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Agri Processing Report:

Opportunities for Growth and Employment in the Western Cape

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Part 1: Agri Processing Overview

Introduction

Provincial Strategic Goal Number one of the Western Cape Government is to create opportunities for growth and jobs (WCG, 2015). To do this, the Western Cape Cabinet commissioned Project Khulisa, an initiative focussed on the province's economic mandate, with the purpose of identifying areas of the economy with the greatest potential for accelerated, sustained growth and job creation for the period 2014-2019 (WCG, 2014). One of the identified sectors identified in this process was agricultural (agri) processing. It comes as no surprise as this sector has also been identified recently in influential policy documents such as the Industrial Policy Action Plan (IPAP), the New Growth Plan (NGP) and the National Development Plan (NDP) for its potential to create jobs and economic growth (DAFF, 2012a).

The agri processing sector contributes to economic development in two ways; directly as a source of income and employment and indirectly through its backward linkages with primary agriculture. There are therefore strong multiplier effects associated with growth in this sector across the various value-chains (Wilkinson & Rocha, 2006). By further developing linkages to the primary sector, countries can maximise direct and indirect employment creation effects. The secondary and tertiary sectors provide input provisions to the natural resource sectors and resource-processing activities are characterised by varying levels of labour and skills intensity. Furthermore, by integrating forward in global value chains, countries are expected to accrue higher levels of export revenues and foreign exchange earnings (Morris & Fessehaie, 2013). It is clear that this sector has the potential to make significant positive contributions to the Western Cape economy in terms of much needed job creation, economic growth and foreign trade revenues.

This report seeks to address three factors which are critical to realising the potential returns within the agri processing sector. First, the sector is complex and dynamic because it incorporates such a multitude of different industries, products and processes which are spread across different value chains. It is therefore essential that this sector be thoroughly analysed in order to understand the areas for potential growth and development in the future. Second, a clear definition is needed to refer to this sector as much of the literature and policy documents use different terminology and classification systems to define it. Here some clarifications will be made and a formal definition will be suggested. Third, this report will seek to analyse the agri processing sector in order to identify areas of growth and job creation that exist at a detailed product level.

To analyse the sector in a more broad and holistic fashion, an important challenge needs to be overcome, namely to aggregate the available, scattered and non-uniform data available for analysis. This is done by merging and aggregating data into a new agri processing database which incorporates information on trade, production, consumption and labour. This will be used then to ultimately create a multivariate index incorporating

various indicators to rank specific products according their potential going forward. The following steps will be followed in this report:

- Step 1: Define the term "agri processing" in a clear and concise manner according to international standards.
- Step 2: Provide a literature review of agri processing and its role in development.
- Step 3: Broadly analyse characteristics and performance of the sector using the available information for both South Africa and the Western Cape.
- Step 4: Develop a multivariate index in order to identify high performing agri processing products based on several indicators. This will assist in prioritising specific products for expansion both within the province and at a national level.

Following these steps will provide much needed information and background for effective, evidence based decision-making within the agri processing sphere and will assist in identifying opportunities in this sector.

Defining agri processing

In the literature there are a variety of definitions used to refer to the processing of agricultural products. More often than not, terminology used to refer to agri processing is used in an ambiguous fashion and no uniform definition is universally applied. The difficulty in defining this sector arises from the complexity of classifying a host of different products, sourced from different primary sectors (agriculture, forestry and fisheries) and with varying practices of processing in various different industries. Furthermore, within this process, these products go through different degrees of transformation between harvesting and final use which translates into different levels of processing and value-addition. This will in turn depend on which parts of the value chain are to be included in the formal definition utilised. Another factor that makes it difficult to pinpoint what forms of "processing" should be included in the definition is the impact of technology and innovation which are systematically widening the range of activities in this sector (FAO, 1997). Finally, official statistics are often unable to clearly capture or disaggregate the full range of post-harvest value-adding activities in their data (Wilkinson & Rocha, 2006). Due to these factors it is essential that a clear definition be used on a consistent basis within policy discussions.

