport networks.

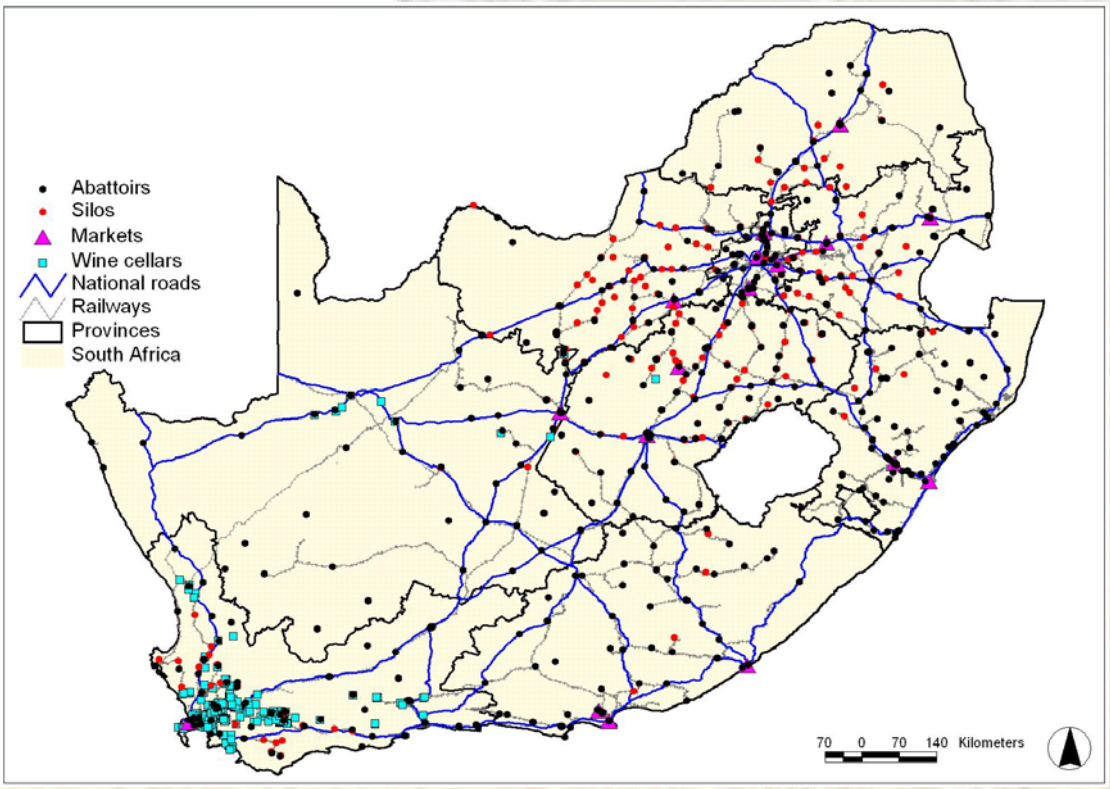


Figure 3.1 Elements of the national agro-logistics infrastructure

The key bottlenecks of the infrastructure for the major flows of agricultural goods are the ports as the import and export points and the major transport corridors.

A survey of industry opinion highlighted the following (well known) bottlenecks with respect to agricultural infrastructure:[18]

[18] Industry questionnaires, Status of Agro-logistics Strategy, January 2006. This study was aimed at addressing gaps in the current agro-logistics system, and as such reports on the current state relative to such gaps and

Rail infrastructure

» Industry does not have access to sufficient effective rail capacity, particularly with respect to bulk commodities such as grain. The wagons and locos that are available to industry are insufficient to service grain's demand for transport.

Road infrastructure

» The cost of toll roads is increasing the cost of business, and adequate alternative roads are not available.

Port infrastructure

» Port congestion in peak season hampers export capacity, especially for the fruit and wine industries.

Export process infrastructure

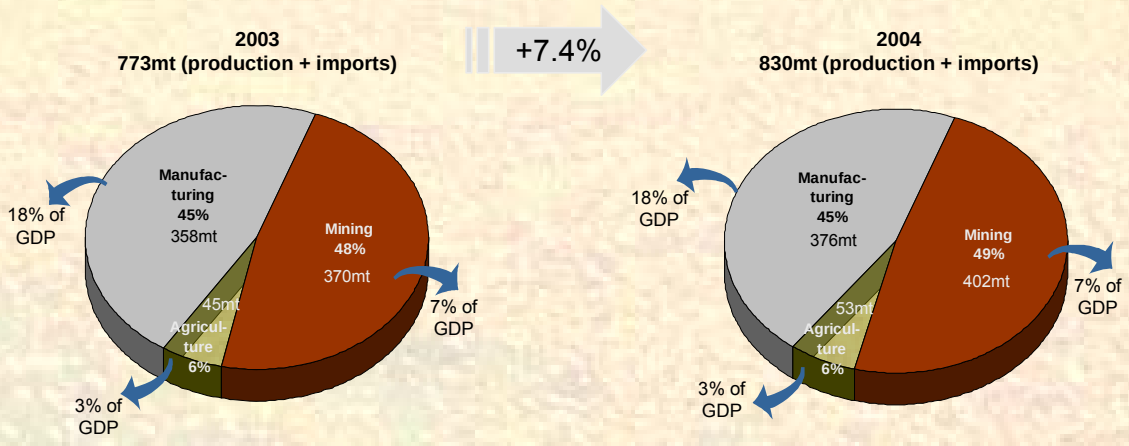
» Capacity of certification laboratories in wine industry is not sufficient.

» Border post capacity is limited.

Industry did not identify any of the other agricultural-specific infrastructure elements as constraints. (These comments must be balanced with the content of the rest of the report).

3.1.2 Agriculture's logistics cost in a macro perspective

South Africa's total 2004 production and imports required the movement of about 830 million tons, of this 6% is represented by agriculture tonnages:



GDP % = specific sector as % of relevant year's GDP at constant 2000 prices

Figure 3.2 Throughput (production and imports)[19]

---

shortcomings. Industry was prompted and mostly responded in terms of gaps rather than in terms of a comprehensive picture of the status quo.

[19] The 2003 import figure was adjusted upward due to new data published by the National Ports Authority for the tonnage imported through SA ports.

Interestingly, while mining and manufacturing tonnages grew by 5% and 9% respectively, agricultural tonnages grew by 18%. Although this is from a small base, it represents a positive trend given the important role agriculture should play in rural economic upliftment.

It costs the South African economy R130 billion to transport this total tonnage, an increase of 11% on 2003's cost.

3.1.3 Rural Focus

Rural typology: economic activity

The rural typology outlined below emphasises the diverse demands that agricultural production places on the logistics system. High and medium intensity commercial farming are typically clustered around metropolitan areas, there would naturally be more infrastructure development. Low intensity farming enterprises, that are already logistically disadvantaged due to the low volume of their supply chains, are furthermore clustered in areas removed from metropoles.

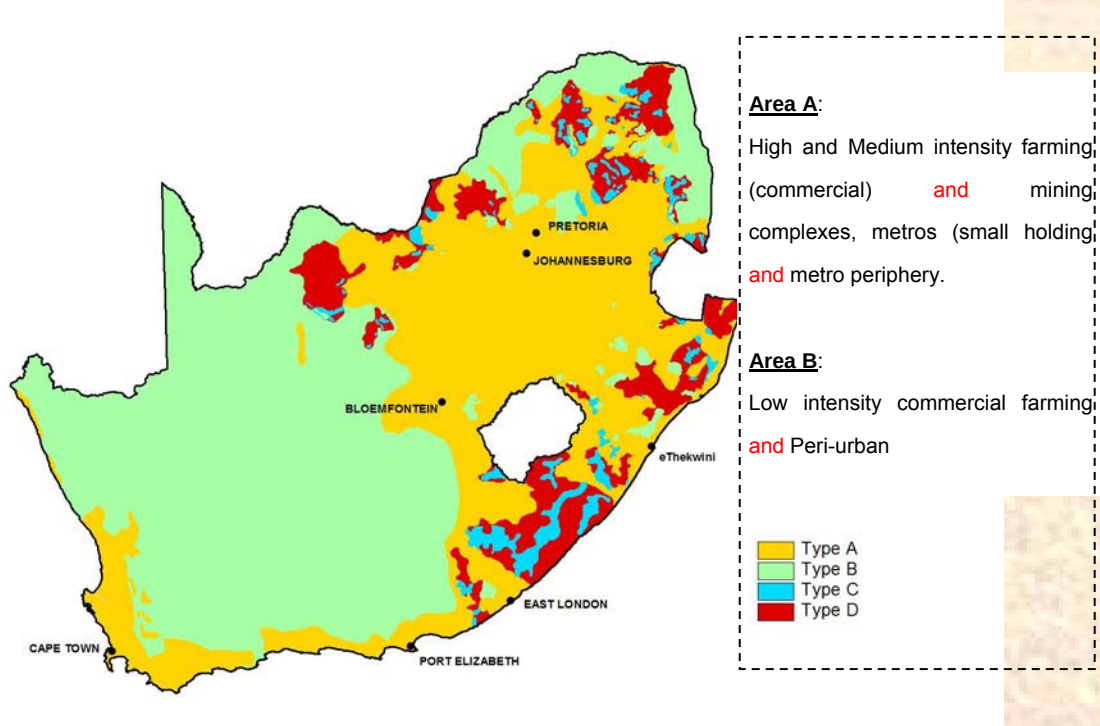


Figure 3.3 Rural typology

In order to indicate the potential for the use of rail by bulk commodities such as grains, the location of the silos relative to the rail network is mapped below.

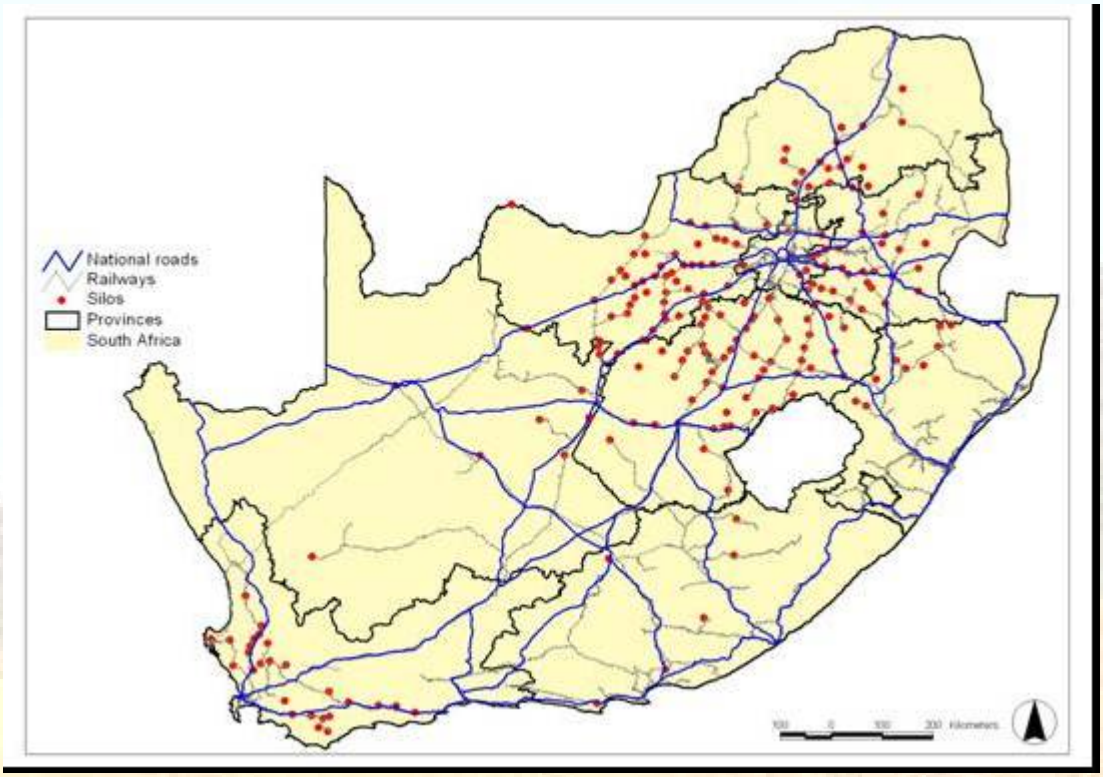


Figure 3.4 Location of grain silos relative to the rail network

The rail infrastructure exists, but lack of operational capacity, operational inefficiencies, and economic considerations are currently limiting the use of rail for the bulk transport of grain. The spatial layout of the grain industry is distorted by past control mechanisms - silos and mills are geographically dispersed and therefore uneconomical for rail transport, due to small dispersed volumes. Interventions aimed at consolidation needs to take place in order for grain transport to become economically viable for rail. Many of the silos are relatively far away from the national roads, indicating that the industry requires well maintained secondary roads if rail transport is not used.

3.2 National Status: services

3.2.1 The Customer perspective

The information is based on the survey results[20] and on logistics service provider interviews. Customers report the following major issues with respect to service delivery:

[20] Industry questionnaires, Status of Agro-logistics Strategy, January 2006

Logistics Service Providers

- Perceptions of the performance of service providers vary widely in agriculture:
  - » Service providers are as efficient as they can be under the prevailing logistics constraints (Cotton)
  - » Logistics service providers are generally not very reliable (Fresh Produce, Fruit)
  - » Logistics service providers are generally reliable (Milk)
- The total fragmentation of logistics services causes an increase in inefficiency and cost (especially in the Fruit industry)
- In some industries economies of scale have led to dominance by a few big players (grain)
- A lack of competition increases costs
- Support for supply chain visibility, traceability and real-time information is lacking
- International service providers form alliances that constitute monopolies

Transport

- Rail
  - » Improved utilisation of wagons for bulk transport of grain is required
  - » Service is unreliable and slow

- Road
  - » Costs are higher due to ever increasing fuel costs
  - » A shortage of qualified drivers influences service delivery
  - » Condition of roads in the case of some transport-sensitive products (e.g. stone fruit)

- Air
  - » High freight rates are caused by monopolistic behaviour – a single airfreight carrier for flower exports to the main export destination
  - » The airfreight export industry is extremely competitive and is characterised by underhand activity along the entire value chain

- Sea
  - » High costs prevail due to insufficient competition between the shipping lines
  - » Maintenance of product quality is lacking: there is a need for improved temperature recording equipment for sea shipments to sterilisation markets

Port Operations

- Poor planning of port operations causes congestion and delays
  - » Poor use of stack availability forces direct deliveries which create bottlenecks
  - » Vessel size is not taken into consideration when determining the number of days that stacks are open for reefer containers

- Unfair revenue models
  - » Cargo dues are set as a flat rate per container and hence low value commodities such as fruit are subsidising high value commodities

Customs services

- A Customs and Excise service is required that is available 24 hours, 7 days per week to reduce delays and to be able to respond rapidly to market demand for high value perishable products such as flowers
- Lead times are lengthened by slow export control processes
- Delays are caused at border posts due to slow clearing of trucks

Testing and monitoring services

- The PPECB plays a major role in fruit and fresh produce exports, and need to improve the following aspects:
  - » Expensive inflexible services
  - » Delays in testing
  - » Variable and inaccurate results which impact on the maintenance of stringent standards (e.g. phytosanitary standards)

- Improved overloading management of road transport is required
  - » Delays are caused by non-uniform interpretation of regulations by officials at different weigh bridges. This results in loads having to be changed or re-arranged.

3.2.2 The Service Provider perspective

This information is based upon logistics service provider interviews and provides an overview of the major issues as experienced by service providers. Spoornet has a major influence on the ability of the agricultural industry to move especially bulk goods, and its agricultural strategy is discussed first. This is followed by a summary of the other logistics service provider responses.

3.2.2.1 Spoornet's Agricultural Strategy

An in-depth discussion was held with representatives from Spoornet's strategy team and is summarised in this section. This was done based on the inputs received from many industries expressing dissatisfaction with Spoornet and its services and the perceived unwillingness of Spoornet to enter into discussions to remedy this. Based on the discussion, it is clear that the perception may be incorrect and that Spoornet is in fact open to discussions and improving its contact with the broader agricultural industry.

Building a long term relationship with the agricultural industry is part of Spoornet's strategic intent. Their main current focus is addressing the service provided to the grain industry. The volumes involved make it a natural customer for the rail industry, whilst the service complexity is a common challenge for both grain and rail industries.

Changes within the industry and Spoornet contributed to the challenges in service delivery experienced over the past decade:

- Deregulation of the agricultural industry led to fragmentation. Farmers are able to supply to any cooperative, in a quest to maximise returns. Transport patterns therefore changed radically, with a steady move to individual loads. In addition, grain is traded on the futures exchange. This also impacts on transport as there is no industry visibility on this trading.

- The lack of a clearly articulated and shared strategy to address the fragmentation of the service and poor cost coverage of a historically heavily cross subsidised product, led to problems in serving the industry. Spoornet clearly indicated that they are positive about working with the industry to develop solutions.

Challenges experienced by Spoornet in agricultural service delivery

- The industry expects Spoornet to be efficient, have the capability to meet their demands and be dynamic and innovative. Spoornet can best meet these requirements through blockload services, as it unlocks rail's core competencies.

- Bulk traffic is predictable, bulk origin-destination pairs, with a stable, 3% growth per annum on point-to-point traffic. The grain industry's facilities and loading requirements are, however, geographically dispersed – leading to movement of less-than-blockload traffic.
  - » Most silos are on the branch line network, where the infrastructure quality is very poor.
  - » Infrastructure e.g. silos are fixed – very costly to change.
  - » There is limited loading capacity at silos. In many instances rail has to wait for road, further impacting turnaround times and sustainability.
  - » Each silo has a weighbridge and loading chute which only takes certain wagon types.

- At the moment, there is thus an inherent conflict in the industry's requirements and Spoornet's ability to meet those requirements.

- When Spoornet indicated that, in order to serve the industry sustainably, it had to move away from single wagon consignments – instead of consolidating loads, there was a notable shift to road.

- Road is exploiting these challenges with tariff premiums of up to 20%, even more over border.

- In addition, rail uses a dedicated grain wagon, which can not be used on the return leg for anything else. In contrast, road use their empty leg to compete with rail, compounding the rate differences.

- Over border flows are also challenging:
  - » High risk due to fluid political situation in Southern Africa.
  - » Lack of bagging facilities over border implies export of bagged maize, but current rail capacity is more geared to transport of bulk maize.
  - » In addition, bagged maize is highly susceptible to theft with tarpaulins covering rail trucks not sufficiently secure.

- Industry's inability to forecast demand results in inefficient asset utilisation and an inability by Spoornet to determine future investment requirements (e.g. depending on size of the local crop, transport could be either import- or export oriented).

Current initiatives by Spoornet to address agricultural service delivery

- Spoornet launched an initiative in 2005 to incentivise longer trains and blockloads:
  - » Spoornet believed that an incentive to use block loads (Flexi – and Megarail) will encourage consolidation of loading points (fewer, bigger) and that even small customers will consolidate orders (to make use of the incentivised blockloads).
  - » Incentives (discounted rail rates) can then be used to fund investments required.
  - » There is currently not a big acceptance of this initiative – it is possible that industry can indicate the reasons for this.

- Spoornet is currently negotiating guarantees for over border flows in bi-lateral agreements with other railways – will result in better service delivery over border.

- Previously, only the FZ dedicated grain wagon was used for grain transport. In an attempt to increase capacity, rail started to use open wagons cross-border and adapted containers for toploading. A number of customers are already utilising these alternatives, but whether the customer is loading containers or wagons, the shunting capability is still a limitation and must be addressed.

- Operational efficiencies are being driven on a weekly basis - better turnaround time on existing rolling stock will increase tonnage transported with existing rolling stock.

Suggestions regarding future initiatives

The following suggestions were made by Spoornet regarding future initiatives to improve service delivery to agriculture (for more detail, see Appendix A).

Government, Spoornet and Industry	Spoornet and industry
DOT and other role players (including Spoornet and industry) must finalise approach to branch lines	**Jointly develop a sustainable volume consolidation strategy**
Spoornet has a need to understand DoA's agreement with the World Food Programme for over-border supply of grain	**Spoornet and industry has to collaborate for a sustainable solution through continuous management commitment, and operational solutions such as industry forums**
Have all options for co-investment been investigated?	**Any initiative must include improved IT capability**

Table 3.1 Spoornet view on future initiatives required for agriculture

A continual focus on innovation (e.g. think creatively about empty leg – e.g. grain one way, fertilizer back) is required. Also, strategies need to be finalised in a transparent manner. The rail master plan and industry strategy must be finalised and the relevant components shared with role players.

3.2.2.2 Summary of logistics service provider issues

The interviews covered a range of service providers – from companies dedicated solely to agriculture, to members of the big five of South African logistics that provide services to all sectors of the economy.

The diverse nature of the challenges facing services providers is illustrated by the varied responses to the question: *What makes it difficult for you the service clients in the agricultural industry?*

- *A futures trader* - "In order to facilitate physical delivery on contracts (necessary in the market) a good and efficient storage, grading and transport system must be in place. Obviously the financial and legal structures must also be efficient and credible"
- *A major shipper* - "Time frames, in terms of delivery uncertainty make planning and service delivery very difficult. Particularly when dealing with fruit and other fresh produce, temperature controls also impact on logistics."
- *A major logistics service provider* – "Fresh produce markets are not working – we need a new commercial model."
- *A major grain logistics service provider* - "The continued lack of rail capacity makes it very difficult to make proper use of rail infrastructure. Silo's are located next to railway lines with their own sidings and yet can't make full use of the mode. Cargo is inevitably shifted to road which has cost implications of an increase of approximately R60-R70/ton."

This illustrates that the service providers face issues ranging from the legal and financial environment, the nature of the agricultural products, the economic viability of key elements of the supply chains such as markets, through to transport inefficiencies.

Questions were structured under the headings of Environment (as created by government and through commercial forces), Innovation and Investment. Government's role with respect to the environment has both an infrastructure and an operations element. Significant scope exists for innovative solutions to improve efficiency, and comments with respect to innovation reveal a significant willingness for co-investment with government to improve the current situation.

The detailed inputs are summarised in the table below:

ENVIRONMENT	INNOVATION	INVESTMENT
Government	» The perception is that most logistics service providers are focussed on cost reduction rather than logistics excellence or innovation	
• **Infrastructure** » Rail and road infrastructure require investment and upgrading		» **PPP investments are required to privatise fresh produce markets with all stakeholders involved (local government, farmers, emerging farmers, market agents)**
• **Operations** » Port service levels are low and can be improved by introducing competition	» Where innovation by logistics service providers take place, the sole focus is to keep up with global trends	
» 12-hour operations of container handling at City Deep is insufficient		
» Government should recognise the vital role of grain in the national food supply chain, and improve its priority as a rail customer	» Technological advances have occurred (e.g. temperature monitoring of fresh produce in containers), but the logistics processes such as shipping have not changed	» **Macro-level investment in an electronic management system of transport infrastructure is required**
» Improved overloading management of road transport through the use of logistics service provider weighbridges in addition to the existing government operated weighbridges		» **Shipping lines will invest in terminals that they can operate**
	» There is a need for a rail hub for grain that can be created via cooperation with Spoornet	» **Logistics service providers can assist government in the land rehabilitation of closed mines to farms for BEE production**
Commercial	» Cost savings can be realised by incorporating other bulk commodities into the grain logistics system	
• **The pressure on export facilities is increasing as exporters have diverted from the local to the export market** • **The number of intermediaries in supply chains are decreasing** • **The R/$ exchange rate affects relationship between storage and movement of grain** • **Grain flows are unpredictable (major exports or major imports) depending on the size of the harvest, placing huge demands on rail and road transport capacity**	» Logistics models that will serve the needs of small farmers to get produce to fresh produce markets cost effectively need to be developed	» **Driver-owned vehicle schemes represent an example of current investments that create new entrepreneurs**
	» Value-added services need to be clustered with fresh produce markets	

3.3 National Status: emerging farmer development

3.3.1 Overview

Emerging farmer development takes place from various perspectives:

- By government, with the aim of unlocking dormant agricultural potential and generating sustainable livelihoods;
- By agri-business and labour-intensive industry, with the focus of integrating emerging farmers into commercial supply chains, and complying with the BEE charter;
- By (donor funded) development programmes, with the aim of poverty reduction and job creation; and
- By integrated rural development initiatives, with the aim of regional economic development.

Ideally, the above development initiatives should result in increased flow of produce from areas of production to areas of consumption, which in turn needs to be enabled by adequate logistics infrastructure. Given that development initiatives often take place in rural areas, the enablement of emerging farmer programmes places specific demands on the secondary logistics system.

A number of views are presented here to demonstrate the status of emerging farmer development relative to the supporting logistics infrastructure.

3.3.1.1 Focus of development initiatives

Getting goods to market implies that all aspects of the supply chain be developed. Historically, development interventions focused on developing and transferring mostly the skills of production to unemployed people. As such, only a limited part of the need to generate income is addressed. While people become proficient in producing goods, they do not necessarily have the means of reaching markets and turning their produce into income.

The diagram below provides an overview of the current focus areas of different types of development initiatives, relative to the supply chain that is required to bring goods to market.

It combines the focus areas of the following role players:

- Government, from strategies such as CASP;
- Industry, as expressed in the emerging farmer survey; and
- Development projects, synthesised from learning on various development projects.[21]

[21] Integrated Rural Development Strategy, State of Logistics Survey 2004 & 2005

Government documents outline some gaps in approach going forward, and industry was asked to provide their views on gaps. Gaps with respect to development projects are again synthesised from experience.

	PLAN	INPUT	PRODUCE	DISTRIBUTE	MARKET ACCESS
GOVERNMENT **focus of initiatives**		Land under irrigation and land reform	Productivity, quality, reliability		
GOVERNMENT **gaps identified**					Support: market access
INDUSTRY **focus of initiatives**			Upgrade & share handling facilities Training for quality		Marketing support
INDUSTRY **gaps identified**	Logistics planning & coordination Input planning Regularly updated logistics information	Road & rail infrastructure Cooperation for improved buying power	Storage & cooling facilities Quality advice	Lack of transport to markets Road & rail infrastructure	Small farmer friendly market infrastructure
DEVELOPMENT PROJECTS **focus of initiatives**		Skills development			Market access
DEVELOPMENT PROJECTS **Gaps identified**	Inadequate costing and management	Uncoordinated low volume supply chains		Uncoordinated low volume supply chains	Poor market information and high transaction costs

Table 3.3 Role of different departments in agricultural policy and strategy

3.3.1.2 Network access of underdeveloped areas

Deep rural areas with low levels of development, have low economic activity levels and many are not located close to the major road and rail network, as is depicted below.

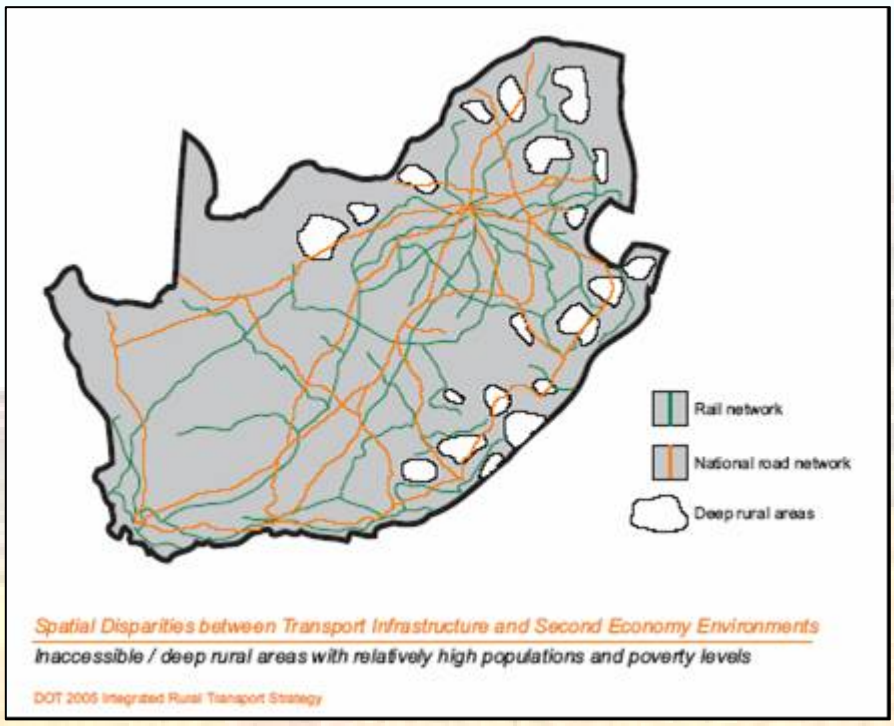


Figure 3.5 Spatial disparities between transport infrastructure & second economy environments [22]

This has implications with respect to both cost and market access, and development initiatives need to be cognisant of what is realistic to achieve, given their specific location relative to the transport network, and relative to economic activity.

3.3.1.3 Location of development initiatives

Development initiatives are first and foremost driven by the need to generate employment, which has to date predominantly been translated into projects that transfer skills. This, in addition to the need for economic development in rural areas, has resulted in the location of development initiatives at locations that are not necessarily optimal relative to the need to transport goods. The direct impact of the location of development initiatives in this way is an increase in the cost of transport of goods to market. An analysis of the cost of accessing the nearest metropole by a 1-ton vehicle is depicted in the logistics cost map outlined below, and serves to demonstrate the logistics cost disadvantage experienced by rural areas:

[22] DOT 2005 Integrated Rural Transport Strategy

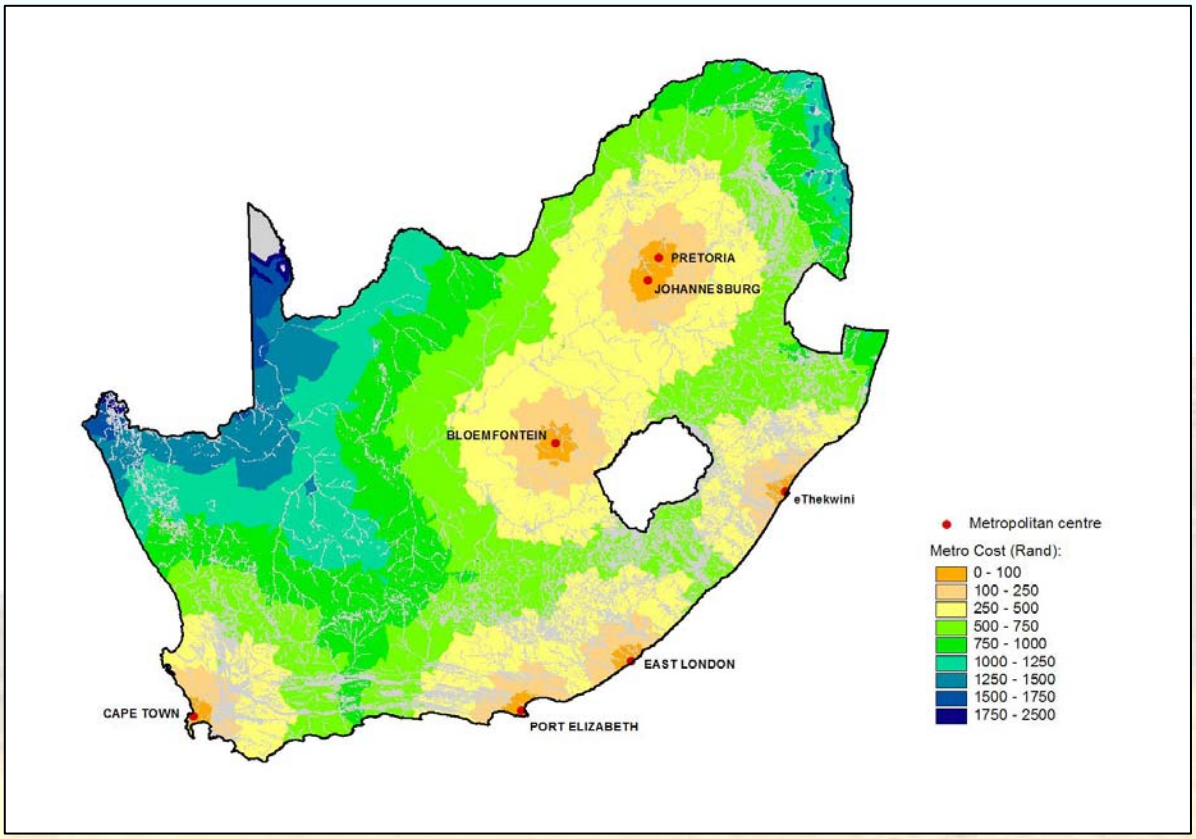


Figure 3.6 **Logistics cost map: cost to nearest metropole**

The location of development projects funded by the Department of Science and Technology over a three-year period from 2001 to 2004 further serves to demonstrate this principle.

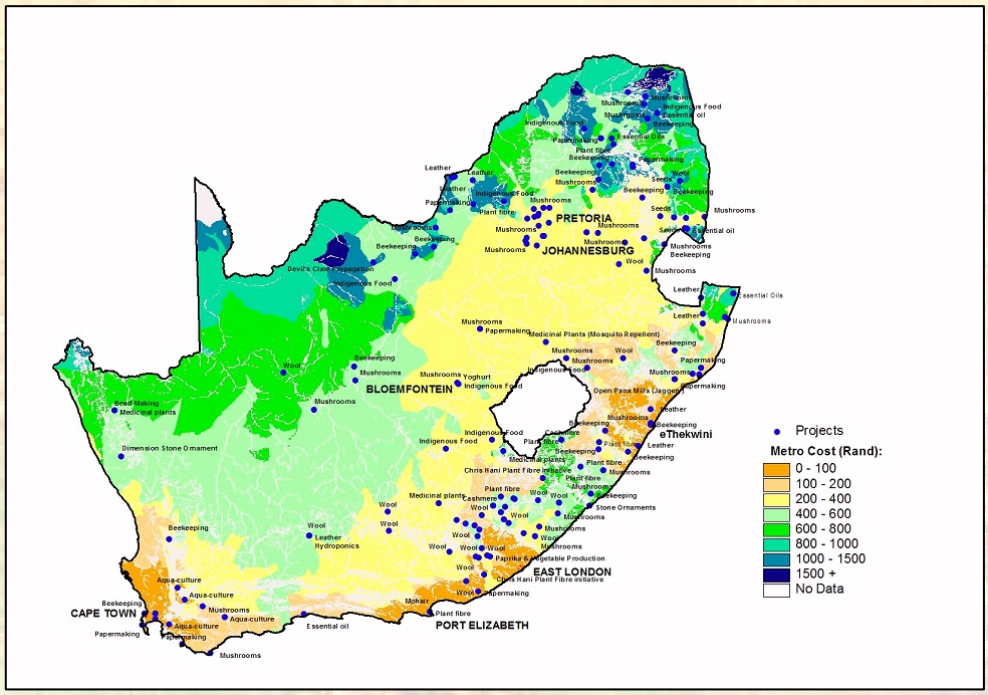


Figure 3.7 **Logistics cost map: cost to nearest metropole**

3.3.1.4 The nature of emerging farmer supply chains

In addition to the remote location of emerging farmer production areas, the inherent nature of such supply chains contributes to the complexity of the logistics constraints that are experienced.

Key points are highlighted below:

General issue category	Prevalence/ root causes	Examples & manifestations
Lack of accessible or scale-efficient support services & infrastructure	This general issue is – in many ways – an endemic, structural condition of most rural areas, characterised by dispersed demand for services, and the difficulty of providing and maintaining vast networks of low volume roads.	• Poor roads • Poor communications and high transaction costs • Lack of accessible storage facilities • Lack of marketing and general business support services
Poor information on, and access to major markets and specialised services	This is, similarly, a structural condition of most rural areas	• Long distances • High transport costs • Mainstream market access barriers
Small farm sizes and low production and supply chain volumes	This is more prevalent in resource poor/ former homeland areas than in more commercially oriented farming areas	• Limited bulk purchasing possibilities and discounts • Inefficient small vehicle or shipment sizes • High transport costs
Poor organisation and general business management, including logistics management	Small enterprises – almost per definition – cannot be expected to contain the full range of skills and services for effective business and logistics management, branding, quality control and packaging.	• Education level of emerging farmers • Underdeveloped or poorly functioning farmer organisations and cooperatives
Insufficient branding, quality control, packaging & general value addition	Since outsourcing is generally not a viable option for most rural SMMEs, the solution seems to lie mainly with bigger enterprise sizes, cooperatives and other forms of cooperation	• Insufficient technical know-how and the non-availability of equipment • Underdeveloped or poorly functioning cooperative ventures.

Table 3.4 Constraints in emerging farmer supply chains

3.3.2 Summary of Case studies

Cases of emerging farmer initiatives serve to demonstrate critical insights with respect to emerging farmer development. A supply chain view is taken with the analysis of both the meat and the wool supply chains, with some obstacles to emerging farmer development being highlighted in the meat supply chain. Local best practice is captured in the description of initiatives in the sugar industry, while a regional view is taken with a description of emerging farmer development in the OR Tambo District Municipality, as well as in Prince Albert. Brief summaries are given below, with more detailed information in Appendix B.

3.3.2.1 Supply chain view: Emerging Farmer Wool Supply Chain

South Africa currently produces about 50 million kg per annum of which in excess of 90% of the clip is exported. Communal and emerging wool producers produce 12% of the national clip and are mainly located in the former homelands of Transkei and Ciskei (Eastern Cape) as well as Thaba Nchu and Qwa-Qwa (Free State). There are an estimated 3 million wool sheep in communal areas, owned by more than 70 000 farmers. The average income from wool varies between R2-00/kg through the informal trader market where wool is often sold in bulk and unclassed, to more than R10-00/kg through the formal auction market where wool is classed, pooled and sold per type and quality grading.

The old Wool Board, National Woolgrower's association of South Africa (NWGA) and private companies have implemented empowerment and development initiatives amongst the black and communal farmers for many years. By taking a supply chain view and focusing on initiatives that assist farmers to integrate their products into the chain to the formal market, it has been possible in some cases to increase income for emerging farmers tenfold.

Factors that are key to the success of this initiative, and that could be carried forward to similar initiatives, are:

- A holistic approach to interventions that addresses all critical supply chain elements;
- Initiatives that are implemented through a partnership between industry, government and development bodies; and
- A focus on the key logistics infrastructure in the chain that has the potential to improve the profitability of producers.

3.3.2.2 Obstacles: Emerging Farmer Meat Supply Chain

South Africa's climate is ideally suited to extensive livestock farming, with 70% of the total land surface suitable for this activity. However, the red meat industry is characterised by dualism with very different commercial and developing sectors. Well developed production, processing and marketing systems exist in the developed sector. While the emerging sector has an estimated 5.3 million head of cattle

(47% of the national herd), the market offtake of this stock is only between 6 and 7%. Initiatives to unlock the potential of this vast source of livestock is the focus of government, commercial industry and the National Emergent Red Meat Producer's Organisation (NERPO), with varying levels of success and impact.

A number of key constraints need to be addressed in order to improve the impact of these initiatives:

Improved access to markets and thus high transaction costs are cited as the greatest impediment to the commercial orientated emerging livestock farmer. Most of the role players are far removed from markets or do not have sufficient marketable surplus to justify investment in marketing systems. Infrastructure involving both the physical (communication, transport, roads and marketing facilities) and institutional infrastructure (market information, security and animal disease control) and marketing systems are poorly developed or non existent and this needs to be addressed as a prerequisite for any further development.

Various role players are currently involved with activities to attempt to bring the emerging farmers into the mainstream industry. Many of these attempts are duplicated by different role players and are fragmented and lack some form of co-ordination.

If the red meat industry is to fulfil its expected roles of:

- Improving household food security and addressing poverty alleviation in the small scale farming areas; and
- enabling South Africa to become self sufficient in the supply of red meat,

there needs to be a joint and holistic approach to initiatives that address all elements identified, but with the initial focus on the key logistics infrastructure and marketing systems.

In this regard, all interested role players should jointly be involved (possibly co-ordinated by the National Agricultural Marketing Council) in initiatives based on a well formulated and agreed to plan of action. In the absence of such a joint strategy, the fragmented initiatives will continue.

3.3.2.3 Local best practice: Emerging Farmer Sugar Supply Chain

The South African sugar industry is one of the world's leading cost-competitive producers of high quality sugar, with a significant contribution to the SAeconomy. There are more than 50 000 registered cane growers comprising approximately 2 000 large-scale farmers farming freehold property, and more than 47 000 small-scale growers. The sugar industry's focus on producing a high quality, profitable and cost competitive product is complemented by its focus on sustainable development providing education and training, social investment, promoting sound and sustainable environmental practices.

Development initiatives include:

Formation of a new land reform company, Inkezo, in 2004 by growers and millers to operate as an independent land reform initiative, promoting sustainable agricultural land reform. In line with the national transformation goals, this company has effected the initial transfer of 70 000ha of land in the sugar industry, over and above 31 000 ha of freehold land under sugar cane already established under black ownership closely aligned with government initiatives[23].

The Sugar Industry Trust Fund for Education (SITFE), founded in 1965, has funded projects in rural schools in sugar areas, and has in the past year supported approximately 70 bursary recipients and 23 education projects.

SASA, together with millers and growers, actively promote sound and sustainable environmental practices within the sugar industry as a whole, in line with national legislation and international requirements. This has involved the development of a variety of environmental education programmes.

The success of the above initiatives is the coordinated and integrated manner in which development is undertaken. The following factors have been key contributors to emerging farmer development in the sugar industry:

- the industry is closely working together throughout the value chain from growers and millers;
- emerging farmers are incorporated into the activities, investment and training programmes of the industry hence they are groomed to produce quality sugarcane;
- the industry is unique in South African agriculture in its complete funding of its own agricultural research and plant-breeding complemented by comprehensive agricultural extension;
- sugar milling research is also partly funded by the sugar milling industry; and
- industrial technical training facilities are also provided at an industrial training centre.

3.3.2.4 Local focus: Emerging Farmer Development in Prince Albert

Recent development initiatives in Prince Albert were originated by a public debate between the town residents to determine an appropriate direction for their future. These were designed primarily to strengthen the local economy through the creation of work opportunities. What is important in the Prince Albert case is that after various strategic options were mooted by the community, the one eventually selected, a cold store for the fruit producers, was logistical – a choice later endorsed under comparison with other rejected possibilities.

Prince Albert is a small Karoo town of around 5 000 souls of which about four fifths fall into the category of previously disadvantaged, many of which are dependant on social grants. In addition the town is unfavourably located in respect of main transport routes and some distance from its nearest port Cape Town. It is also surrounded by semi-desert with mountains and impassable roads on its eastern boundary. The core of the town's economy lies in irrigation farming with a high potential for fruit production. Hence the concerted call by the Prince Albert community for a cold store to be built in the town – to help resolve the relatively complex logistical problems of peak season (export) fruit production.

[23] South African Business Guide, 2004/2005

Fruit demands an extremely strict cold-chain regime to be maintained from harvest until its arrival on the supermarket shelves.

Alongside the logistical advantages of the cold store were also social and economic benefits. In simple terms, the risk of fruit farming would be reduced by the project, the existing jobs would be better secured and further expansion and more employment encouraged. The indications are that with improved product quality and more efficient and less interrupted logistical arrangements, the cold store could return an additional R500 000 into the community each year.

The Prince Albert case illustrates two points: the social and political sustainability of an openly debated, non-partisan approach to rural development; and the key role of the pioneer growers (entrepreneurs) who established the potential for fruit production in the first place – laying a foundation for meaningful infrastructural investment.

3.3.2.5 Regional focus: Emerging Farmer Development in OR Tambo District Municipality

The OR Tambo Municipality is one of the poorest areas in the country, and has been the centre of a number of regional-focused development initiatives. While the region is characterised by extreme poverty and underdevelopment, some key infrastructure elements exist that could form the baseline of development.

The region is accessed by the N2, which links the main regional centre of Umtata, to Cape Town and Durban, by road. The R61 east-west connection road intersects with the N2 at Umtata. This route provides a critical linkage for the central and eastern areas of Oliver Tambo District. Many areas of the district suffer from poor road access, with the Pondoland region being particularly disadvantaged. The OR Tambo District has a rich natural resource base for agricultural, maricultural, tourism, manufacturing and infrastructural development.

A number of independent development initiatives in the past resulted in fragmentation and sub-optimal use of specifically logistics infrastructure. Backward and forward linkages are not fully exploited in the region. Despite the large tracts of arable land, the agricultural sector of the economy is poorly developed. The secondary sector is relatively weak with little manufacturing and value-adding activity taking place. Areas not used for settlement are typically subsistence farming with some semi-commercial agriculture.

Currently, a regional focus to development is taken, through the development of key infrastructure that could support a number of different industries The rationale for targeted focus areas is similar to that of spatial development initiatives (SDIs), namely to “crowd in” investment from the private sector on a project-based approach. Hence, upgrading of service nodes and roads are planned to occur in tandem with projects to promote or improve livestock, forestry, tourism, agriculture, and other economic activities. Although the relative inaccessibility of these areas provides some protection against environmentally insensitive development the development of sustainable eco-tourism and mariculture

activities require at least some connectivity improvements such as upgraded access roads, river crossings and communication networks. The focus on Port St Johns as a tourism centre will grow as the upgrading of infrastructure and road access takes place.

Development initiatives in the OR Tambo area are evolving from fragmented initiatives aimed primarily at skills development to a process whereby innovative logistics solutions are developed as an enabler of development projects and of economic activity across a wide range of industries.

3.3.3 Emerging Farmer Logistics constraints

A number of development programmes are being undertaken by respective industries, and these industries were consulted with respect to their views on the gaps that exist and interventions that are required to improve the success of their development programmes. Their views are summarised in a supply chain context:

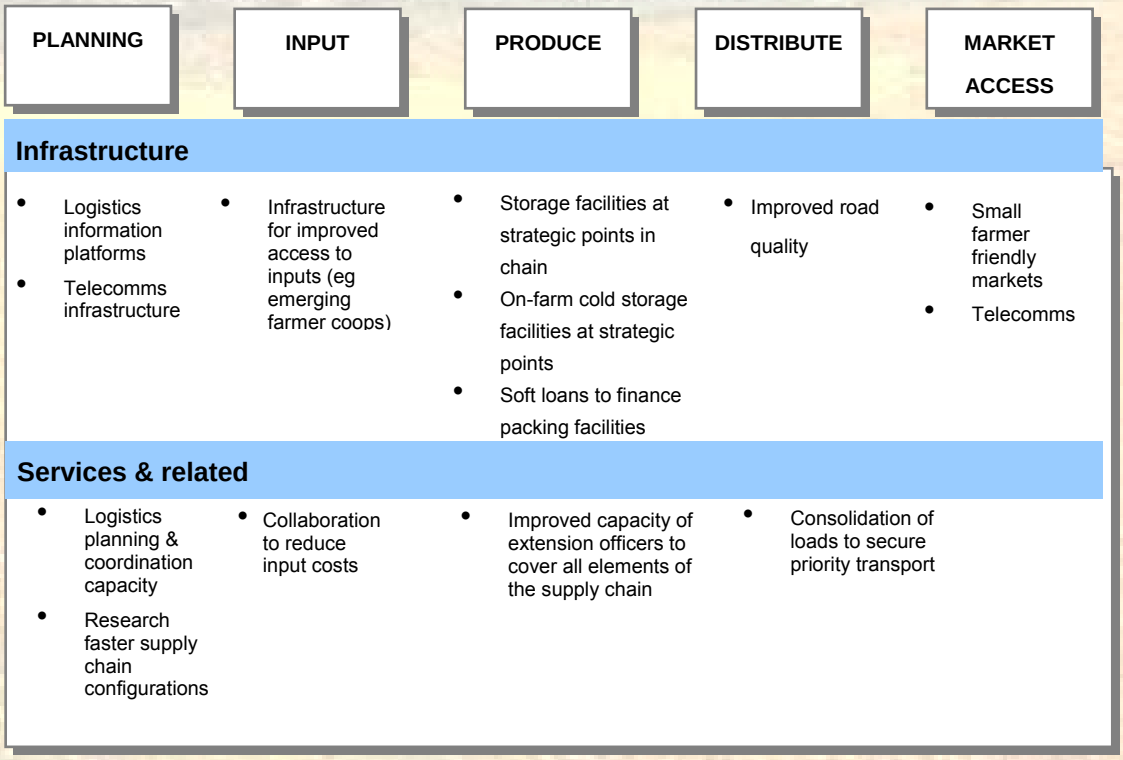


Figure 3.8 Emerging farmer logistics constraints

In addition to the above, lessons learnt from industry-independent regional development projects have over time been synthesised.

This learning points to the following logistics constraints, as they relate to the nature of low volume supply chains:

Main rural logistical problems and solution options

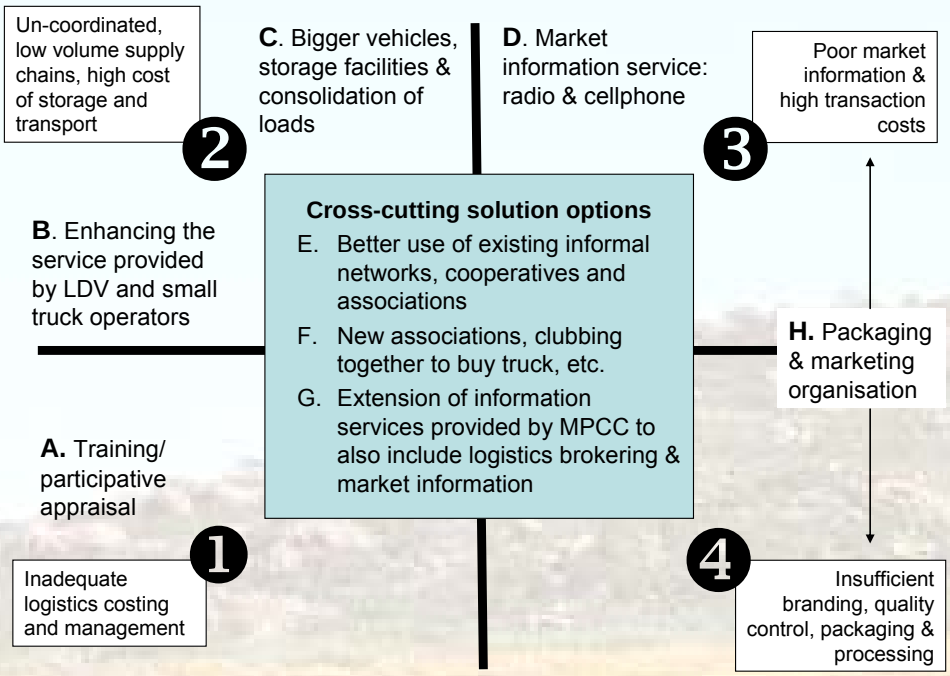


Figure 3.9 Main rural logistical problems and solutions

3.3.4 Implications

Based on the various inputs and elements investigated during the course of the study, a number of general findings are made that will impact on the recommendations with regard to the logistics position of emerging farmers:

Fragmentation

From the responses received and literature reviewed, it is clear that efforts to address shortcomings and gaps in logistical and other requirements in the emerging sector are fragmented and uncoordinated. A vast number of government departments, development agencies, industry bodies, private companies and other role players are spending considerable amounts of time and money in this sector but the cumulative results do not reflect the effort being put in and are considered to be disappointing. There needs to be greater coordination to ensure more of an impact and return on effort. Also, in rural areas a regional focus needs to be taken, with the aim of consolidating logistics needs and integrating investment in emerging farmer development with other development initiatives. There needs to be a joint and holistic approach to initiatives that address all elements identified, but with the initial focus on the key logistics infrastructure and marketing systems.

Differentiated solutions

In dealing with the logistics needs of emerging farmers, it has become evident that one cannot view this group as being homogeneous with similar requirements. There are, in fact, two (markedly different) categories namely:

- those that are involved in farming by virtue of being beneficiaries of the land reform process in areas that are predominantly under commercial farming stewardship; and
- those that have traditionally been involved in (mainly subsistence) farming activities in the former relatively densely populated homeland areas.

Land reform beneficiaries

Some of the land reform beneficiary category of emerging farmers do, apart from support relating to sustainability and market access, not require special or specific logistical interventions as they will make use of the same infrastructure, systems and support structures as the traditional agricultural sector. Their needs will be similar to those of the traditional commercial sector including aspects such as improved rail and road capacity, storage capacity etc. Otherwise, generally, they do require special interventions. A large amount of support and growth is required to enable them to sustainably and profitably integrate into commercial supply chains.

Former homeland areas

The logistical setup and requirements of the farmers in the former homeland areas are different and require specific interventions. At present, the logistical infrastructure is limited and of inferior standard. Where existent, roads leave much to be desired - and there is little else. Logistically, developments will need to be encouraged to establish infrastructure in an evolutionary way parallel to developments in agricultural production – being led by the pace of the commercialisation of agriculture, not forcing it.

Appropriate interventions

In similar vein, care should be taken to refrain from implementing strategies and plans that are not relevant for the areas and types of agriculture concerned. Far better results would be obtained if a needs assessment was done, and interventions focused on the basic farming needs (mainly capital and skills) first, following which further supportive enhancements and infrastructure should be allowed to develop naturally with appropriate coaxing. For example, the developmental impact will be far greater if secondary roads are built or upgraded rather than constructing, say, sophisticated produce markets / depots which are not easily accessible (with bad roads) and probably not required.

Impact of location

Geographic location needs to be taken into account, and emerging farmer development programmes need to be cognisant of the complications or benefits of a particular project resulting from its location relative to economic activity, as well as relative to the transport network. Development expectations need to be realistic, and need to include plans to overcome disadvantages with respect to market access that are related to location.

Deep rural communities

An important factor to remember with 'deep rural' communities is that they are largely net consumers of agricultural products. The logistical need to move goods away from the market centres to the rural communities must not be forgotten. Achieving this is mainly the domain of the rural retail trade and is done by bakkies whose added cost to the transported product is directly proportional to the distances travelled and the state of the roads. Inefficient transport directly affects the cost of living in these areas. The two-way product flow opens the way for the two-directional traffic of goods, a development which requires more organisation and encouragement than investment (apart, that is, from better roads). The traders should be encouraged to combine forces with farmers and specialist transporters (e.g. specialist freight taxis) to make the markets and supply chains more efficient.

Need for value-added market access services

Emerging farmers who have learnt farming skills or are operating in traditional agriculture (e.g. wool) are typically competent in production, and not market access. Entities are required that will provide easy "one-stop" access to markets, with value-adding services such as cooling, packaging and distribution.

Sophisticated markets

While market access is a priority, it also needs to be taken into account that where access to markets has been enabled, markets are increasing in sophistication of demand. This in turn places high demands on supply chains. Emerging farmer development programmes need, where appropriate, to develop supply chains that are able to conform to requirements such as traceability.

3.4 International Status

3.4.1 Overview

When considering international best practice in agro-logistics, it would be ideal to examine the experience of South Africa's main competitors and trading partners. However, the limited results from an extensive literature survey on the topic indicates that agro-logistics as such is a concept that is not frequently reported on. Results from the survey pointed to initiatives in the Netherlands and Australia, as well as to some work in Chile and Canada.

While this subset of countries is from an overall economic perspective not necessarily the preferred sample against which to benchmark, the challenges experienced in terms of logistics have many similarities to the South African situation. For example, the Netherlands recognises a backlog in development and maintenance of infrastructure, and then proceeds to design innovative initiatives to cope with the inefficiencies resulting from this situation. Chile is dealing with ports inefficiencies, and Australia and Canada are focusing on initiatives that will improve international competitiveness. In all cases, these countries are looking at innovative solutions to improve their ability to efficiently move agricultural products, given that they need to overcome certain challenges and constraints. Key

challenges, as well as focus areas and examples of some of the agro-logistics initiatives are summarised below. More comprehensive information is provided in Appendix D.

3.4.2 Drivers of agro-logistics trends

Demands on agro-logistics service provision are driven by changes in the international environment, and specifically by changes in consumer needs. Increased demand for convenience, as well as food safety and traceability, places new pressure on producers and on supply chains. Some of these influences are outlined below:

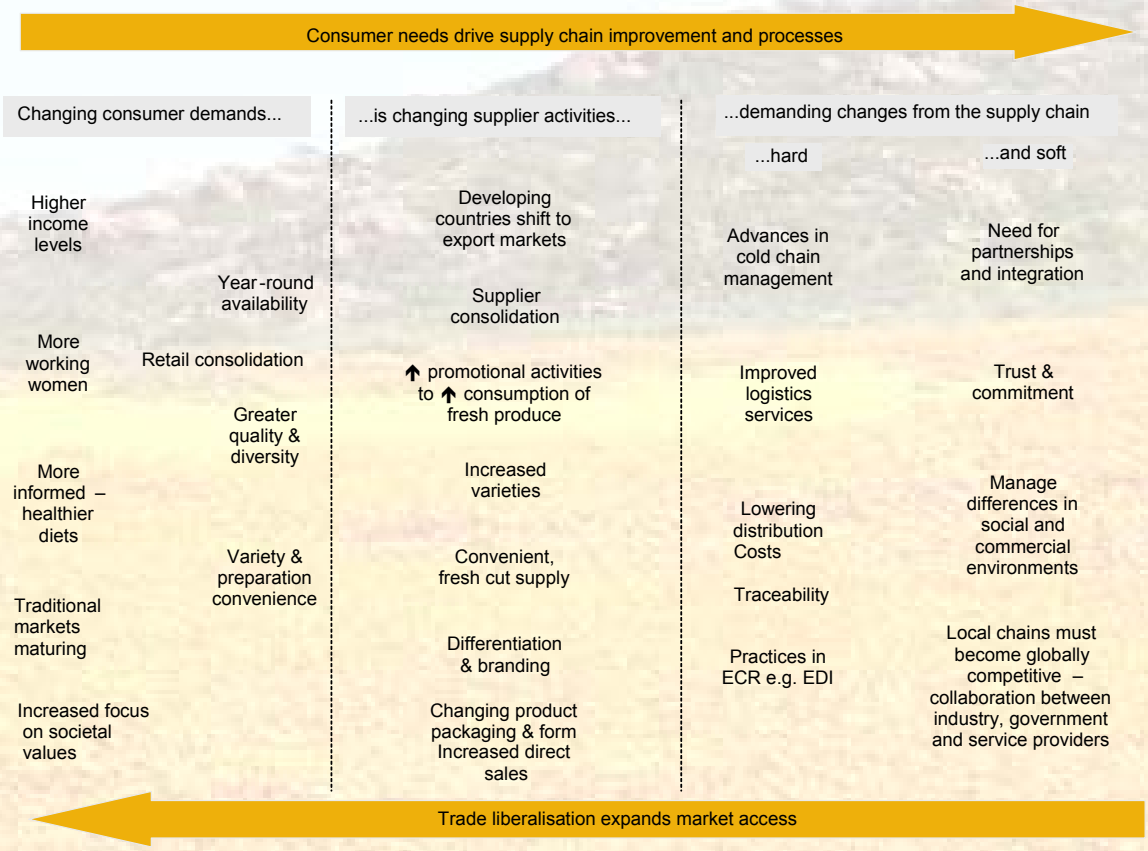


Figure 3.10 Influences on agro-logistics trends

With respect to trade with developing countries, the World Bank, World Trade Organisation and Food & Agricultural Organisation are assisting emerging economies and developing countries to upgrade cross-border trade.

There are four activities that can encourage supply chain development by stakeholders:

- Raising awareness to get increased involvement in the chain;
- Institution building, where both public and private partners are included;
- Pilot projects to give insights and expertise; and

- Tools, through which knowledge and experience are distributed to stakeholders.

3.4.3 International initiatives

International initiatives in agro-logistics range from providing an enabling environment within which innovative solutions to logistics problems can continuously be generated, to targeted initiatives that address key operational issues such as inefficiency or traceability.

Initiatives undertaken by the Netherlands and Australia, with some reference to work done in Canada and Chile, are summarised below.

COUNTRY	LOGISTICS CHALLENGES	INITIATIVE	PURPOSE	SOME PROJECTS (see appendix D for details)
Netherlands	Congestion, pollution and animal transport	Platform Agro-logistics	Encourage innovation in order to improve logistics efficiency	➢ **Agribusiness parks**
		Vision Agro-logistics	Clustering to reduce the need for transport	➢ **Long-distance express train for combined transport of passengers and perishable products** ➢ **Dairy park and poultry chain clustering that co-locate facilities**
			Connecting input and product streams through multimodal solutions	➢ **Underground logistics system for flower transport between flower auction, Schiphol and the rail network**
			Directing and managing flows that do not pass through the Netherlands by using ICT to improve efficiency and food safety	➢ **Virtual cattle auctions** ➢ **Virtual import and export inspections** ➢ **Separate flow of information from physical flow of goods for flowers and ornamental plants**
		Community of Practice	Share knowledge and experience and search for solutions	➢ **Creative workshops**
Australia	Supply chain congestion	Smart Freight	Improve efficiency & reduce congestion in Port of Melbourne	➢ **Implementation of ICT tools** ➢ **Evaluate impact of "mismatched" working hours**
		Benchmarking Technology in Ports	Application of technology to improve efficiency	➢ **Assess the use of container-related technology and managements systems in 3 ports**
		Evaluating Logistics Chain Technology	Identify possible technologies to improve efficiency of chain from farms to ports	➢ **Investigate use of technology in supply chain from farm to port**
Chile	Ports efficiency	Privatisation	Improved ports efficiency without large infrastructure investments	➢ **Technology upgrades & efficiency improvements**
Canada	**Competitiveness**	**Benchmarking**	**Improved international competitiveness**	➢ **Tool for benchmarking farming operations with peers and competitors**

3.4.4 Implications

Some of the critical success factors and key learnings from the above initiatives include:

- Constraints in the system are recognised, and innovative means are developed to improve logistics efficiencies within these constraints where necessary;
- A long-term view is taken with respect to resolution of the problem;
- There is a strong focus on innovation;
- Interventions are almost without exception collaborative efforts between industry and government, and have improvement at an industry as opposed to firm level as goal;
- Government plays an enabling role by encouraging collaboration and removing obstacles; and
- Interventions are prioritised in favour of those that can be dealt with relatively quickly with limited investment, but with high impact.

3.5 Implications of the current state of agro-logistics

In summary, the current state of agro-logistics has the following implications:

- Systemic issues in the national logistics system need to be resolved by long-term investment in new infrastructure, while key bottlenecks could be resolved by short-term investment in initiatives that will enable agriculture to engage more effectively with existing (inadequate) infrastructure;
- Fragmented service provision results in compromises being made with respect to aspects such as safety and standards. Simultaneously, monopolies are in place or are emerging, and are influencing cost-efficiency and consumer choice;
- Significant investment and intent exist in emerging farmer development, but very little evidence exists of successful economically sustainable interventions that enable access and that bring emerging farmers across the threshold of economic viability. Differentiation needs to be made at various levels when development programmes are designed; and
- International best practice recognises the lag between investment decisions and the availability of new infrastructure, and therefore takes a holistic, long-term view that seeks innovative solutions for infrastructure-related problems, reaching beyond investment in physical infrastructure.

4 Industry and Sectoral Analysis

Gaps in the logistics system, logistics requirements and sector-specific logistics constraints are driven by the current priorities of the agricultural industry. This section provides a brief analysis of industry in the context of its environment, and then summarises sector-specific logistics gaps and constraints as collected during the industry surveys.

4.1 Industry analysis

4.1.1 Vision

The agricultural community has a dream and vision for improvement and although it is not necessarily a comprehensive or official view, it provides a summary of views recorded in industry workshops.

External	• Viable, holistic transformation • Rural development & poverty reduction • Effective public-private partnerships • Market access for all • Improved transport infrastructure & service
Market	• Integrated market-led value chains • Increased regional trade • Increased exports
Internal	• Effective resource allocation • Production security • Globally competitive • Key SA industry

Table 4.1 2014 Vision for Agriculture

The *external* environment refers to those factors that give meaning and substance to an industry, how it is regulated and the contribution it makes to society. In this regard transformation has to be concluded effectively, facilitated by rural development and poverty alleviation programmes from government and through effective public/private partnerships. This can not be achieved without cost effective and fair market access for all, which, in turn, will be completely impossible without dramatically improved transport infrastructure – a core component of logistics.

The *market* environment refers to how an industry organises itself in order to achieve success in the market place. In this area it is important to link the value chain together effectively, move downstream and find greater value and penetration in beneficiated products, produced according to market demand. This should be seen as a regional and global play, not restricted to South Africa alone, making global logistics and supply chains between players in the value chain a core requirement.

The *internal* environment refers to an industry's own characteristics which in the case of agriculture mean that it has to be resourced effectively, produce food at a stable tempo, know how to compete internationally and be respected for these characteristics in the country.

The vision for agriculture in South Africa corresponds well with the President's response to a recent Government survey on performance, where accelerated progress in the first economy for growth, coupled with fast moving interventions in the second economy is stated as primary requirements. The President talked about "seriousness and determination" in terms of these aspects in his State of the Nation address (3 February 2006). The vision to halve poverty and unemployment by 2014 is restated in this address. These challenges from the President pose a specific requirement for agriculture, because in spite of the industry's relatively small size, millions of people in this country are directly dependent on agriculture for survival and growth. Hence, agriculture has to make an important contribution to both the first and second economy. In this way our "memories of the Future" for 2014 as outlined by the Presidency in December 2003, could be positive.

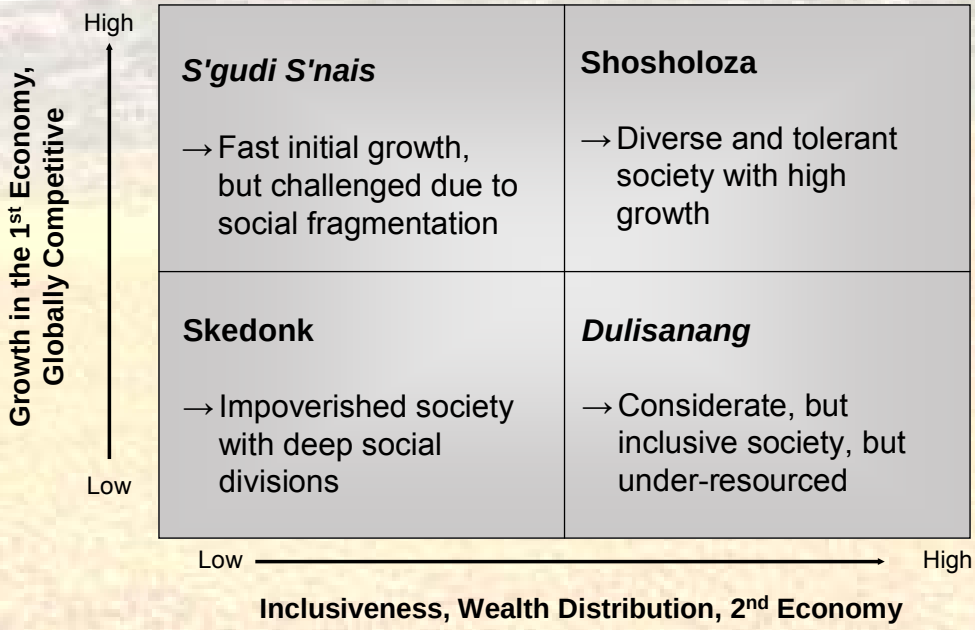


Figure 4.1 Memories of the future (adapted from the Presidency's statement)

To achieve the Shosholoza memory, both the first and second economies must receive attention, and no other industry in South Africa is better poised to contribute to this vision.

This is a wide and challenging vision for South African agriculture, but at its heart dependant on an important externality, i.e. the state of logistics infrastructure in South Africa. But how important could this obstacle be?

4.1.2 Obstacles

The participants were asked to identify obstacles in the same areas described above and these are depicted below:

External	» Unstable socio-economic, political and macro-economic environment » Non-viable land reform » Trade barriers that limit market access » Lack of integrated government service delivery and support » National freight logistics environment not addressed
Market	» Insufficient information and market-lead approach
Internal	» Lack of resources and skills » Insufficient R&D investment » Lack of competitiveness » Lack of co-operation

Table 4.2 Obstacles to industry development

Unstable *external* environmental factors are issues that all industries have to contend with if they occur, with the agricultural community probably the most vulnerable. Non-viable land reform that destroys economic units and a lack of market access are more specific dangers, but a lack of government support and service delivery exacerbated by a disintegrating freight logistics environment, will also hamper competitiveness.

A lack of industry-wide co-ordination to penetrate *markets* through aggressive global market-led tactics (supported by solid information) could continue to hamper the industry's competitiveness.

The industry itself could continue to be under-resourced *internally* (especially in terms of skills and natural resources) and under-invest in research and development. As the cost of production factors (especially transport) rises, investment becomes increasingly unattractive. Markets were fragmented by the deregulation of marketing boards, and their ability to act in unison as demanded by the regulated environment, was removed (remembering that the price of regulation lay in its excessive administrative cost and market distortions - which had to be offset in most sectors via price and tariff controls). The resultant lack of co-operation has created a challenge for logistical planning and strategising. Indeed, if is not addressed effectively logistics will continue to be an expensive and unmanageable externality to agriculture. Co-ordination, and a more direct involvement in the freight logistics strategy of the country, needs to be explicitly facilitated.

4.2 Sectoral analysis

4.2.1 Typologies

4.2.1.1 Characteristics of Agriculture typologies

In determining an approach towards logistics for the agricultural industry, it is important to understand what defines the industry, what differentiates it from others; and within the industry itself, what characterises one sub-sector (or typological category) compared to another. The exercise is to ensure that certain specifics of agriculture, although seemingly obvious, are carefully considered alongside other sectors of the broader economy when it comes to strategic planning. Bulleted below are some of the more relevant aspects that characterise the sector.

- Risk through revenue fluctuation. The agricultural sector at primary level is exceptionally vulnerable to risk on two fronts – through prices and climate. The problem of fluctuating prices is exacerbated by the fact that prices are largely determined externally (and uncontrollably) by a combination of international demand and supply, tariff barriers, and first world protection policies. Further, production is highly dependant on an unpredictable and erratic climate - in South Africa especially. The two risk factors are not linked – it is possible to have both low prices and poor production in a single season.

- Seasonality and perishability. Because agriculture is about the harnessing of natural processes it is unavoidably seasonal and the products are perishable, presenting a limited market window or requiring especially costly carry over storage. From a logistical perspective agriculture is highly complex.

- Production geography - sites fixed and spread out. The possibility, open to many industries, of positioning production units close to the market or supply lines only exists in agriculture in the broiler and chicken industry – and to some extent in vegetable production. Further, most production is away from the main transport corridors linking markets. Given 'fixed-site' production along with the geography of markets and ports it is clear that the positioning and management of logistical infrastructure (e.g. storage depots) will have an important bearing on the competitiveness of the industry's various sectors.

- Stratification and diversity. Agriculture is stratified vertically into several sub-sectors with massively differing needs. Compare broiler production with sugar production and again with, say, export fruit production. Logistically their needs are extremely different. Indeed, the only common denominator is that they are all products of biological activity. Horizontally, agriculture is stratified by size and by socio-political dispensation – small farmers, part time farmers, large farmers, emergent farmers, 'homeland' farmers – each with different perspectives and different goals. Stratification has two corollaries: it is difficult to strategise for the industry in an all-encompassing way; and (similarly) it is difficult to develop unity of vision and purpose from the sector. Hence the approach adopted in this study to canvass and evaluate separately each sub-sector of the industry.

- Political influence. Agricultural prowess, meaning the efficient utilisation of land for farming, will determine the success or failure of government policies aimed at restoring the land ownership imbalances in South Africa. Added to which are important cultural and emotional dimensions rooted in land ownership. Individual differences and agendas (already existing in the diversity of agriculture) are likely to be exacerbated by the proposed transformations. The resultant muting of the farming lobby (better infrastructure and services, say) should be noted in this context and should not detract from an appreciation of the benefit that such infrastructure and services would have on the national economy and on the success of transformation.

4.2.1.2 Characteristics of Farming typologies

Adding to the profile of the agricultural industry and to help understand its logistical complexity it is of value to consider some farming typologies. Unlike an arithmetically determined 'average farm', a farming typology is a 'typical' farming operation that most realistically describes or represents a certain category of farms. This approach helps appreciate what a farming operation is really about. Different farming typologies have different resource structures, different economies, ownership, output patterns and, important here, different logistical needs. Any one of these components can be focused on when a typology is described. In this assessment the focus is on the logistical typologies.

Because a 'typology' describes a typical member of a larger category of similar units, it is important to select and define categories which are appropriately illustrative of the task at hand. The number of possible categories which can be typified in a field as diverse as agriculture in South Africa is obviously very large – even for the relatively narrow purpose (logistical strategy) for which this exercise is required. In the event, four vertically subdivided major sub-sectors – livestock (meat and dairy), fruit, grains and vegetables/flowers – have been selected, covering as they do a large and varied cross-section of the industry; each is then subdivided horizontally into categories of emerging and commercial farming units. The logistical profile, indicating supply chain characteristics, logistical needs and constraints/problems of all these typologies are schematically represented in a matrix in Appendix E.

Taking a broad view, it would be of value to discuss some of the horizontal subcategories which have been 'typified' in the appendix. These subcategories, which are rooted in history and politics, consist of: mainly white-owned commercial farms (large and medium); emerging farms originating out of land reform (termed 'threshold commercial'); and emerging farmers originating out of the farming systems of the erstwhile homeland areas (termed 'ex-homeland'). The logistical framework around the large and medium commercial farms is reasonably well appreciated and articulated by industry representative bodies as this study has shown. Whatever the status of the infrastructure and service, it at least exists for this category of farmer. For reasons that Land Reform farms, by virtue of their origins, are juxtaposed to the commercial white farms, it is reasonable to assume (and confirmed by the industry representatives) that these will be absorbed into the existing infrastructure and strategic plans – even accepting that special marketing arrangements may be made for them through preferencing and subsidisation.

It must be mentioned, however, that the logistics perspective assumes normal production performance. In the majority of instances this has been below expectation amongst the Land Reform emerging farmers. This is for various reasons, in the main because of lack of skills, working capital and motivation – particularly where large groups have been involved. These are matters which require to be attended to outside the logistics arena.

The position is very different in the ex-homeland areas. Notwithstanding some active and highly successful pockets of commercial-style farming there is very little farming on a meaningful commercial scale in these areas. For this, and historical reasons, there is very little farm turnover (produce mainly consumed at home) and minimal logistical support. The roads in particular are extremely bad and transport unreliable. Simply upgrading the infrastructure (e.g. providing depots, cold rooms and markets) will not in itself improve the production capability. Greater effort and funding need to be applied in skills enhancement and general facilitation, of which the latter should be aimed at co-ordinating resources and creating greater lobbying power and economic scale. Apart from improving the road systems, which are essential for several additional reasons, infrastructural developments in the agricultural sector should take their lead from developments on the ground.

Interestingly, logistical solutions in the homeland situation lend themselves to creative thinking – taxi, bakkie, bus capacity, trading network – includes depots possibly serving as marketing or bulking stations – could be used in conjunction with cell phones to stimulate a better marketing environment and lay the foundations for future, more dedicated, infrastructure.

4.2.2 Agricultural pricing

After the depression of the 1930's many governments, including South Africa, decided that agriculture should not be left to free market forces and the freedom of choice. Most agricultural industries were subject to government intervention, varying from the most severe such as production quotas (sugar cane and wine grapes); single channel marketing and fixed prices (sugar cane, maize and winter grains - originally based on cost of production plus a margin for the producer, but in the 1980's prices were fixed at so-called "market related levels"); single channel marketing pools (deciduous fruit, citrus, dried fruit, bananas, wool, mohair, tobacco, oilseeds, chicory, rooibos tea and lucerne seed); price support schemes (red meat, eggs, dairy products, grain sorghum and dry beans) and less interventionist supervisory and price regulation schemes (canned fruit and cotton and later ostrich products). More than 90 percent of the value of agricultural production fell under one of the above interventions. Most of these interventions were regulated by the Marketing Act of 1937 (repromulgated in 1968), each being administered by its Control Board (or the less offensive term, Marketing Boards) or a co-operative (wine grapes, ostrich products). The only significant industries that had little or no government intervention were broiler chickens and vegetables.

Many of the Control Boards were involved in (and in some cases had total control over) logistical aspects such as transport and storage as well as the supply of certain inputs, such as fruit packing material. The co-operatives were in many cases appointed as sole agents of the Control Boards. From a logistics point of view, the location of agricultural storage and processing facilities was not always optimal. Examples are abattoirs, grain mills and silos which were situated in the major towns and cities instead of the production areas.

All the efforts and interventions of the Boards were focussed on the mainstream commercial agricultural sector. It was only after the political changes in the early 90's that any real awareness and efforts developed around the emerging agricultural sector.

In the late 1980's and early 1990's the world-wide thinking was away from government intervention towards a more free market dispensation and the freedom of choice. One of the results was the appointment by the then Minister of Agriculture of the Committee of Inquiry into the Marketing Act in 1992 which recommended that the agricultural industry be deregulated (Kassier Committee, 1992). The outflow of these recommendations was the drafting and promulgation of the Marketing of Agricultural Products Act of 1996 and the establishment of the National Agricultural Marketing Council (NAMC[24]). The NAMC was appointed in December 1996 and began its operation in January 1997 with the mandate that the deregulation process should be completed within 12 months. That meant that all the Control Boards and their marketing schemes were abolished.

4.2.2.1 Agricultural product pricing

The closure of the Control Boards meant that agricultural product prices (fixed or supported) were now subject to normal market forces. Also, statutory single channel marketing no longer applied and producers had to market their produce by themselves or through agents of their choice. There being no "sunset" arrangements, this sudden change to a free market caught many producers unprepared from being in the main producers and not marketers[25]. They had little or no experience in, for instance, foreign exchange hedging or the functioning of the futures market, and relied on marketing agents/brokers to handle this, some of whom had no track record either. This was compounded by the fact that South Africa's international trade regime was liberalised at the same time, with the result that farmers, as price takers, were subjected to fluctuating import or export parity prices as well as an unstable exchange rate.

The logistics become more critical the more perishable the product. For instance, the shelf life of dessert peaches is highly correlated with the time it takes from picking until they have been cooled to the required temperature – a rule of thumb is that for every additional hour it takes, it reduces the shelf life by one day. When a tomato is mature enough to be picked, any delays will have a negative effect on quality. Other products, such as sugar cane, are less sensitive to time delays – whether the cane is cut this week or next week does not affect its quality, but once cut, it has to be crushed within a couple of days. Grains are not highly perishable, but under the Control Board system deliveries were done and payments effected at harvest time, creating a seasonal peak demand on transport and storage. Producers are only now beginning to install storage facilities on farms, hoping to realise higher prices later in the season. At the other extreme are products which are "not perishable' once shorn/harvested, such as wool, mohair and cotton. However, cash flow considerations result in producers wanting to sell as soon as possible.

---

[24] It must be mentioned that none of the members of the Kassier Committee were involved in the drafting of the new Act. Also important is that the Committee recommended that "sunset clauses" be established for the deregulation process to enable the various industries the make the necessary arrangements/adaptations for a free market dispensation.

[25] The assertion that the problems many producers experienced were due to deregulation may be one view, but another is that they were caused by regulation in the first place. The absence of "sunset" arrangements was unfortunate.

4.2.2.2 Agricultural input prices

As with product prices agriculture, with its large number of individual producers, is basically a price taker. Some leverage/bargaining power can be achieved by collective action. This is in contrast with a limited number (in some cases a monopoly such as glass) of input suppliers. Fuel prices and minimum farm worker wages are presently set by government.

From a logistics point of view, most inputs are non-perishable and can be purchased any time and stored on the farm. Cash flow (due often to insufficient discounts for early orders) and storage risk aspects result in producers placing their orders as close as possible to the time when they are needed, thus creating bottlenecks. For direct deliveries to farms, prices quoted usually include transport. This will differ from case to case. Purchases from local input suppliers are either delivered by the supplier or transported by the producer and the price/cost will again differ.

4.2.2.3 Logistics, costs and pricing

Agriculture is characterised by the so-called “cost:price squeeze”. This phenomenon is brought about not only by the relative shifts in the supply and demand regimes for outputs and inputs, but also, importantly, by the respective price elasticities.

Agricultural producers are generally quite responsive to increases in output prices giving rise to relatively elastic supply regimes, i.e., the percentage change in supply is higher than the percentage change in price. However, the demand for most agricultural products is relatively price inelastic. The result is a downward pull on product prices.

On the other hand, in the case of farm inputs, the supply is normally relatively price inelastic, due to the existence of cartels, for example. Due to the elastic supply for products referred to above, the demand for concomitant inputs is thus relatively elastic with an upward push on input prices, resulting in the “cost:price squeeze”.

In this context, logistics can be considered an input to the industry. Any attempt at improving operations efficiency and reducing the cost of logistics to the industry has the potential to relieve the cost:price squeeze on the industry. Conversely, a lack of a strategy focused on improving logistics efficiency is only exacerbating the problem.

5 Flow Scenarios

5.1 Logistics cost and agriculture

South Africa's agricultural production was approximately 54 million tons in 2004. It is expected that this production will grow to between 60 and 70 million tons by 2014 (Figure 5.1).

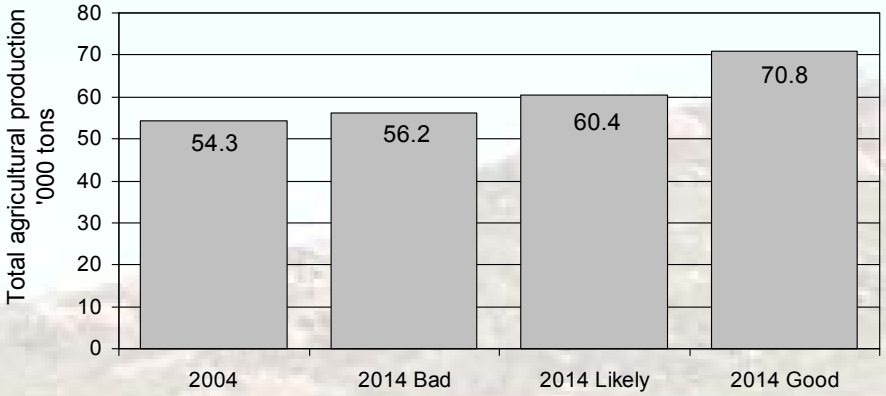


Figure 5.1 Weight of agricultural production in South Africa[26]

This expected growth of between 11% and 30% could be challenging for South Africa's logistics infrastructure and further clarification is therefore required. It is important for the agricultural community to ensure that the means exist to manage the movement and storage of this production efficiently and effectively in the future, whilst at the same time continuously reducing the cost of this process. This is necessary both for local growth and the international competitiveness of South Africa's export economy. The *relative position* of primary agriculture is depicted below.

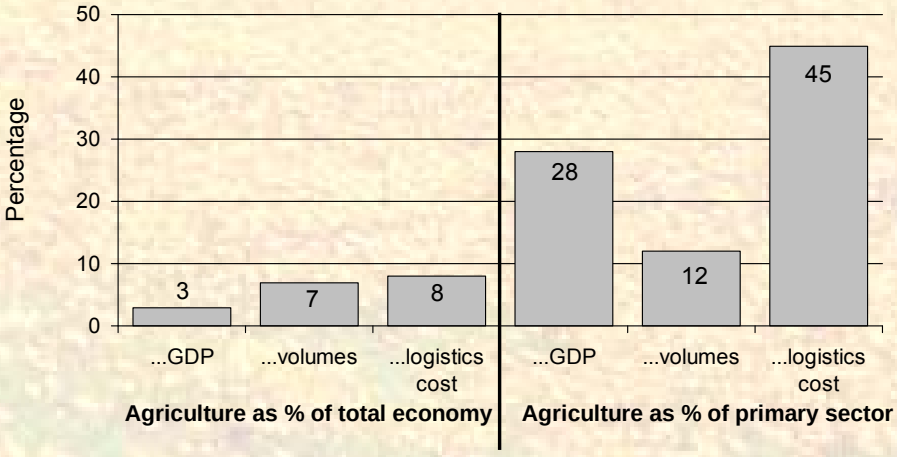


Figure 5.2 The relative position of agriculture

[26] All 2004 production figures in this Chapter were obtained from the Abstract of Agricultural Statistics (Directorate: Agricultural Statistics, National Department of Agriculture). The forecasts are based on inputs from industry and experts from Agri-Africa (see section on scenarios in this Chapter)

Figure 5.2 above provides insight into agriculture's relative position in the primary sector (i.e. agriculture and mining) of the South African economy. Agriculture contributes 28% to the rand value of primary GDP, 12% to the volumes transported in the primary sector, and 45% to the logistics cost[27] accrued in the primary sector. Compared to its volume and value contribution, its logistics cost contribution is relatively much higher and seems out of kilter. In terms of the total logistics costs (right hand side of graph), primary agriculture logistics cost is almost 8%, which equates to 1.2% of the South African GDP in 2004. This is however caused by specific factors listed below. This is caused by the following factors:

- Agricultural produce is mostly transported by road and has collection, distribution and long-haul legs. The unit cost of transporting mineral ores by rail over long distances is extremely low. For example it is eight times more expensive per ton-kilometre to transport fruit with a large refrigerated truck on the long-haul leg of the journey than to transport iron ore by rail. There are also no significant collection and distribution transport costs involved in bulk mineral ore transportation. As a comparison, the short distance collection/distribution leg of the journey is 38 times more expensive per ton-kilometre than the long haul rail journey of iron ore.