From the onset it is fundamentally important to distinguish between two important concepts which apply to this sector and which are often confused with one another, namely "processing" and "value addition". The former entails the physical changing of the products' form, while the latter implies addition of value to a product (thus increasing the price of the product) without changing its physical form (DAFF, 2012b). Formal definitions used in the literature will often vary based on whether or not value-adding activities are included.

One of the traditional definitions used for this sector comes from the Food and Agricultural Organisation's (FAO) 1997 definition of "Agro-processing". It states the following: "*Agro-processing (industry) is a subset of manufacturing that processes raw materials and intermediate products derived from the agricultural sector. Agro-processing thus means*

transforming products originating from agriculture, forestry and fisheries." (FAO, 1997:222). Henson & Cranford (2009) also uses this 1997 definition by the FAO, while UNIDO, IFAD and FAO later define "Agro-processing" in more detail as being the "*processing, preservation and preparation of agricultural production for intermediate and final consumption*" (UNIDO; IFAD & FAO, 2008:2). To make the classification of agro-processing activities easier, the United Nations' (UN) have introduced the International Standard Industrial Classification (ISIC) which defines agro-processing to encompass any of the following standard classification industries:

Food
Beverages
Tobacco products
Paper and wood products
Textiles, footwear and apparel
Leather products
Rubber products (ISIC, 2013)

Another method of defining agri processing is by means of identifying upstream and downstream industries (FAO, 1997). The former are engaged with initial processing of agricultural commodities such as rice and flour milling, while the latter industries undertake further manufacturing activities such as the making of bread or noodles.

The definitions mentioned above, even though they are very broad, still do not include further upstream activities preceding the farm gate, on-farm post-harvest value-addition. Wilkinson and Rocha (2006) introduce the term of agri processing in their initial work and subsequently state that the "agro-processing" industry is broadly defined as "*postharvest activities involved in the transformation, preservation and preparation of agricultural production for intermediary or final consumption and covers a broad area of postharvest activities, comprising artisanal, minimally processed and packaged agricultural raw materials, the industrial and technology-intensive processing of intermediate goods and the fabrication of final products derived from agriculture*" (Wilkinson & Rocha, 2009:46). This definition therefore also includes value-adding activities, as well as the processing activities mentioned in the other definitions.

From a Western Cape Government prospective, the Department of Economic Development and Tourism (DEDAT) defines Agro-processing as "*a set of techno economic activities, applied to all the produces, originating from agricultural farm, livestock, aqua cultural sources and forests for their conservation, handling and value-addition to make them usable as food, feed, fibre, fuel or industrial raw materials*" (DEDAT, 2014: 58). Clearly, this definition incorporates post-harvest value-adding activities simmilarly to the definition used by Wilkonson and Rocha (2009).

Upon reviewing the relevant literature, and with consultations with various role players, it is advised that the word "agri processing" be used within the Western Cape Department of Agriculture. The definition for agri processing is therefore closely aligned to and

incorporates the definitions used by Wilkinson and Rocha (2009) and DEDAT (2014), and adds elements from internal discussions. Agri processing is therefore defined as follows:

> ***All post-harvest activities applied to products that originate from primary agriculture, forestry and fisheries which involve the transformation, preservation and preparation of products for intermediary and final consumption to make them usable as food, feed, fibre or industrial raw materials. This includes waste and waste products.***

To illustrate the different dimensions included in this definition, Figure 1 sheds some light on the different processes associated with agri processing. Though not an exhaustive list of the different activities, it does show all the major processing and value adding activities stretching from before the farm-gate to the final use of the product. Important to note from Figure 1 is that imported raw products are also included under the primary sector heading and exports of products are included at the consumer-end of the value chain. Ultimately some of the products coming through the agri processing value chain will also be utilised as inputs into primary sectors creating a loop effect (Henson & Cranford, 2009).