- Agricultural products are mostly stored in purpose-built storage facilities. These facilities are often equipped with expensive specialised equipment e.g. to regulate temperature, to control pests and to ensure that facilities conform to strict hygienic standards. The duration of storage is often also much longer due to the natural imbalance in production and supply of agricultural products. This is in stark contrast to minerals that are mostly stored in the open, on low value land. The storage duration of ore and other low-value minerals is also very short, often only hours before the next train or ship leaves. In most cases ores can be crudely handled by high volume handling equipment, as there is no danger of losses due to damage.

- The risk of transporting and storing high value perishable agricultural products is much higher than is the case with most unprocessed minerals, sand and stone. Per ton cost of management and administration, as well as inventory holding, should therefore be much higher for agricultural products than for minerals.

These are all understandable and logical reasons, but it also presents a challenge as a major indicator of how logistics costs could be reduced: **"What can be done to provide innovative logistics solutions to the agricultural industry (both from the industry and service provider perspective), and what can be learnt from the models implemented on the dedicated mining export lines?**

Figure 5.3 depicts logistics cost components and confirms the above analysis:

[27] All logistics cost data are based on the Logistics Cost Model developed by the Department of Logistics, University of Stellenbosch (used as basis for the Annual State of Logistics Survey, published by the CSIR and USB-ED.)

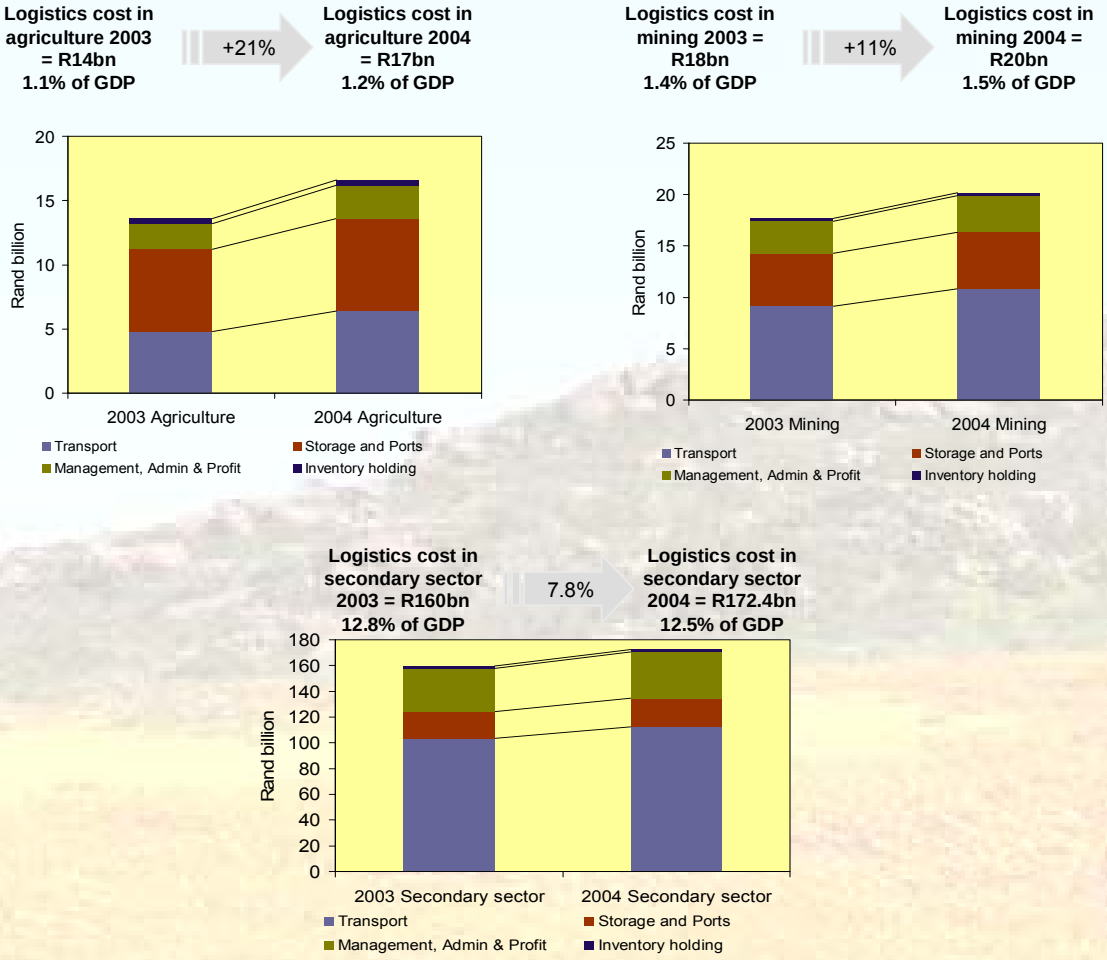


Figure 5.3 Logistics cost components (in nominal terms)

Storage costs are especially high:

- Agricultural products have a longer duration of storage than most other types of products. The reason for this is that local agricultural production is highly seasonal in nature, whereas demand is fairly constant during the year. As a result there are natural (inherent) constraints to matching production (supply) to demand, which is not the case with manufactured goods and minerals.

- Storage unit cost of agricultural products is high compared to other types of products. Many agricultural products require cold storage or special handling facilities. Even grain products, which are more closely related to low value mineral ores than to manufactured goods, have to be stored in relatively expensive structures.

In the most likely scenario, agricultural logistics costs are expected to rise by R2.722 billion (in real terms) by 2014.

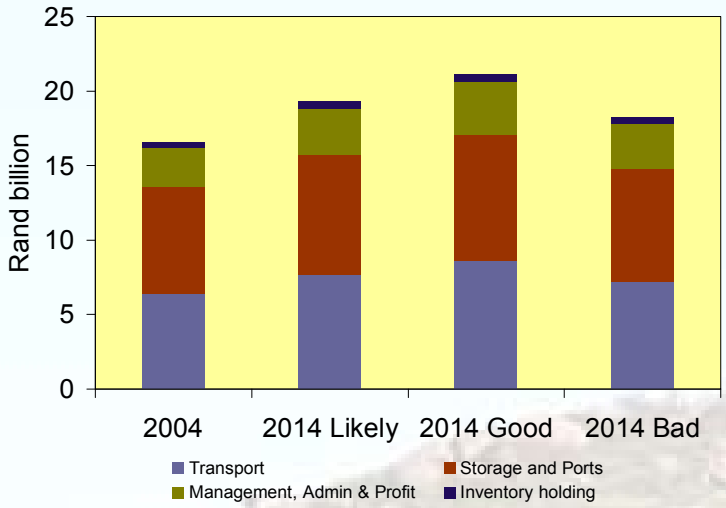


Figure 5.4 Future agriculture logistics costs (in real terms)

It is true that storage costs are currently higher than transport costs (R0.8 billion higher), but *much of the growth in costs is expected from transport* (fig. 5.5). The most likely increase in primary agriculture throughput between 2004 and 2014 of 11% will result in an increase of 16% in logistics cost. The increase in transport cost will be about 1.8 times higher than that of storage. From this it can be deduced that transport cost is much more sensitive to an increase in production than storage cost. The increase in management and administration costs can be attributed to the fact that more tonnages are transported, it is however from a relatively low base, compared to transport cost.

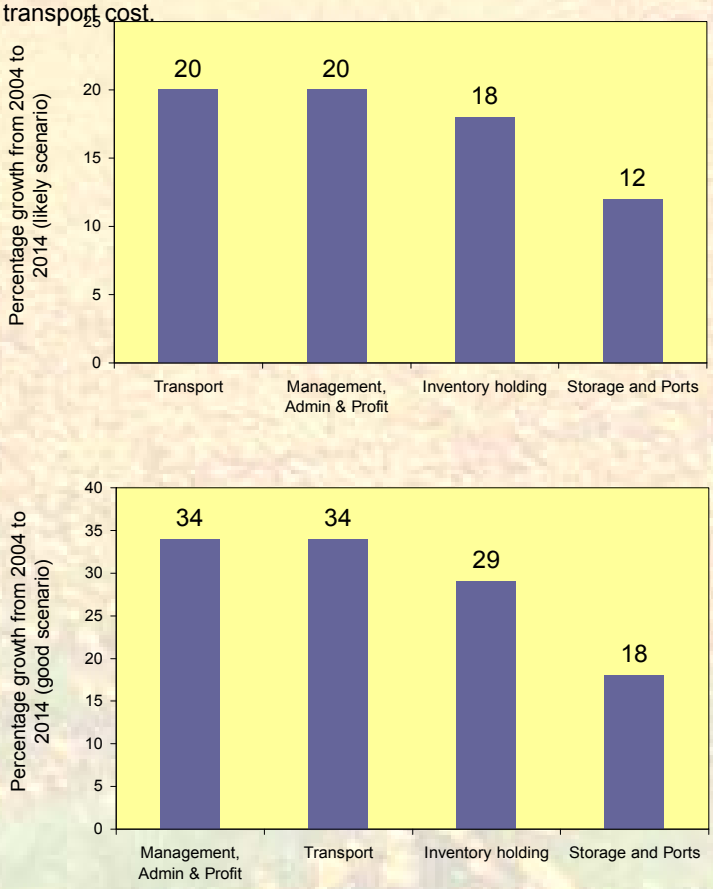


Figure 5.5 Growth (from 2004 to 2014) in agriculture logistics costs for the likely and good scenarios

The logistics cost model assumes that there will not be a significant shift between transport modes for agricultural products up to 2014. A concerted effort to obtain the optimal balance between road and rail traffic should reduce the increase in transport costs. This does not necessarily imply that storage and inventory holding costs will decrease, e.g. rail transit times might be longer, leading to an increase in inventory holding costs. Similarly, a deeper understanding of the management & administration costs of the different logistics solutions is required to understand the impact of mode switches on this cost component. Any efforts should therefore focus on reducing the cost of the whole chain, not just isolated elements.

This represents another challenge, i.e. **"What can be done to minimise the cost of agricultural produce logistics"?** This question can be analysed further by considering the *flow* of agricultural production in South Africa.

5.2 National supply and demand of agricultural commodities

Agricultural flows were modelled by firstly developing a supply and demand model for agriculture, and then developing flows via a flow model (see Appendix F).

The final supply figure used for each commodity is depicted in Table 5.1 [28]. The top 8 commodities contribute 80% of total supply.

COMMODITY	'000 TONS	% OF TOTAL AGRICULTURE
Dairy	19,092	35%
Maize	10,333	19%
Vegetables	3,649	7%
Wheat	2,953	5%
Sugar cane	2,233	4%
Citrus	1,722	3%
Viticulture	1,684	3%
Deciduous fruit	1,542	3%
Poultry products	1,258	2%
Livestock (slaughtered)	1,013	2%
Sunflower seed	694	1%
Subtropical fruit	599	1%
Nursery products	476	1%
Grain sorghum	460	1%
Cotton	242	0%
Soya beans	238	0%
Barley	236	0%
Nuts (groundnuts)	145	0%
Beans	135	0%
Other	5,548	10%
	54,254	100%

[28] In the model utilised, supply equals demand *per commodity*, because investment / inventories is also taken into account

Table 5.1 Supply figures per agricultural commodity (2004)

The regional and provincial split of supply and demand tonnages is depicted in Table 5.2 and Table 5.3 respectively. Based on available statistics, Kwazulu Natal is the province with the largest supply and demand of agriculture (38% and 27% respectively). (Interestingly, the Gauteng-Durban corridor is the corridor that carries the most tonnage in South Africa – all cargo, not just agriculture).

REGION NUMBER	REGION NAME	000 TONS SUPPLY	% OF TOTAL SUPPLY	000 TONS DEMAND	% OF TOTAL DEMAND
16	Thukela, Port Natal, Southern Natal, East Griqualand, Natal Midlands (KZN)	9,485	17%	11,745	22%
3	Gauteng	1,833	3%	10,737	20%
5	Cape Metropole & Winelands	3,473	6%	6,614	12%
7	Free State	7,289	13%	4,841	9%
15	Zululand (KZN)	10,904	20%	2,706	5%
2	Sub regions 2,4,5 EL (Eastern Cape)	1,130	2%	2,305	4%
1	Sub regions 1&3 PE (Eastern Cape)	963	2%	2,284	4%
14	Northern, Lowveld, Central, Southern (Limpopo)	1,501	3%	2,190	4%
8	Eastern, Far Eastern, Central North West	2,699	5%	1,822	3%
19	Eastveld (Mpumalanga)	2,035	4%	1,684	3%
4	West Coast Saldanha (Western Cape)	1,473	3%	1,465	3%
6	Southern Cape (WC)	2,840	5%	1,214	2%
17	Lowveld (Mpumalanga)	3,274	6%	1,150	2%
10	Bo-Karoo, Diamond Fields, Kalahari (Northern Cape)	674	1%	867	2%
18	Highveld (Mpumalanga)	1,480	3%	848	2%
9	Western & Southern North West	2,050	4%	817	2%
13	Bushveld & Western (Limpopo)	467	1%	440	1%
12	West, Lower Orange (Northern Cape)	635	1%	340	1%
11	Namaqualand North (Northern Cape)	49	0%	184	0%
		54,254	100%	54,254	100%

Table 5.2 Agricultural supply and demand figures per region 2004 (sorted according to % of total demand)

PROVINCE	000 TONS SUPPLY	% OF TOTAL SUPPLY	000 TONS DEMAND	% OF TOTAL DEMAND
KwaZulu Natal	20,389	38%	14,452	27%
Gauteng	1,833	3%	10,737	20%
Western Cape	7,785	14%	9,293	17%
Free State	7,289	13%	4,841	9%
Eastern Cape	2,092	4%	4,589	8%
Mpumalanga	6,789	13%	3,682	7%
North West	4,750	9%	2,640	5%
Limpopo	1,968	4%	2,630	5%
Northern Cape	1,358	3%	1,391	3%
	54,254	100%	54,254	100%

Table 5.3 Agricultural supply and demand figures per province 2004 (sorted according to % of total demand)

5.3 Forecasting supply of agricultural commodities

In order to determine agriculture's future demands on the national logistics system, supply of agricultural commodities had to be forecasted to 2014.

5.3.1 Background to scenario development

"A scenario is an internally consistent view of what the future might turn out to be - not a forecast, but one possible future." Michael Porter

Forecasting is designed to help decision making and planning in the present. Forecasting by nature is rooted in uncertainty. In order to arrive at the best possible answer, a combination of forecasting techniques was used in this project.

The consensus method involves seeking expert opinions from more than one person. Each is an expert in his own discipline, and it is through the synthesis of these opinions that a final forecast is obtained. This was attained in the project by the involvement of experts from various industries and disciplines within the agricultural sector during workshop sessions. This included developing a narrative of the future, which could later be translated into an actual figure. The results of these sessions were compared to historical trends (trend extrapolation) and debated by agricultural experts to ensure that all known current and future events are discounted in the three forecasting scenarios.

It is important to note that *generic* bad, likely and good scenarios were *not* defined. This process was followed for each industry individually to increase accuracy of forecasting, and to make the recommendations based on the forecasts more realistic. The reality is that where one sector succeeds another may fail – i.e. the probability of all being successful is very low and vice versa. This makes it more necessary to tackle the problem of forecasting logistics needs industry by industry via the proposed 'industry desk' solution (see Chapter 6 for more detail).

A word of caution: Many futurists have expressed the idea that the way the future is contemplated is an expression of the desire to create that future. Physicist Dennis Gabor claimed that the future is invented, not predicted[29]. Agriculture's, and other stakeholders', current and medium term actions will therefore influence the future that is created.

[29] Source: StatPac Inc, http://www.statpac.com

5.3.2 Forecast percentages

Based on the approach described above, the following forecast percentages were used (for detail see Appendix F3, F4).

	Scenario	Production	Exports	Imports
Wheat	Bad	1%	2%	**3%**
	Likely	1.5%	2.7%	**1.5%**
	Good	2.25%	2%	**2%**
Maize	Bad	0.15%	1.74%	**1%**
	Likely	1.9%	-4.23%	**1%**
	Good	3%	0.61%	**1.5%**
Sunflower (oilseeds)	Bad	1%	1.15%	**1%**
	Likely	1.5%	2.92%	**1%**
	Good	2%	5.43%	**1%**
Soya beans	Bad	1.58%	1.1%	**1.74%**
	Likely	2.5%	0.17%	**4.74%**
	Good	4.9%	1.29%	**5.27%**
Citrus	Bad	1.04%	1%	**2%**
	Likely	2.2%	1.5%	**2%**
	Good	3.04%	2%	**2%**
Deciduous	Bad	0.87%	0.5%	**3%**
	Likely	1.81%	1%	**2%**
	Good	2.83%	1.5%	**2%**
Subtropical	Bad	0.15%	1.5%	**2%**
	Likely	1.25%	2.5%	**2%**
	Good	2.47%	4%	**2%**
Vegetables	Bad	1.8%	1.95%	**1.5%**
	Likely	2%	2.19%	**3%**
	Good	2.5%	2.8%	**3%**
Viticulture	Bad	2.27%	5%	**2%**
	Likely	4.15%	10%	**2%**
	Good	6.74%	15%	**2%**
Poultry products	Bad	1.92%	1.5%	**3.5%**
	Likely	2.8%	2%	**3%**
	Good	4.12%	2.5%	**2.5%**
Dairy	Bad	1.5%	0%	**2%**
	Likely	2%	0%	**3%**
	Good	3%	0%	**2%**
Livestock	Bad	1.75%	0.63%	**0.67%**
	Likely	2.15%	1.91%	**2.19%**
	Good	2.5%	3.49%	**2.81%**
Sugar cane	Bad	-1.5%	-	**-**
	Likely	-1%	-	**-**
	Good	2%	-	**-**
Flowers	Bad	0%	5%	**0%**
	Likely	15%	5%	**10%**
	Good	25%	5%	**25%**

Table 5.4 Forecast percentages

As mentioned previously, this means that South Africa's agricultural production of 54 million tons in 2004 is expected to grow to between 60 and 70 million tons by 2014 (or between 11% and 30%). In order to understand the impact on logistics infrastructure, this growth has to be understood in terms of flows (for a description of the flow modelling approach, see Appendix F).

5.4 Flow of agricultural commodities – 2004 and 2014

As expected, the majority of agricultural flows (56%) in the South African economy are rural flows (Fig. 5.6), yet, for the industry, corridor flows are also substantial (37% of total agricultural flows).[30]

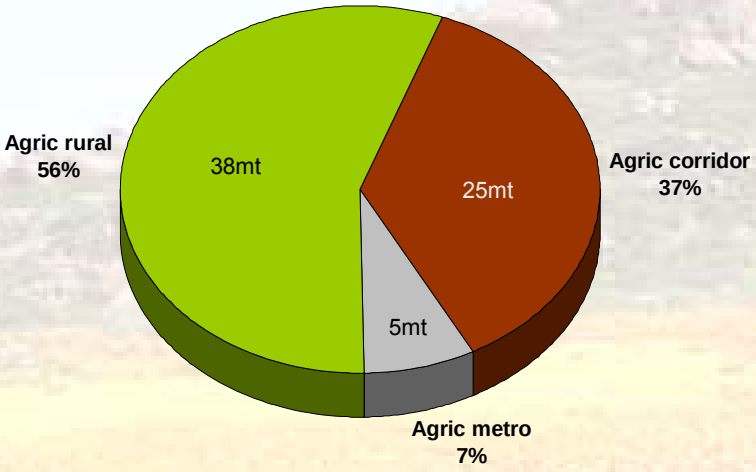


Figure 5.6 Composition of agricultural flows[31]

In national context, the flow of agricultural products in rural areas contributes only 3% of the total flows of all commodities in South Africa, but constitutes 12% of all rural tons transported. At the same time, the flow of agricultural products on corridors contributes only 2% of the total flows of all commodities in South Africa, but constitutes 11% of all tons transported on corridors.

[30] Key input commodities (fuel, fertiliser and animal feed) are included in the flow analysis, as they form an integral part of agricultural flows

[31] The source of all flow data in this Chapter is flow models developed by the CSIR and USB-ED.

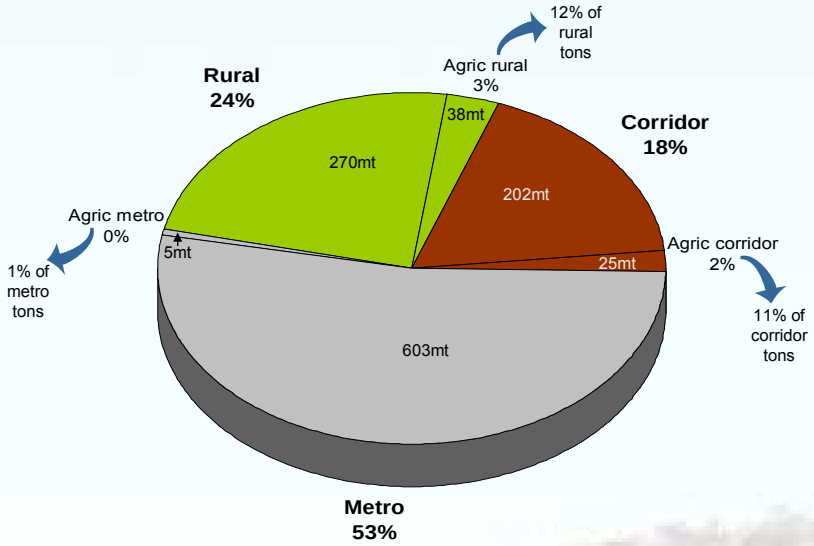


Figure 5.7 Agriculture within the national context[32]

This can be analysed further by looking at agriculture's contribution on corridors and in rural areas (see table below). The corridor data is based on results from the annual State of Logistics Survey[33]. Road data is developed from the South African National Roads Agency's (SANRAL) Comprehensive Traffic Observation (CTO) Yearbooks, while actual rail data is used to calculate total traffic[34].

In terms of total agricultural flows, the Gauteng-Durban and the coastal corridor (Cape Town-Port Elizabeth-East London-Durban) make up 24% of total flows. Rural traffic within Kwazulu Natal, Free State and Mpumalanga (i.e. excluding the metropolitan areas) constitute 45% of total flows (column 8 in Table 5.4). In terms of agriculture's contribution to flows on individual corridors, agriculture on the coastal corridor (Cape Town-Port Elizabeth-East London-Durban) account for 40% of total flows, and on the corridor Gauteng-Port Elizabeth subregions for 29%. The contribution to individual flows were however weighted with the percentage that the specific corridor or rural area contributes to total corridor and rural flows in South Africa. This weighting indicated that rural Kwazulu Natal, Free State and Mpumalanga are the key rural areas for agriculture, while the corridors Gauteng-Durban, the coastal corridor (Cape Town-Port Elizabeth-East London-Durban) and Cape Town-Gauteng are the key corridors (this constitutes 74% of 2004 agricultural flows and 71% of 2014 likely flows – these 6 areas remain the top 6 over the forecast period based on current forecasts). These 3 rural areas and 3 corridors are therefore deemed to be the key focus areas for agriculture from a macro-economic perspective. Interestingly (apart from the export coal corridor), Gauteng-Durban and Gauteng-Cape Town are the corridors that carry the most tons in South Africa, while Kwazulu Natal and Free State are the provinces carrying the most rural traffic. Agriculture's recommended focus areas therefore align well with the recommended national focus areas, which bodes well for addressing supply chain issues.

[32] Corridor figures exclude the dedicated rail coal and iron ore export lines

[33] Corridor model developed by USB-ED for the Annual State of Logistics Survey

[34] Due to a lack of granularity in available data, the modelling exercise did not indicate agricultural traffic on the corridors Cape Town-Springbok, Richardsbay-Durban, Gauteng-Polokwane and Richardsbay-Gauteng, and also not in rural Gauteng.

1	2	3	4	5	6	7	8	9	10	11
Corridor / Rural traffic	Corridor / Rural detail	TOTAL TON ROAD & RAIL 2004 '000 TONS	AGRICULTURE '000 TONS				AGRIC 2004 AS % OF TOTAL TON	TOTAL TON AS % OF SA CORRIDOR & RURAL TON (535MT)	AGRIC 2004 FLOWS AS % OF TOTAL AGRICULTURE FLOWS	WEIGHTED % [35]
			2004 [36]	2014 BAD	2014 LIKELY	2014 GOOD				
Rural	Rural Kwazulu Natal	63,150	15,499	14,403	15,082	19,261	25%	12%	25%	14%
Rural	Rural Free State	49,308	6,318	6,503	7,194	8,272	13%	9%	10%	6%
Rural	Rural Mpumalanga	44,385	5,792	5,742	6,337	7,460	13%	8%	9%	5%
Rural	Rural North West	48,111	2,681	2,830	3,275	3,621	6%	9%	4%	2%
Rural	Rural Limpopo	26,048	2,648	2,744	2,974	3,429	10%	5%	4%	2%
Rural	Rural Western Cape	26,860	2,455	2,854	3,088	3,555	9%	5%	4%	2%
Rural	Rural Northern Cape	1,715	1,533	1,665	2,042	1,802	89%	0%	2%	1%
Rural	Rural Eastern Cape	15,949	198	219	244	310	1%	3%	0%	0%
Corridor	Gauteng-Durban	46,331	7,694	7,883	7,932	9,566	17%	9%	12%	7%
Corridor	CT-PE-EL-Durban	17,323	6,981	6,771	6,911	8,705	40%	3%	11%	6%
Corridor	Cape Town-Gauteng	34,801	3,295	3,595	4,111	4,571	9%	7%	5%	3%
Corridor	Gauteng-Port Elizabeth subregions	7,050	2,046	2,296	2,536	2,782	29%	1%	3%	2%
Corridor	Gauteng-Lobatse	5,914	1,319	1,430	1,529	1,720	22%	1%	2%	1%
Corridor	Gauteng-Beitbridge	7,247	954	1,092	1,170	1,276	13%	1%	2%	1%
Corridor	Gauteng-Nelspruit-Maputo	20,130	834	825	846	1,029	4%	4%	1%	1%
Corridor	Gauteng-East London	3,521	582	641	709	769	17%	1%	1%	1%
Corridor	Gauteng-Swaziland	6,437	554	603	692	751	9%	1%	1%	0%
Corridor	Gauteng-Upington-Namibia	2,996	324	377	405	454	11%	1%	1%	0%
Corridor	Gauteng-Witbank	12,527	288	321	361	394	2%	2%	0%	0%

Table 5.4 Agriculture's contribution on corridors and in rural areas (sorted according to weighted percentage)

[35] Formula to calculate weighted % = (Column10 + (Column8*Column9))/2

[36] Corridor tons refer to tons in both directions. Note that total tons transported are more than total tons produced, as some traffic is transported over more than one corridor / in more than one rural area.

The detail of the commodities transported on the 3 key corridors and the 3 key rural areas are provided in the table below (all commodities where more than 100 000 tons are transported are listed, the rest are aggregated under other).

CORRIDOR / RURAL (Bi-directional)	COMMODITY	'000 TONS			
		2004	2014 Bad	2014 Likely	2014 Good
Gauteng-Durban	Dairy	3,846	3,307	3,478	4,688
	Maize	1,673	1,816	1,802	2,109
	Wheat	761	1,111	954	914
	Sugar cane	524	608	639	704
	Citrus	336	372	392	412
	Sunflower seeds	112	125	129	136
	Livestock	102	124	124	130
	Other	69	80	77	473
Gauteng-Durban Total		**7,694**	**7,883**	**7,932**	**9,566**
CT-PE-EL-Durban	Dairy	4,738	4,074	4,285	5,776
	Vegetables	503	602	614	645
	Wheat	291	423	373	344
	Viticulture	257	308	345	412
	Maize	327	393	236	352
	Deciduous fruit	243	272	306	347
	Poultry	226	273	297	337
	Citrus	194	214	216	221
	Other	201	213	239	270
CT-PE-EL-Durban Total		**6,981**	**6,772**	**6,911**	**8,705**
Cape Town-Gauteng	Maize	1,314	1,338	1,635	1,779
	Viticulture	499	592	654	774
	Sugar cane	390	453	476	525
	Vegetables	250	299	305	320
	Deciduous fruit	224	248	277	312
	Petroleum	181	174	200	216
	Citrus	124	139	193	229
	Other	313	352	371	417
Cape Town-Gauteng Total		**3,295**	**3,595**	**4,111**	**4,571**
Rural Kwazulu Natal	Dairy	11,901	10,232	10,763	14,507
	Wheat	799	1,043	958	982
	Animal feeds	648	760	806	906
	Maize	601	633	718	791
	Fertilizer	300	345	331	429
	Petroleum	298	286	329	355
	Citrus	221	246	277	302
	Poultry	177	217	233	263
	Livestock	144	174	178	185
	Subtropical fruit	125	130	144	163
	Other	284	338	343	377
Rural Kwazulu Natal Total		**15,499**	**14,403**	**15,082**	**19,261**
Rural Free State	Maize	1,771	1,770	2,221	2,422
	Dairy	1,614	1,388	1,460	1,968
	Vegetables	908	1,085	1,107	1,162
	Sugar cane	530	615	646	713

CORRIDOR / RURAL (Bi-directional)	COMMODITY	'000 TONS			
		2004	2014 Bad	2014 Likely	2014 Good
	Fertilizer	355	409	393	508
	Petroleum	355	340	392	423
	Poultry	181	219	239	271
	Animal feeds	158	186	197	221
	Grain sorghum	106	122	135	137
	Sunflower seeds	105	116	122	128
	Livestock	92	109	114	118
	Other	143	143	169	201
Rural Free State Total		**6,318**	**6,503**	**7,194**	**8,272**
Rural Mpumalanga	Dairy	2,172	1,868	1,965	2,648
	Maize	1,441	1,466	1,791	1,951
	Citrus	628	695	752	802
	Petroleum	341	327	376	406
	Fertilizer	258	297	285	368
	Animal feeds	195	228	242	272
	Sugar cane	176	205	215	237
	Subtropical fruit	132	136	151	171
	Wheat	101	110	117	126
	Livestock	81	96	100	104
	Grain sorghum	80	91	102	104
	Poultry	67	82	89	101
	Other	119	141	151	169
Rural Mpumalanga Total		**5,792**	**5,742**	**6,337**	**7,460**

Table 5.5 Commodities transported on the 3 key corridors and the 3 key rural areas

The table below totals the commodities transported on the 3 key corridors and the 3 key rural areas:

COMMODITY	'000 TONS			
	2004	2014 Bad	2014 Likely	2014 Good
Dairy	24,272	20,867	21,951	29,587
Maize	7,127	7,418	8,403	9,405
Wheat	1,953	2,687	2,402	2,366
Vegetables	1,661	1,986	2,025	2,127
Sugar cane	1,621	1,881	1,976	2,179
Citrus	1,503	1,667	1,830	1,966
Other	1,128	1,267	1,351	1,908
Petroleum	1,175	1,127	1,298	1,399
Animal feeds	1,002	1,174	1,245	1,399
Fertilizer	913	1,052	1,009	1,306
Viticulture	756	899	999	1,186
Poultry	651	791	858	973
Deciduous fruit	468	520	583	659
Livestock	419	503	516	536
Subtropical fruit	257	265	295	333
Sunflower seeds	217	241	251	264
Grain sorghum	186	213	237	240
Total	**45,308**	**44,558**	**47,229**	**57,834**

Table 5.6 Summary of commodities transported on the 3 key corridors and the 3 key rural areas

Table 5.6 above shows that 80% of the total tonnage in the 2014 likely scenario will be represented by dairy, maize, wheat, vegetables, sugar cane and citrus.

The commodity focus changes slightly when looking at corridor and rural traffic separately (see table below). For corridor traffic dairy, maize, wheat, sugar cane and viticulture represent 80% of the tonnages. For rural traffic, the key commodities are dairy and maize (66% of total).

	COMMODITY	'000 TONS			
		2004	2014 Bad	2014 Likely	2014 Good
Corridor	Dairy	8,584	7,380	7,763	10,464
	Maize	3,314	3,548	3,673	4,240
	Wheat	1,052	1,534	1,327	1,258
	Sugar cane	914	1,061	1,115	1,229
	Viticulture	756	899	999	1,186
	Vegetables	753	901	919	965
	Citrus	654	726	800	863
	Other	583	645	687	1,160
	Deciduous fruit	468	520	583	659
	Poultry	226	273	297	337
	Petroleum	181	174	200	216
	Sunflower seeds	112	125	129	136
	Livestock	102	124	124	130
Corridor Total		**17,698**	**17,910**	**18,617**	**22,842**
Rural	Dairy	15,688	13,487	14,188	19,123
	Maize	3,812	3,870	4,730	5,165
	Animal feeds	1,002	1,174	1,245	1,399
	Vegetables	908	1,085	1,107	1,162
	Petroleum	994	953	1,097	1,184
	Wheat	901	1,154	1,075	1,109
	Citrus	849	941	1,029	1,104
	Fertilizer	913	1,052	1,009	1,306
	Sugar cane	707	820	862	950
	Other	546	622	664	748
	Poultry	426	518	561	635
	Livestock	317	379	392	406
	Subtropical fruit	257	265	295	333
	Grain sorghum	186	213	237	240
	Sunflower seeds	105	116	122	128
Rural Total		**27,610**	**26,648**	**28,612**	**34,992**

Table 5.7 Commodities summarised within 3 key rural areas and on 3 key corridors

5.5 Implications

The corridor challenges experienced in South Africa formed a major part of the research to develop the National Freight Logistics Strategy (NFLS). In most industries, it is clear that a major shift from rail to road traffic occurred over the past decade. As rail was unable to compete for the market, rail's cost per ton grew, the utility under-invested, service levels deteriorated and a downward spiral ensued, creating a performance gap.

Based on the current knowledge of corridor capacity (as researched for the NFLS), there is sufficient installed[37] corridor capacity in South Africa. Maintained and operational capacity must however be addressed. This will only be achieved if an optimal balance between the surface freight transport modes (road and rail) is achieved – an optimal balance enabled via multi-modal solutions (refer to the multi-modal section in the report). This optimal balance will enable both modes to focus on its core competence. It will also enable rail to increase its density, increase return and thereby enabling investment in infrastructure. Public funds spent on the maintenance of national roads can be diverted to the maintenance and upgrading of rural logistics infrastructure. The first priority for these solutions must be the Gauteng-Durban and the Gauteng-Cape Town corridors. Further observations on specific corridors – key corridors both for South Africa and agriculture:

- Gauteng-Durban corridor
  - » Rail's operational capacity is challenged by a lack of effective fleet, trained people & market. The theoretically installed capacity does however exist to address the large demand, provided that operational & market problems could be solved.
  - » The general nature of the cargo suggests that competition in the market would be possible for all modes.
  - » The topography challenge indicates that either new road or rail infrastructure or a switch of export growth would be required by 2020. Port capacity suggests that Durban's port could by then only be expected to handle the port's immediate hinterland.
  - » This means the lowest investment cost option seems to be a switch of corridor exports and imports and the closing of the rail performance gap.

- Gauteng-Cape Town corridor
  - » The nature of the commodities on this corridor (significant FMCG component) means that a significant portion could be containerised by 2020 and could be ready for competition in the market for all modes as soon as an intermodal solution is available (with open access competition for this intermodal traffic).
  - » Some expansions in the port could be required between now and 2020.
  - » With well thought out investment the harbour could become a fruit export terminal for the entire country.

---

[37] Capacity definitions:

- ◊ Installed capacity: Installed capacity is the theoretical line (rail) / lane (road) capacity. It can only be increased by adding lines or lanes or building new highways or new rail permanent ways.
- ◊ Maintained capacity: Combination of wheel/rail or wheel/pavement interaction. It includes axle load issues, signalling or road density issues, safety and quality of line/lane infrastructure. It can be increased by investing in accelerated maintenance.
- ◊ Operational Capacity: Availability and quality of rolling stock, labour and asset productivity. It can be increased by increasing fleet sizes and quality; and training more people.

- » The rail performance gap will have to be closed somewhat in any case (as the cheapest infrastructure solution, given the current low utilisation of rail installed capacity), and to avoid the road corridor filling up completely.
- » An intermodal solution with possible private investment is desperately needed to make rail workable and bring costs down.

From a macro-economic point of view, the biggest impact on the agricultural industry will be made by focusing on rural Kwazulu Natal, Free State and Mpumalanga - the key rural areas for agriculture, and on Gauteng-Durban, the coastal corridor (Cape Town-Port Elizabeth-East London-Durban) and Cape Town-Gauteng - the key corridors for agriculture (these 6 areas remain the top 6 over the forecast period based on current forecasts). This should be balanced by a focus on the key commodities in these rural areas (dairy and maize) and the key commodities on these corridors (dairy, maize, wheat, sugar cane and viticulture). In addition, this should also be balanced with the other recommendations made in this report.

6 Towards an Investment Strategy

6.1 Approach

Various views on the status of agro-logistics have been presented in sections 2 to 5. Each discussion was concluded with a summary of some implications for investment decisions.

The various views and implications are now integrated into a recommendation framework for future investment in efficient logistics for agriculture, with a brief explanation of some of the key aspects (section 6.2). The National Department of Agriculture needs to develop a strategy that aligns with the National Freight Logistics Strategy. Based on the recommendation framework, we develop some pointers towards the development of such a strategy, and propose examples of key projects that could be considered for investment (section 6.3). An implementation framework is also outlined.

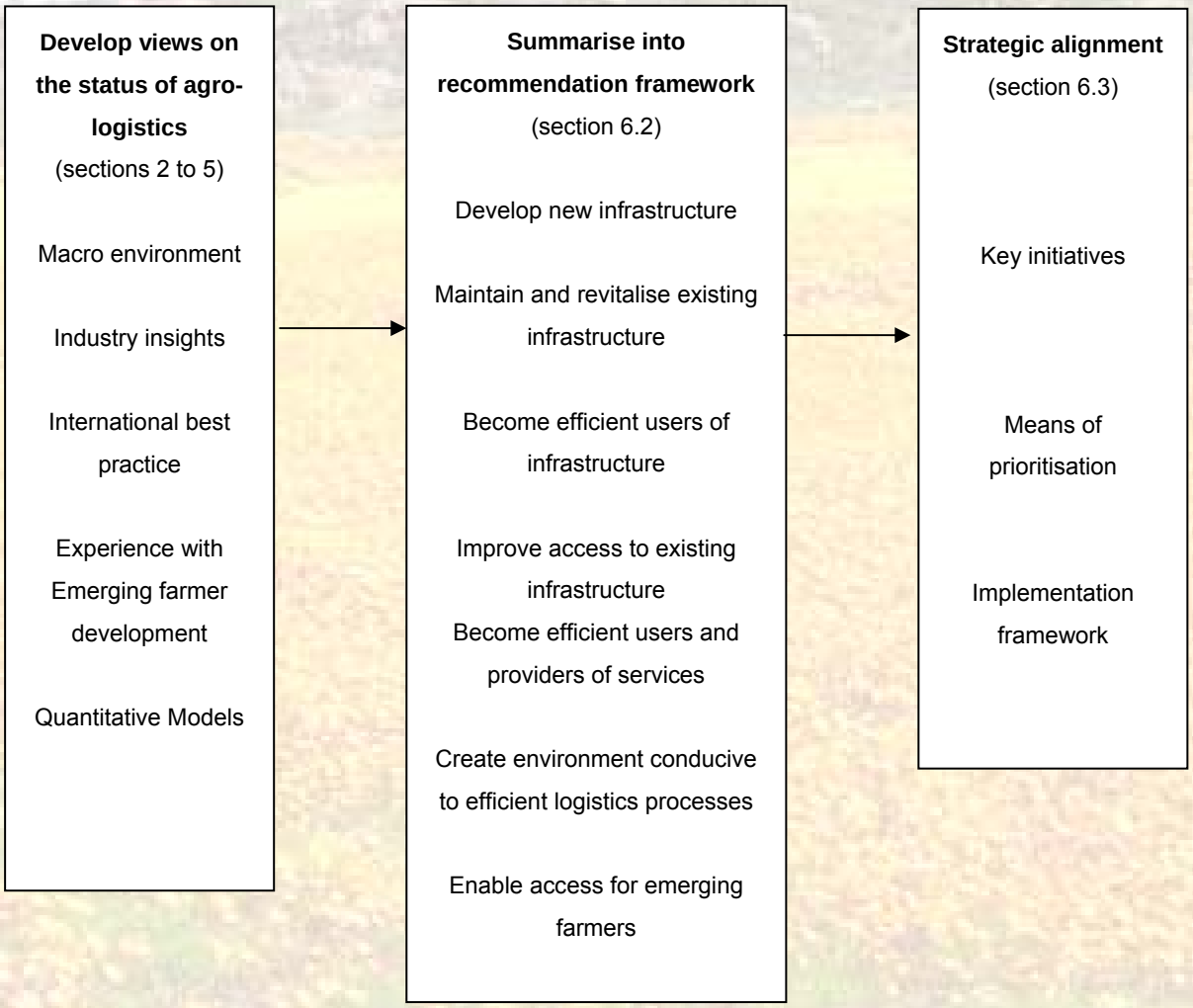


Figure 6.1 Investment recommendation framework

6.2 Investment recommendation framework

Investment recommendations need to aim at improving all aspects of interaction with and development of the existing logistics environment. For example, while investment in infrastructure is a key enabler of performance, investment to enable appropriate access and effective utilisation of infrastructure has similar potential to improve performance. In order to address issues holistically, a seven point framework has been developed, comprising development and maintenance of infrastructure, efficient usage of existing infrastructure and access to infrastructure. Focus points are discussed below.

6.2.1 Develop new infrastructure

While the development of new infrastructure is critical to the performance of the logistics system, it is constrained by budgets and funding priorities of infrastructure owners. Although the development of new infrastructure is not the only priority in improving the efficient flow of agricultural products, some investment (or alternative approaches to investment) in new infrastructure is required. In terms of the development of new infrastructure, room for industry to co-invest in infrastructure has potential to improve access. Also, a shift in focus from mode-specific to multimodal solutions would in the long run enable an infrastructure that is more flexible and in line with international shifts in logistics trends, while at the same time increasing investment efficiency. The potential for multimodal solutions is discussed below.

The potential for multimodal freight solutions in South Africa

South Africa is a spatially challenged country, with large volumes of production and consumption around Gauteng, but important secondary markets around Durban and Cape Town, as well imports and exports through Durban and Cape Town. If the long distance ***stylised triangle*** is considered, as depicted below, approximately 20% of South Africa's GDP by weight moves between these three nodes in any given year.