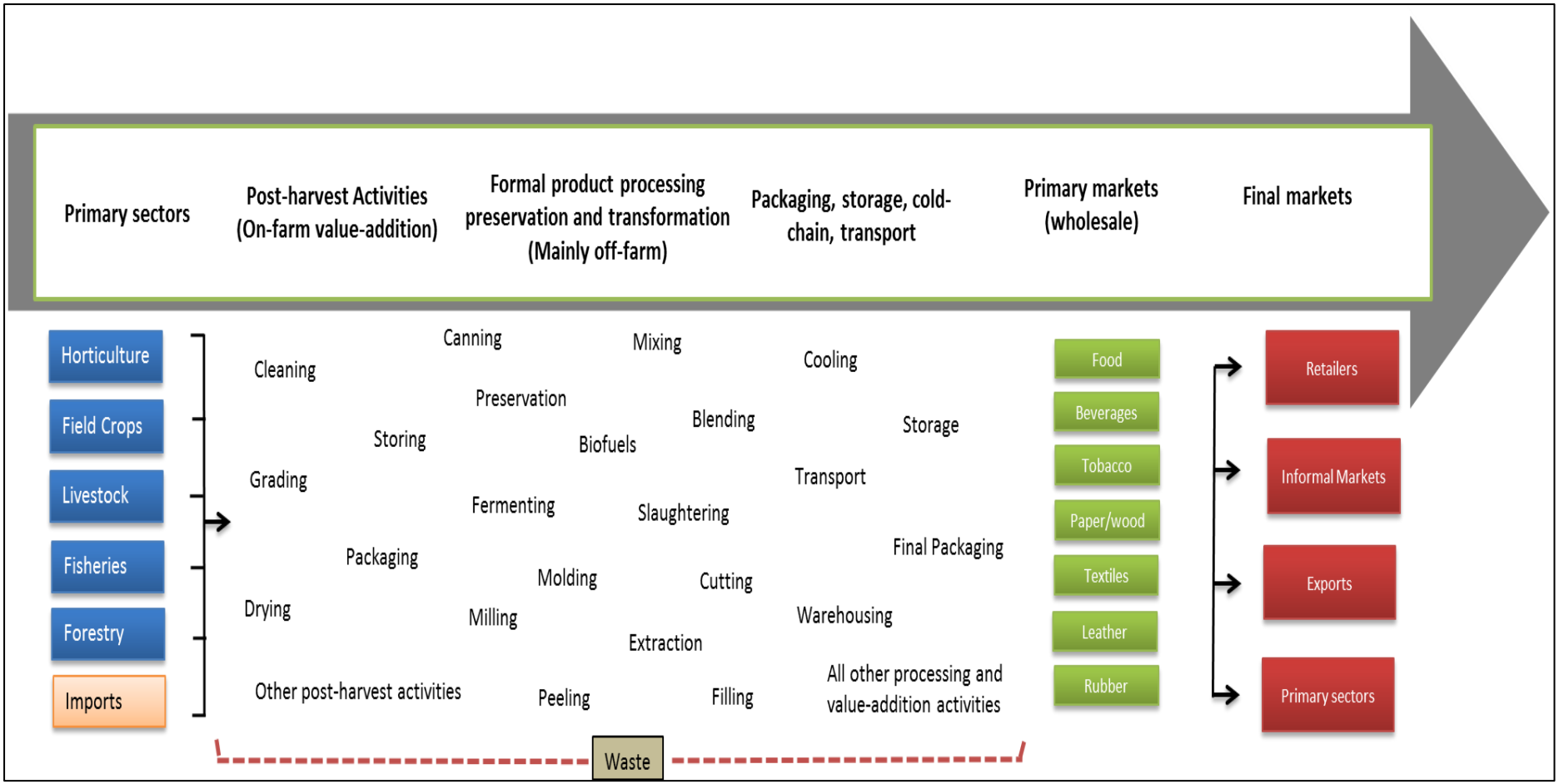

Figure 1: A Value-Chain Diagram of the Agri Processing Definition

Source: Own Compilation

Literature review on agri processing

Historically, primary agriculture and secondary industries have been viewed as separate sectors due to differences in their fundamental characteristics and in terms of their role in development. Agriculture was said to be the main driver in the first stages of a nation's development while industrialisation occurred further down the pathway of progressed developmental stages at the expense of resources away from agriculture to the industrial sector of the economy (FAO, 1997). However, since the seminal work of Johnston and Mellor (1961), it has become clear that this view no longer suffices. Agriculture clearly contributes to industrialisation and harmonious development while also warranting political and social stability. Furthermore, agriculture has become a form of industry itself as vertical integration, technology advances and marketing and consumer preferences have evolved in resemblance to that of many industrial sectors (FAO, 1997). Thus, the key in development is to find the optimum contribution that agriculture can make to the economy both in terms of its functioning and its links to the rest of the economy. Developing a competitive agri processing sector provides substantial employment and income opportunities; while at the same time enhancing the quality of, and the demand for, farm products.

Demand for higher value-added food is expected to keep on growing in the coming years, suggesting that strategies for improved economic growth, food security and poverty alleviation could be realised by focussing efforts on agri processing. It is essentially the upstream (primary sectors) and downstream (wholesale and retail sectors) linkages of these industries that ensures high multiplier effects in terms of job creation and value-addition (Da Silva & Baker, 2009). Furthermore, agri processing enterprises create demand pull-impacts in the sense that they stimulate businesses well beyond the closest links (direct input suppliers and buyers) with a whole range of ancillary services and supporting activities in the secondary and tertiary sectors of the economy being positively impacted (Da Silva & Baker, 2009). The links and flows of such activities will be further examined in the following section by looking at global agri processing trends and developments.