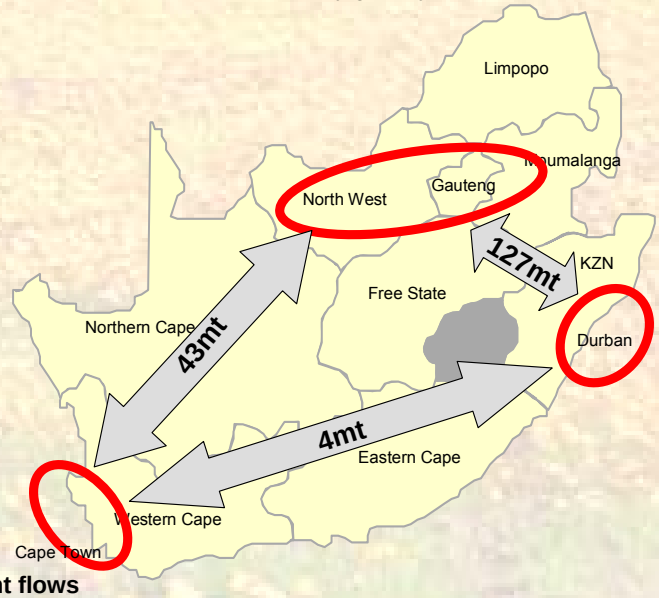


Figure 6.2 Stylised triangle of freight flows

Sixty percent or 100 million tons of this freight is bulk exports, moving on the two most effective, and cost efficient rail export machines in the world. In spite of the high density nature of the other freight (44 000 trainloads per annum, or 120 trainloads per day) more or less all of the other 75 million tons move on road. Basic rail economics indicated that even if *no railway infrastructure* existed a much cheaper investment option for these 75 million tons would be a rail solution with multimodal transfer points. The traffic, most of which was rail traffic in the past, moved to road for many reasons, but the most important are the following:

- Speed and flexibility;
- Double handling due to door-to-door requirement;
- Rail service levels (including time appointments reliability and consignment safety); and
- Rail tariffs.

The first two reasons relate directly to the absence of a multimodal solution. A train can travel between Johannesburg and Cape Town in eighteen hours and, with efficient multimodal picking and offloading, the trip can be done in less than 24 hours, door-to-door. The last two reasons are indirectly related to the absence of a multimodal solution. As more and more traffic moves from rail to road the rail load becomes less dense and the capital and maintenance cost have to be carried by less and less traffic. The direct result is two-fold: (1) less and less direct investment in infrastructure, people and maintenance; (2) combined with a related drop in service levels and higher relative tariffs. Once the downward spiral starts it usually only stops with either (1) the complete breakdown of the rail service, (2) investment in new technology or (3) new regulation.

North America opted for a combination of (1) and (2) where medium-haul distances were allowed to revert to trucking, but new multimodal technologies were developed for longer haul. This worked for the United States and Canada with their highly developed economies, “conspicuous over- consumption” culture, Lebensraum and free market beliefs. Europe opted for a combination of (2) and (3) for reasons of density, congestion and environmental concerns. In Europe, technologies are geared towards getting even medium haul on rail and great successes in this regard have been achieved over the last fifteen years. A further compounding factor for South Africa’s problems is that, even though a combination of (2) and (3) are indicated in the RDP, Gear and South Africa’s latest growth and development strategies, the railroad persistently tries to model solutions on United States type railroads – which does not fit our local requirements, given a different commercial and operating environment.

The only multimodal solution currently available in South Africa is the movement of maritime containers. This solution however does not fit our gauge efficiently (we can fit two maritime containers on a railway wagon, compared to three on an interlink truck, and we can’t double stack). There is no compelling reason to stick to maritime container technology *exclusively* as only a small percentage of the 100 million tons in question is maritime. The development of a swap-body or road-railer solution that fits our gauge can be developed easily, with minimum investment, and swap-bodies can even be developed to suit specific customers. European crane and piggy-stacker systems can handle 40 different multimodal combinations, including piggy-backing, swap-bodies, maritime containers, etc. Various technologies are available of which the “Kombiwaggon”, a well-wagon with multiple spigots, is the best example.

The choices for South Africa's future are simple in this regard. We will probably have to invest more than ten billion rand in the N1, for example, over the medium term and double as much over the long term. A multimodal rail solution for a fraction of the cost, releasing *investment potential* for the second economy, is definitely possible. Government could contribute through some form of inducement for and regulation in favour of the multimodal solution, Spoornet and road hauliers through cooperation to create it and freight owners by supporting the system until critical mass is reached. In this regard specifically, agriculture can contribute by load consolidation at central points designed as part of the multimodal solution.

6.2.2 Maintain and revitalise existing infrastructure

While the actual (theoretical) capacity of infrastructure is generally sufficient to carry the load on the network, the effective capacity is not necessarily adequate. This means that the way in which service providers are operating the infrastructure results in less capacity being available to clients. Investment in additional infrastructure is one means of attempting to improve actual (and in consequence effective) capacity. However, the capacity of operators to unlock value from capacity will remain a constraint in an environment with more capacity, and needs to be addressed. Also, a lag exists between the decision to invest in new infrastructure and the availability of the infrastructure to the network. In order to address these issues, innovative means of unlocking more effective infrastructure needs to be explored, such as the introduction of private operators on the network.

6.2.3 Become efficient users of logistics infrastructure

The ability of operators to efficiently utilise infrastructure is dependent on the nature of load that it is attempting to service. Service providers that have capacity constraints will tend to service loads that generate the most profit. Also, service provider operations are more efficient if they are concerned with loads that are easy to integrate with their specific service offerings. For example, bulk carriers are more effective if they are handling large loads that can be collected at a limited number of points in the network. Industry can explore a number of options in order to align the nature of their loads with the nature of service provision that is available. Key to the ability to do this is the need to explore means of reducing industry fragmentation, and of enabling collaboration between industry players. The aim in the long run is to find innovative ways of reducing the load on the logistics system, and of enabling service providers to deliver cost-effective services.

Reduce industry fragmentation

Inefficiencies in infrastructure utilisation, from a systems perspective, often result from a system trying to respond to the needs of individual users. This results in local optimums being created, which impedes the ability to optimise the system as a whole. For example, the attempt to comply to the demands of both the wine and fruit industry during peak season at the Port of Cape Town inevitably results in either party having to compromise on access to port capacity. Integration of industry demands, and planning across individual firms and even across industries, enables the system to take advantage of opportunities to optimise the system as a whole. For example, access to joint forecasts for wine and fruit industry members will enable the Port of Cape Town to schedule access to facilities with a view of minimising delays for both parties.

In order to achieve such optimisation, an industry and cross-industry rather than firm-level view needs to be taken. While such collaborative approaches to logistics are difficult, it remains a major potential contributor to the optimisation of systems efficiency. Some specific examples include:

- Facilitation of cross-industry collaboration to ensure constant demand for logistics;
- Facilitation of more certainty regarding demand forecasting to enable investment by logistics service providers (infrastructure is a long term investment, and needs to informed by proper planning and forecasting); and
- Creation of a clear and shared developmental strategy for agriculture to enable translation into future logistics demand.

The collaboration requirement

The opportunities that could be provided by the National Freight Logistics Strategy, hinge on one overarching requirement – collaboration. This talks to a critical ability for the total sector to increase intra-commodity and inter-commodity integration at the front end of the value chain, co-operation through the value chain to beneficiated products and across the country, region and world into global value networks. Without this and without the ability to effectively and timeously stop the current fragmentation, many opportunities will be lost.

Innovative management of flows

In resource-constrained environments, users of shared systems are forced to either live with the situation, or to develop innovative solutions to gain more out of the capacity-constrained infrastructure. A number of options can be explored in this regard, but from the perspective of reducing the effective load on the network, the redirection of flow on the network in a more efficient way has significant potential to improve effective capacity, and to reduce the competition for scarce resources.

6.2.4 Improve access to existing infrastructure

In a capacity-constrained environment, the agricultural industry does not have priority access to logistics service provision. In becoming efficient users of infrastructure, as outlined above, and in improving the ability of service providers to move agricultural freight, the industry has the potential to improve the priority of their freight to the industry, and therefore in gaining more access to the network. The ability to innovate, especially at industry level and across industries, is key to achieving this objective. In a competitive environment, firms do not collaborate, and government is required to create an enabling environment within which industry-level innovation can take place.

Best practice in other countries in this regard includes the establishment of joint platforms or communities of practice that are aimed at information sharing and innovation. Focus areas of such initiatives could be:

- Influencing transport and distribution policy, by developing integrated logistics chain and innovation policy;

- Enabling competitiveness in global supply chains;
- Influencing modal choices via financial incentives (such as concessions and subsidies);
- Developing multi-modal solutions; and
- Privatisation, and opening access to industry to own part of the infrastructure.

6.2.5 Become efficient users and providers of services

Logistics service providers are faced with a number of constraints when it comes to service provision, which influences the ability to deliver cost-effective services. Government investment in terms of creating an enabling environment for service providers has the potential to increase efficiency and reduce cost. The service provider environment is mostly influenced by regulations that are not owned by the Department of Agriculture, which implies that Agriculture's role in these interventions are either to demonstrate the potential impact thereof to the relevant regulators, or to assist service providers in engaging with the relevant regulators.

6.2.6 Create environment conducive to efficient logistics

Integration of government efforts

Logistics is a cross-functional capacity that enables the smooth flow of goods and services. However, government regulation focuses on parts of the chain, and does not necessarily optimise across the flow of goods in the supply chain. In addition, attempts to optimise processes typically focus on a subset of the chain, without sharing of knowledge and information across the chain. As a consequence, improvement efforts often hamper rather than enable the efficient flow of goods. Industry then has to deal with ineffective processes when trying to move (and particularly export) goods. The Department of Agriculture has in this environment a role to facilitate cross-channel process focused optimisation efforts.

6.2.7 Enable access for emerging farmers

The emerging sector requires very specific attention and interventions based on its particular position and role in the economy and the resultant needs that differ from the mainstream commercial sector.

These include:

Land reform beneficiaries

While the logistical requirements of emerging farmers that are involved in commercial farming via the land reform process will be largely absorbed into the normal agricultural systems and infrastructure, specific integrated interventions across Departmental boundaries will always be required. Special attention need to be given in the fields of sustainability and market access in order to put these farmers in a position to be able to have sufficient produce of an acceptable quality to access the mainstream marketing systems.

Former homeland areas

The main focus of interventions in the emerging sector must be in the traditional emerging sector in the former homeland areas where the emphasis should be on the addressing of basic needs and appropriate interventions. These would include:

- putting in place basic road infrastructure to facilitate the flow of inputs and products within and from these areas;
- putting in place an effective communication network in these areas- this is already developing with the increased use of cellular telephones. The necessary infrastructure should be put in place to further enable and facilitate this natural development;
- encouraging the establishment of additional infrastructure in an evolutionary way as the needs arise and improved productive systems evolve – be guided by the pace of the commercialisation of agriculture;
- utilising the existing infrastructure of the taxi industry - its stops and depots - to assist in the distribution of both inputs and outputs in the rural agriculture context;
- development of collection points that can feed into existing supply chains (e.g. similar to the wool industry receival points);and
- encouraging the co-ordination of transport between the farmers and traders in the deep rural communities.

Facilitating role

There is a need for facilitating development initiatives and spending on all fronts including logistics in the emerging agricultural sector. The fragmented approach with its attendant delays and red tape has done more harm than good. Greater co-ordination is required from government and the NGO sectors.

6.3 Strategic alignment

6.3.1 Key Initiatives

The National Freight Logistics Strategy (NFLS) is setting the scene for a number of changes in the national approach towards managing the logistics system. Strategic alignment between DoA's logistics initiatives and the key focus points of the NFLS has the potential to improve the impact of such initiatives from DoA.

The NFLS is a response to the freight system's inability to fulfil the demand for cargo movement at prices, levels of service, quality of service and at acceptable levels of reliability in a manner that supports the national developmental strategies[38]. As such, the NFLS is responding at various levels to fundamentally alter the aspects that result in this inability over time.

The following key focus points from the vision of the NFLS[38] are of relevance when DoA develops its strategy for logistics investment:

Focus point	Purpose
» A move from modal regulators towards functional regulators that regulate across consignment life cycle	**Overcome current regulatory gaps that exist when cargo changes mode**
» Ownership of infrastructure in three ways: - State infrastructure utilities - State-owned enterprises - Private sector	**Strategic and economic developmental mandate** **Commercialised public sector owners with socio-economic agenda, not pure profit focus**
» Infrastructure owners need to be sufficiently separated from operators	**To allow introduction of competition in operations in public owned and operated infrastructure**
» A space must be created for private sector involvement in ownership, funding and operation of infrastructure	**To resolve components of current decline in services to rural and regional economies, increase efficiency, ensure optimal infrastructure usage, expand the state's developmental agenda interest**
» **Management of infrastructure is to be done mainly by the state**	**To ensure level playing fields and the advancement of regional and local socio-economic imperatives**

Table 6.1 Key focus points from the NFLS

With respect to the implementation of the above strategic points, the NFLS emphasises that funding schemes must include a space for public and private funding of a debt and equity nature.
The strategy also emphasises two special elements of implementation, namely:

- First and second economy integration with development of rural freight transport systems from a freight system perspective; and
- An approach to corridor development along certain defined critical freight corridors, with the purpose of developing corridor-specific responses to inefficiencies.

The industry is challenged to contribute in many respects, including:

- Providing reliable information, intelligence and forecasts (that will improve planning);
- Developing new logistics technologies to address specific problems (that will improve efficient logistics infrastructure usage);
- Contributing towards the intermodal drive (that will enhance effective logistics infrastructure usage); and
- Creating integrated electronic technologies such as trading and flow portals (that will improve advanced planning and scheduling in the networks).

[38] National Freight Logistics Strategy, Department of Transport, 2005

In doing this, industry has the opportunity to, through a single voice, propose what government and society *should* contribute, i.e. a freight logistics system that works, is affordable and contributes to the development ideals of South Africa, which is, in turn, related to and aligned with the ideals of agriculture.

In addressing the gaps outlined earlier, and with the view of developing strategic alignment with the NFLS, the following key initiatives are proposed:

Investment focus	Impact	Key Initiatives
Develop new infrastructure	Long-term proactive positioning for international logistics shifts Increase investment efficiency by focusing on multimodal infrastructure Socio-economic upliftment	» **Create a mechanism to influence investment priorities towards agricultural-specific multimodal infrastructure** » **Undertake a pilot project to demonstrate and quantify the potential benefit of multimodal solutions** » **Promote models of co-investment by industry to infrastructure owners** » **Re-consider user-pay principles (analyse toll-road model and make usage of funds transparent)** » **Facilitate policy transparency of key stakeholders (especially government and Spoornet) – long-, medium- and short term, to facilitate planning** » **Develop model for socio-economic infrastructure investment and define role of various stakeholders**
Maintain and revitalise existing infrastructure	More efficient operations Socio-economic upliftment	» **Explore economically sustainable models for infrastructure ownership** » **Rehabilitate rural infrastructure**
Become efficient users of infrastructure	Continual innovation around logistics efficiency in agriculture	» **Establish ongoing cross-industry initiatives to develop innovative solutions to infrastructure congestion** » **Investigate multiple uses and optimal usage of infrastructure to, *inter alia,* facilitate emerging farmer access**
	Increased ports efficiency	» **Create a cross-industry innovation forum to explore solutions for management of peak flows through ports**
Improve access to existing infrastructure	Higher priority for agricultural produce on national network	» **Create cross-industry demand forecasts to enable logistics service providers to prioritise and plan** » **Basic principles and policy must be agreed between industry forum and service provider (via platforms at the right strategic level) – the commercial transaction however takes place between service provider and individual customer** » **Industry to approach government collectively with specific recommendations** » **Establish economic regulator for monopoly infrastructure e.g. rail and ports (part of NFLS)**

Investment focus	Impact	Key Initiatives
Become efficient providers & users of services	Transport cost reduction	» **Research the potential impact of a change in axle weight restrictions on container transport costs**
	More efficient operations	» **Investigate with transport SETA ways to improve human capital for logistics and lower cost of training (align with DoT's initiative to create a National Centre for Logistics Excellence)**
	Supply chain efficiency	» **Create and support platforms to share logistics information in selected industries (align with freight transport databank)**
Create environment conducive to efficient logistics	Export competitiveness	» **Joint pilot project with SARS, customs and industry to speed up export processes, paperwork and inspections** » **Create organised industry forum interacting with various role players**
	Increased efficiency and competitiveness	» **Initiatives to enable consistent quality control. Quality control should be made more affordable, accessible and transparent**
	Competitive supply chains	» **Undertake a study to benchmark against international best practice, to determine the viability to establish a benchmark club with world best practice**
Enable access for emerging farmers	Consolidate and coordinate impact of development spend	» **Create an inclusive means of planning and reporting on development initiatives in specific development nodes**
	Enabling access for deep rural initiatives	» **Pilot innovative solutions for deep-rural freight transport**
	Fulfil specific infrastructure needs	» **Develop infrastructure to support innovative deep-rural logistics solutions** » **Develop and upgrade secondary roads, in conjunction with development initiatives**
	Appropriate and differentiated support	» **Develop a holistic and integrated approach to emerging farmer development. Differentiate between needs of different categories of emerging farmers, based on a prior needs assessment.**

Table 6.2 Key initiatives per investment focus area

The following ***priority initiatives*** are recommended:

Investment focus	Priority Initiatives
Maintain and revitalise existing infrastructure	» **Explore economically sustainable models for infrastructure ownership**
Become efficient users of infrastructure	» **Establish ongoing intra-and cross-industry initiatives to develop innovative solutions to infrastructure congestion:** - ***Industry desks*****, where industry and service providers collaborate to form an independent liaison committee with decision-making powers regarding the strategic planning and allocation of available key logistics capacity and infrastructure on a quarterly basis (e.g. grain desk, fruit desk), with a focus on the analysis of seasonality and how the use of infrastructure can be optimally balanced throughout the year** - ***Cross-industry innovation forums*****, to explore solutions for management of peak flows through ports (fruit, wine and port role players exploring industry-driven scheduling in the ports to alleviate congestion / staggering)** - ***Innovations for multi-purpose use of infrastructure*** **– for example, multi-purpose wagon technology for rail, other uses for pack houses when not used for "traditional" commodities.**
Become efficient providers & users of services	» **Information initiatives for improved decision-making, such as:** - **The creation of platforms to share logistics information in selected industries.** - **Broad-based agriculture driven information sharing to align with national initiatives such as a freight transport databank**
Enable access for emerging farmers	» **Create an inclusive means of planning and reporting on development initiatives in specific development nodes**
	» **Differentiate between needs of different categories of emerging farmers, based upon a prior needs assessment**
	» **Enable market access by making value-added logistics services available to emerging farmers**
	» **Pilot innovative solutions for deep-rural freight transport**
	» **Develop secondary roads in conjunction with development initiatives, where appropriate**

Table 6.3 Recommended priority initiatives

6.4 Implementation framework

6.4.1 Role Players

Implementation of the above recommendations cannot be undertaken in isolation. A collaborative effort is required between government, industry and logistics service providers, but with government in a facilitating and enabling role. Some roles are outlined below relative to gaps in infrastructure, services and the enabling environment, as well as relative to emerging farmer access to infrastructure.

INTEGRATED INVESTMENT FR AMEWORK		**AGRO-LOGISTICS GAPS**	ROLE OF		
			GOVERNMENT	**INDUSTRY**	SERVICE PROVIDERS
	INFRASTRUCTURE	Facilities Transport network Etc	» Develop new and maintain existing infrastructure » Improve access to existing infrastructure » Unlock potential investment	Become efficient users of infrastructure	**Co-invest in infrastructure development**
	SERVICES	Research Information Logistics services	Enable efficient usage of services	Become efficient users of services	**Provide cost-effective services**
	ENVIRONMENT	Regulatory Pricing	**Create environment conducive to efficient logistics processes**		
	EMERGING FARMER ACCESS	**Access for low-volume supply chains**	**Pilot and test holistic, innovative solutions across departments**	**Enable access to existing industry infrastructure and services**	**Create accessible logistics processes**

Table 6.4 Role players in agro-logistics investment

6.4.2 Key implementation steps

This study was undertaken with the purpose of providing input into the development of an agro-logistics strategy. Once the strategy has been finalised, and key strategic focus areas have been identified, the following steps will facilitate the successful implementation of the strategy:

1. During strategy development, the details of each strategic focus area must be clearly articulated to ensure that, during the implementation process, the core reasoning behind strategic focus area is not lost. This includes the development of implementation steps over three distinct time periods: short term (3-6 months), medium term (6-24 months) and long term (2-5 years). The specific time periods are not absolute, although consensus on the time periods should be achieved. By doing this, the long-term output for each strategy is articulated. The detailed implementation plan can then be monitored against these overall goals to ensure that the long term goal is achieved. This also serves as a motivator, because people know what they are working towards.

2. A sponsor (someone within the DoA) must be assigned to each strategic focus area. This sponsor is responsible for driving the initial implementation of the assigned strategic theme. The position of the sponsor is not cast in stone, but the key principle is that this person is responsible until such time as another sponsor is assigned (with agreement from the strategic team).

3. The key first step for the sponsor is the completion of "the template of agreement" for the specific strategic theme (see below).

Summary of strategic focus area	Describe the reason for the existence of the strategic focus area (scope and objectives)
Define scope and boundaries (what is excluded)	What will we do and what will we not do
Sponsor, Steercom, project manager & team members	Who are the key people that will implement this? (Sponsor should be a senior executive)
Opportunities to exploit	Which opportunities must we grab, which threats / weaknesses impact on this strategic focus area and must be addressed, which strengths must we exploit?
Threats to monitor & address	
Strengths to leverage	
Weaknesses to overcome	
Perceived risks	What could go wrong if we implement / do not implement this strategic focus area?
Resources required (financial, skills, culture shift required)	What do we need to do this?
Other stakeholders / participants	Who must we also take into account / consult / involve?
Prerequisites for execution	What has to be in place BEFORE this theme can be implemented successfully and what can we do to ensure that this happens?
Interaction with other strategic focus areas and projects	How do we align this outcome with other initiatives?
Key timelines	What are key milestone dates and the due date?

Table 6.5 Template of agreement

4. The sponsor and an initial project team populate the "template of agreement" and present this to the department within three weeks. The template should outline the thinking on specific aspects of the strategy and will ensure final alignment on the exact content of the strategic focus area.

5. It is the task of the overall, or plenary, group to talk to this outline and come to an agreement that the terms of reference of the strategic focus area reflect the group's intentions.

6. Following agreement on the context of the strategic focus area, a detailed project plan must be developed and implementation must be managed by the sponsor, based on standard project management principles.

7 Conclusion

All players in agriculture experience the constraints associated with the current logistics system. Different industries require different levels of sophistication with respect to logistics services and infrastructure. Also, industries vary with respect to their maturity of engagement with the problem. This implies that any strategy to improve agriculture's experience with the logistics environment needs to contain focused, industry-specific approaches.

The enthusiasm of most of the industry role players for participating in this project highlights the importance of agro-logistics. It also demonstrates a willingness to participate with government, and to explore the potential of strategic partnerships that will leverage joint industry and government investment. Logistics service providers have indicated their willingness to contribute to joint investment.

While investment in infrastructure is a key focus, a wide scope and potential exists for process improvement, many of which have the potential of immediate impact. In developing a strategy for improving logistics, government's role as an enabler as opposed to the major provider of services and infrastructure need to be considered. International best practice underscores the role of government as such.

The long-term improvement of agro-logistics hinges on the availability of information on which to base decision making. The sourcing of information for this study was labour-intensive, and processes are required to source and update this information more regularly.

Appendix A – Summaries of Industry Feedback

A.1 Summary of industry recommendations for logistics improvement

A.2 Summary of industry views of logistics-related aspects hampering international competitiveness

A.3 Summary of Spoornet's view on proposed improvements with regard to agro-logistics

A.4 Summary of industry views on emerging farmer development

A.1 SUMMARY OF INDUSTRY RECOMMENDATIONS FOR LOGISTICS IMPROVEMENT

Source: Industry questionnaires

DEVELOP NEW INFRASTRUCTURE

Bulk commodities: rail capacity

- A percentage of the Spoornet investment in infrastructure should be spent on grain lines
- The grain industry is prepared to pay high tariffs if Spoornet improve on their service delivery and make more wagons available
- The grain industry would be prepared to go into a PPP with Spoornet and government to address shortages in wagons and locomotives
- A PPP is possible with the Forestry Industry for investment in improved rail infrastructure and rolling stock to serve rural timber growing areas
- Establishing rail connections to fruit juice factories could be investigated but needs interface to road-based distribution networks

Export commodities: port handling capacity

- Transnet to supply port facilities and infrastructure and also more land for development
- Modern port infrastructure, new more effective equipment, modern shipping gear and methods
- Deeper quays are required in order to handle bigger vessels
- Allow more private terminals operated by international lines
- Co-investment by government and industry would speed up the expansion of cold storage facilities in Cape Town harbour
- More plug-points in the port for reefers
- More cold sterilization facilities in the ports

Export commodities: inland infrastructure

- More private investment in inland cooling infrastructure
- Inland container terminals at citrus source but obviously needs to be coupled to efficient rail system
- Development of dedicated flower export facilities at Johannesburg and Cape Town airports by the flower industry in partnership with government (DTI).

Non-Export commodities: inland infrastructure

» Create ripening facilities on all the major fresh produce markets in relation to the demand of the area that the market services
» Decentralised receival depots for wool needs to be built in rural areas – Co-investment with industry
» Government should invest in consolidation of multiple wool harvesting facilities in emerging sector
» Feedlots are often in grain producing areas and need to be relocated

MAINTAIN EXISTING INFRASTRUCTURE

Bulk commodities: road capacity

» Government should maintain the roads in rural areas since the distribution from mills is 100% by road
» Dry goods carriers should be regulated and limited more strictly to limit road damage

Export commodities: ports efficiency & associated costs

» Greater efficiencies are required to lower costs. Privatisation of port operations or provision of concessions that will allow private operators to compete with Portnet. The privatisation of ports is international best practice
» Penalties on port authorities if falling behind schedule. Money paid to suppliers for loss of income and damage to goods and loss of customers
» Improved container handling infrastructure

Non-Export commodities: inland infrastructure

» Municipalities need to upgrade cold rooms at fresh produce markets
» Infrastructure limitations regarding fresh produce markets can be dealt with by separating the ownership and management of fresh produce markets.
» Fresh produce markets should be privatised
» An intensive impact assessment study on the challenges facing market agencies in SA should be done (e.g. to look at needs of emerging farmers)

IMPROVE ACCESS TO EXISTING INFRASTRUCTURE

Export commodities:

» Establish a National Operating Body to develop long term volume forecasts, strategic plans and contingency plans regarding logistics infrastructure use

BECOME EFFICIENT USERS OF INFRASTRUCTURE

Bulk commodities:

» To lead to logistics improvements in future facilitation and interpretation is required in order to develop a greater appreciation of potential cost savings from improving efficiencies

Export commodities:

» Investment in supply chain visibility through product tracking systems in order to improve logistical planning and coordination
» Establish logistics information sharing structures

BECOME EFFICIENT USERS AND PROVIDERS OF SERVICES

Export commodities: port management and operations

» Different and modern management style is required in order to keep up with international norms and pressures
» Greater efficiencies are required to lower costs. Privatisation of port operations or provision of concessions that will allow private operators to compete with Portnet
» Food safety aspects and cargo protection needs attention
» Container depots should be encouraged to be open 24 hours – especially with reefer stacks only being open 3 days – to allow for quicker turn-around times
» Vessel sizes should be taken into consideration when determining the number of days that stacks are open for reefer containers

Export commodities: cooperation to reduce transport costs

» Industry coordination to increase volumes, in order to be able to negotiate better freight rates and arrangements for collective benefit
» Ensure consistent demand for air freight throughout the year by sourcing flowers elsewhere in Africa in our lower seasons for export from South Africa
» Share information and knowledge regarding logistics. Growers need to understand and have sound knowledge of the logistical cost chain. In this manner the logistics chain can become more competitive and be used to provide maximum returns to the grower rather than the “middle men.”

Export commodities: export processes

» Performance of DoA certification laboratories needs to be improved to reduce time delays and improve quality of tests. Government should allow the use of private certification laboratories or privatise DoA certification service.
» PPECB control of shipping and cold stores must be more flexible, commercially orientated and the PPECB must be accountable
» 24/7 Customs & Excise inspection operations
» Customs documentation should be done electronically to ensure quick release of cargo at destination ports

Bulk commodities: road transport

» Appropriate vehicle design and corresponding offloading facilities and scheduling of vehicles is required for efficient road transport

Containerised freight: road transport

» The max weight restrictions should be re-looked, and considerations should be given to increasing the limit by +- 1.5 Tons on suitable tri-axle / double diff trucks. This will allow the container space/capacity to be utilized fully – which will decrease the transport costs.

CREATE AN ENVIRONMENT CONDUCIVE TO EFFICIENT LOGISTICS

Bulk commodities: supply chain focus

» Industry facilitation to overcome fragmented nature of supply chain and inappropriate industry regulations that have become entrenched over time

Export commodities: processes, regulatory and commercial environment

» Streamline border processes: upgraded border posts with well trained border officials who have minimal documentation to peruse is required
» Government should influence trading countries to amend phytosanitary regulations since they are not always warranted, slow down exports and is more often used as a non-tariff barrier
» Development of code/practice to govern live cattle exports
» Develop bilateral and multilateral international agreements for wine production and labelling requirements
» Develop a central IT system with all wine production and labelling requirements
» Enable exporters to select their own logistics companies to counteract the global logistics monopolies (USA alliance, Japan alliance)

A.2 SUMMARY OF INDUSTRY VIEWS OF LOGISTICS-RELATED ASPECTS HAMPERING INTERNATIONAL COMPETITIVENESS

Source: Industry workshop 18 January 2006

INFRASTRUCTURE

- Limited private participation in ports and rail
- Lack of government investment in Spoornet
- Lack of infrastructure investment
- Infrastructure constraints
- Insufficient infrastructure
- Access to markets hindered due to bad roads / infrastructure
- Deterioration of transport infrastructure – both rural and urban
- Lack of resources and suitable infrastructure
- Poor infrastructure system
- Inadequate road / rail system
- Collapse of infrastructure and services
- Infrastructure bottlenecks

SERVICES

- Lack of access to transport services
- Collapse of infrastructure and services
- High transport costs
- Lack of service coordination

- **Lack of integrated government service delivery and support**

» Red tape
» Over regulation
» Slow service delivery by government
» Promises from politicians vs. reality
» No synergy between national and provincial departments of government in terms of priorities, programs etc.
» Many government projects fail – not sustainable enough to grow
» Poorly implemented government programs
» Lack of government support

ENVIRONMENT

- Lack of resources and inadequate resource allocation
  - » Skills
    - Lack of skilled agricultural researchers
    - Capacity building from PDI and emerging farmers
    - Logistical capacity and expertise
    - Lack of proper training for RPF on marketing and production

- » Lack of funding from banking institutions and support for transformation
- » Lack of appropriate infrastructure to support growth and development of the sector
- » Poor service levels at domestic fresh produce markets
- » Inadequate / skewed resource allocation

- Trade barriers continue to limit market access
  - » Protectionism
  - » Unfair competition from rich countries
  - » Unfair competition in world markets due to subsidies in developed economies
  - » Domestic support and export subsidies by the developed countries
  - » Negative tariff regime
  - » WTO unsuccessful to reduce subsidies
  - » Cheap imports
  - » Continuity of uneven playing field
  - » Unfavourable free trade agreements
  - » Poor market access
  - » Inability of government to guarantee compliance with phyto-sanitary and other non-tariff barriers

- Lack of industry cooperation
  - » Lack of participation by relevant industries to eliminate the existing problems when they are requested to do so
  - » People operating in silo's
  - » Lack of transparency
  - » Lack of cooperation
  - » Politics

- Insufficient R&D investment
  - » Low investment in R&D
  - » Reduction in funds for research
  - » Outdated technology

- Insufficient market information and market-led approach (push- in stead of pull philosophy)
  - » Lack of market information that is timely and reliable for RPF's
  - » No marketing and export support
  - » Research that is not demand-led
  - » Segmented marketing
  - » Lack of relevant information
  - » Lack of appropriate / relevant research
- Non-viable land reform
  - » Land reform, transport and agricultural programs not synergised
  - » Too many small farm operators (poverty trap)

» Forced and non-economic empowerment
» Improperly executed land reform program
» Poorly coordinated farmer support programs
» Insufficient farmer support programs
» Underutilisation of available agricultural land

A.3 SUMMARY OF SPOORNET'S VIEW ON PROPOSED IMPROVEMENTS WITH REGARD TO AGROLOGISTICS

Government, Spoornet and industry:

- DoT and other role players (including Spoornet and industry) must finalise the approach to branch lines:
  - » The grain industry is totally dependent on branch lines
  - » One potential solution is that a branch line operator can consolidate loads to mainline
  - » Core premise is that consolidated loads (possible through cooperation with road) will enable Spoornet to serve the industry, taking trucks of road corridors, and leading to diversion of road maintenance funds from road corridors to rural roads
  - » Interface between branch lines and other role players (e.g. industry, Spoornet) must be defined upfront

- Spoornet indicated a need to understand DoA's agreement with the World Food Programme (WFP) for over border supply of grain - can influence long term planning for rail infrastructure and other infrastructure e.g.
  - » The WFP has a bagging facility in South Africa. A number of entrepreneurs have also set up bagging facilities at Beitbridge. An over border bagging facility could alleviate some of the transport problems, but might not be feasible due to political instability?

- Have all options for co-investment been investigated?
  - » A case study that illustrates the possibilities is the Douglas-Belmont railway branch line upgrading project[39] where national and provincial government is co-investing with the Griqualand Wes Ko-op group which has invested in loading facilities.

Industry and Spoornet:

- Develop a proper consolidation strategy – e.g. Coligny, Klerksdorp, Mafikeng can build blockloads (provided that destination point can take blockload)
  - » Consolidation points should be chosen in conjunction with Spoornet
  - » 80% of total cost is related to shunting – should try to minimise shunting

- Spoornet and industry has to collaborate for a sustainable solution:
  - » The core of collaboration is relationships, which requires continuous management commitment from all parties, both during start-up and maintenance phases
  - » Create an industry forum that incorporates relevant bodies and individual customers where required
  - » Separation of commercial and operational relationships is key (have a council that just looks at operational issues)
  - » Proper measurements and visibility eventually leads to self-regulation
  - » In terms of investment model – there must be joint investment; this will require sharing of numbers for next 5-10 years and commonality i.t.o. planning.

- Any initiative must include improved IT capability

[39] Address by Minister of Transport Jeff Radebe at the launch of the Douglas-Belmont Railway Branch Line Upgrading Project, 14 October 2005, available at [http://www.transport.gov.za/comm-centre/sp/2005/sp1014.html], accessed 21 February 2006.

A.4 SUMMARY OF INDUSTRY VIEWS ON EMERGING FARMER DEVELOPMENT

Emerging farmer constraints

- Lack of land
- Technology
- Infrastructure
- Physical transport
- Distance to local markets
- Technical support
- Mentorship
- Credit / finance
- Lack of information (market and service information) / communication
- Storage facilities
- Loading and off loading cattle facilities
- Cooling facilities (cold storage)
- Tarred roads
- Capacity building (training farmers and extension workers)
- Technical knowledge on production
- Practical skills
- Forward fodder flow planning (MPO)
- Market access

Who currently provides for logistics needs of emerging farmers?

- Farmers themselves
- DFPT / DFTS and other industry associations
- Logistics provided by exporters
- Formal
- National Wool Growers Association (NWGA), local gov, DoA, DoA, ComMark Wool Brokers, ARC, Cape Wools SA, and private companies (construction and upgrading of shearing infrastructure, handling and dipping facilities, capacity building, marketing support, etc)

What is needed?

- Collective system (cooperation)
- Industry initiative to determine extent of constraints and needs and to address these on an industry basis
- Road maintenance
- Real time information
- Stable destination prices
- Market needs
- Communication (literacy, faxes, phones etc)
- Training to interpret
- Mentorship
- Government assist with market access through efficient extension services
- Training courses and mentoring for/of extension officers
- UBISIMAIL – publication for emerging farmers (MPO)

- Fencing and water supply
- Generic improvement (introduction of quality rams)
- Capacity building
- Dipping tanks
- Upgrading of roads
- Construction / renovation and funding of harvesting infrastructure (wool)
- Storage facilities at strategic points (planned and constructed on a needs / production basis
- Availability of inputs – cooperatives / MPCCs (multi purpose community centres)
- Local marketing infrastructure needed to accommodate many small producers (storage)
- Road and rail infrastructure (Spoornet)
- Red meat – information available but dissemination of information a problem
- Red meat – Proper trucks and mobile livestock auctioneering
- Red meat – any model that would ensure small scale farmers co-operative improve volumes
- Red meat - Market system (bringing animals to buy and sell in negotiation – not an auction)[40]
- Red meat – government must establish holding farms then buy from emerging farmers and sell to formal markets

What is the industry doing?

- Exposing farmers to symposiums and workshops
- MPO – industry needs to make training and mentorship available

Investment needed

- Research to reduce time delays
- Capacity building (farmers into entrepreneurs)
- Supporting of good potential projects instead of spreading efforts too thin
- Establishing mentorship programmes
- Training and mentoring of extension officers
- WGA invest in capacity building
- Red meat – needs to invest in mobile units

Initiatives

- Directorate of Food Safety and Quality Assurance – awareness campaign on food safety and quality standards
- CASP –fund – Limpopo build a pack house
- Mpumalanga – upgrading the irrigation schemes
- Potato SA involvement with emerging farmers with projects in the EC taking off
- Setting of market standards
- Information and field days

[40] The “virtual aucton” as is investigated in the Netherlands, could be an appropriate intervention (see section 3.4.3)

- Current research results made available
- Marketing initiatives
- Training
- LRAD / CASP / trade missions
- Most agencies fund projects with no backup and / or long term involvement in projects
- Government industry collaboration in development of the fruit industry plan and identifying emerging farmers with potential to grow
- Joint ventures, share milking schemes on commercial level
- Gov provides financial support for upgrading and innovation of infrastructure
- NWGA, DoA, development agencies and private sector provide training and development programme in communal areas
- Value adding and wool processing, infrastructure development, genetic improvement, training and resource management
- Red meat – lots of initiatives but industry need funds and government has funds but not capacity
- Red meat – CASP funds establish a marketing scheme

Successes cited by industry

- Citrus industry supports business plan development to access funds – Letsitele farmers establish orchards, build a pack house and other services
- DFPT - Business skills training and all programmes where the commercial agricultural sector is in partnership with new farmers
- MPO- Two joint ventures in the EC (Tsitsikama) are successful models
- Wool - Infrastructure development, training and marketing support, wool marketed through the commercial auction systems (emerging farmers obtain world prices)
- Red meat – Bulenefu project, Limpopo and Northwest improvement of quality and supplying better bulls

Appendix B – Emerging Farmer Case Studies

B.1 Supply chain view: emerging farmer wool supply chain

B.2 Obstacles: emerging farmer meat supply chain

B.3 Local best practice: emerging farmer sugar supply chain

B.4 Local focus: emerging farmer development in Prince Albert

B.5 Regional focus: emerging farmer development in the OR Tambo District Municipality

B.1 SUPPLY CHAIN VIEW: EMERGING FARMER WOOL SUPPLY CHAIN[41]

1. Brief history

South Africa currently produces about 50 million kg per annum of which in excess of 90% of the clip is exported. Communal and emerging wool producers produce 12% of the national clip and are mainly located in the former homelands of Transkei and Ciskei (Eastern Cape) as well as Thaba Nchu and Qwa-Qwa (Free State). There are an estimated 3 million wool sheep in communal areas, owned by more than 70 000 farmers. The average income from wool varies between R2-00/kg through the informal trader market where wool is often sold in bulk and unclassed, to more than R10-00/kg through the formal auction market where wool is classed, pooled and sold per type and quality grading. The net income in the latter case is reduced somewhat by the costs incurred in marketing the wool but is still significantly higher than the returns in the informal trade. Communal producers own between 5 to more than 600 sheep, with average sheep numbers varying between 40 sheep per farmer marketing their wool informally to 120 sheep per farmer marketing their wool formally through the auction.

The old Wool Board, National Woolgrowers' Association of South Africa (NWGA) and private companies have implemented empowerment and development initiatives amongst the black and communal farmers for many years. These were aimed at assisting emerging farmers to market their wool through the formal markets. Programmes included in the development initiatives were the construction of shearing sheds within these areas, wool shearer and classer training, putting in place the necessary infrastructure to get their wool to the wool auctions which take place in East London and Port Elizabeth, as well as the creation of special pools for their wool at these auctions - e.g. the creation of a Lesotho pool where all the wool from Lesotho was brought together to a central point, transported to the auctions and sold collectively, thus significantly increasing their returns.

There are currently an estimated 900 communal sheds in the Eastern Cape that vary from old and poor constructions with insufficient equipment, handling facilities and no dipping facilities, to sheds that are well constructed with all the necessary infrastructure for effective wool shearing, classing and marketing. The quality of the facilities in the Free State is much the same.

The NWGA is a producer organisation for wool sheep farmers, established in 1929, with the objective to act as a mouthpiece for wool producers in South Africa and to promote their interests. The mission of the NWGA is the promotion of a sustainable and profitable wool sheep industry in South Africa. The NWGA is a representative organisation for all wool producers in SA. More than 50% of the 10 000 members are black communal and emerging farmers who have representation in all the structures.

---

[41] Sources for this case study:

1. www.nwga.co.za: (a) Opleiding for Boere and Plaaswerkers, Wolboer (b) Thaba Nchu Wool Project (c) Woolgrowers and AgriBEE
2. Inputs from Mr Leon de Beer

In 1997, the NWGA launched an extensive wool sheep development programme in the former Transkei and Ciskei (Eastern Cape), and in Thaba Nchu (Free State) (as discussed in the Thaba Nchu case example which is included in this section).

2. Development initiatives and logistics requirements and interventions

The NWGA initiated its training and development programme in communal areas during 1997. This programme is based on the following activities:

- Upgrading of existing and construction of new shearing infrastructure (shearing sheds, handling facilities, shearing shed equipment, dipping facilities).
- Market support
- Genetic improvement of communal flocks through the introduction of quality rams.
- Training
- Resource management

The NWGA currently provides training and development support to nearly 300 communal sheds annually, involving close to 9 000 farmers, averaging 30 farmers per shed. Courses are presented in basic wool sheep production, including:

» Handling and movement of sheep
» Animal husbandry
» Marketing
» Maintenance of shearing shed and equipment
» Wool classing
» Selection and breeding
» Resource management

On the logistics front, they have been responsible for the upgrading and construction of more than 100 sheds in communal areas since 1997. Since July 2004 alone, nine new shearing sheds have been constructed in the Eastern Cape and five in the Free State, with another four under construction. Other infrastructure includes judging pens, handling facilities and dipping tanks. The existence and proper functioning of these facilities forms a very important part of the production supply chain - in the absence of which the industry would be unable to function and these role players would be excluded from the market. Given this link into the NWGA marketing channels, the logistical needs of the emerging wool farmers on the output supply chain (including transport) are served by the existing commercial infrastructure. As with all logistical needs in the deeper rural areas an improvement in the road systems would help significantly.

On the input side, the ram project provides at least 3 000 quality rams per annum from nearby group breeding schemes on an exchange basis. The ram project has been running for three years and will continue for at least another four. Marketing support is provided through training in this field, assistance with making up the clip (classing, baling and transporting the wool in marketable quantities to the auctions), facilitation of the marketing process through brokers and record keeping. Examples of the impact of the programme have shown that on average, communal farmers have increased their income from wool more than tenfold.

All these initiatives are implemented in partnership with support from partners like Cape Wools SA, ComMark Trust, Departments of Agriculture (Eastern Cape and Free State), National Department of Agriculture, Local and District Municipalities, Development Corporations and private companies. The programme has made it possible for communal farmers to participate in the export market with commercial farmers, earning foreign currency and impacting very positively on the economy of these areas.

3. Implications for Government strategy

At the launch of AgriBEE on 26 July 2004, the NWGA was used as an example of successful AgriBEE implementation. Farmer development of wool farming in communal areas is therefore already a clear and ongoing success. The initiatives to create the necessary logistical infrastructure have come a long way and will continue. In the view of the NWGA the major issues that need to be addressed are black farmer establishment on their own land and the development of truly commercial black farmers. They see this as the ultimate challenge. A NWGA Business Plan addressing topics such as training of farmers, identification of candidates for settlement, availability of farming land, support / mentorship of settled farmers and involvement of existing farmers in the LRAD programme with an implementation framework for sustainable black wool farmer establishment is currently with the National Department of Agriculture. Committed government support is essential for success with the NWGA farmer establishment programme.

Factors that are key the success of this initiative, and that could be carried forward to similar initiatives, are:

- A holistic approach to interventions that addresses all critical supply chain elements
- Initiatives that are implemented through a partnership between industry, government and development bodies
- A focus on the key logistics infrastructure in the chain that has the potential to improve the profitability of producers.

The making available of land to potential farmers is the responsibility of Government. This process is currently regarded as a major stumbling block – more so than logistical support. Without land, no progress is possible. Means to speed up the process of land acquisition within the framework of willing seller/willing buyer must be developed.

The industry is well positioned and actively involved in black farmer support and development and has urged the Department of Agriculture to work in partnership with the NWGA and make black economic empowerment in wool farming the success story that South African agriculture clearly needs.

Case Example: **Thaba Nchu Wool Project**

The NWGA and the Department of Agriculture in the Free State have formed a partnership that will boost the development of emerging wool sheep farmers in Thaba Nchu. This project involves the building of five new shearing sheds to communities that have been struggling to shear their sheep for many years. They are the communities of Klipfontein, Kommissiedrift, Yorksford, Morakgo and Middeldeel. In total, twelve communities will be involved in this development project that will also include:

- Renovation of existing dipping tanks.
- Upgrading of the water supply to their sheep.
- Shearing shed equipment
- Erection of handling facilities for sheep.
- The supply of quality rams to improve the genetic quality of their sheep.
- Training in basic skills and knowledge of wool sheep farming, shearing and marketing of wool.

The NWGA is confident that the project will contribute towards sheep farmers from Thaba Nchu to drastically increase their income from their wool and their sheep.

At Klipfontein Myaluzeli Klaas built a shack to serve as a shearing shed. On the left is Edward Mothlese a local trained wool-classer and Myaluzeli Klaas, a well known NWGA shearing instructor. The peach tree was part of the shed equipment.

This old ruined shed sheltered the shearing at Kommissiedrift. Organised shearing by the NWGA improved the wool income by 300%. The training of the shearers is funded by the National Skills Fund. In co-operation with the government a new shed has since been built at this spot.

Skills Development Funded by the National Skills Fund:

B.2 OBSTACLES: EMERGING FARMER MEAT SUPPLY CHAIN[42]

1. Background

South Africa's climate is ideally suited for extensive livestock farming. Almost 70% of the total land surface is suitable for raising livestock and it is the most viable agricultural activity in large parts of the country. Livestock farming has been identified as the agricultural enterprise with the most likely chance of improving household food security and addressing poverty alleviation in the small scale farming areas in the ISRD Strategy.

The red meat industry is characterised by dualism with very different commercial and developing sectors.

The commercial red meat sector is efficient and the production, processing and marketing systems are well developed. The industry which is organised at all levels, boasts facilities of first world standard from farm to retail, including efficient and modern producer support systems and infrastructure, suppliers of animal health products, regular organised cattle auctions, well managed feedlots, modern abattoirs, meat processing and packaging plants and renowned research and development institutes.

The emerging sector has an estimated 5,3 million head of cattle which makes up 47 % of the national herd. (In the case of sheep, pigs and goats the emerging sector owns 12%, 20% and 64% respectively) Approximately 95% of emerging farmers farm on communal grazing land where overgrazing i.e., the well-known principle of "the tragedy of the commons", is a widespread phenomenon and only 5% have leased or privately owned land. Projections show that the livestock population in the emerging and subsistence sectors will continue to increase. Different than for the commercial sector, very few of these farmers participate actively in formal agricultural markets with the marketing off take only between 6 and 7 percent.

Amongst the African societies, livestock are seen as a measure of wealth. Farming is mostly for own use or the needs of extended families and as a result it is largely outside of the mainstream industry. Farmers have mostly non-economically quantifiable reasons for keeping stock. Private sales represent an important marketing channel. According to the National Emergent Red Meat Producers' Organisation (NERPO), trading can best be explained as a non- institutionalised activity involving the buying and selling of various forms of livestock from local farmers for different reasons for slaughter (tradition and religion based) or investment in the form of bartering and cash

[42] Sources for this case study:
1. Chair in International Agricultural Marketing and Development on request of ABSA Business Bank services: Agribusiness – Industry Analysis: Feedlots in South Africa (2001).
2. South African Meat Industry Company Annual Report 2004
3. An analysis of the South African Beef Supply Chain – Submitted as partial fulfilment of Magister Commercii degree by GC Olivier, Rand Afrikaans University, November 2004.
4. Business plan and levy application for the red meat industry. Submitted on behalf of the Red Meat Industry Forum- March 2005.
5. The marketing of livestock on communal lands in the Eastern Cape Province: contraints, challenges and implications for the extension services by L Coetzee, BD Montshwe and A Jooste
6. Factors affecting participation in mainstream cattle markets by small-scale cattle farmers in South Africa by B.D. Montshwe, A. Jooste and Z.G. Alemu
7. Broadening access to market information in the South African small-scale livestock sector: a rural development perspective by B.D. Montshwe, L. Simela, A.M. Mahanjana and M.P. Tshuwa
8. Press Release: Nerpo's Reaction on collapse of the North West Department of Agriculture- NERPO, 20 January 2006
9. NERPO Annual Report 2005

sales. This private buying is important to farmers as they are in the position to determine the prices for their animals. Farmers do not incur any marketing costs but demand is irregular and prices fluctuate considerably.

There is broad consensus that the cattle herd in the hands of small-scale farmers is under-utilised. Apart from environmental constraints, such as the lack of fencing and stock water, the efficient participation of small-scale farmers in the marketing of livestock is impeded by the fragmented and decrepit infrastructure in rural areas. The roads are mainly gravel and severely eroded, rendering access to the livestock production areas which are often remote, difficult. Infrastructure involving both the physical (communication, transport and roads) and institutional infrastructure (market information, security and animal disease control) needs to be developed in order to assist the industry to evolve.

Attempts are underway to unlock this vast source of livestock by improving market access and supplying of a supportive institutional environment. It is important to note that market access will determine to what extent emerging producers can become commercial producers. It is further important to note that not all emerging livestock farmers have the ability or desire to become involved in the formal market. Vast numbers of participants own between 1 and 10 head of cattle as commodities and do not expect any economic returns. Development efforts amongst these participants are minimal and mainly focus on animal improvement and safety issues. The real development initiatives begin with owners with herds of 50 or more head of cattle and it is in this category that current and future interventions will be focused.

2. Focus on development initiatives to date

2.1 Government initiatives in the emerging and subsistence sectors

Since 1999, isolated efforts to improve livestock marketing have been initiated by Government. These programmes include the Land Care Project that has been successful in the improvement of wool production and marketing and the Agrilink Project which initiated rural livestock auctions that have been successful as long as the services were financially supported by Government.

Various initiatives exist within the National and Provincial Departments of Agriculture and these have had varying degrees of success. The National Department of Agriculture and Organised Agriculture developed and adopted a National Livestock Industry Strategy and Implementation Framework in terms of which all parties acknowledge that there is considerable potential to improve livestock production in the emerging and subsistence sector. Over the past financial year and through the Comprehensive Agricultural Support Programme (CASP), the DoA funded the improvement of infrastructure in communal grazing areas, such as erection of fences, renovation of dipping tanks and installation of crush and sale pens. Various provincial Departments have also included initiatives of this nature in their development plans e.g. the Bull Programme at Dohne and Bathurst and the Limpopo Improved Breeding Material Programme. Although most of the Departments thus have research and development programmes, it seems that the efforts are very fragmented and much duplication happens, while other areas that require support are overlooked.

2.2 Commercial industry initiatives

The organised meat industry has also implemented a number of initiatives to assist in developing the emerging sector. Some cases in point in the feedlot industry include:

- Beef Profit Partnerships Project (BPP project)
  The perception is that animals from emerging farmers are of a lower quality. The purpose of this project is to give training (extension services) to emerging farmers to upgrade their animals to acceptable levels (practical advice at grass-roots level).
- Training of graduate students for the feedlot industry
  This project entails the training of agricultural graduates and farmers in livestock production techniques and farm management.
- Marketing of Class C animals
  This project entails the marketing of older cattle (Class C animals). Feedlots are buying these animals from emerging farmers, feed them in their feedlots and market them when marketable. This has established a new outlet for the subsistence and emerging sectors.

In 2005, the red meat industry successfully applied for the introduction of statutory levy funding. In the motivation for this funding, it was stated that at least 10% of the funds will be spent towards developing the emerging red meat sector, in particular increasing market access, commercialisation, addressing the lack of infrastructure and extension services. The amount budgeted for this activity in the 2005 year amounted to R2,92 million. A monitoring programme to ensure progress is currently under consideration.

2.3 National Emergent Red Meat Producers' Organisation (NERPO) initiatives

NERPO was established in 1997 as a farmer commodity organisation. This was necessitated by the existing disparities in terms of access to resources, business opportunities, support, skills and capacity between the established and emerging agricultural sectors. The primary aim of NERPO is to create successful commercial livestock farmers out of its predominantly previously disadvantaged members. The strategies by NERPO to make this possible for its members (38 000 members at present) include:

- Beef Profit Partnerships Project (BPP project)
- Influencing policy and legislation in favour of the emerging farmers
- Facilitating sound decision making
- Facilitating access to technical support, finance and markets
- Facilitating participation of youth and women in the industry
- Providing consulting and training services within the red meat industry.

NERPO has developed a so-called "NERPO 10 point plan" specifically to implement the various elements of these strategies. This plan includes aspects ranging from capacity and institution building to public relations and communication to infrastructure development, training and value adding. Of particular importance from a **logistics** point of view is:

- Programme 6: Animal Improvement Programme

  This programme is aimed at facilitating efficiency and product quality within the sector. The Presidential Bull and Heifer Project entails aspects such as the purchase of benchmark farms to keep heifers of members, distribution of registered and performance tested bulls to members and the acquisition of heifers from members through the barter system. The participants of these initiatives must have the appropriate infrastructure to benefit (e.g. adequate grazing, fencing, dipping and loading facilities). NERPO aims to facilitate the expedition of installation of livestock handling facilities in particularly the communal areas so that this initiative can be implemented. At present NERPO has access to two holding farms (Rodabil in Northwest province and Mara in Limpopo province). In 2004/2005, 20 performance tested bulls were distributed to 14 farmers at Waterberg District Municipality in Limpopo Province, while 40 heifers were acquired in terms of the barter scheme.

- Programme 7: Farmer Training Programme

  The purpose of this programme is to equip livestock farmers with relevant knowledge and skills. This is done using real case studies in which the farmers are involved. Topics include improved livestock production, proper record keeping and improved competency in livestock marketing.

- Programme 8: Marketing Infrastructure.

  The objectives of this programme are to improve physical livestock marketing infrastructure and to improve access to institutional marketing infrastructure. In this regard NERPO aims to facilitate the access to 80% of participating members to marketing facilities by the construction and refurbishment of auction sales pens, to facilitate the holding of 112 livestock auctions per year for which records are kept and the dissemination of marketing trend information to farmers in such a way that 80% of participants understand marketing trends. NERPO aims to introduce mobile marketing units in areas where marketed volumes do not justify the erection of permanent structures.

The implementation of the 10 point plan has been underway since July 2002 and a comprehensive evaluation of progress will take place in the latter half of 2006.

NERPO has also established a Call Centre through which its members will receive information pertaining to market opportunities: - weekly prices of livestock; potential buyers and sellers; livestock sales days and any offer provided by inputs suppliers. Livestock farmers may choose to call the Centre for market information and/or SMSs will be sent to their cellular phones.

3. Proposed interventions in the industry

Various role players including the government and industry are in the process of developing plans and strategies to address the challenge of unlocking the commercial potential of the emerging red meat industry.

One of the objectives of the Marketing of Agricultural Products Act, 1996, is to increase market access for all market participants, especially for emerging farmers. At present one of the initiatives entails to facilitate the creation of marketing schemes for emerging farmers for the different agricultural commodities. The specific

intervention currently under consideration for the emerging red meat industry entails a Custom Feeding Project where emerging farmers will be encouraged to participate in the feedlot system to the mutual benefit of themselves and the feedlots which are only running at 80% capacity. Emerging farmers will be able to participate in the feedlot industry using existing infrastructure and expertise at a subsidised rate. In terms of the proposals under review, they will retain the choice to market through the feedlots or not and will at all times retain ownership of their animals. The ideal is to transform emerging farmers from animal keepers to animal marketers. It is hoped that with the Custom Feeding Project, South Africa could become self-sufficient in its production of beef. In time, these farmers could start their own feedlot system (owned or leased) and source animals from fellow emerging farmers and eventually big business (BEE Consortiums) could also invest funds to start feedlot systems and to market the animals sourced from emerging farmers.

Complimentary to its 10 Point Plan, NERPO endeavours to partner with various organisations and Government departments to make the commercialisation of the emerging red meat sector a reality. In April of 2005, NERPO submitted a business plan for the implementation of the National Livestock Strategy in the smallholder livestock subsector of South Africa, with particular focus on training and service provision to the farmers. Possible projects in this proposal (which is still under review) include *inter alia* the following:

- The introduction of Community Based Livestock Workers (CLW), who are reimbursed for their efforts by charging a small fee and who are farmers selected by their communities to receive training and provide basic animal health care and livestock management services in their areas.

- In support of the CLW-programme, NERPO and the DoA propose the establishment of integrated service centres at strategic points within the smallholder communities. The service centres are to serve as one-stop shops from which the livestock farmers will be able to obtain inputs such as livestock remedies and animal feeds, sell their hides and skins and attend training courses. More advanced centres could offer specialised services such as artificial insemination.

- The introduction of mobile livestock marketing units in areas where there is no existing infrastructure or where the logistics do not justify installation of permanent structures. Farmers who do not have access to transport will be assisted to take their livestock to auctions using a suitable hauling truck.

- The revival of grass lot cattle fattening schemes are proposed in order to address the issue of the quality of livestock offered for sale from the smallholder sector. The former Lambasi Scheme that was run in Lusikisiki in Transkei was an example of a successful scheme of this nature.

4. Logistics requirements and interventions resulting from this activity

Improved access to markets and thus high transaction costs are cited as the greatest impediment to the commercial orientated emerging livestock farmer. Most of the role players are far removed from markets or do not have sufficient marketable surplus to justify investment in marketing systems. Infrastructure involving both the physical (communication, transport, roads and marketing facilities) and institutional infrastructure (market

information, security and animal disease control) and marketing systems are poorly developed or non existent and this needs to be addressed as a prerequisite for any further development.

Various role players are currently involved with activities to attempt to bring the emerging farmers into the mainstream industry. Many of these attempts are duplicated by different role players and are fragmented and lack some form of co-ordination.

If the red meat industry is expected to fulfil its expected roles of:

- Improving household food security and addressing poverty alleviation in the small scale farming areas; and
- enabling the South Africa to become self sufficient in the supply of red meat, there needs to be a joint and holistic approach to initiatives that address all elements identified, but with the initial focus on the key logistics infrastructure and marketing systems.

In this regard, all interested role players should jointly be involved (possibly co-ordinated by the National Agricultural Marketing Council) in initiatives based on a well formulated and agreed to plan of action. In the absence of such a joint strategy, the fragmented initiatives will continue.

B.3 LOCAL BEST PRACTICE: EMERGING FARMER SUGAR SUPPLY CHAIN

1. Introduction

The South African Sugar Industry is one of the world's leading cost-competitive producers of high quality sugar. It is a diverse industry combining the agricultural activities of sugarcane cultivation with the industrial factory production of raw and refined sugar, syrups and specialised sugars, and a range of by-products. Sugarcane is grown in 14 cane producing areas extending from Northern Pondoland in the Eastern Cape Province through the coastal belt and midlands of KwaZulu-Natal to the Mpumalanga Lowveld. Of the 412 000 hectares currently under sugarcane about 68% is grown within 30 km of the coast and 17% in the high rainfall area of the KwaZulu-Natal midlands. The balance is grown in the northern irrigated areas which comprise Pongola and Mpumalanga lowveld.

The South African sugar industry is a proceeds sharing partnership established in 1935 between millers and growers and presently operating as an umbrella organisation, the South African Sugar Association (SASA). It is jointly controlled by the SA Cane Growers' Association and the SA Sugar Millers' Association Limited. The Sugar Association is responsible for the administration of the industry with its production of an estimated average of 2,5 million tons of sugar per season. About 50% of this sugar is marketed in the Southern Africa Customs Union (SACU). The remainder is exported to numerous markets in Africa, the Middle East, North America and Asia.

2. Sugar and the economy

The South African sugar industry makes an important contribution to the national economy, given its agricultural and industrial investments, foreign exchange earnings, its high employment and its linkages with major suppliers, support industries and customers. Based on revenue generated through sugar sales, in the SACU region and world market exports, the South African sugar industry is responsible for generating an annual average direct income of R6 billion. The South African sugar industry contributes an estimated average R2 billion to the country's foreign exchange earnings on an annual basis.

The sugar industry makes an important contribution to direct employment in cane production and processing, and provides indirect employment for numerous support industries in sectors such as fertiliser, fuel, chemical, transport, food and services. Employment within the sugar industry is approximately 85 000 jobs. Direct and indirect employment is estimated at 350 000 people. It is estimated that there are more than one million people dependant on the sugar The sugar industry's focus on producing a high quality and cost competitive product is complemented by its focus on sustainable development. This includes land reform, education and training, social investment, and the promotion of sound, sustainable environmental practices. During 2004 a new land reform company called Inkezo was formed. This important initiative was developed by the growers and millers. The company, while initially funded by the industry, will operate as an independent land reform initiative.

The Inkezo Land Company has an initial target to ensure 30% Black ownership of freehold sugarcane land by 2014 and will assist in the transfer of approximately 70 000 hectares of land in the sugar industry to black farmers. Inkezo assists in identifying sellers and buyers, streamlining processes of land reform and promoting sustainability through outsourced support service providers and mentorship programmes with existing farmers. In addition to

this, there are numerous projects and initiatives being undertaken by individual milling companies, and the Cane Growers' Association.

The Sugar Industry Trust Fund for Education (SITFE), founded in 1965, funds education projects in sugar areas and aims at improving the quality of schooling in rural areas. In the past year SITFE has supported approximately 70 bursary recipients and 23 education projects. The education and training initiatives include ongoing technical and institutional support to small-scale grower projects through the Small Grower Development Trust. This Trust was established in 1992 to provide for the procurement and administration of funds and funding the training requirements of small-scale growers.

Nutrition programmes provide educational resources and training for those community members who can educate others about nutrition. Health professionals are trained in nursing colleges countrywide. The Youth Project assists teachers in promoting nutrition to learners in schools. Approximately 150 organisations received support for a variety of initiatives during the past year, which included the support of health and welfare initiatives addressing HIV/Aids.

SASA together with millers and growers actively promotes sound and sustainable environmental practices within the sugar industry as a whole, in line with national legislation and international requirements. This has involved the development of a variety of environmental education programmes, posters and training manuals.

The 50 000 registered sugarcane growers annually produce on average 22 million tons of sugarcane from 14 mill supply areas. More than 47 000 are registered small-scale growers, of whom about 50% deliver cane annually producing almost 12% of the total crop. With the growth of economic development and empowerment of previously disadvantaged people, a growing number of medium-scale farmers are continuing to enter sugarcane agriculture on farms made available at realistic prices by the major milling companies.

There are approximately 2 000 large-scale growers who produce in excess of 75% of total sugarcane production. Milling companies with their own sugar estates produce around 10% of the crop. This percentage of the total crop produced by these miller-cum-planter estates has decreased in recent years and is likely to continue to do so as the companies promote more medium-scale farming development.

3. The South African Cane Growers Association

The South African Cane Growers' Association (CANEGROWERS) was established in 1927 to represent the interests of independent sugarcane growers. CANEGROWERS is a Section 21 Company (incorporated not for gain) and individual growers are members through the 43 grower groups which make up the member organisations of CANEGROWERS. In each mill area all member organisations are represented by a Local Grower Council. The democratic nature of the representation structure allows for the election of any individual cane farmer to the Executive Committee or Chairmanship of the organisation. This, typically, would be through a region's Local Farmers' Association, its Local Grower Council, the centrally based Board of Directors (56 members) from which a Chairman and Vice-Chairman are elected annually, and finally to the Executive Committee (11 members). An Executive Directorate, management team, economists and staff administer the day to day business of CANEGROWERS, by:

- representing the interests of all growers and jointly determining policy within the industry partnership;
- providing a wide range of services with the emphasis on agricultural economics advice;
- compiling information and statistics for growers' benefit, particularly the annual survey of cane production costs; and
- developing and empowering cane growing communities through the promotion of cane development involving training, information and support.

4. Sugar Milling and Refining

The milling sector of the industry employs 12 800 people in 14 sugar mills and at the companies' administration offices in KwaZulu-Natal and Mpumalanga. Five mills are owned by Illovo Sugar Ltd; four by Tongaat-Hulett Sugar Ltd; two by Transvaal Sugar Ltd and one mill each by UCL Company Limited , Umvoti Transport (Pty) Ltd and Ushukela Milling (Pty) Ltd. The two Transvaal Sugar Ltd mills are located in Mpumalanga and the remainder in KwaZulu-Natal

Three of the mills are known as "white end" mills and produce their own refined sugar. Raw sugar produced by Transvaal Sugar Ltd is exported via the sugar terminal in Maputo. Raw sugar produced at the remaining mills is routed to Durban where it is either refined at the central refinery of Tongaat-Hulett Sugar Ltd or stored at the SASA's sugar terminal prior to export. Diversity is the key factor in today's highly integrated sugar milling operations and the mills produce a range of other products such as ethyl alcohol and furfural and its derivatives, although these activities are outside the grower/miller partnership.

5. The South African Sugar Millers' Association Limited

This Association represents the interests of all sugar millers and refiners. The Association's activities cover legislative measures affecting the industry, training, scientific and technological research and compilation of statistics. The Association is administered by an Executive Director and staff who undertake these activities and who interact with the other organisations of the industry, particularly CANEGROWERS, on matters concerning the partnership.

6. Key areas for success

The following proved to be key to emerging farmer development in this industry:

- the industry is closely working together throughout the value chain from growers and millers;
- emerging farmers are incorporated into the activities, investment and training programmes of the industry hence they are groomed to produce quality sugarcane;
- the industry is unique in South African agriculture in its complete funding of its own agricultural research and plant-breeding complemented by comprehensive agricultural extension;
- sugar milling research is also partly funded by the sugar milling industry; and
- industrial technical training facilities are also provided at an industrial training centre.

B.4 LOCAL FOCUS: EMERGING FARMER DEVELOPMENT IN PRINCE ALBERT

Like most small towns in South Africa, Prince Albert evolved out of a history of racial separation and forced removals resulting at the time of democratisation in a dual society; consisting of a relatively opulent 'North End' of white residents and an impoverished 'South End' of coloured residents and little communication in between. Coinciding with the political turnaround in South Africa, but before the devolvement policies for municipalities (via the IDP) was finalised, all the citizens of Prince Albert came together in open public debate to determine an appropriate strategy for their future – a strategy which would be designed primarily to strengthen the local economy through the creation of work opportunities. What is important in the Prince Albert context is that after various strategic options were mooted by the community, the one eventually selected, a fruit cold store, was logistically based – a choice later confirmed through analysis of all the options.

To appreciate why this is so requires an understanding of the context. Prince Albert is a small Karoo town of around 5 000 souls of which about four fifths fall into the category of previously disadvantaged. Unemployment of the disadvantaged residents probably exceeds half the potentially active adults. The population is highly dependant on social grants and as with similar situations elsewhere, alcohol abuse has reached chronic proportions. Prince Albert is 47 kilometres off the beaten track – the nearest arterial transport routes being the Johannesburg/Cape Town railway line and the N1. It is surrounded by semi-desert with mountains and impassable roads on its eastern boundary. Although tourism has contributed substantially to its present much improved condition, the core of the town's economy lies in agriculture – more specifically in those areas irrigated by streams and runoff from the Swartberg Mountains. At one time the irrigated lands were used exclusively for lucerne and ostrich production, but with the collapse of ostrich meat and leather prices the farms have largely converted to fruit production – for which, given the right encouragement, there is still significant room for expansion.

Fruit farming in Prince Albert is highly vulnerable as a consequence of its isolation and remoteness from other regions of intensive agriculture where the necessary infrastructure, services and skills are at hand. Yet, notwithstanding the risk, utilising scarce irrigation water in the production of fruit is one of the most promising ways of increasing employment in the area, and given suitable logistics the quality of Prince Albert stone fruit is among the best in the world. The main fruit varieties grown are apricots, plums and nectarines. These have specific handling needs if the fruit is to fully realise its quality potential and enjoy a good shelf life. Hence the concerted community call for a cold store and the request that that option be subjected to feasibility analysis and compared to other job creation opportunities in the town.

As an important aside, one other alternative option was also logistical and involved the creation of a 'transport (or load transfer) hub' situated at Prince Albert Road on the N1. It was felt that such a facility would enable loads from Johannesburg destined to both Cape Town and the Southern Cape to be split and reloaded at the Prince Albert 'hub' allowing full loads to be transported to each Cape destination instead of a round trip of incomplete (and therefore costly) loads, as is currently the case.

Even were the economic merits of the cold store and the transport 'hub' similar, the social merits of the cold store would far outweigh those of the 'hub'. This for reasons that the risk attached to the core economic activity of farming would be reduced, thereby better securing existing jobs and encouraging further expansion and more

employment. In fact the feasibility study showed that with improved product quality and more efficient and less interrupted logistics arrangements the cold store could result in an injection of R500 000 into the area.

The Prince Albert story is interesting in that it demonstrates the social and political value of a very public approach to development; it underlines the importance of the entrepreneur farmers who established the pattern for fruit production in the first place – inviting logistical solutions; and it illustrates the value of appropriate logistics in securing the future of the micro economy of a region.

B.5 Regional focus: emerging farmer development in the OR Tambo District Municipality

1. Background of the area

The region is accessed by the N2, which links the main regional centre of Umtata, to Cape Town and Durban, by road. The R61 east-west connection road intersects with the N2 at Umtata. This route provides critical linkage for the central and eastern areas of Oliver Tambo District. Many areas of the district suffer from poor road access, with the Pondoland region being particularly disadvantaged. The OR Tambo District has a rich natural resource base for agricultural, maricultural, tourist, manufacturing and infrastructural development.

Backward and forward linkages are not fully exploited in the region. While there is a high demand for furniture from the chain stores in the towns, the furniture manufacturing industry is poorly undeveloped and its link to the timber industry is weak. The tertiary sector is well represented by the towns that act mostly as trading posts for the large population of the area.

2 Key economic & local development initiatives

There are substantial regions that are under forestry, both indigenous and commercial forests. These offer potential for future enterprises in timber, manufacturing and export. The Langeni Forest and Magwa Tea are the major contributors to the primary sector of the economy. Despite the large tracts of arable land, the agricultural sector of the economy is poorly developed. The secondary sector is relatively weak with little manufacturing and value-adding activity taking place. In terms of commercial uses, there are plantation forests concentrated around Langeni, to the west of Umtata, and smaller cultivated forests around Lusikisiki. Of the remaining land, areas not used for settlement are typically subsistence farming with some semi-commercial agriculture.

The coastal area has been identified as a development area where most tourism and LED initiatives will be focused. Tourism will increase as soon as upgrading of infrastructure and road access takes place. Should the proposed Toll road and Pondoland National Park be developed, the development of Nyandeni, Port St Johns, Lusikisiki nodes and the settlements between them and Umtata would improve due to the unfolding economic opportunities. The focus on Port St Johns as a tourism centre will grow as the upgrading of infrastructure and road access takes place.

Because of its extensive under-utilised potential for forestry and other agricultural activities, particular emphasis is placed on the Mfundisweni cluster between Ntabankulu, Flagstaff and Lusikisiki.

3. Focus of development interventions

The rationale for targeted focus areas is similar to that of spatial development initiatives (SDIs), namely to "crowd in" investment from the private sector on a project-based approach. Hence, upgrading of service nodes and roads are planned to occur in tandem with projects to promote or improve livestock, forestry, tourism, agriculture, and other economic activities. Although the relative inaccessibility of these areas provide some protection against environmentally insensitive development the development of sustainable eco-tourism and mariculture activities requires at least some connectivity improvements such as upgraded access roads, river crossings and communication networks. The focus on Port St Johns as a tourism centre will grow as the upgrading of infrastructure and road access takes place.

Besides the Langeni forestry area to the west of Mthatha and the associated potential for timber products in Mthatha itself, there is extensive under-utilised potential for forestry and other agricultural activities in Ntabankulu, Flagstaff and Lusikisiki.

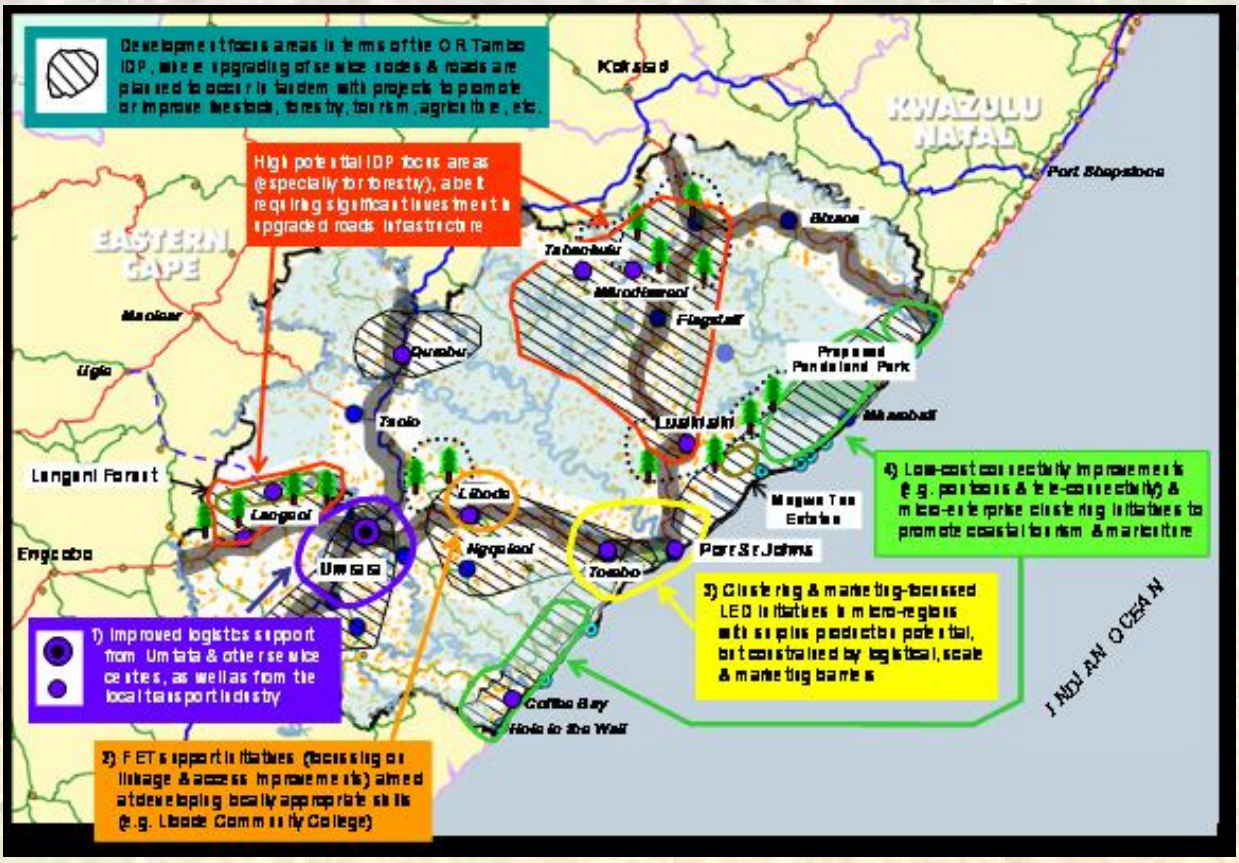


Figure 1 Concentration of economic activities in and around OR Tambo.

4. Development motivations

Motivations for choosing this area include the following:

- A large proportion of the area is still very isolated (inter-alia by the rugged topography – especially the deep river ravines along the coast);

- There is considerable latent economic development potential, which could be better utilised as a result of significant recent and well as significant improvements in "macro-accessibility" – referring here particularly to the recent paving of the R61 "missing link" between Port St Johns northwards to Lusikisiki;

- Lusikisiki's location on the provincial spine R61 leading to the relatively economically vibrant KZN south and the dominant inland node of Mthatha renders it a good candidate for exploring the potential for developing a hub-satellite network of nodes and linkages and allied logistics facilities and/or brokerage services. For example, at a meso level, Lusikisiki could provide warehousing facilities supplying a booming node like Port St Johns or Mbotyi [which do not have sufficient space and are also largely environmentally sensitive], while at a local level, it could be linked to a network of multi-purpose centres and periodic markets (stimulated by pension payout vehicles services). To some extent, Lusikisiki is already playing this role providing higher order services to satellite centres such as Flagstaff, Mbotyi, etc.; and

- Given the variety of transport services that serves Lusikisiki (formal buses, minibus taxis, bakkies, motorbikes, and non-motorised transport modes), and given the sometimes difficult terrain, and the location of socio-economic activities (Magwa Tea Estate, Flagstaff Municipal offices, PSJ tourism facilities, etc.), the potential for effectively demonstrating a sufficient range of integrated rural access interventions is relatively higher.

4.1 Hypotheses about the core problems and solutions options

The following diagram was developed and used as part of interactions with small business owners at the Tombo MPCC.

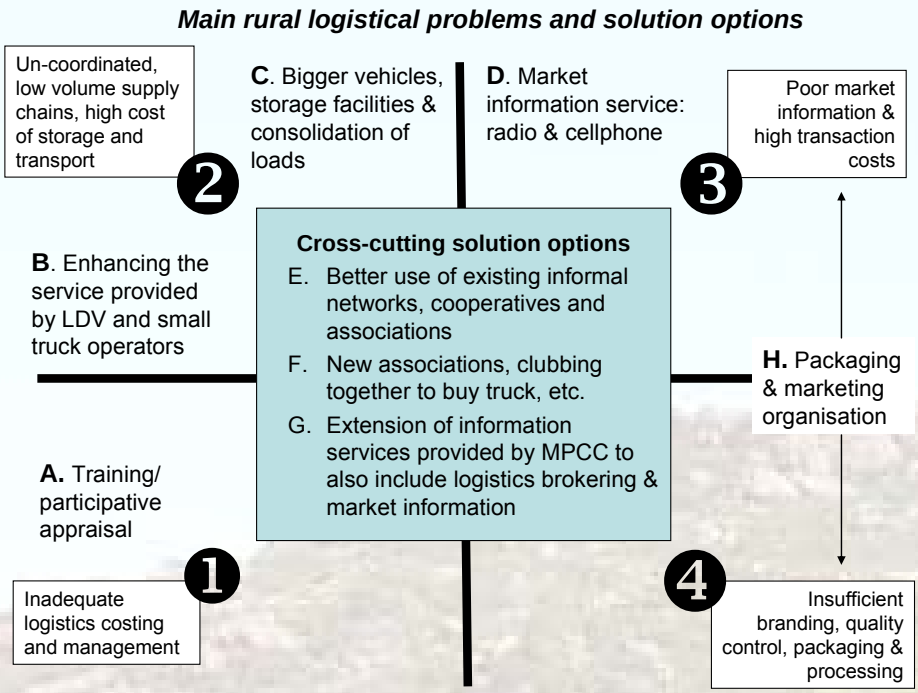


Figure 2: Main rural logistical problems and solution options

Following the main rural logistics problems and solution options a number of projects are proposed and on-going in the OR Tambo area.

Examples of projects that can realise significant economic potential are:

- Forestry (see 3 areas on map)
- Mariculture
- Agriculture (general)
- Beekeeping
- Vegetables
- Nurseries
- Cold storage
- Commercial cash crops
- Subtropical fruit small holding
- Proposed dairy farm
- 11 hectare commercial farm
- Agricultural development around Port St Johns (yellow area on map)
- Village-based infropreneurs

Appendix C – Regulatory Environment

1. Introduction

In Section 2.3 of the main document an introduction to the relevant legislation is provided and transport related legislation is covered. In this Appendix, a full overview is provided of the other relevant legislation, namely the Constitution, agriculture related legislation and other general legislation. The Appendix ends with a summary of the relative importance of the legislation for agro-logistics as a whole and summary of the legislation that affects individual products.

2. The Constitution

The Constitution plays a very important part in logistics due to the manner in which it assigns certain competencies to national or to provincial or local government.

One of the cornerstones of the Constitution is its operation over three spheres of Government – National, Provincial and Municipal. Each of these spheres has certain powers and duties based on their legislative and executive authorities.

National Government has an overarching authority over all matters, *unless* it falls within the exclusive areas of competence of a Province or Local Authority. Provinces and Municipalities, on the other hand, only have authority over the matters listed in Schedules4 and 5 to the Constitution. These may be exclusive (Schedule 5), or subject to joint or concurrent jurisdiction with National Government (Schedule 4).

This can be illustrated as follows:

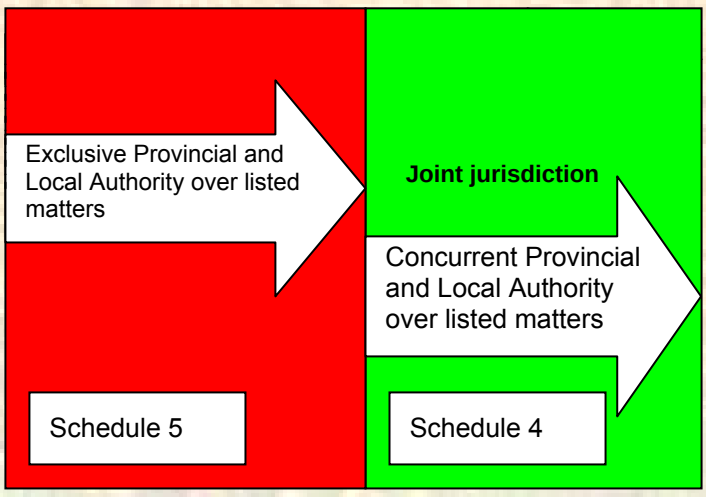


Figure 1 Illustration of national, provincial and local authority competencies

Schedule 4 is divided into two parts – A and B. The Schedule determines that the following matters that could relate to agricultural logistics are matters of *concurrent* national and provincial jurisdiction:

- Agriculture;
- Regional planning and development;
- Road traffic regulation;
- Urban and rural development; and
- Vehicle licensing.

In terms of Schedule 5, which lists *exclusive Provincial and municipal* authority[43], the following linkages are apparent:

- Provincial planning;
- Provincial roads and traffic;
- Markets (Municipal);
- Municipal abattoirs;
- Municipal roads;
- Street trading (Municipal); and
- Traffic and parking (Municipal).

It is clear from the above that some of the areas that would be pertinent to agricultural logistics could fall either under the joint jurisdiction of national and provincial/municipal government, or be the within the exclusive ambit of provincial/municipal authorities. In itself the mere division of these powers of course does not impact on logistics *per se.*

However, the *manner* in which the powers are exercised (if at all) and resultant aspects such as confusion as to who is actually responsible for what[44], capacity constraints on especially provincial and local level, and an unwillingness to politically intervene between national and provincial/municipal levels of Government[45] could and often does result in an extremely difficult environment.

On a perusal of some of the responses we believe that the Constitution to a large extent inadvertently is responsible for a lot of the problems being encountered. This ranges from financial and capacity constraints on provincial/local level, to differences in approach in applying legislation on a local level, to simple ignorance of what provinces or municipalities are supposed to do.

[43] i.e. to the *exclusion* of national prerogatives, unless certain strict criteria are met

[44] Especially on Schedule 4, i.e. joint jurisdiction, issues

[45] Not only unwillingness – there simply is no real remedy if a province does not perform

3. Agriculture

On face value agricultural legislation, in a sense, seem "simpler" than transport related legislation, or at least better organised with clearer policy objectives shining through. Perhaps this is partly the result of agriculture traditionally being approached more from a centralised perspective[46], with relatively few Acts being left to provincial or municipal authorities to implement or administrate, or maybe because most of the Acts are more technically oriented. The following Acts in our opinion are the most important:

3.1 Marketing of Agricultural Products Act, 1996

This Act is the successor in title (for lack of a better description) of the old Marketing Act of 1968 under which the marketing Control Boards used to function. All these Boards were phased out and accordingly cannot influence the logistics chain any more. As such the Act is "watered down" with respect to the powers left to intervene in marketing matters, and these are not really viewed as intrusive[47]. In essence the core remaining aspect is the power to authorise industry specific levies, and even the application of these have been limited to research and other issue of common interest.

Hence the impact of the Act on logistics *per se* would be rather limited. However, the National Agricultural Marketing Council is tasked with advising the Minister of Agriculture in marketing matters in general, and in this manner could exercise considerable influence. Furthermore, the Act *does* provide for a prohibition on the export of agricultural products under certain restricted circumstances, although this provision has never been used.

3.2 Perishable Product Export Control Act, 1983

This Act establishes the PPECB with the mandate to co-ordinate the transport of agricultural products from our harbours to overseas markets. Whilst this is the core function of the PPECB, that body is better known for inspection of export fruit. However, that particular function is simply performed on an agency basis for the Department of Agriculture in terms of the Agricultural Product Standards Act.

3.3 Agricultural Product Standards Act, 1990

This Act, as it name suggests, deals with the setting of standards for agricultural products. According to this Act a different scenario is set for internal and export marketing – internally the standards only require that if a product is sold according to a certain calls it must comply to the requirements for that class, i.e. a class two product cannot be sold as a class one product.