Agri processing from a global perspective

From a global context, since the 1990's there has been a rapid shift in agri processing industrialisation in many developing countries, characterised by the establishment of various firms across an increasing array of food and non-food sectors (Henson & Cranford, 2009). The strong growth in the global agri processing sector has been a result of profound changes in the structure and organisation of the entire agro-food complex.

To get a better understanding of these changes, Reardon and Barrett (2000) developed a framework to look at the different linkages among agri processing industries, globalisation and economic development. This perspective is given in Figure 2 below. Starting from the left column, some main meta-trends underline the evolution of this sector. In domestic markets for products from the agri processing sector, population and income growth are driving changes in food consumption patterns away from starchy staples and towards

meats, dairy products, fruits and vegetables, oils and processed grains. This phenomenon is reflecting Bennett's law which states that as income rises, per capita consumption of starchy food staples decline (Henson & Cranford, 2009). Furthermore, Increasing urbanisation, increased female participation in labour markets and greater ownership of appliances (e.g. refrigerators and microwave ovens) all induce higher global demand for processed and higher value-added products. For instance, food systems are heavily impacted by the higher demand for food preservation, dietary transitions towards new products and the demand for convenience foods (Wilkinson & Rocha, 2006). This trend counteracts the downward pull coming from lower relative food expenditure that is brought by Engle's law. This Engle's law states that as incomes rise, the proportion of income spent on food declines (Henson & Cranford, 2009).

The growth in demand for agri processed goods will lead to an increased demand for raw agricultural goods which can generate economic benefits for the agriculture, forestry and fisheries sectors. The final meta-trend relates to the impact of rapid technology changes which are transforming the conduct and structure of production and commerce in all sectors, causing increases in productivity and enabling customised production and marketing processes (Reardon & Barrett, 2000).