For exports the regime is somewhat different – products my not be exported unless they comply with the set standards. This is of particular importance to the fruit industry.

---

[46] Despite the fact that agriculture is listed as a "joint jurisdiction" matter in the Constitution, for example, no provincial marketing boards exist (yet).

[47] For example the power to co-operate and run pools is still there, but only on a voluntary basis.

The core functions of the Act are often undertaken by agents, for example in the case of fruit the PPECB.

3.4 Meat Safety Act, 2000

This Act applies to the slaughter of animals (sheep, goats, cattle, pigs, game, ostriches, horses, rabbits, chickens, ducks etc.) at abattoirs. As such it has little influence on logistics, save that live animals and meat and meat products have to be transported in a certain manner. Similarly, offal products have to be disposed of in a certain manner. This is one of the view pieces of agricultural legislation that has been largely delegated to provincial level. Inspection functions are undertaken on an agency basis by an independent third party.

3.5 Agricultural Produce Agents Act, 1992

This Act deals with the activities of commission agents that deal with livestock and fruit and vegetables. Such agents are registered with the Agricultural Produce Agents Council (APAC).

As such the Act itself has little impact on logistics. However, agents registered in terms of this Act operate on markets that are established in terms of local by-laws, and these markets are monopolies in the geographical areas they serve.

3.6 Fertilizers, Farm Feeds, Agricultural remedies and Stock Remedies Act, 1947

As such this Act deals with registration and control of fertilisers and farm feeds[48]. These have little direct effect on logistics, save that certain fertilisers have to be transported in a particular manner in terms of the Hazardous Substances act.

3.7 Co-operatives Act

In the past co-operatives had certain powers to influence the marketing of agricultural products, for example it had the power to force producers to sell its produce through a particular co-operative. These powers have largely been diminished, but some co-operatives still try and maintain this approach though its articles of association. De facto most co-ops have changed to companies, but some still maintain their co-operative modus operandi.

The Competition Commission has in recent years declared some co-operative type practices contrary to the provisions of the Competition Act. As such these practices can have a significant effect on logistics, e.g. by co-operatives or companies insisting that producer members make use of the storage facilities of that co-operative, or by refusing third party access to storage facilities. This is of particular concern in the grains industry, where storage facilities are concentrated in the hand of a few large agricultural companies.

3.8 Subdivision of Agricultural Land Act Repeal Act, 1998

[48] And dog food.

This Act repeals the Subdivision of Agricultural Land Act. It is not yet in force. In terms of the Act it repeals, farms cannot be divided into smaller units than what are viewed as “economically viable”. Once in force it can be expected that the characteristics of agricultural land distribution will change which in itself would have an effect on agricultural logistics.

3.9 Animal Health Act, 2002

This Act deals with animal diseases and the control thereof. Wide ranging powers are given to prohibit the movement of animals in order to curb the spread of disease. Some measures are permanently in force, for example to prevent the movement of certain disease carrying game lower than the “red line”, whilst others are dependent on the outbreak of disease. Needless to say this Act can have a major impact on logistics, depending on where and how it is implemented.

It is also linked to South Africa’s international obligations, for example to prevent the spread of certain diseases to the international markets.

3.10 Liquor Products Act, 1989

This Act deals with the standards to which certain liquor products must comply. As such it does not really affect logistics *per se*. However, it does affect the *type* and *standard* of products transported, and the means of transport.

3.11 Conservation of Agricultural Resources Act

This Act could impact on logistics in that permission is required to change land use, e.g. from grazing to horticulture. In turn this could have an effect on the type of agricultural activity taking place.

3.12 Genetically Modified Organisms Act, 1997

This Act provides guidelines for the experimentation and use of genetically modified organisms. As such it will become increasingly important in future as the debate on the use of GM crops heat up. In turn it could indirectly affect logistics, e.g. if larger yields result or if production of certain crops no longer take place.

4. General legislation

As mentioned previously, logistics is such a wide field that other legislation also can play an indirect role. *Per se* this legislation has perhaps a more indirect effect, and is perhaps not of that much significance. Examples of such legislation are:

- Agricultural Pests Act
- Plant Improvement Act
- Land Bank Act
- Animal Health Act
- Cosmetics and Foodstuffs Act
- Companies act
- Plant Breeders' Rights Act
- Sugar Act
- Competition Act
- Tax legislation
- Petroleum Products Act
- Pipelines Act

Local by-laws are also noteworthy, as these could indeed impact on logistics. However, given the number of local authorities, it is impossible to list them all. These would relate to:

- Health ordinances and regulations impacting on the transport of animals, milk and products
- Abattoirs
- Pounds
- Market ordinances

5. Relative importance of legislation

Although a subjective exercise, the following table gives some idea of the importance of all of the above-mentioned legislation for agro logistics:

Legislation	Very Important	Somewhat Important	Not very important
1.Constitution			
2.Legal Succession to Transport Services Act			
3.National Ports Act			
4.National Road Traffic Act			
5.National Roads Agency and National Roads Act			
6.Marketing of Agricultural Products Act			
7.Perishable Product Export Control Act			
8.Agricultural Product Standards Act			
9.Meat Safety Act			
10.Agricultural Produce Agents Act			
11.Fertilizer, Farm Feeds etc. Act			
12.Co-operatives Act			
13.Subdivision of 14.Agricultural Land Act			
15.Animal Health Act			
16.Liquor Products Act			
17.Agricultural Pests Act			
18.Plant Improvement Act			
19.Land Bank Act			
20.Conservation of Agricultural Resources Act			
21.Cosmetics and Foodstuffs Act			
22.Genetically Modified Organisms Act			
23.Sugar Act			
24.Plant Breeders' Rights Act			
25.Competition Act			
26.By-laws (Health, Markets, Abattoirs)			

Table 1 Comparative table of Legislation affecting agricultural logistics

6. Product specific regulatory regimes

6.1 General

The most important legislation affecting the agricultural products that this study focussed on, are set out above. However, whilst a "general" sense of importance for the different legislation has been provided, the legislation that affects individual products may in some instances have different levels of importance. Hence a summary of legislation and products that in one way or another "differ" from the general scenario is given below.

Product	Impact of legislation
Vegetables	**No specific issues, except perhaps the market dispensation on particular markets that may affect logistics.**
Deciduous fruit	**For deciduous fruit, the export-oriented and transport legislation would have the most impact, e.g. the harbour dispensation and facilities, rail and road transport, and quality approvals. These are set out in Figure 2.**
Citrus	**In principle it should be the same issues as for deciduous fruit, especially on the export markets. Hence the road transport, harbour and PPECB-type activities would be the most important.**
Subtropical fruit	**No legislation that has a particular impact on subtropical fruit *per se.***
Viticulture	**In essence the same legislative issues as for deciduous and citrus**
Summer cereals – Maize	**Mainly rail and storage-related issues. Storage *per se* is not subject to any act or regulatory regime. Could become a competition issue, hence potentially the Competition Act and its implementation could have an effect on the industry. Acts like the Genetically Modified Organisms Act could eventually affect production patterns.**
Winter cereals– Wheat	**Same as for maize.**
Oilseeds–Sunflower	**Rail transport issues. Issues such as load limitations on road transport, and storage related issues could be of concern.**
Rice (imports)	**Not really any real issues.**
Sugar	**No legislation that has a particular impact. Indirectly the Sugar Act may have an effect on production and marketing, in turn affecting logistics.**
Dairy (Milk and products)	**Health legislation and associated regulations, and by-laws, for example on the selling of raw milk, and transport requirements regarding transport of milk (e.g. refrigeration) would be important.**
Poultry	**Generally the legislation regulating poultry is as set out in Figure 2. However, of particular importance to the industry would be the Agricultural Product Standards Act and the Meat Safety Act.**
Fertilizer, feed and fuel	**The Petroleum Products Act provides for a pricing regime that applies to fuel (petrol and diesel). The way the system is implemented could have a major impact on logistics. In particular, the pricing regime is made up of different components, of which transport is one. This would have an effect on road transport and pipeline transport, and which of these are used. The Petroleum Pipelines Regulator (NERSA) approves tariffs for pipelines, which could have an effect on pricing of transport of fuel, and hence an impact on logistics. Transport of fertilizers could be affected by road and trail transport regulations relating to the transport thereof.**

Table 2 Legislation affecting specific agricultural products

Appendix D – International Agro-logistics Trends and Best Practice

An extensive literature search on international trends in agro-logistics delivered reports mainly on developments in the Netherlands and Australia. These developments focus to a large extent on the use of Information and Communication Technology (ICT) and initiatives to encourage innovation that will lead to improved efficiency.

The Netherlands

In the Netherlands, agricultural products account for more than 20% of all goods transport and 52% of the agricultural products are transported by road[49]. This contributes significantly to the problems of congestion and pollution. The Dutch are therefore looking for intelligent logistics solutions that will reduce the amount of (especially road) transport, congestion, pollution as well as the space required.

In 2000 the Dutch government and agricultural industry established "Platform Agro-logistics", an initiative to encourage innovation in order to improve logistics efficiency in the agricultural sector. Platform Agro-logistics gave rise to "Vision Agro-logistics", which was published jointly by the Ministry of Agriculture and the Ministry of Transport in 2001. The Vision is built on three pillars[50], namely:

1. Clustering – grouping primary production, processing and distribution companies geographically in agribusiness parks, thereby reducing the need for transport and providing opportunities for using each other's by-products and setting up industrial ecosystems.
2. Connectivity – consolidating input and product streams into thicker streams that require fewer kilometres per vehicle and linking clusters with multimodal transport solutions.
3. Directing – organizing and managing agricultural product flows that do not necessarily pass through the Netherlands physically, by using ICT to improve efficiency and food safety. (E.g. a virtual auction will reduce the need for transport, improve animal welfare and reduce the risk of spreading diseases.)

The following developments that impact on agro-logistics were identified[51]:

[49] Kranendonk, R & Kersten, P. 2005. Mid-life CoPs: Experiences and Alignment. In: Proceedings of I-KNOW '05, Graz, Austria. http://i-know.know-center.tugraz.at/content/ download/408/1601/file/Kranendonk_paper.pdf

[50] Plaftorm Agro-logistics. Improving logistics for the agricultural industry (brochure). http://www.agrologistiek.nl/upl_docs/Improving%20logistics.pdf

[51] Plaftorm Agro-logistics. 2001. Vision Agro-logistics. http://www.agrologistiek.nl/upl_docs/visie%20agrologistiek.pdf

Development	Impact
High consumer demands (quality, assortment, time, place)	**Increase complexity of logistics**
Supply chain reversal (consumer demand pull rather than producer supply push)	**Increase retailer power & frequency of deliveries**
Increased resolution of distribution networks and fragmented goods flows	**Increase total distance travelled to deliver (frequently) to all clients**
Larger supermarkets & megastores (up to 100 000 different products)	**Increase complexity of logistics due to number of products**
Increased scale of agrodistribution	**Increase need for collaboration between suppliers to bundle goods flows** **Outsourcing to LSPs**
Globalisation & liberalisation	**Increase in international logistics**
Sustainability	**Pressure on companies to reduce transport & pollution and improve food safety and animal welfare**
Regulations to limit traffic	**Limited delivery hours, increased costs**
Traceability & food safety	**Need for ICT and separate transport of products**
Underutilisation of ICT & lack of innovation	**Inefficient logistics**

Table 1 International developments that impact agro-logistics

The following examples of innovation projects address one or more of the pillars[52]:

- Agribusiness parks.
- Distrivaart – intermodal network combining the use of inland waterways and road transport for transporting Fast Moving Consumer Goods (e.g. beer) between producers and supermarket distribution centres.
- EFFORRT (European Food and Flower Overland Road and Rail Transport) – long-distance express train for the combined transport of passengers, perishable products and other time sensitive goods
- Underground logistics system – a transport system without delays to link the Alsmeer flower auction, Schiphol airport and the rail network.
- Use of bus lane during off peak for delivery vehicles.
- Virtual cattle auctions.
- Virtual import and export inspections.
- Tracking and tracing in flower and meat supply chains.

The activities and projects of Platform Agro-logistics have since been designed to support Vision Agro-logistics. It is up to the partners in the various agro-logistics networks to build the three pillars. This, however, requires looking beyond individual companies' interests at the bigger picture. The Platform provides role-players in agriculture with the opportunity to develop innovative solutions to improve logistics efficiency. It does not subsidise

[52] Plaftorm Agro-logistics. 2001. Vision Agro-logistics. http://www.agrologistiek.nl/upl_docs/visie%20agrologistiek.pdf

projects, but instead provides mentors to guide project participants. The Dutch government sees its roll as encouraging collaboration and removing unnecessary obstacles.

Examples of pilot projects include[53]:

- Dairy Park – clustering a company that makes cheese, milk powder and whey with related businesses next to the motorway. Transport is reduced and water and heat are re-used.
- Poultry meat chain – clustering the companies involved in different stages of the poultry production chain in one location, thereby minimising the need for transport and improving animal welfare.
- Four-leaf clover – new greenhouse area with rail terminal for (off-) loading of pallets and "fresh food park" where products can be traded and processed (e.g. ready meals).
- Check Trade – the development of intelligent inspection methods based on risk profiles for imported and exported agricultural products. This speeds up the flow of products and reduces the cost of inspection.
- Fresh Logistics Network – aims to improve the efficiency of perishable products transport (especially flowers and ornamental plants) by separating the flow of information from the physical flow of goods.

An agro-logistics Community of Practice (CoP) has been formed to share knowledge and experiences amongst participants of the different pilot projects and to help search for solutions[54]. Creative workshops are organised for the CoP.

Holland International Distribution Council (HIDC)[55] is a private non-profit organisation that aims to strengthen the competitiveness of the Dutch logistics sector in the European market and provides matchmaking services for logistics partnerships in Europe. It also promotes knowledge development and application in order for the Netherlands to maintain its leading edge in logistics. Its knowledge development programme consists of the following themes:

- European logistics networks
- Multimodal networks
- Intelligent logistics
- Regional logistics projects
- Agro-logistics, as a crosscutting theme that links with Platform Agro-logistics.

HIDC collaborates with its members, knowledge institutions and other organisations to develop knowledge and also plays an active role in the dissemination of the outcomes of the knowledge projects. HIDC participated, for example, in the Distrivaart project (see above) and in developing a guideline document for consolidating agricultural loads[56]. They are currently participating in the Fresh Logistics Network (see above).

---

[53] Platform Agro-logistics. Springplank voor groene netwerken (brochure) http://www.agrologistiek.nl/upl_docs/3227_brochure_agrologistiek.pdf

[54] Kranendonk, R & Kersten, P. 2005. Mid-life CoPs: Experiences and Alignment. In: Proceedings of I-KNOW '05, Graz, Austria http://i-know.know-center.tugraz.at/content/ download/408/1601/file/Kranendonk_paper.pdf

[55] www.ndl.nl

[56] Michon, M, Duineveld, M & Groothedde, B. 2003. Stappenplan ,'Bundelen en samenwerken doe je zo!' Buck Consultants Int, A&F, TNO Inro report. http://www.ndl.nl/files_content/pdf/ToolBook_Bundelen_Doe_Je_Zo-dec2003.pdf

Transforum Agribusiness and Rural Areas is a private non-profit organisation with a large network in knowledge institutions, industry, government and NGOs. It promotes knowledge development and application for sustainable agricultural and food sectors and provides matchmaking services for parties with innovative ideas. Examples of projects include:

- Agribusiness cluster Gent-Terneuzen – new greenhouse area combined with fertilizer and ammonia producers. A biomass fermentation plant will produce biogas from by-products, which will be used to generate electricity for the greenhouses.
- Flor-i-log (International Information and Intelligence for FLORiculture LOGistics) – the development of an international network to manage the distribution of ornamental plants directly from grower to market instead of via an auction in the Netherlands.
- Knowledge management – investigating how companies develop and manage knowledge gained from international agrifood networks by analysing five agricultural case studies and five case studies from other sectors.
- Netchaingame – management game to study the decision making processes of role-players in the agricultural and food sectors. The current focus is on sustainable production, transport and marketing.
- New mixed production – clustering horticulture and animal production in order to provide each other with inputs and by-products. Also investigating the production of biogas from manure and the use of biogas to generate electricity. The project links with Platform Agro-logistics.

In 2003 the Advisory Council of the Dutch Ministry of Transport, Public Works and Water Management investigated the logistical challenges for the Dutch economy[57]. Recognising that there is a backlog in the construction and maintenance of infrastructure, the report focuses on logistical challenges which business can deal with relatively quickly with limited government investment. The role of government is to create the right conditions and exert a positive influence on the behaviour of business.

The main challenges were to

- Improve domestic distribution efficiency by 20% in five years,
- Achieve a 10% modal shift from road to other forms of transport within five years, and
- Bring together businesses in the same value chain in spatial clusters linked by congestion-free (European) networks.

It was recognised that shippers and receivers had not been involved directly in freight policy, which reduced its effectiveness. Also, the transport and logistics policies were fragmented and spread over various authorities and government departments, which resulted in poor coordination and policies not always addressing the needs properly. The Advisory Council proposed that the Transport and Distribution Policy be evolved into an Integrated Logistical Chain and Innovation Policy, which includes the Transport and Distribution Policy[58].

---

[57] Advisory Council for Transport, Public Works and Water Management. 2003. Logistics challenges for the Dutch Economy, http://www.raadvenw.nl/data/media/pdf/executivesummaryigv.pdf

[58] The Transport and Distribution Policy aims at “reinforcing the domestic and international competitive position of the Dutch transport and distribution sector” whereas an Integrated Logistics Chain and Innovation Policy aims at “reinforcing the economic position of the Netherlands in the supply chains of the (inter)national business community”.

The following action programme was proposed to address the main challenges:

- Develop a national urban distribution framework, which will allow deliveries on a 24-hour basis with special environmentally and urban friendly vehicles.
- Influence the mode of transport selected by shippers and receivers through financial incentives. E.g. a nominal discount on the corporate tax owed by the party paying for the transport – a fixed amount per ton-km or TEU-km that is shifted from road to rail, inland shipping or short sea shipping. Therefore, no investment grants are given to transport companies, but a fiscal scheme is introduced that will only cost the government money if the shippers and receivers actually use it.
- Develop an interdepartmental spatial clustering policy to strengthen and optimise value chains. The spatial industrial clusters should be linked to multi-modal transport networks to provide them with a logistics advantage.

In order to implement the action programme the Advisory Council proposed setting up a Task Force on Logistics and the Economy for a period of five years. This Task Force should consist of the directors-general of relevant government departments and representatives from the business community (including producers, retail, logistics service providers and the various transport modes). The Task Force should have sufficient funding for its own activities as well as for research projects and co-financing of public-private initiatives.

Australia

Australia is by far the largest exporter of wool in the world, the largest exporter of beef and veal, the second largest exporter of wheat and the third largest exporter of cotton and diary products. (Although 20% of Australia's fruit and vegetable production is exported, it is only 0.5% of world exports.) This makes Australia a suitable country to benchmark against.

Smart Freight

The Government of the state of Victoria, Australia, is providing Aus $4 million over a period of four years (ending June 2007) for the Smart Freight project. The project aims to improve efficiency and reduce congestion in Port of Melbourne supply chain through the development and implementation of ICT tools. The Port of Melbourne handles approximately 40% of Australia's container traffic and it generates about 100 000 shipping transaction documents per day. In a parallel initiative, the Business Activity Harmonisation Study examines the impacts of "mismatched" working hours in the transport, distribution and logistics sector.

***Benchmarking technology on the Australian Waterfront – implications for agricultural exports*[59]**

In 2002 the Rural Industries Research and Development Corporation (RIRDC) of the Australian Government commissioned a study to assess the use of container-related technology[60] and management systems within

[59] Access Economics Pty Ltd & Maunsell Australia Pty Ltd. 2002. Benchmarking technology on the Australian Waterfront – implications for agricultural exports, RIRDC Publication No 02/116. http://www.tradegate.org.au/news-centre/reports/RIRDC-Benchmarking-Technology.pdf

[60] Technology is here defined as equipment, software and systems, and work practices that relate to their use.

stevedoring and its immediate ship and shore-side interfaces in three Australian ports, and to compare it with selected international ports. The focus was on containerised agricultural exports, namely meat, diary, wool and cotton.

The reform of industrial relations in the Australian ports since 1998 has given stevedores much more control over their business. As a result they invested heavily in technology, which resulted in a significant improvement in productivity. Technological improvements included new cranes and container handling equipment as well as improved management and planning software and systems. The study found that the improvement in labour productivity and the investment in technology are interrelated. Companies were only prepared to invest in technology once labour productivity had improved significantly, which in turn made it more worthwhile to implement better technologies.

In Table 2 the various best practise technologies in use in the export of containers worldwide as well as their benefits, are summarised. In Table 3, benchmarking data for a number of ports, including Durban, are summarised.

Table 2: Technology and the Export Supply Chain

	Road	Rail and Intermodal Terminal	Port	Container Terminal	Ship
Technology Issues – Best Practice	1) *Vehicle Booking System (VBS)* Retinue slots to deliver and pick up containers 2) *24 hour operation* at terminal 3) *GPS Tracking Systems* 4) *In-cab Monitoring* 5) *In-cab Communications* (2-way radio, mobile phones, computer)	1) *Documentation/EDI* allows data entry reduces transaction costs and transmission errors. software and error reducing software to electronically produce and despatch consignment note (waybills) 2) *Rolling Stock Information and Control Systems (RICS)* integrate wagon booking system with daily and master train plan 3) *On-Line to Rail Terminal and Ship, Automatic Equipment Identification (AEI)* utilisation and reduces inventories. 4) *Longer Trains - Double Stacking*	1) *Port Community Systems* allow port stakeholders to share information over a dial up network 2) Web camera systems, providing real time video over the internet to stakeholders	1) *Gate Automation and Automatic Equipment Identification (AEI)* use of transponders, or swipe cards to read truck and container information, verifying location for discharge. AEI updates database information on container movement. 2) *Yard Planning*, finds free locations, calculates best stacking patterns. 3) *Container Movement Control*, automatically sends instructions to equip operators to maximise equipment utilisation and minimise empty returns on next task, based on twist lock activation. 4) *EDI/E-Commerce* links digital linkage throughout the export chain, paperless transmittal of information. 5) Container Monitoring - through out the chain - particularly reefer boxes, Cold chain Management of produce.	1) *Vessel Planning of ships* electronic communication of ships log plans and container information to terminal operators prior to arrival facilitates more efficient unloading 2) *Draught Under Keel Clearance Systems* in shipping channels allows optimising of tidal conditions to draft of the ship to maximise ship loading for the conditions and widen the tidal windows. 3) *Newspapers / Media* whether shipping newspaper, and increasingly on the internet, advising of schedule, port arrival and departure times 4) *Ship Size*
Benefits	1) Reduces delays and congestion, speeding up truck turn around time, allows terminal to allocate receival resources efficiently. 2) Ensures sufficient straddle carriers/forklifts are on hand for the workload. Allows greater flexibility in operations, avoids peaks. 3) Security – know where the consignment is at any one time. Also allows trucks to be directed to closest next job, thus reducing empty running. 4) Allows immediate monitoring of reefer containers without driver leaving the cab 5) Minimises empty running, maximises productivity, optimal truck utilisation.	1) Single rather than multiple data entry reduces transaction costs and transmission errors. software to electronically produce and despatch consignment note (waybills) 2) Efficient utilisation of resources avoids peaks, gives predictability at loading and unloading end. 3) Allows speedy information flow avoids delays, information transaction costs. AEI improves equipment utilisation and reduces inventories. 4) This allows trains to operate at optimal efficiency and cost. Currently this system only operates on the Adelaide to Perth corridor.	1) Allows speedy information flow, avoids delays, information transaction costs. 2) Of benefit to trucking firms, allowing them to gauge road conditions and for others to provide a check on general port access conditions.	1) Reduces truck delays and congestion improves terminal receival efficiency. AEI provides accurate and timely equip. status, automates inventory keeping and improves equip. utilisation, reduces inventories, and increases stock turn. 2) Maximises yard stacking density and space. 3) Optimises equip. movement and reduces misplaced containers. 4) Allows speedy information flow avoids delays, information transaction errors and costs. 5) Detects problems instantly, ensures quality through to final user.	1) Speeds up discharge/load, reduces ship time in port 2) Allows ship to load to maximum deadweight given particular tidal conditions, increases amount of net cargo/containers carried, thus maximizing ship utilisation and reducing port dredging requirement and cost. 3) Allows speedy information flow, avoids delays, information transaction costs. 4) Economies of scale and the rationalisation of costs

Table 3: Technology on the Waterfront: Benchmarking Result

	Vehicle Booking			Yard Planning				Container Tracking and Monitoring				Productivity					Throughput
	Have VBS	Automatic Gate Entry	VBS allow return booking	Ship Planning Software	Yard Planning Software	Yard Optimising Software	Plans for Robotics	Have Tracking Facility	Internet or Dial up	Real time monitoring of reefer containers	Remote fault diagnostics of reefers	VBS	Yard Planning	Cont. Track and Monitoring	Current Crane rate (hour)	Truck Turnaround rate (minutes)	Containers handled 2000 (No. TEU)
Tauranga	No	N/A	N/A	Navis Sparcs	Navis Sparcs	Navis Sparcs	No	Yes	Both	Not real time, manually read, uploaded to web	No	N/A	10%	Nil	Gross (no deductions) 32	12	180,000
Auckland	No	N/A	N/A	Yes	Yes	Yes	No	Yes	Both	No	No	N/A	No comment	No comment	28-29 gross. 22-23 net	20	521,690
Manila ICTSI Terminal	No	N/A	N/A	Yes	Yes	Yes	No	Yes	Internet	No	No	N/A	Improved	No visible improve, cust. Service	22	44	969,502
Durban	No	N/A	N/A	Cosmos	Cosmos	Cosmos	No	Feb 02	Internet	No	No	N/A	30% increase Yard Prod	Expect vast improvement, I based, Investigating intro DGPS	Net 22, Gross 30	35	1,291,100
Felixstowe	Will intro. In 2002	N/A	N/A	Navis Sparcs	Navis Sparcs	Navis Sparcs	RTG systems, ready to evolve to automation	Through FCPS Community System	Internet	No	No	N/A	Imp. Equip Utilisation & Optimisation, & stacking density without penalising performance	N/A	21	46	2,700,000

Oakland	10 Term., most have VBS	No	No	Yes	Yes	Most - constrained by work practice	No	Yes	Both	No	No	Anecdotally noted increase	Anecdotally noted increase	Anecdotally noted increase	30 gross	27	1,776,922
Vancouver-Centerm Terminal	Yes	Yes, just installing	No	Yes, just Purch. Sparcs Express	Yes	No	No	Yes	Internet	No	No	Currently install., expect 50% increase	N/A	N/A	24 gross	N/A	1,163,178
Vancouver -TSI Vanterm	Yes	No	No	Yes	Yes	Yes	No	Yes	Both	No	Yes	Smooths peaks, reduced congestion, increased turnaround time	Better control, reduced double handling	Reduced customer phone enquiries	23.86 gross	18	301642 TEU
Brisbane	Yes	Being introduced	Being looked into	Yes	Yes	Yes	Trailing	Planned	Not as yet	Not as yet	Not as yet	Smooths peaks, reduced congestion, increased turnaround time	Big improvement in Productivity	N/A	23.5	25	0.5m TEU
Sydney	Yes			Yes	Yes	Yes		Planned	Not as yet	Not as yet	Not as yet			N/A	28.4	33	1m TEU
Melbourne	Yes			Yes	Yes	Yes		Planned	Not as yet	Not as yet	Not as yet			N/A	31.3	30	1.3m TEU

***Evaluating logistics chain technology – Australian farmgate to port*[61]**

Following on from the study on the use of technology in Australian ports, there was a need to investigate the use of technology upstream in the agricultural supply chains from the farm to the port. The study focussed on the use of technology in the land-based containerised export supply chains of meat, cotton, wool, grain, fruit and vegetables, and diary. Five broad categories of supply chain technology systems were investigated, namely

- booking systems,
- tracking systems,
- cold chain systems,
- compliance and documentation systems, ands
- ordering and payment systems.

The tables below[62] list the levels of technology available in each category, from manual to automated systems. The use of technology is considered to reduce logistics costs and the risk of goods being damaged in transit, while also increasing the speed, security and reliability of delivery. In future, the use of technology such as electronic reporting, electronic container seals and container X-ray scanners will become essential in order to comply with the new European and North American safety and security requirements, such as farm-to-fork traceability, the Container Security Initiative (CSI), the 24-Hour Rule, the Customs-Trade Partnership Against Terrorism (C-TPAT) and the Bio-Terrorism Act.

[61] Access Economics Pty Ltd & Maunsell Australia Pty Ltd. 2005. Evaluating logistics chain technology – Australian farmgate to port, RIRDC Publication No 04/188.
http://www.agric.uwa.edu.au/ARE/AARES/Conf2005/PapersPDF/ParkinsonAARES%202005.pdf

[62] Source: Access Economics Pty Ltd & Maunsell Australia Pty Ltd. 2005. Evaluating logistics chain technology – Australian farmgate to port, RIRDC Publication No 04/188.
http://www.agric.uwa.edu.au/ARE/AARES/Conf2005/PapersPDF/ParkinsonAARES%202005.pdf

Table 1: Technology in Booking Systems

1	Manual booking in person, by mail or courier.	
2	Booking by phone or fax	
3	Online booking system	
4	Automatic booking	More Advanced ↓
5	Dynamic booking through tracking system	

Table 2: Technology in Tracking Systems

1	Manual recording in or out of inventory	
2	Scanning barcodes or RFID to record in or out of inventory	
3	Links between scanning barcodes or RFID in or out of inventory and ERP	
4	Links between scanning barcodes or RFID in or out of inventory and customers or suppliers	
5	Links between scanning barcodes or RFID throughout production process and ERP	
6	Links between scanning barcodes or RFID throughout production process and customers or suppliers	
7	Links between scanning barcodes or RFID at multiple points along logistics chain and ERP	
8	Links between scanning barcodes or RFID at multiple points along logistics chain and customers or suppliers	
9	Auditing and quality management	More Advanced ↓
10	Constant tracking of goods via GPS	

Table 3: Technology in Cold Chain Systems

1	Basic manual checks	
2	Manual logging	
3	Data loggers	
4	Automatic feedback from data loggers to refrigeration unit	
5	Auditing and quality management	More Advanced ↓
6	Combining data loggers with tracking systems	

Table 4: Technology in Documentation and Compliance Systems

1	Manual submission and receival of documents in person or by mail or courier	
2	Online submission of documents, manual receival of documents	
3	Online submission and recieval of documents	More Advanced ↓
4	Automatic submission and recieval of documents to all parties in the transaction	

Table 5: Ordering and Payments Systems

1	Manual ordering and payments in person or by mail or courier	
2	Ordering and payments by phone or fax	
3	Online ordering and payments system – Email	
4	Online ordering and payments system – Webform	
5	Online ordering and payments system – EDI (proprietary)	
6	Online ordering and payments system – XML (open)	More Advanced ↓
7	Automatic, open ordering and payments system	

For the effective use of many technologies, access to computers and the Internet is required by all links in the supply chain. The 2002 survey of the Australian Bureau of Statistics showed that 53% and 43% of Australian farms used computers and the Internet, respectively, for business operations compared with 84% and 72% of all Australian businesses (excluding agriculture). The rates of usage varied with the agricultural commodity, State and estimated value of agricultural operations. In the transport and storage industry 82% and 67% of Australian

businesses had access to computers and the Internet, respectively. The main Internet applications used were email (71%) and Internet banking (62%), while it was used to a lesser extent to exchange electronic forms with trading partners (38%), participate in online sites or electronic market places that connects many buyers and sellers (23%), track customer orders or inventory online (13%) or undertake mobile commerce such as fleet management and remote monitoring (6%).

Technologies used in the road transport industry to reduce transport time and costs and to increase reliability and safety, include

- on-board weighing and automated cubing to determine the dimensions of the freight,
- Electronic Control Units (ECU) to measure driver and engine performance,
- in-vehicle navigation systems (e.g. GPS) to select the best routes and track vehicles, as well as
- barcodes and RFID for scanning items as they are loaded onto or off the truck.

Technology in use to reduce the impact of regulations on the road transport industry include

- Safe-T-Cam, which uses digital camera technology to read the front number plates of heavy vehicles in order to monitor speed and driving hours,
- Weigh-in-motion systems to ensure that trucks comply with maximum mass limits, and
- Intelligent Access Program (IAP), a voluntary program that uses satellite-based ECU systems to monitor freight vehicles. Benefits include permission to carry heavier loads on approved routes and changing their hours of operation, thereby increasing vehicle utilisation.

For the specific commodities investigated, the following was found:

- Meat: a standardised system allowing for full paddock-to-plate traceability through a two-part process has been developed for the meat industry. The National Livestock Identification Scheme (NLIS) uses read/write RFID ear tags to track the animal from birth to slaughter. The Portmark system, which uses EAN.UCC barcoding, is then used to track pallets ad cartons of meat from the slaughterhouse to retail outlets. Some of the State governments have made these systems compulsory.
- Cotton: the cotton industry has been using barcodes on cotton bales since the 1980s. The industry is dominated by five large companies, three of which are multinational agribusinesses that have integrated computer-tracking systems in all their production and export facilities around the world.
- Wool: the wool industry consists of a large number of small players with little coordination amongst the players, which inhibits the adoption of industry-wide technologies that will result in large industry-wide cost savings, but small individual cost savings. There is a need to improve weighing technology on farm to reduce the number of overweight wool bales that cause bottlenecks in the export supply chain.
- Grain (wheat): most of the wheat is exported in bulk rather than in bags or containers. There is a trend towards containerisation in order to control product quality and deliver small quantities directly to the customer. However, the weight of a container of grain exceeds some of the cargo handling equipment and rail bridges.
- Fruit and vegetables: the most important issue is temperature control, for which advanced technology is now available to monitor temperature, humidity and other parameters in real time.
- Diary: as with fruit and vegetables, temperature control is a key priority. An Australian Quality Logistics standard (AQL1) has been developed that combines the use of data loggers with other management and tracking systems to ensure cold chain integrity.

For a company to adopt new technology the benefits have to offset the cost. Often the full benefit can only be derived when a critical mass of role-players in the industry or supply chain adopt the same or a compatible technology. This is difficult in a fragmented industry with large numbers of small players. Industry bodies can help to coordinate the adoption and standardisation of technology within an industry. Lack of reliable communication infrastructure in rural areas also constrains the use of ICT, thereby affecting the whole supply chain.

Australian wine industry: a focus on industry collaboration[63]

The wine industry of the 1980's and other upstream agricultural producers' challenges compares directly with South Africa's producers' problems of today:

» There are many small producers, each acting more like a cottage business
» They have insufficient revenue and capital to create a brand for themselves, to grow market share and increase revenue;
» The volatility of their current revenue makes exporting imperative, but the costs and skills are too high on their current capital base
» Low margins and profitability means that additional external capital is almost impossible to obtain from commercial sources that could fund an export or domestic expansion
» The potential for growth is more likely to come from new product niches that attract new customers into the market than from converting someone else's existing customers. However, predicting which niches and which customers isn't always clear or easy;
» The many small producers were powerless in negotiations with the few companies that controlled the distribution channels. These companies had very little interest in supporting new product sources and they were very skilled at "divide and conquer" techniques to ensure they got the best of any deals that they did want to do;
» Where a few producers have been able to market their products overseas it has taken them five years to establish a distinctive brand, with a trusted reputation for a quality product. These are essential for a vendor to differentiate itself from the competitive "noise".

In the past two decades Australia has transformed the wine and tourism industries from net importers into exporters that generate almost $20 billion a year in export revenue.

This situation was turned around for the Australian Wine Industry with concerted actions implemented over the long-term. Much of this action had to do with collaboration, integration and actual pooling of stock.

The Australian Wine and Brandy Corporation (AWBC) was formed in 1981 under an Act of Parliament as a successor to the Australian Wine Board. This was originally set up in 1929 for the purpose of improving the quality of wine and brandy, and promoting the sale of wine and brandy in Australia and overseas. At the time of the formation of AWBC, wine imports were greater than exports - though domestic wine consumption was strong. The

[63] Higgs, P.L. and Kennedy, T.A. From cottages to corporations - Building a global industry from Australian creativity, 12 December 2003, available at http://www.cultureandrecreation.gov.au/cics/Access2Markets_FP.pdf], accessed 15 February 2006

AWBC was committed to changing the overseas perception of Australia as a bulk wine producer to a producer of quality wines at competitive prices and to do that through a collaborative effort.

In 1992, with Australian wine exports on the rise and reaching $200 million, the Australian Wine and Brandy Corporation established the Australian Wine Export Council (AWEC), as a wine promotional body with a target of $1 billion in wine exports by the year 2000. The extraordinary success of the Australian wine industry is highlighted by the fact that the $1 billion target was achieved a year earlier than predicted. This growth has continued with $2.38 billion in exports achieved in 2002/03. This result represents a substantial leverage from the annual budget of approximately $14 Million dollars of the AWBC.

The success of the Wine industry was not just a result of good marketing. The quality and efficiency of the grape growing and the wine production process has improved dramatically as a result of a substantial investment in research and development by many parties, once again in a collaborative fashion. For instance, the Grape and Wine Research and Development Corporation contributes around $11 million per annum towards viticulture and wine research and innovation.

The overarching strategies that ensured its success were:

» Collaborative market access strategies;
» Market support;
» Subsidies to ensure solid and trustworthy data collection; and
» Pooling of resources in the supply chain and the pooling of actual stock

A peak industry group to represent all key stakeholders were established including industry associations, industry members, government, researchers and academics and the training sector.

The Australian Wine and Brandy Corporation collects monthly statistics for the wine industry through a mechanism of export licensing which makes it very effective and consistent. The methodology of collection and analysis has to be consistent across the various sectors and over time so that specific trends, for instance changing levels of cross-over activities, can be tracked. As an incentive to contribute their data, individual organisations and companies would be able to compare their own performance against that of their peer group or peer sector which would be advantageous in business planning.

Only by implementing a whole-industry approach to industry and market information, could timely and accurate data be obtained on export activity, R&D investment and marketing investment.

The Australian Wine industry as recently as the 1970s was viewed internationally as producing “Chateau Cardboard” that was shipped overseas in bulk and consumed in bulk. The Australian Wine and Brandy Corporation (AWBC) over a period of two decades was able to substantially raise the quality and variety of Australian Wines from all of the producers, both small and large. But just as importantly, it has tracked this quality improvement with marketing campaigns to ensure the overseas target markets consider, acquire and re-purchase Australian Wines. This was done at the wholesaler, retailer and consumer levels.

Chile

It is reported that since privatisation in 2000 the Chilean ports have become much more efficient and traffic through the ports has increased[64]. This has not been achieved through large infrastructure investments, but rather by upgrading technology and improving operational efficiency. The Port of San Antonio now moves an average of 43 containers per hour, which is more than the USA and European average. At the Port of Valparaiso, which exports 62% of Chile's fruit, the average waiting period to berth is 30 minutes and the port can handle 23 000 TEUs per hectare in transfers.

Canada

Agriculture and Agri-Food Canada (the Canadian Department of Agriculture) developed a free, easy to use financial tool called "Benchmark for Success" to benchmark farming operations with peers and competitors[65].