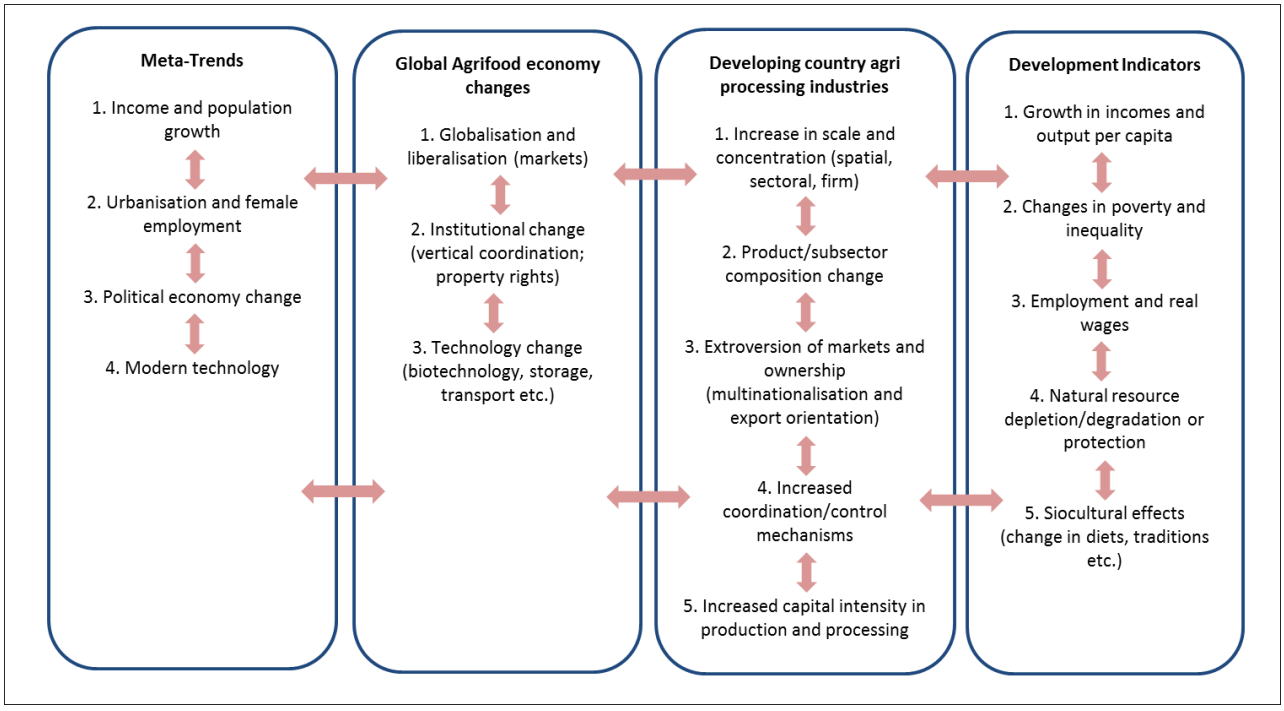

Figure 2: Flow Diagram Showing Links Between Globalisation, Agri Processing and Development
Source: (Reardon & Barrett, 2000)

These meta-trend factors foster changes in global markets (moving from left to right in Figure 2). Most notably the impact of market liberalisation during the 1980's and 1990's created new opportunities for private sector involvement and lowered barriers to trade for agri processing products to enter new markets (Henson & Cranford, 2009). This is clearly illustrated in global food trade, with processed products now predominating in exports and imports (Wilkinson & Rocha, 2006). There have also been dramatic changes in

institutional arrangements, with reduced state regulation on farmers' production and marketing choices and the rise of new contractual arrangements between firms and farms, of quality and safety standards, and of intellectual property rights (Reardon & Barrett, 2000). Technology also has impacted the agri processing sectors in a general sense (information and communication) and industries such as the farm-input industries (seed and chemicals).

All of these patterns noted in the first two columns will inevitably affect agri processing industries in developing countries like South Africa. This manifests mainly through relative shifts in factor and product prices, enhanced flow of capital such as foreign direct investment (FDI) and the transfer of technology, organisational structures and institutions. Moving to column 3, a shift in product composition towards subsectors occurs in which producers and upstream and downstream firms have global comparative advantage, in line with local consumer preferences. This in turn has seen an increase in the value-added share of processing and distribution within the agri-food chain. Furthermore, these changes often attract the presence of multi-national organisations in the off-farm portions of developing countries' agri-food systems as value chains are increasingly extending beyond national and regional borders. Other outcomes include increased coordination and also a shift in technology improvements which increases capital/labour ratios relative to the more traditional and more artisanal methods of processing (Reardon & Barrett, 2000).

As expected, all of the changes mentioned above will impact the development indicators listed in column 4. Technological changes, renewed access to private foreign capital, new institutional arrangements and organisational forms to enhance coordination will stimulate growth in output and per capita income. It is widely accepted that agri processing industries play a fundamental role in employment creation and income generation (UNIDO; IFAD & FAO, 2008). The outcome on employment and poverty will depend on various factors, but even if labour/output ratios fall, there is sufficient potential output growth to still stimulate aggregate employment growth. Consumer welfare will also be impacted by altering the quality and quantity of diets, by increasing convenience and leading to a greater variety of products.

The accelerated growth in agri processing industries could pose risks in terms of equity, sustainability and inclusiveness in the presence of unbalanced market power and distributions between chain participants (Da Silva & Baker, 2009; Henson & Cranford, 2009). Such industries will only be sustainable if they are competitive in terms of costs, prices, operational efficiencies, product offers, and only if they are able to buy raw materials at prices that would incentivise farmers to produce for these channels. It is clear that the full potential of the agri processing sector as a vehicle for economic development has not yet been realised in many developing countries, especially in Africa. The weakness of Africa's industrial development can be attributed to both exogenous factors, such as conflicts, as well as endogenous factors, such as low infrastructure investments and policy decisions. African countries therefore have not developed their secondary industries compared with the rapid industrialisation of Asia and

Latin America in the latter half of the twentieth century (Morris & Fessehaie, 2013). This is clearly evident in the prevalent trade patterns which are characterised by intra-industry trade in intermediate goods; exporting raw materials while importing final consumer goods (DAFF, 2012b).

Agri processing in the South African economic context

The global perspective on agri processing painted above clearly illustrates that agri processing industries are having a significant global impact on economic development and poverty reduction. The potential opportunities for growth and development within this sector for diversification and value addition in agriculture, particularly in developing countries, are immense (Da Silva & Baker, 2009). However such potential should also be seen in the context of the wider structures and the development of the economy of a specific country.

The early development of the South African economy was mainly driven by primary sectors such as agriculture and mining. In the initial stages, formal farming activities started with the establishment of the Dutch East Indian Company's (VOC) supply station in Table Bay on the Cape Peninsula to supply fresh food for Dutch fleets. Indigenous agricultural production was also in existence long before the arrival of European settlers in South Africa (Byrnes, 1996). Prior to the discovery of diamonds in the 1870's and gold in the 1880's, the economy of South Africa was almost entirely dependent on agriculture (Feinstein, 2005). With the newly found mineral riches, South Africa was drawn into the international economy through its exports of diamond and gold and development advanced with new investment into the region (Byrnes, 1996). In the first half of the 20th century, economic policies in South Africa were designed to stimulate growth in other sectors, such as farming and manufacturing, to reduce the reliance on the mining sector. In the manufacturing sector particularly, the government helped establish local textile and pulp and paper industries during the 1950's and 1960's, as well as state corporations to produce fertilizers, chemicals and oils (Byrnes, 1996). Figure 3 shows the development of the structure of the South African economy since 1946 in the form of Gross Domestic Product (GDP) distributions between sectors.

It is clear that the secondary industries showed steady increases after 1946 relative to other industries in the economy. However, the early 1980's saw the start of a trend of de-industrialisation which has continued till the present. The percentage of workforce employed in Manufacturing declined from roughly 12% in the mid-1980's to less than 7% by 2000, while the percentage of manufacturing exports to GDP ratio only increased by 5% in the same period (Rodrik, 2006). The South African economy has transitioned to be more concentrated in services, relative to the primary and secondary sectors. Thus, South Africa has developed into a tertiary economy where services such as finance, retail and government services predominate and are growing faster relative to the primary and secondary components in the economy.