[64] Latin Trade, Dec 2005.
http://www.latintrade.com/dynamic/index.php?pg=site_en/pastissues/Dec05/tradelanes1.html

[65] www.agr.gc.ca/ren/BenchmarkApps/apps_e.cfm

Appendix E - Typologies

E.1 Supply chain typology: Grain

E.2 Supply chain typology: Meat / Dairy

E.3 Supply chain typology: Fruit

E.4 Supply chain typology: Fresh market products

E1 SUPPLY CHAIN TYPOLOGY: GRAIN

Logistics profile

High volume, low value, not perishable, bulk handling, incensitive to transport, high seasonal activity

	PRODUCTION UNIT	NET INCOME INDICATOR	OWNERSHIP AND MANAGEMENT	SC CHARACTERISTICS	SC CONSTRAINTS	SUPPORT REQUIRED
COMMERCIAL	**LARGE COMMERCIAL**	>R0.5 million	Corporate	High volume, harvest mechanised, bulk transported, large central storage shared. Much logistical equipment owned and used seasonally. Market via co-ops	Access to reliable cost-effective transport (rail) Compete for shared resources (silos) Transport a high proportion of cost	Rail links, silos Effective transport for distant producing regions. Market interpretation.
	MEDIUM COMMERCIAL	R100 000 to R500 000	Private	As above but equipment shared/hired.	Dependent on logistics providers, require business alignments. Transport cost high.	As above
EMERGING	**THRESHOLD COMMERCIAL** **(Land Reform)**	Up to R200 000	Communal ownership Development project Private ownership	Partially mechanised, some hand harvested, non-bulk transport. Equipment hired.	Administrative. Incorporation with normal commercial logistics. Lack of access to knowledge and harvest equipment.	Co-operative logistical solutions or through commercial farm channels
	EMERGING FARMER (Ex-homeland)		Private / communal	As above. Almost all hand harvested.	The decision-making capacity in respect of production and logistics. Bulk storage capacity	Coordination to achieve economies of scale Small-farmer friendly interfaces (e.g. markets, information dissemination)
	SUBSISTENCE FARMER		Private No formal market participation	Low volume Low production density Uncoordinated SC volumes		

LOGISTICS NEEDS FOR	PRODUCTION UNIT	INPUTS FOR PRODUCTION	PROCESS	OUTPUT
EMERGING COMMERCIAL AND (LARGE MEDIUM)	**THRESHOLD COMMERCIAL (Land reform)**	Fertilizer, diesel, basic machinery, hire of harvest equipment, hire transport to mills	To mills (own or local) for consumption as meal	For own use (grain and meal) or onward sale to mills and processors, using established agent such as the co-op.
	SUBSISTENCE FARMER	Fertilizer, hired machinery, bags, labour	Use at home, may take maize to local mill if necessary to exchange for meal.	Own bagged meal, grain (converted sometimes into livestock – e.g. pigs)
	EMERGING FARMER & DEVELOPMENT (ex-homeland)	Fertilizer, diesel, basic simple machinery, hire of harvest equipment, (emphasis on management support and co-ordinated arrangements).	Home consumption or to mills. Could include own storage and milling facilities depending on the size of the development.	For own use (grain and meal) or onward sale to mills and processors,
	COMMERCIAL (Large and medium)	Fertiliser, diesel, pest control, reliable transport, access to storage	Milling, food manufacture (baking, cereals etc). Some on farm processing takes place.	Bulk grain

E2 SUPPLY CHAIN TYPOLOGY: MEAT/ DAIRY

Logistics profile

High volume, high value, perishable, very specific cold chain requirements (process and distribution) fairly transport intensive, not exported

	FARM TYPOLOGY	NET INCOME INDICATOR	OWNERSHIP AND MANAGEMENT	SUPPLY CHAIN CHARACTERISTICS	SUPPLY CHAIN CONSTRAINTS	SUPPORT REQUIRED
COMMERCIAL	**LARGE COMMERCIAL**	> R500 000	Corporate/private	Meat - own finishing yards, produced on large isolated land areas, animals trucked to municipal abattoirs. Dairy – cold chain storage and transport (tanks and tankers), packaging and processing plants.	Meat – few constraints as economies of scale are sufficient. Rail transport is inadequate for cattle and meat transport. Dairy – None identifiable, does not lend itself to state transport.	Meat - Some roads to be improved Efficient rail transport to and from city and large municipal abattoirs Dairy – None
	MEDIUM COMMERCIAL	R200 000 to R500 000	Family/private	Meat - co-operative finishing, sent to municipal abattoirs, medium farms often specialise in part of the 'growing out' process. Dairy –As above	Meat - Insufficient 'locally based' abattoirs (too much transport in and out of large city markets), market information for cattle sales. Transport problems as above. Dairy – As above	Meat as above. More smaller locally based abattoirs Dairy – None
EMERGING	**THRESHOLD COMMERCIAL (Land Reform)**	<R200 000	Group/Private/co-operative	Meat – some co-operative finishing, sent to municipal abattoirs, farms can specialise in part of the 'growing out' process. Often animals are genetically inferior. Also often sold at cattle sales. Dairy – as for 'medium commercial' above	Meat – Co-ordinated access/transport to finishing facilities; insufficient local slaughter facilities, knowledge Dairy – As above	Meat – Knowledge, access/transport/roads to finishing pens and direct sales; Dairy – attaining economies of scale. Small cheese processing units, bulking opportunities
	EMERGING FARMER (old homelands)	<R100 000	Group/Co-operative/private.	Meat - often genetically inferior animals held for too long. Usually slaughtered locally or sold on cattle sales or to local buyers. Dairy – some home consumption, balance collected for processing	Meat - As above Dairy – As above	Meat - As above plus provide finishing facilities. Dairy – as above
	SUBSISTENCE FARMER	Around R30 000	Family	Meat and dairy - Cattle grazed on a commonage and sold/consumed within the community. Dairy – Home consumption	Meat - As above Dairy – None	Meat - As above Dairy – none

LOGISTICS NEEDS FOR	TYPOLOGY	INPUT	PROCESS	OUTPUT
EMERGING	**SUBSISTENCE FARMER**	Meat – commonage Dairy – some feed.	Meat - Home slaughter, live sales (local or feed pens). Dairy - Nil	Meat - Home/local slaughter (home consumption) of unfinished animal Dairy – milk, maas
	THRESHOLD COMMERCIAL FARMER (Land Reform)	Meat - Large grazing area, finishing (major transport cost), transport live animals, slaughter costs. Dairy – Quality pasturage, knowledge, feed, transport, tank storage	Meat - A combination of live animals, home slaughter, frozen meat, Dairy – some central processing into cheese	Meat - A combination of live animals, frozen carcasses and meat. Dairy – fresh milk, processed products
	EMERGING/DEVELOPMENT FARMERS (Old homeland)	Meat –co-ordinated grazing camps (often on commonage), finishing costs (where applicable). Dairy – Capital, grazing planning & pasturage, tanks, transport	Meat – Slaughter (often at home) or live sales Dairy – central processing and packaging	Meat - Unfinished and finished animals, carcasses Dairy – milk, cheese/butter, icecream
COMMERCIAL	**COMMERCIAL (Medium and large)**	Meat - Large land area, finishing feed (major transport cost), transport live animals, seasonal feeding patterns Dairy – Quality pasturage, high technology, feed (cost and volume), transport, storage tanks	Meat - Slaughter, frozen, processed (e.g. canned). Dairy – central processing of cheese, butter, ice cream.	Meat - Finished and unfinished animals, carcasses, packaged and processed product. Dairy – fresh milk, cheese, ice cream

E3 SUPPLY CHAIN TYPOLOGY: FRUIT

Logistics profile

High volume, high value, perishable, sorted / packaged, transport sensitive, mainly exported, complex chain

	PRODUCTION UNIT	NET INCOME INDICATOR	OWNERSHIP AND MANAGEMENT	SC CHARACTERISTICS	SC CONSTRAINTS	SUPPORT REQUIRED
COMMERCIAL	**LARGE COMMERCIAL**	>R1 million	Corporate hierarchy	High volume, hand harvested, quality sensitive to transport. Own sorting/packing. Cold chain dependent, processed as dried/canned/fresh/juice. Refrigerated container-based transport for export. Internal distribution via retail, wholesale and municipal markets.	Cold storage to even product flow to markets and processors. Packing capacity. Shipping capacity	Improve cold chain transportation and shipping.
	MEDIUM COMMERCIAL	R200 000 to 1million	Family/private	As above but packing and marketing is contracted out.	Handling costs of some co-operative pack houses	Improve cold chain transportation and shipping. Market information
EMERGING	**THRESHOLD COMMERCIAL (Land Reform)**	<R200 000	As above	As above but handling contracted out. Often direct local marketing	Storage (bulking) and transport to bulking/packing points/centres; co-ordination capability	Improve cold chain transportation and shipping. Co-ordinated access to local markets, information
	EMERGING FARMER(S) (old homeland)	R0-100 000	Group/Co-operative.	Own consumption; surplus marketed in the vicinity	As above	Decentralised transport centres and distribution centres (market points)
	SUBSISTENCE FARMER	R0-R50 000	Family	Own consumption	Not consequential	Use bakkies and taxi-trailers

LOGISTICS NEEDS FOR	TYPOLOGY	INPUT	PROCESS	OUTPUT
COMMERCIAL	**COMMERCIAL (Large and medium)**	labour, machinery, fertiliser, food inspection policies, pest control, packing materials, packing/cooling/storage facilities, transport, shipping	Canning, drying, juice concentrate, packing for export and in retail packs.	Preserved and fresh fruit packaged for the market (local and export)
EMERGING FARMER	**SUBSISTENCE FARMER**	Family labour, minimal pest control	NA	Fruit off the tree for home consumption.
	EMERGING FARMER(S) (Land Reform)	Fertiliser labour, pest control, small scale transport. Outsourced packing/storage	Canning, drying, Fresh local/export marketing	Fresh packed local and some export. Local sales to processor
	DEVELOPMENT AND EMERGING FARMERS (Old Homeland	Owner labour, some depot handling/bulking, transport, local market unpacked.	Local fresh direct sales	Local sales often loose

E4 SUPPLY CHAIN TYPOLOGY: FRESH MARKET PRODUCTS

Logistics profile

High volume, high value, perishable, bulk handling, handling-sensitive, high output per hectare, municipal markets, some export by air

	PRODUCTION UNIT	NET INCOME INDICATOR	OWNERSHIP AND MANAGEMENT	SC CHARACTERISTICS	SC CONSTRAINTS	SPECIAL SUPPORT REQUIRED
COMMERCIAL	**LARGE COMMERCIAL**	>R1000 000	Corporate/private	In house transport and storage, refrigeration usually necessary, some long hauling to and between cities, delivery to established outlets. Some centralised marketing.	Quick delivery (appropriate storage and harvesting methods), adequate road links, efficient distribution planning, quality control.	Nil
	MEDIUM COMMERCIAL	R200 000 to R1000 000	Family	Own transport and contract trucking. Central markets. Little use of state transport. Some direct local sales.	Obtaining full loads; operating outside the direct distribution channels, distance to markets	Nil
EMERGING	**THRESHOLD COMMERCIAL ('land reform category')**	<R0 to R500 000	Group, co-operative, a few private	Own transport and contract trucking. Central markets. Little use of state transport. Some direct local sales Group, co-operative, private. Some on-farm sales	Obtaining full loads; operating outside the direct distribution channels; distance to markets	See commercial farms. Bulking and marketing centres – informal, cost effective.
	THRESHOLD COMMERCIAL ('ex-homeland' category)	Mainly <R 0	Group, co-operative, private (facilitated)	Own transport and contract trucking. Central markets. Little use of state transport. Fair percentage local sales.	Need small local markets in densely populated adjacent areas (informal depots). Co-operative institutions needed	Improve roads, assist with selling centres(with taxis say)
	SMALL & SUBSISTENCE FARMER	Approx R12 000	Mainly private, but also communal	Own consumption, some on farm sales of surplus	Community consumption.	Nil

TRANSPORT NEEDS FOR	PRODUCTION UNIT	INPUTS FOR PRODUCTION	PROCESS	OUTPUT
EMERGING	**THRESHOLD COMMERCIAL (Land reform)**	Fertiliser, diesel, pest control, labour, storage, packing materials, reliable transport, tunnels (often)	Packing and distribution	Fresh produce and flowers of supermarket quality.
	SUBSISTENCE FARMER	Fertiliser, water	Nil	Food for family (food security)
	EMERGING FARMER & DEVELOPMENT (ex-homeland)	Fertiliser, pest control, labour, water,	NA	Fresh produce, 'local market quality'
COMMERCIAL	**COMMERCIAL (Large and medium)**	Fertiliser, diesel, pest control, labour, storage, packing materials, reliable transport. Some tunnels.	NA	Central fresh produce or flower market lots.

Appendix F – Description of Suite of Models

F1. SUPPLY-DEMAND MODEL AND RESULTING FLOW MODEL

Methodology: Calculation of the inter-sectoral volumetric road, rail and other freight demand in tons

No national current flow data exists for any commodity in South Africa. Three approaches exist to develop this:

- Actual data - Comprehensive surveys amongst producers, consumers and logistics service providers
- Modelled data - Modelling of regional supply and demand per commodity based on the input-output model of the South African economy, followed by a transportation algorithm where flows between regions are modelled based on rules developed (e.g. infrastructure location such as distribution centres, known variables such as rail flows etc.)
- A combination of the above where modelled data is informed by a sample survey amongst key role players.

Due to cost and time constraints, approach 3 above was utilised, focusing on the agricultural sectors of the economy.

The objective of the model is to estimate the freight transport market in volumetric terms according to agricultural product type. This enables the identification and quantification of the interactions between the transport industry and the agricultural sector of the economy. The steps in this exercise are as follows:

1. The 1998 Input-Output table in tons (excluding imports), after adjustments to include additional agricultural products, was used for the basis of the study. The first step was to adjust this table to include imports. This required each sector's outputs to be multiplied by an import adjustment factor.
2. The total freight, in tons, that was transported regardless of the mode used for transportation was thus calculated per product type.
3. The results generated in the previous step had to be adjusted to account for transport from warehouses to the retailers. Multiplying these adjustments factors with the results from the previous step, represents a more reliable figure pertaining to the total freight, in tons, transported.
4. The total freight, in tons, transported was divided between road, rail and other transport modes by using percentage divisions between the different modes.
5. For total, road, rail and other freight the data is disaggregated for the supply and demand components of the Input-Output table.
6. The freight data per industry was then supplemented with an assessment of economic activity per region[66] (regions are depicted in Figure 2) to enable an understanding of the spatial demand for transport infrastructure (including import and exports).

[66] In the 1998 Development Profile the DBSA, in collaboration with development organisations in the various provinces, subdivided the provinces into functional sub regions for analytical and planning purposes. Some of these sub regions were then aggregated together by Conningarth Economists to make them more applicable for transport and planning purposes. They were aggregated on a homogeneous structure from an economic point of view. Areas of similar agricultural economic activity were grouped together. For example areas in the Eastern Cape comprising mainly of Karoo type vegetation where

a) Magisterial districts could not be used as a basis for the flow model due to the unavailability of data on this detailed level

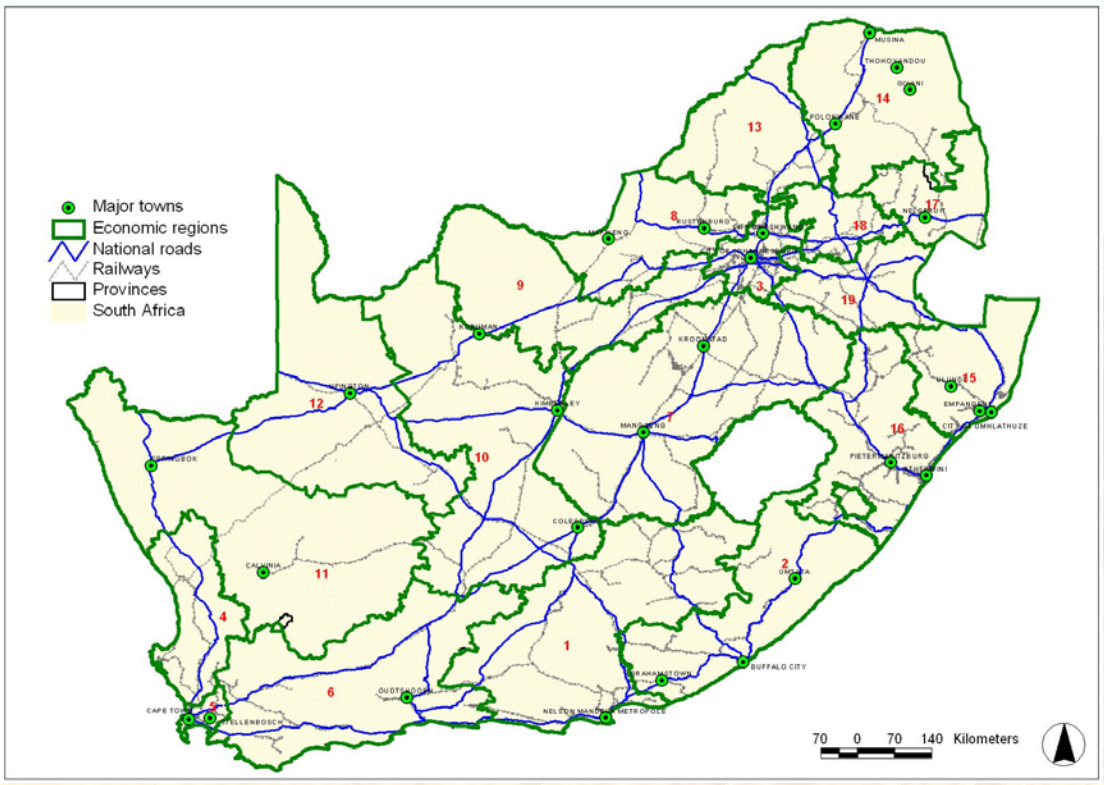


Figure 1 Map of 19 regions (see Table 1 for names of regions)

sheep farming is the prominent economic activity were grouped together. Areas of predominantly grasslands type vegetation, consisting mainly of cattle ranching were also grouped together. However the boundaries of the original sub regions set out by the DBSA were not broken, the sub regions were merely added together creating 19 larger sub regions.

Region Code	Region description	Province
1	Sub regions 1 and 3 - PE	Eastern Cape
2	Sub-regions 2, 4 and 5 - EL	Eastern Cape
3	Gauteng	Gauteng
4	West Coast - Saldanha	Western Cape
5	Cape metropole & winelands	Western Cape
6	Southern Cape	Western Cape
7	Free State	Free State
8	Eastern, Far Eastern and Central	North West
9	Western and Southern	North West
10	Bo-Karoo, Diamond Fields & Kalahari	Northern Cape
11	Namaqualand, North	Northern Cape
12	West, Lower Orange	Northern Cape
13	Bushveld & Western	Limpopo
14	Northern, Lowveld, Central, Southern & Central	Limpopo
15	Zululand	KwaZulu Natal
16	Thukela, Port Natal, Southern Natal, East Griqualand, Natal Midlands	KwaZulu Natal
17	Lowveld	Mpumalanga
18	Highveld	Mpumalanga
19	Eastveld	Mpumalanga

Table 1 Names of 19 regions (see Figure 2 for map)

7. The regional tonnages were assigned to the transport network using the total volumes derived as a starting point. A flow model was developed to assign the volume of each commodity that was produced in a specific region to a region of consumption. Storage of product, imports and exports were also taken into account. The model comprised a set of rules, customised per commodity, that were used to make the allocation of supply to demand. The model is aimed at matching supply and demand in such a way that flows between regions are generated as close to reality as possible.
8. Estimates for the total road and other freight were made using the total tonnage per magisterial district / region as a control total.
9. Supply, demand and flows per agricultural commodity and region were forecasted to understand the impact of growth on the demand for logistics infrastructure.

F.2 LOGISTICS COST MODEL

1. AGRICULTURE SCENARIOS, INPUTS AND REFINEMENTS TO THE LOGISTICS COST MODEL

The following inputs and refinements were made to the (Logistics Cost Model) LCM to enable the desired output to be produced:

- The primary sector output was disaggregated into “mining” and “agriculture”.
- Primary agriculture throughput (local production and imports) was updated for 2004 based on the figures provided by the specialist agriculture study.
- Average annual growth in throughput for the “Good”, “Likely” and “Bad” scenarios were provided by the specialist agriculture study. These growth rates were converted to growth factors of the throughput for each of the primary agricultural commodities between 2004 and 2014.

It should be noted that no adjustments were made to the following model inputs:

i) Agriculture logistics cost were calculated for primary agriculture outputs only, and excludes processed/manufactured produce and production inputs.

ii) Unit costs of transport, storage, management and administration and inventory holding cost were left unchanged. The model output is therefore in constant 2004 prices without any allowance for inflation to 2014. Differential rates of inflation between the logistics cost elements may influence their relative impact.

iii) It was also assumed that the mode split of the individual products remains the same and that the method of storage, as well as the duration of storage remains constant between 2004 and 2014.

2. THE LOGISTICS COST MODEL EXPLAINED

The model covers the following specific aspects:

iv) Estimates the absolute value of logistics cost of goods within the borders of South Africa per mode, cost component and sector for a specific year

v) Calculates the percentage that logistics contribute to the gross domestic product (GDP) of South Africa.

vi) Considers the application and/or adaptation of international methodology, e.g. the approach followed by Delaney in the United States, for the purpose of calculating the cost of logistics.

vii) Uses both “top-down” and “bottom-up” approaches to calculate logistics cost. The top-down approach uses national accounts to derive logistics cost by **disaggregating** officially published data into transport and storage components. The bottom-up approach derives transport cost by **aggregating** the logistics cost of individual primary and secondary products.

viii) Uses independently sourced data, such as diesel fuel sales/consumption, ton-kilometres travelled and the size of the commercial vehicle fleet, to validate the results.

ix) Develops a procedure to estimate national logistics cost on an ongoing basis.

The following definitions and descriptions are relevant:

1. "**Logistics**" is considered to be that part of the supply chain process that deals with the transportation, warehousing, as well as inventory administration and management of physical products between the point of production and the point of delivery to the final consumer. Per definition this excludes the cost of passenger transport and the cost of transport, storage, packaging, handling etc. of mail and luggage, as well as the storage and transport tasks which occurs **during** the production process.

    a. The extent of logistics within the supply chain process can be explained by means of the following example; once iron ore enters the smelter it exits the logistics chain and enters the production process. After the hot rolled steel is produced it again enters the logistics chain as an altogether different product, but exits again when it enters the body pressing plant of a motor manufacturer. The entire process ends when a consumer finally takes delivery of the product, which may consist of many individual products that are dealt with separately until they are finally assembled into one and delivered to the client.

2. "**Cost**" means the direct financial cost of performing logistics tasks that will be reflected in national accounts, up to the point where the final consumer purchases the product.

3. "**Goods**" are all physical inputs and outputs of fully or partly completed physical products ensuing from the production (construction, processing assembling and manufacturing) process, as well as waste, defective products and scrap.

4. "**Within the borders of South Africa**" include imported and exported goods movement, storage, etc. from the point where it pass through a border control point. It does however include the activities in a seaport or airport up to the point where it is loaded onto a vessel for export.

5. "**Gross domestic product**" (GDP) figures are published by the SA Reserve Bank for a calendar year.

6. Data are presented per mode, per cost component and per industry/sector. Modes include road (collection/distribution), road (long haul), rail, air, coastal sea and pipeline. Cost components are transportation, warehousing, inventory management, as well as administration and management. Sectors are defined in terms of the standard classification and include the primary (agriculture and mining) and secondary (manufacturing) sector.

3. STUDY METHODOLOGY AND APPROACH

Practices described in the literature to calculate logistics cost proved to be unsuitable for application in this study. For this reason an entirely new approach was developed, based on two independent approaches. The top-down and bottom-up approaches were used in parallel to calculate the logistics cost.

The top-down approach disaggregates data published in National Accounts to a level that reflects transport and storage cost. This method of calculating logistic cost is referred to as the **Disaggregate Approach**.

The bottom-up approach computes logistics cost by aggregating detailed, transport specific and warehousing data and relating it to the specific products. This method is referred to as the **Aggregate Approach**. The parallel approach followed in this study has the following advantages over other commonly applied methods:

1. Aggregate and Disaggregate approaches are entirely independent in their method of analysis and source data. This not only allows for logical checks, but it also allows the assessment of the propensity to outsource logistics tasks.
2. The Aggregate Approach builds up the cost of logistics from its most detailed input elements. Census data form the basis for input and each data element is sourced from primary sources. This is in contrast to the methods commonly used to extrapolate cost data based on sample surveys. Validity of data could be verified at the primary source before any aggregation takes place.
3. The fact that the Aggregate Approach is underpinned by a model that runs off a MS Excel spreadsheet platform means not only that different sensitivity analyses can be easily performed, it also allows easy updating of data if more reliable figures are obtained.
4. The model focuses research on the refinement of individual input elements. It would even be possible to add more detailed layers for the analysis of a particular industry in more detail.

4. DESCRIPTION OF THE DISAGGREGATE RESPONSE (TOP-DOWN)

The South African Reserve Bank (SARB) does not separate the cost of logistics from that of communications in their official publications. Transport and storage costs are aggregated with that of communications under the tertiary sector in the Bank's Quarterly Report, although unofficial estimates can be obtained. Passenger transport operators are also included under transport. It proved impossible to separate passenger services from that of goods transport as data that is aggregated to this level of detail could not be obtained from the SARB. Companies who are not primarily focussed on goods storage and handling, such as the Airports Company of South Africa (ACSA), make a considerable contribution towards the cost of storage, data disaggregated to this level of detail could however not be obtained. The cost of such operations is included in the storage amount, which means that the presented figure is higher than the actual. According to the SARB definition, transport and storage include only the cost of services rendered for reward, i.e. by third parties. It consequently excludes services that are provided in-house by companies as part of their day-to-day operations. The main purpose of the disaggregate approach is that it would be used in the calculation of the propensity to outsource logistics tasks. However, it also provides a rough check of the logistics cost calculated by means of the aggregate approach.

5. DESCRIPTION OF THE AGGREGATE APPROACH (BOTTOM-UP)

The basis of the Aggregate Approach was the development of a model that can calculate the logistics cost. Running off an MS Excel spreadsheet platform, the model computes the total logistics cost using detailed product-specific data on the amount transported and stored, the distance that it is being transported, the transit time and the unit cost of transport. The model outputs are validated against the "top-down" cost data as reflected in the national accounts and other aggregated statistical data published by the South African Reserve Bank and Statistics South Africa, as well as other independent sources, such as the amount of fuel consumed.

Following is a brief description of the input requirements of the model and the primary input data sources used for compiling each of the parameters.

Throughput

Throughput is the term used to describe the total amount of goods that are transported and stored and is expressed in terms of physical units (tonnage or volume). In cases where the amount of goods produced are published in units other than tonnage (volume, number of units) these were converted to ton-equivalent, e.g. one litre of fuel is equal to 0.8 kg. Throughput consists of local production plus imports. Products are listed in three main categories. The two primary sector categories are mining and agriculture, whereas the secondary sector includes all manufactured and processed products. The throughput for each product type has been determined from the above official sources. Some adjustments were necessary in order not to double-count products, as more than one source sometimes list the same product line. For example, the Department of Agriculture include butter and cheese in their classification of dairy production, whereas these products are listed by Statistics South Africa as manufactured products.

Transport cost

Transport cost is a function of throughput, mode usage, transport distance and the unit cost of transport throughput.

Mode Usage

- Road, collection and distribution
- Road, line haul
- Rail
- Air
- Water, coastal shipping from point where goods enter or leave the country
- Pipeline

The extent to which each product type use each of the identified modes was determined in terms of tonnage carried.

It should be borne in mind that the total tonnage transported by all modes combined exceeds the total throughput, as the same product could make use of more than one mode. For example, products transported by rail for the line-haul leg of a journey could be delivered to its final destination by road.

Transport distance

The average distance that each product is transported by each of the modes was determined from reports and discussions with practitioners.

Transport Unit Cost

Unit cost of transport per mode was entered in terms of Rand per ton-km. The aim was to determine a typical cost per ton-kilometre for each mode and product category, as the unit cost per unit of one product could differ substantially from that of another, even if they are transported by the same mode.

Warehousing cost

Warehousing cost is a function of the duration and volume of storage, unit cost of storage and the handling cost of goods.

Duration of storage

Two sources for the need for storage in the logistics chain were recognised in this study namely, storage for freight consolidation purposes and intra-seasonal storage. Freight consolidation takes place where commodities are accumulated at a certain location for onward transport in order to optimise the utilisation of the transport modes delivering to and collecting from the accumulation point. Distinction is also made between consolidation for collection as opposed to consolidation for distribution. An example of consolidation for collection is farmers delivering bananas with a five-ton truck to a cooperative that consolidates loads for collection by 28-ton refrigeration trucks line-hauling the bananas to major centres. An example of consolidation for distribution is several 28-ton refrigeration trucks, each with a different commodity on board, delivering to a cross-dock centre where their loads are broken up and commodities resorted and combined for delivery to retail outlets with non-refrigerated 8-ton trucks.
Certain commodities are harvested during a specific season while it is consumed at a constant rate throughout the year, for example, maize. Other commodities are harvested during a specific season but have only a limited storage life, for example, prunes. This seasonality of production of certain commodities and the delayed consumption thereof necessitates intra-seasonal storage.

The duration of intra-seasonal storage for products that are evenly produced and evenly consumed throughout the year is zero. The duration of storage of all products that have a non-zero intra-seasonal storage duration is calculated by finding the difference between the weighted mean time of production and the weighted mean time of consumption.

Unit cost of storage

Unit cost of storage in terms of R/ton/day was collected for each individual product line. The following six main types of storage have been identified:

- Hardstanding outside (dry products)
- Specialised tanks (liquids)

- Bulk warehouse (dry products)
- Silo (dry products)
- Shelved warehouse (dry products)
- Cold storage (dry products)
- Bulk tankyard (liquids)
- General storage inside (dry products)
- Cold storage (dry products)
- Storage tanks (liquids)
- Cold storage tanks (liquids)

Storage cost will be allocated for each product type according to the type of storage associated with the product. Storage unit cost refers to the combination of storage and handling costs expressed in rand per ton. Storage cost is fixed in nature and is the cost of establishing and maintaining the storage facility, spread over the expected throughput of the facility. Handling cost is variable in nature and reflects the marginal cost of handling each unit of throughput. Storage cost, in rand per ton, is derived by multiplying the duration of storage of a specific commodity with the storage type-specific storage cost per ton-month. Handling cost accrues to the commodity as it is handled. The sum of this storage cost and handling cost forms the storage unit cost.

Inventory cost

Inventory cost is a function of the value of products, the amount of goods transported and stored, the time in transit and the time value of money.

Time in Transit

Transit time consist of the duration of storage and the transport time. Transport time is based on the amount transported and the speed of travel for each mode and product type.

Time value of money

The time value of money is the average prime bank lending rate for the year in question

Management and administration

The cost of management and administration was taken as a percentage of the unit cost of transport and warehousing. These amounts were provided by sources within the logistics industry

F3. SCENARIOS PER COMMODITY

	% Volume growth from 2004 to 2014 (growth per annum)			Industry: Wheat
SCENARIO	**Production**	**Exports**	**Imports**	**Key Assumptions**
Bad	1%	2%	3%	▪ International subsidies remain as is ▪ Current projections re Aids are valid ▪ Zero SA import tariff for wheat & flour is assumed ▪ Western Cape production is reduced by 50% ▪ SADC starts feeding itself
Likely	1.5%	2.7%	1.5%	▪ Exports into Africa comes from increased production in the Free State, not Western Cape. This is accompanied by a switch into irrigated wheat production, highly dependent on price of wheat, and price of water ▪ Production in the Western Cape declines
Good	2.25%	2%	2%	▪ A swing from maize to wheat is experienced ▪ Per capita income increases ▪ Export subsidies (EU) are down to zero ▪ Africa is in a position to feed itself ▪ Food aid is untied ▪ Research results in better yields ▪ GMO's

General notes:

- Consumption will increase at the rate at which the middle class grows = 1.5% p.a.
- The strength of the Rand won't encourage exports – switching to livestock etc in Western Cape takes place due to the strength of the Rand
- Imports will increase at least at the rate of consumption – South Africa doesn't have production capacity to be self-sufficient

	% Volume growth from 2004 to 2014 (growth per annum)			Industry: Maize
SCENARIO	**Production**	**Exports**	**Imports**	**Key Assumptions**
Bad	0.15%	1.74%	1%	▪ International subsidies remain as is ▪ Current projections re Aids are valid ▪ Growing black middle class switches from maize to rice. This will have a big negative impact on consumption of white maize ▪ A strong shift is seen into oilseeds for use in the poultry industry. ▪ Maize is relatively less profitable than oilseeds, and oilseeds have become the biggest agricultural import over the past 10 years
Likely	1.9%	-4.23%	1%	▪ Increase in yellow maize should be more than an increase in white maize ▪ This increase would be in the Eastern Cape ▪ More maize is being planted in steady rainfall areas e.g. Midlands Natal, and more constant yields are obtained
Good	3%	0.61%	1.5%	▪ An increase in per capita income is experienced ▪ Export subsidies (EU) are down to zero ▪ Africa is in a position to feed Africa - Africa has potential to produce enough maize, provided that political scenarios stabilise ▪ Food aid is untied ▪ Research results in better yields ▪ GMO's

General notes:

- Forecasts for maize EXCLUDE the recently announced maize-to-ethanol project
- When a drought is experienced in South Africa, a drought is not normally experienced in SADC, and vice versa. However, when the situation arises (occasionally) that there is a drought in the entire region, logistics becomes a major constraint (as has been the case in 1993). A need exists to reserve logistical capacity for critical periods such as these
- Imports refer mostly to cross-border trade

	% Volume growth from 2004 to 2014 (growth per annum)			Industry: Sunflower (oilseeds)
SCENARIO	**Production**	**Exports**	**Imports**	**Key Assumptions**
Bad	1%	1.15%	1%	▪ Sunflower oil is intended to be a competitor to maize, but the change to sunflower oil does not take place ▪ Consumption increases at a rate that is close to the population growth
Likely	1.5% \	2.92%	1%	▪ Sunflower oil emerges as a strong competitor to maize. It beats maize, but with rotation taken into account (one won't replace other completely) ▪ Animal feed (specifically chickens and pigs) is the driver for the rise in sunflower oil consumption. The demand for chickens is increasing at 3% p.a. The demand for oil seeds will grow faster. SA imports 70-80% of what is used locally – import substitution will take place
Good	2%	5.43%	1%	▪ Importation of cheaper edible oil substitutes decreases the demand for sunflower oil

General notes:

- Oilseeds will grow at the expense of maize, since both are competing for same resources.

	% Volume growth from 2004 to 2014 (growth per annum)			Industry: Soya beans
SCENARIO	**Production**	**Exports**	**Imports**	**Key Assumptions**
Bad	1.58%	1.1%	1.74%	▪ Growth keeps pace with the population growth. ▪ The use of soya beans as animal feed does not increase
Likely	2.5%	0.17%	4.74%	▪ Soya beans are eaten as a cheaper alternative to meat ▪ Soya beans are used as a replacement for maize in animal feed
Good	4.9%	1.29%	5.27%	▪ Soya beans are exported into Southern Africa

	% Volume growth from 2004 to 2014 (growth per annum)			Industry: Citrus
SCENARIO	**Production**	**Exports**	**Imports**	**Key Assumptions**
Bad	1.04%	1%	2%	▪ Very little new plantings of orchards are done. ▪ Strength of the Rand poses a problem for exports ▪ Land is used fro the production of grapes for wine
Likely	2.2%	1.5%	2%	▪ Export markets into China provides opportunity for expansion
Good	3.04%	2%	2%	▪ Going into China with citrus is niche opportunity, but the trade is quid pro quo. The positive implication is that the processing industry is getting higher quality inputs.

	% Volume growth from 2004 to 2014 (growth per annum)			Industry: Deciduous fruit
SCENARIO	**Production**	**Exports**	**Imports**	**Key Assumptions**
Bad	0.87%	0.5%	3%	▪ The strength of the Rand limits exports, resulting in a decrease in production
Likely	1.81%	1%	2%	▪ Strength of the Rand and the strength of European supermarkets represent strong buying power - 140 exporters are operating in SA alone, and approximately 400 exporters in the northern hemisphere. The market is dominated by only 5 large buyers.
Good	2.83%	1.5%	2%	▪ Growth is experienced in the internal market, consistent with the growth of the black middle class

	% Volume growth from 2004 to 2014 (growth per annum)			Industry: Subtropical fruit
SCENARIO	**Production**	**Exports**	**Imports**	**Key Assumptions**
Bad	0.15%	1.5%	2%	▪ The strong Rand affects South Africa's ability to export.
Likely	1.25%	2.5%	2%	▪ There is potential in the local market for growth ▪ The subtropical fruit industry is globally the only fruit industry with real potential for growth
Good	2.47%	4%	2%	▪ Exports are increasing

General notes:

- The subtropical fruit industry is globally the only fruit industry with real potential for growth

- Avocados
  - Natal Midlands is focusing in the production of avocado's, which is more profitable
  - However, avocados have reached a ceiling. It is mainly used for avocado oil, but 3-4 oil presses have been established, with no further expansions planned
  - Chile also has a big impact

- Macadamias
  - This sector has experienced big growth, with over 1million trees sold
  - The product is very profitable. Exports were increasing due to the stronger Rand
  - Macadamias comprise less than 1% of nut market. It is a very healthy, low cholesterol product.
  - Potential exists for strong production growth: production can treble at current prices
  - South Africa is the second largest producer. The back-at-farm prices is R80 per kilogram, resulting in a 80k-100k net profit per hectare
  - The product is exported to the USA and now also to Europe

- Pecan nuts also has potential
- Some growth is experienced in the litchi business
- Mangos are experiencing growth in certain areas
- Bananas are produced only for local consumption. It cannot compete in the global market: break even is at R 600 per ton, and the current price is R 600 – R 1000 per ton. However, water is a constraint (especially in Mpumalanga)

	% Volume growth from 2004 to 2014 (growth per annum)			Industry: Vegetables
SCENARIO	**Production**	**Exports**	**Imports**	**Key Assumptions**
Bad	1.8%	1.95%	1.5%	▪ Growth will take place at a rate that is close to that of South Africa's population rate growth
Likely	2%	2.19%	3%	▪ Increased growth as South Africa's black middle class grows, due to a switch from maize to vegetables
Good	2.5%	2.8%	3%	▪ The growth potential is 3-4%. Unions will only grow at that rate if it is exported. There is a huge export potential for onions (especially to Holland). ▪ The restaurant trade is also growing - growth is in cabbages and baby vegetables

	% Volume growth from 2004 to 2014 (growth per annum)			Industry: Viticulture
SCENARIO	**Production**	**Exports**	**Imports**	**Key Assumptions**
Bad	2.27%	5%	2%	▪ Growth estimates are based on already planted vines that will come into production
Likely	4.15%	10%	2%	▪ Growth is dependent on the weakening of the Rand
Good	6.74%	15%	2%	▪ Growth is driven by the ability to sell in the international market

	% Volume growth from 2004 to 2014 (growth per annum)			Industry: Poultry products
SCENARIO	**Production**	**Exports**	**Imports**	**Key Assumptions**
Bad	1.92%	1.5%	3.5%	▪ Past growth came from frozen packs and whole fresh chickens. However, diversification into chicken products (sosaties, etc) will result in a slower growth in demand, because of the increased price of these products
Likely	2.8%	2%	3%	▪ The industry has seen substantial growth over past 10 years. The cost of production and the retail price have not come down, which makes growth equal to that of the past 10 years unlikely ▪ However, Pick & Pay still experiences chickens as the product with the fastest growth in their shops
Good	4.12%	2.5%	2.5%	▪ A switch from red to white meat is takes place, for health and cost reasons

	% Volume growth from 2004 to 2014 (growth per annum)			Industry: Dairy
SCENARIO	**Production**	**Exports**	**Imports**	**Key Assumptions**
Bad	1.5%	0%	2%	▪ The Rand is strong, and export subsidies are still in place ▪ The biggest threat for dairy industry is imports. The European production subsidies such as imports of cheese and powdered milk is always a threat ▪ DoA does not have the ability to support the industry
Likely	2%	0%	3%	▪ The Rand is weaker, and export subsidies are not in place ▪ World prices increase by 15-20%
Good	3%	0%	2%	▪ The Rand is weaker ▪ A shift is experienced in consumption patterns ▪ World prices increase by 15-20% ▪ A growth is experienced in per capita consumption, based on the GDP growth

General notes:

- Increase in dairy production coming from pastures. Significance in terms of logistics, only suitable for specific regions, e.g. Southern / Eastern Cape, Free State
- Restriction from production side, but also consumption restriction on fresh milk (switch to long life – 70-80% of fresh milk consumption is long life - and 2%) – but processed lots of growth (total milk 2.2ml – fresh consumption 1.6ml fresh)

	% Volume growth from 2004 to 2014 (growth per annum)			Industry: Livestock (slaughtered)
SCENARIO	**Production**	**Exports**	**Imports**	**Key Assumptions**
Bad	1.75%	0.63%	0.67%	▪ The production of pork is not efficient enough yet. Production needs to be consolidated, and a need exists to improve efficiency.. Prices are low.
Likely	2.15%	1.91%	2.19%	▪ The large population of cattle in the old homelands could impact the market. They comprise 30% of national herd, 10% of what is traded.
Good	2.5%	3.49%	2.81%	▪ Sheep will begin to be imported, as soon as prices in SA increase enough. ▪ Exports are taking place to niche markets ▪ A big market exists for live goats for religious purposes (e.g. Indian market in Durban)

General notes:

- SA still cannot measure meat production consumption
  - Some experts estimate that SA is undercounting red meat consumption by 50% - for sheep, goats, cattle
  - The counted abbatoirs are 250. However, there must be about 10 000 abattoirs if informal businesses are considered. Even the formal trade industry is not counting all abbatoirs.

	% Volume growth from 2004 to 2014 (growth per annum)			Industry: Sugarcane
SCENARIO	**Production**	**Exports**	**Imports**	**Key Assumptions**
Bad	-1.5%			▪ Land is being used for more profitable crops (e.g. subtropical in the Lowveld) ▪ Water is a constraint. A larger percentage of the crop is to be grown in rain-fed areas; not under irrigation ▪ The biggest consumers of sugar (coffee / tea, cooldrinks) are looking for replacements, resulting in a decline in demand ▪ The average consumption per capita is declining. This results in a decline in sugar consumption, in spite of the growth in population. ▪ SA produces twice as much as local consumption. Production will decline to equal local consumption, and no imports or exports will take place.
Likely	-1%			▪ The role of small growers is increasing rapidly (50 000 growers exist in total, of which 2 000 are commercial and 48 000 are small farmers). Sugarcane will become a political crop, but decline will continue
Good	2%			▪ In order to reach this growth in production, more water will need to be made available by DWAF

General notes:

- Sugar is a dense commodity. The harbour infrastructure was built to offload from trains. Road is currently much more efficient than rail. The only thing that might switch the freight back to rail is damage to the road infrastructure.

	% Volume growth from 2004 to 2014 (growth per annum)	Industry: Fresh Produce Markets
SCENARIO	**Volume**	**Key Assumptions**
Bad	Annual 10% reduction in volume	▪ Direct links exist between producers and retailers ▪ More competition is experienced under a deregulated environment
Likely	0% volume growth	▪ Minimum capital is spent on infrastructure ▪ The status quo continues
Good	Annual 10% growth in volume	▪ Capital is spent to upgrade infrastructure ▪ Sustained growth potential exists in expanded production ▪ Privatization of National Fresh Produce Markets takes place

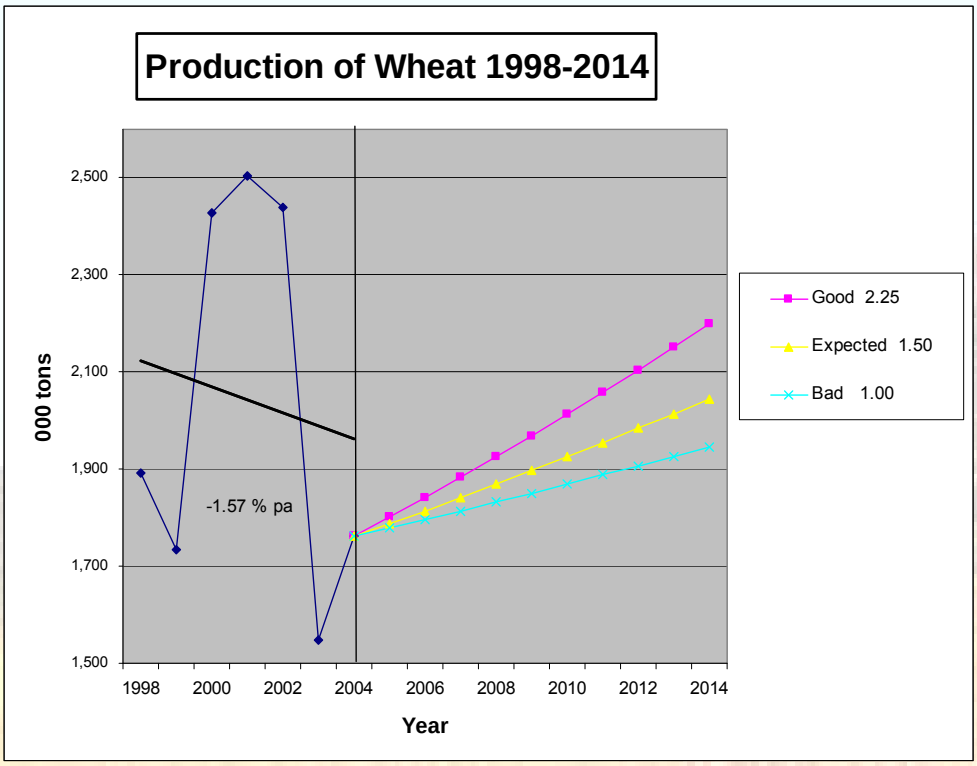
	% Volume growth from 2004 to 2014 (growth per annum)			Industry: Flowers
SCENARIO	**Production**	**Imports**	**Exports**	**Key Assumptions**
Bad	0%	5%	0%	▪ No co-operation ▪ Duties into Europe are in place ▪ No consolidations ▪ Expertise is lacking ▪ Australia and Zimbabwe are exporting more proteas than South Africa is
Likely	15%	5%	10%	▪ More production is aimed at the local market ▪ New projects are undertaken ▪ Farmers are consolidating
Good	25%	5%	25%	▪ Major synergies exist between farms ▪ Improved technology is employed for year-round production ▪ New varieties and markets are explored

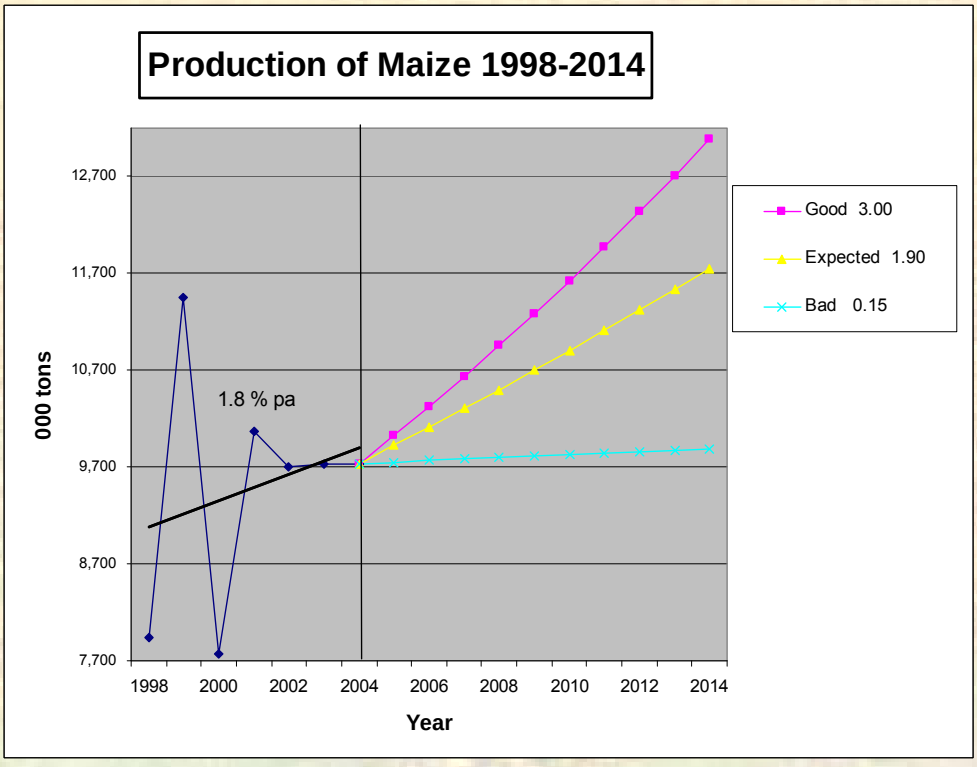
General notes:

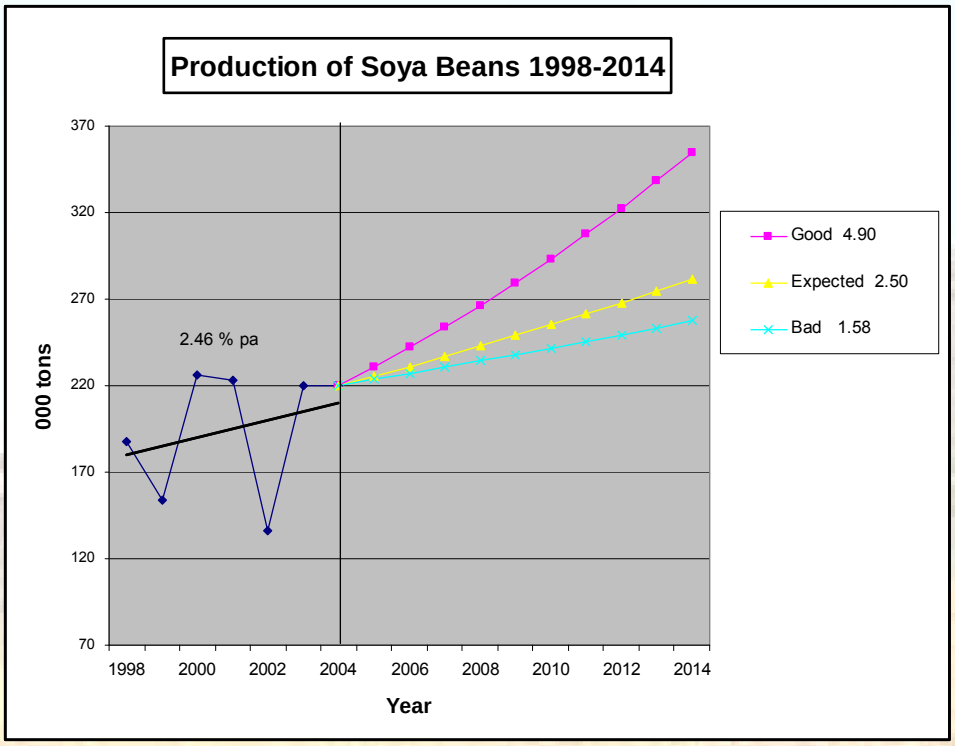
- The industry is very small in terms of demand on transport. If transport can change from air freight to sea freight it will be a highly profitable product. For example, if Fynbos can use sea freight, return on farm could be doubled. There is a drive to address sea freight. The market perception that sea freight product not as good as air freight needs to be changed.
- Major export potential exists, especially for Fynbos. South Africa has a gene pool and should be world leaders, also for hybrids (on auction markets in Holland every day of the year)

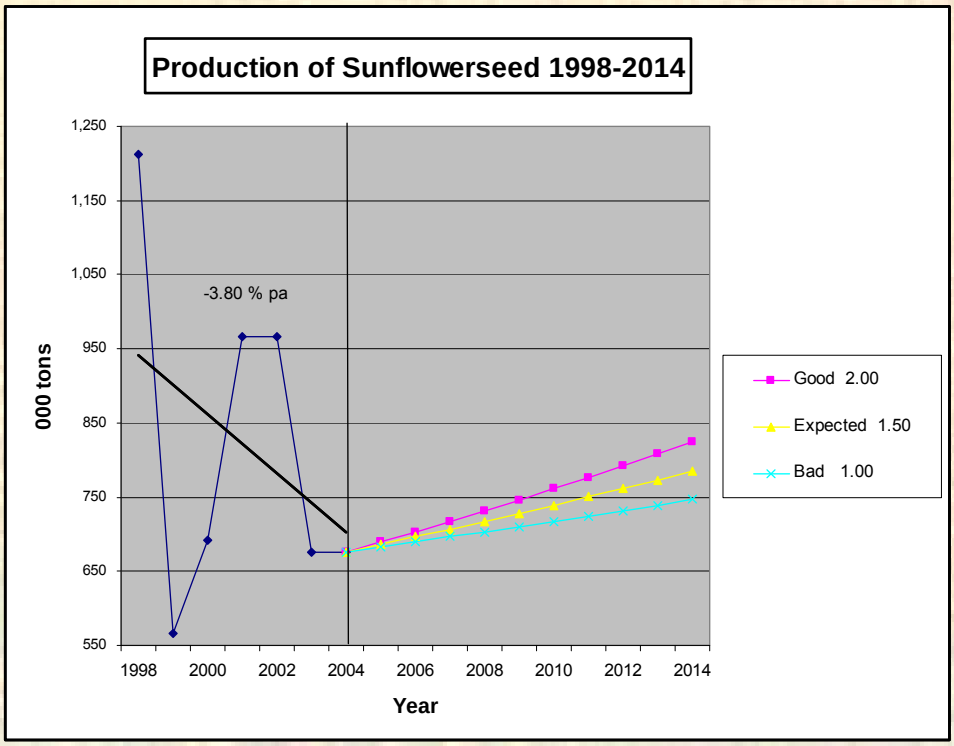
F4. Graphs – historical trends and future scenarios

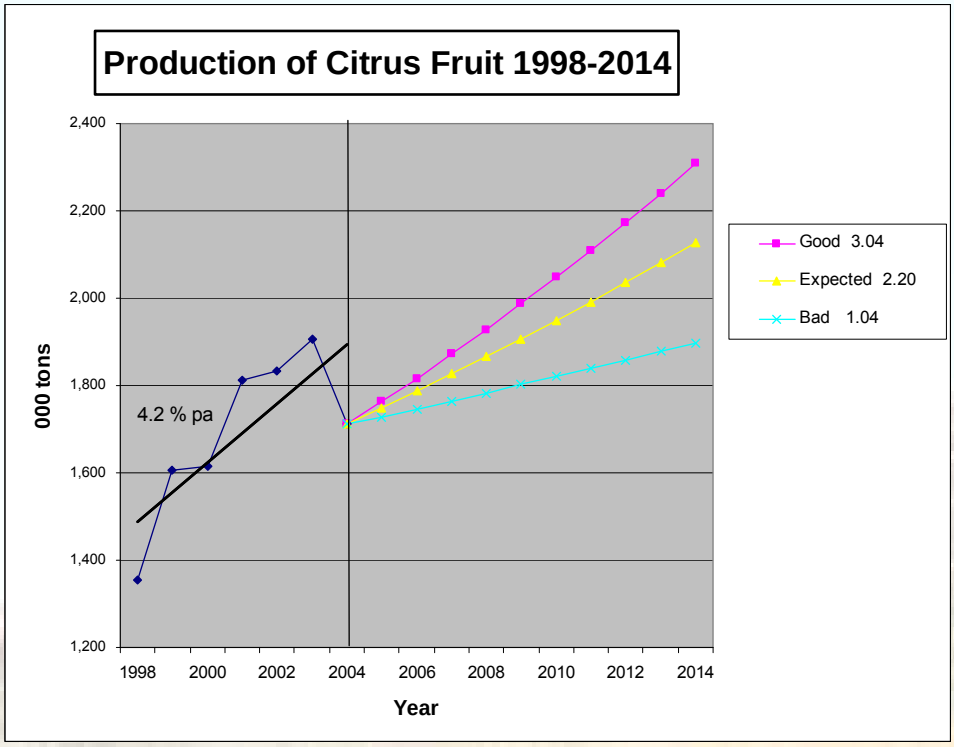
The scenarios listed in Appendix F3 are depicted here in graphical format.

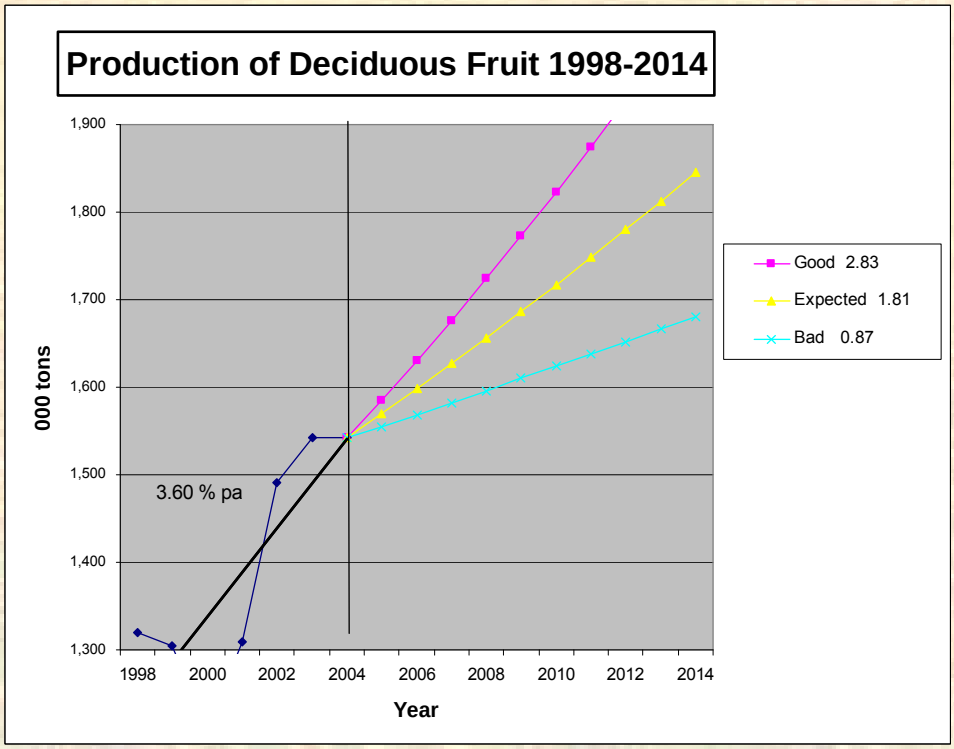


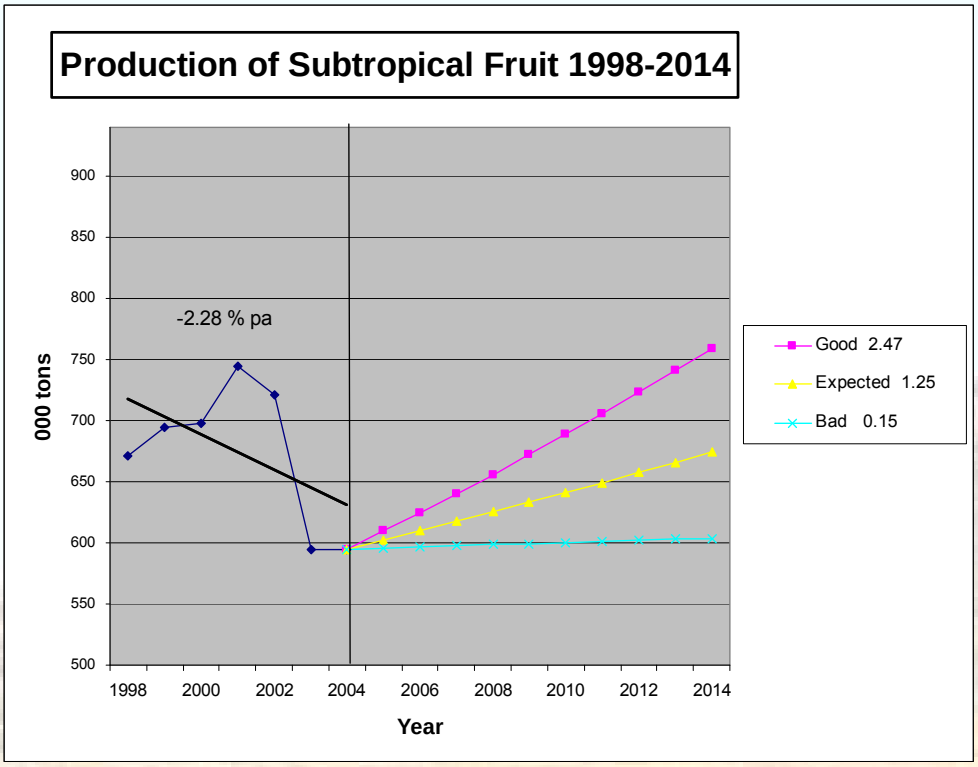


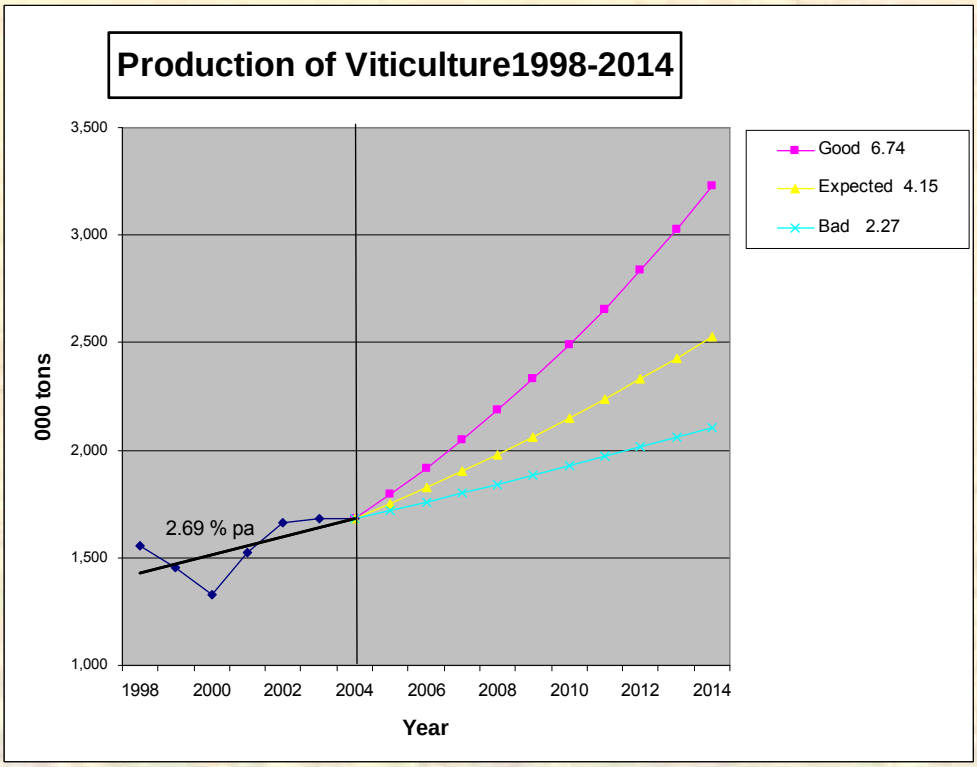

Production of Soya Beans 1998-2014
370
320
270
220
170
120
70
000 tons
2.46 % pa
1998
2000
2002
2004
2006
2008
2010
2012
2014
Year
Good 4.90
Expected 2.50
Bad 1.58

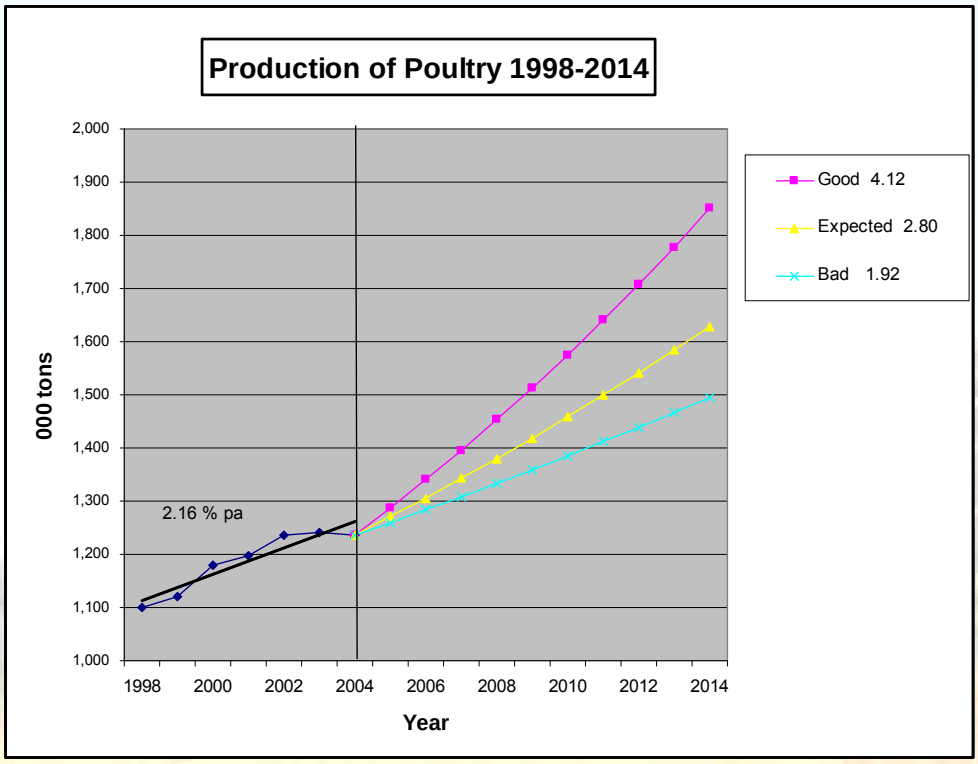

Production of Sunflowerseed 1998-2014
1,250
1,150
1,050
950
850
750
650
550
000 tons
-3.80 % pa
1998
2000
2002
2004
2006
2008
2010
2012
2014
Year
Good 2.00
Expected 1.50
Bad 1.00

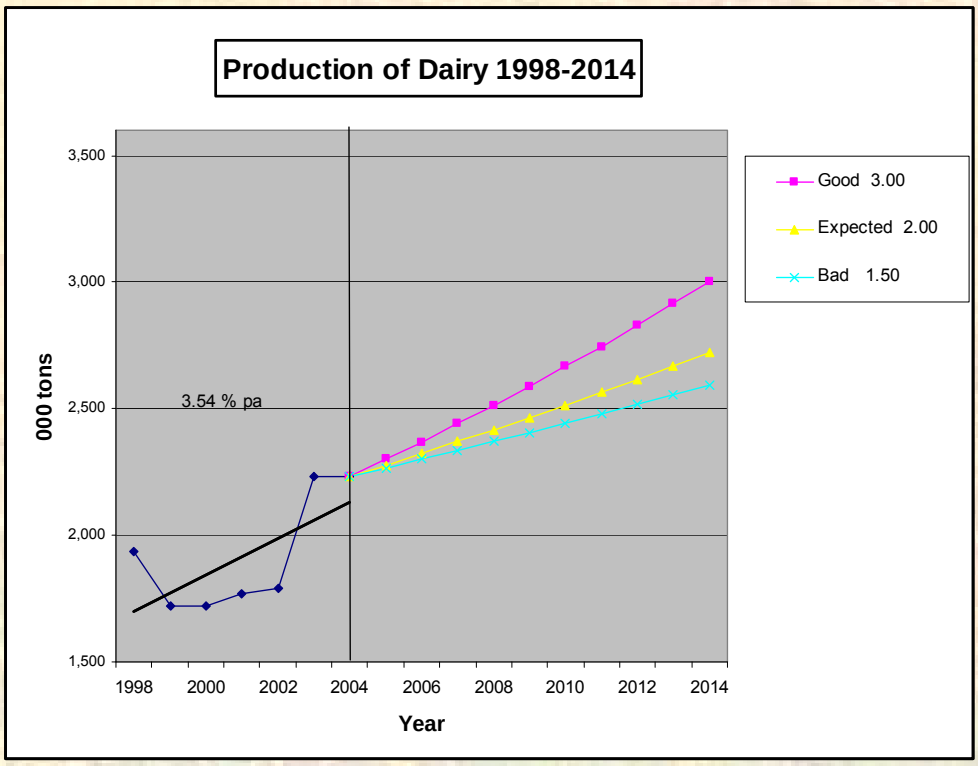

Production of Citrus Fruit 1998-2014
2,400
2,200
2,000
1,800
1,600
1,400
1,200
000 tons
4.2 % pa
1998
2000
2002
2004
2006
2008
2010
2012
2014
Year
Good 3.04
Expected 2.20
Bad 1.04

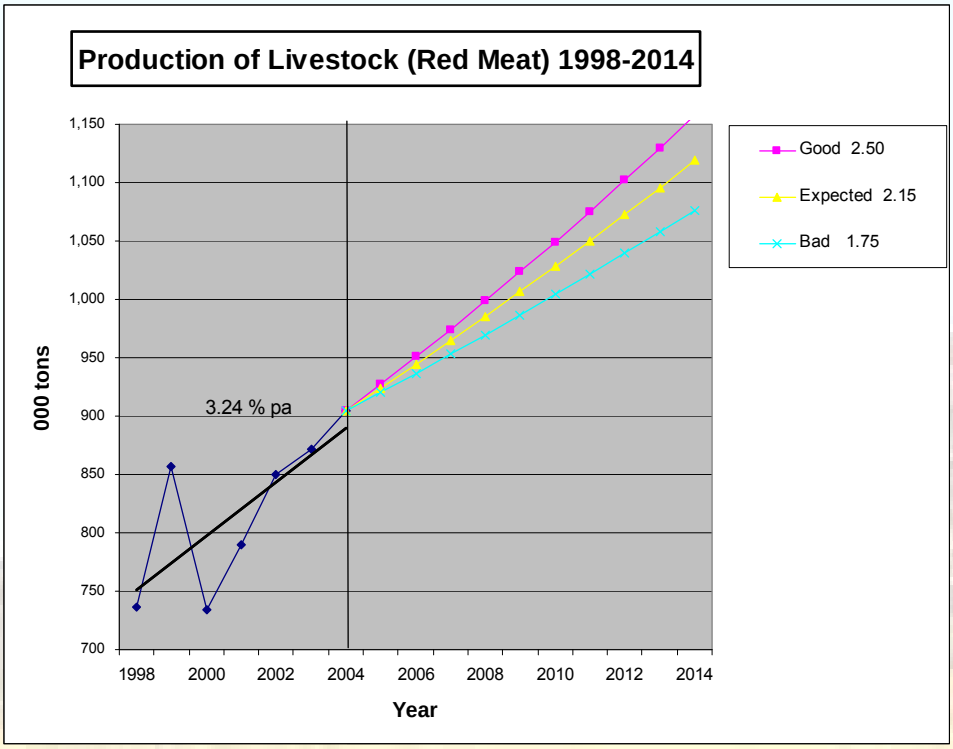

Production of Deciduous Fruit 1998-2014
1,900
1,800
1,700
1,600
1,500
1,400
1,300
000 tons
3.60 % pa
1998
2000
2002
2004
2006
2008
2010
2012
2014
Year
Good 2.83
Expected 1.81
Bad 0.87

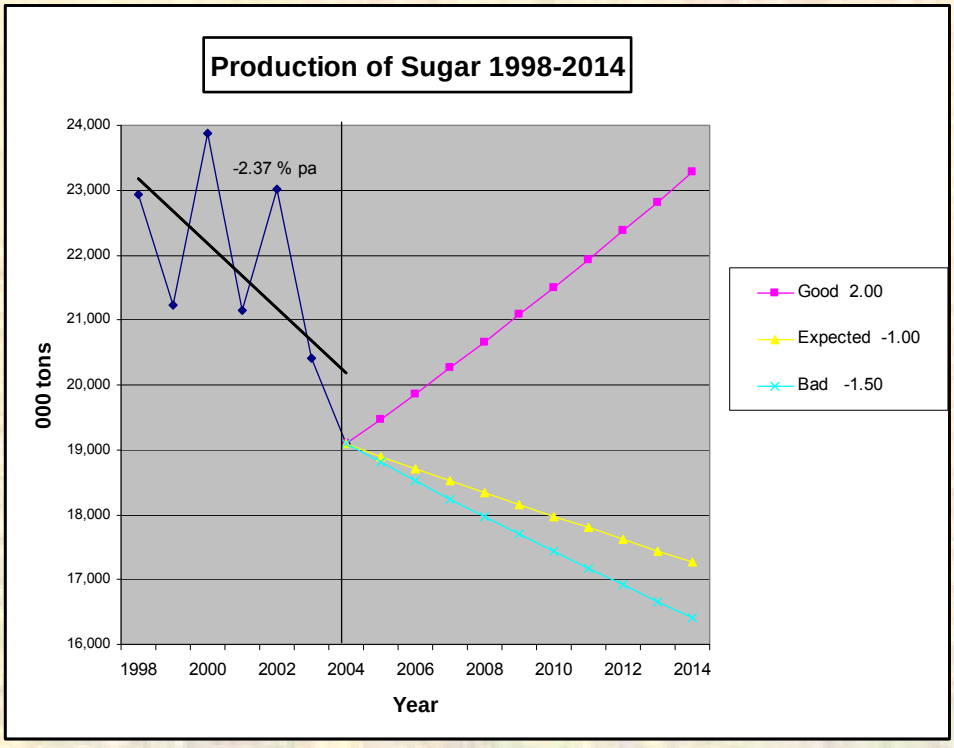

Production of Subtropical Fruit 1998-2014
900
850
800
750
700
650
600
550
500
000 tons
-2.28 % pa
1998
2000
2002
2004
2006
2008
2010
2012
2014
Year
Good 2.47
Expected 1.25
Bad 0.15

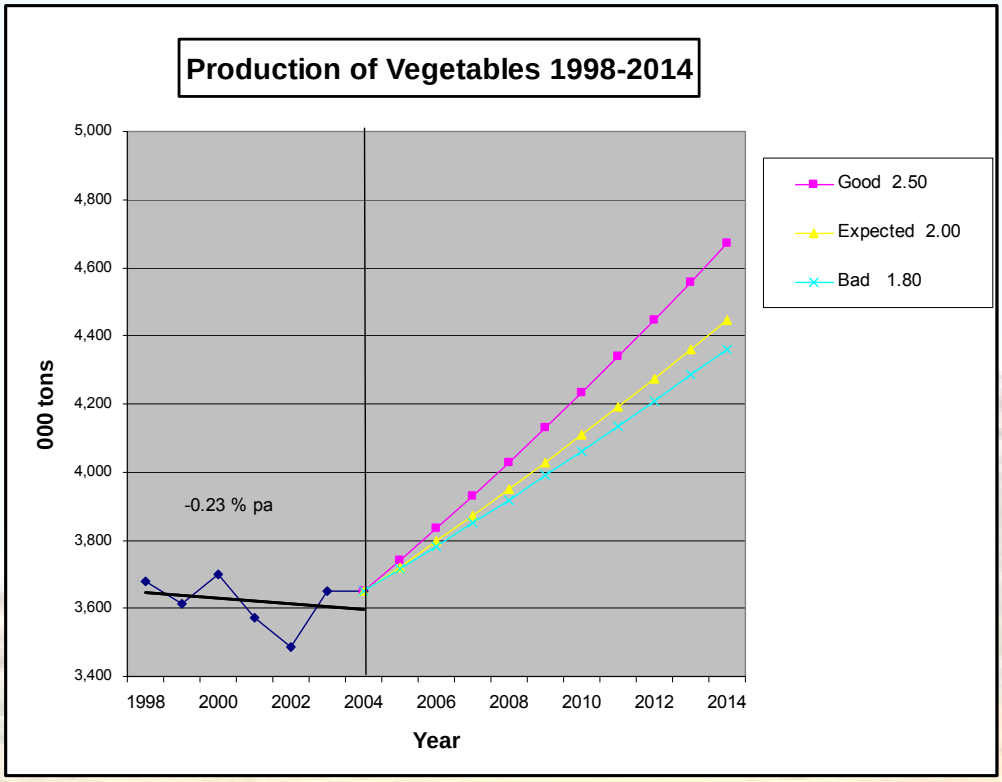

Production of Viticulture1998-2014
3,500
3,000
2,500
2,000
1,500
1,000
000 tons
2.69 % pa
1998
2000
2002
2004
2006
2008
2010
2012
2014
Year
Good 6.74
Expected 4.15
Bad 2.27

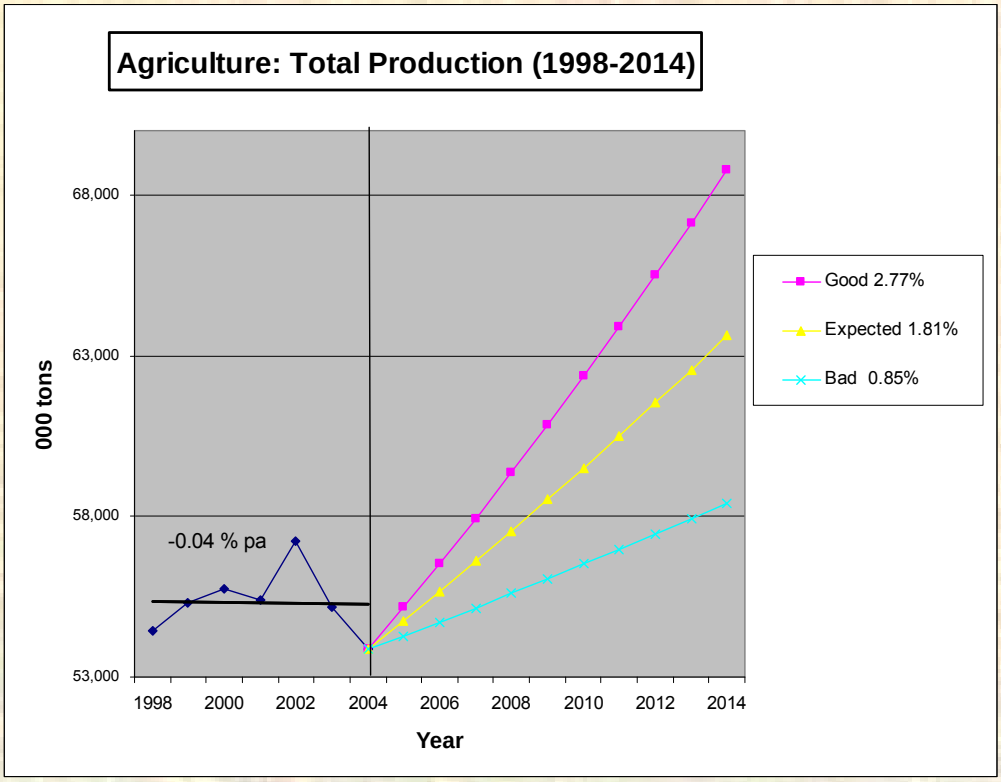

Production of Poultry 1998-2014
2,000
1,900
1,800
1,700
1,600
1,500
1,400
1,300
1,200
1,100
1,000
000 tons
2.16 % pa
1998
2000
2002
2004
2006
2008
2010
2012
2014
Year
Good 4.12
Expected 2.80
Bad 1.92


Production of Dairy 1998-2014
3,500
3,000
2,500
2,000
1,500
000 tons
3.54 % pa
1998
2000
2002
2004
2006
2008
2010
2012
2014
Year
Good 3.00
Expected 2.00
Bad 1.50


Production of Livestock (Red Meat) 1998-2014
1,150
1,100
1,050
1,000
950
900
850
800
750
700
000 tons
3.24 % pa
1998
2000
2002
2004
2006
2008
2010
2012
2014
Year
Good 2.50
Expected 2.15
Bad 1.75


Production of Sugar 1998-2014
24,000
23,000
22,000
21,000
20,000
19,000
18,000
17,000
16,000
000 tons
-2.37 % pa
1998
2000
2002
2004
2006
2008
2010
2012
2014
Year
Good 2.00
Expected -1.00
Bad -1.50


Production of Vegetables 1998-2014
5,000
4,800
4,600
4,400
4,200
4,000
3,800
3,600
3,400
000 tons
-0.23 % pa
1998
2000
2002
2004
2006
2008
2010
2012
2014
Year
Good 2.50
Expected 2.00
Bad 1.80


Agriculture: Total Production (1998-2014)
68,000
63,000
58,000
53,000
000 tons
-0.04 % pa
1998
2000
2002
2004
2006
2008
2010
2012
2014
Year
Good 2.77%
Expected 1.81%
Bad 0.85%

Appendix H – Terms and Abbreviations

H.1 List of Abbreviations

H.2 List of Terms

H.1 List of Abbreviations

ABC	Agricultural Business Chamber
ACSA	Airports Company of South Africa
AFMA	Animal Feed Manufacturers Association
AFU	African Farmers' Union
AgriBEE	Broad-based Black Economic Empowerment Framework for Agriculture
Agri SA	Agri South Africa, previously called the South African Agricultural Union
ARC	Agricultural Research Council
AQL	Australian Quality Logistics
AWBC	Australian Wine and Brandy Corporation
AWEC	Australian Wine Export Council
BATAT	Broadening of Access to Agriculture Thrust
BAWSI	Black Association of the Wine and Spirit Industry
BPP	Beef Profit Partnerships
BEE	Black Economic Empowerment
CASP	Comprehensive Agricultural Support Programme
CLW	Community Based Livestock Workers
CRM	Customer Relationship Management
CSI	Container Security Initiative
CTO	Comprehensive Traffic Observation
C-TPAT	Customs-Trade Partnership Against Terrorism
CWSI	Cape Wine and Spirits Institute
DBSA	Development Bank of South Africa
DEAT	Department of Environmental Affairs and Tourism
DFPT	Deciduous Fruit Producers' Trust
DFTS	Dried Fruit Technical Services
DTD	Droevrugte Tegniese Dienste
DLA	Department of Land Affairs
DoT	Department of Transport
DTI	Department of Trade and Industry (the dti)
DWAF	Department of Water Affairs and Forestry
EAN	European Article Number
ECR	Efficient Consumer Response
ECU	Electronic Control Units
EDI	Electronic Data Interchange
EFFORRT	European Food and Flower Overland Road and Rail Transport
ERP	Enterprise Resource Planning
FAO	Food & Agricultural Organisation
FMCG	Fast Moving Consumer Goods
FPT	Fresh Produce Terminals
GATT	General Agreement on Tariffs and Trade
GEAR	Growth, Employment and Redistribution Strategy

GDP	Gross Domestic Product
GMO	Genetically Modified Organisms
GPS	Global Positioning System
GWK	Griqualand Wes Ko-op group
HIDC	Holland International Distribution Council
IAP	Intelligent Access Program
ICT	Information and Communication Technology
IDP	Integrated Development Plan
IFSS	Integrated Food Security and Nutrition Strategy
IMSA	Institute of Market Masters of South Africa
I-O	Input-Output
ISRDS	Integrated Sustainable Rural Development Strategy
KWV	Ko-operatiewe Wyn Vereniging
Land Bank	Land and Agricultural Bank
LCM	Logistics Cost Model
LDV	Light Delivery Vehicle
LRAD	Land Redistribution for Agricultural Development
LSP	Logistics Service Provider
MESA	Meat Exporters of South Africa
MPCC	Multi-Purpose Community Centre
MPO	Milk Producers Organisation
MTSF	Medium-Term Strategic Framework-Purpose Community Centre
NAFU	National African Farmers' Union
NAMC	National Agricultural Marketing Council
DoA	National Department of Agriculture
NERPO	National Emergent Red Meat Producers' Organisation
NFLS	National Freight Logistics Strategy
NGO	Non-Governmental Organisation
NLIS	National Livestock Identification Scheme
NPA	National Ports Authority
NWGA	National Woolgrower's Association of South Africa
OABS	Optimal Agricultural Business Systems
PGDS	Provincial Growth and Development Strategies
PPECB	Perishable Products Export Control Board
PPP	Public Private Partnership
RDP	Reconstruction and Development Programme
RFID	Radio-Frequency Identification
RIRDC	Rural Industries Research and Development Corporation (Australian Govt)
SAAPA	South African Agricultural Processors Association
SACOTA	South African Cereals and Oilseeds Traders Association
SACU	Southern African Customs Union
SADC	Southern African Development Community
SAFE	South African Fruit Exporters

SAFEX	South African Futures Exchange
SAFT	Southern African Fruit Terminals
SAMIC	South African Meat Industry Company
SAMPRO	South African Milk Processors Organisation
SANRAL	South African National Roads Agency
SARB	South African Reserve Bank
SARDA	Southern African Refrigerated Distribution Association
SARS	South African Revenue Service
SASA	South African Sugar Association
SASRI	South African Sugarcane Research Institute
SAWB	South African Wine and Brandy Company (also SAWBC)
SAWIS	South African Wine Industry Information and Systems
SDI	Spatial Development Initiative
SETA	Sector Education and Training Authority
SITFE	Sugar Industry Trust Fund for Education
SMME	Small Medium and Micro Enterprise
SSA	Statistics South Africa
TAU	Transvaal Agricultural Union
TEU	Twenty-foot Equivalent Unit
UCC	Uniform Code Council
USB	University of Stellenbosch Business School
USB-ED	USB Executive Development Ltd (Executive education arm of the USB)
VinPro	South African wine farmers' service organisation
VKL	Cape Estate Wine Producers' Association
WCSA	Wine Cellars South Africa
WEKUFU	Weskaap Ubuntu Farmers Union
WFP	World Food Programme
Wine-Online	The Wine industry-wide Integrated Information System
WINETECH	Wine Industry Network of Expertise and Technology
WOSA	Wines of South Africa
WTO	World Trade Organisation
WWTG	World Wine Trade Group
XML	eXtended Markup Language

H.2 List of Terms

Benchmarking	Comparison of best practice against major competitors
Community of Practice	Group of people who share information for the purpose of improving the collective body of knowledge
Concession	Concession contracts are similar to Design, Build, Operate and Finance arrangements (see below), except that the private sector contractor recovers its costs either through direct user charges or through a mixture of user charging and public subventions.
Design, Build, Operate and Finance	DBOF contracts are contractual relationships between the public sector and private sector contractors for the design, construction, operation and financing of public facilities or infrastructure. The private sector contractor is responsible for designing, building, operating and financing the facility and recovers its costs solely out of payments from the public sector, which is dependant on their ability to meet the pre-approved output specifications as part of the performance mechanism. At the end of the term of the contract, ownership of the facility commonly transfers to the public sector.
Flexi and Mega Rail	Service modes of Spoornet, referring to different transport options that are available to clients.
Intermodal	A term that refers to more than one mode of transport. Intermodal as applied to the transportation of freight in a container or vehicle, refers to the use of multiple modes of transportation (rail, ocean carrier, and truck), without any handling of the freight itself when changing modes. The advantage of utilizing this method is that it reduces cargo handling, and so improves security, reduces damages and loss, and allows freight to be transported faster.
Logistics	Logistics is considered to be that part of the supply chain process that deals with the transportation, warehousing, as well as inventory administration and management of physical products between the point of production and the point of delivery to the final consumer.
Logistics Stack elements	Components of logistics cost: transport, storage, inventory holding, management & administration costs and profit.
Mariculture	The cultivation of marine organisms for food, either in their natural environment, or in seawater in ponds or raceways (e.g. the farming

	of marine fish, prawns or oysters in saltwater ponds). A specialised branch of aquaculture.
Multimodal	Utilising more than one mode of transport
Phytosanitary	Plant health measures. An agreement on how governments can apply food safety and animal and plant health measures (sanitary and phytosanitary or SPS measures) sets out the basic rules in the WTO. Phytosanitary Certification: Under the International Plant Protection Convention, it has been agreed that all signatory countries will carry out the required inspection and treatment to ensure that quarantine and other noxious pests are not disseminated along with plants and plant products exported from their respective countries.
PPP	Public Private Partnership (PPP) is a partnership between the public and private sector for the purpose of delivering a project or service traditionally provided by government.
Roadrailer	RoadRailer equipment is a hybrid that is both a highway trailer and a railcar at the same time. On the road, RoadRailer equipment can be hauled by a regular tractor on the RoadRailer unit's rubber-tired wheels. These same units can, however, be coupled together into a railroad train, without having to be loaded onto flatcars. The conversion to rail mode is accomplished by simply adding railroad bogies (similar to the trucks found under normal railcars) between the trailers. Terminals simply require an area where tracks are set into pavement (as on trolley lines) and simple forklifts for moving the rail bogies around.
TEU	"Twenty-foot Equivalent Unit" is defined as a volume equivalent to that occupied by one ISO twenty-foot container. A common measure of freight volume is 2TEU, which is the volume occupied by one ISO forty-foot container.
Typology	A ‘typology’ describes a typical member of a larger category of similar units.