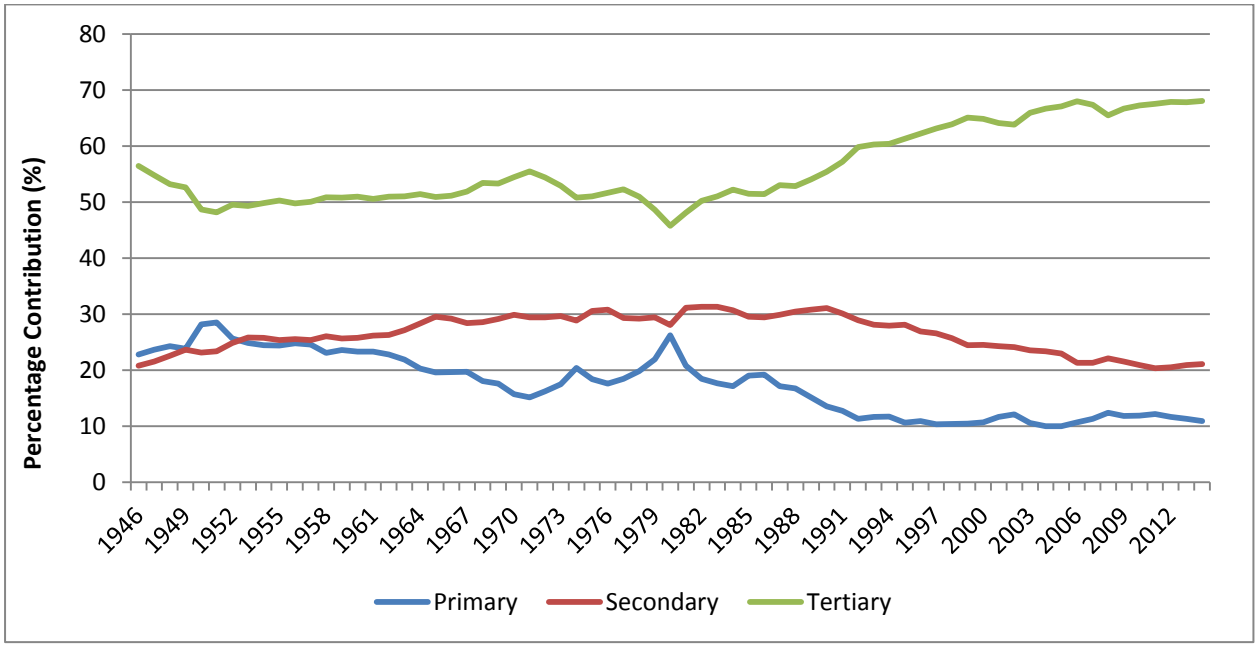

Figure 3: Sector Contributions to the Economy in terms of GDP at Current Prices

Source: (Quantec, 2015a)

This is in stark contrast to recent development of many other developing countries in Asia and Latin American countries where the share of manufacturing increased over time (Morris & Fessehaie, 2013). Rodrik (2006) compares this phenomenon witnessed in South Africa with the structural change that took place in Malaysia from 1980 to 2002, a country which at the time was quite similar to South Africa in terms of output and productivity and both countries had a similar reliance on mining. In the 1980's Malaysia was undergoing a process of industrialisation clearly seen by the increase in employment in manufacturing which grew from 8% to 16% of the total labour force and the share of manufactured exports to GDP increased from 6% to 80%. The Malaysian government played an active role in promoting manufacturing by means of industrial policies aimed at expanding and diversifying the industrial base of the economy. This ensured a continued trend in industrialisation with manufacturing that was promoting both growth and equity (Rodrik, 2006).

Some of the suggested reasons for South Africa's de-industrialisation include the debilitating effects of trade sanctions that South Africa faced in world markets in the 1980's and the high spending levels on defence industries to maintain political control. On the other hand, South Africa's development trajectory, and the inability to realise significant growth in the country's primary and secondary sectors, has been a key contributor to the persistently high level of unemployment in the country (Rodrik, 2006). Indeed, one of the key reasons cited for South Africa's persistently high unemployment rate is that the structure of the economy has developed in a way that has led to a mismatch between the type of labour demanded by firms in the labour market and the type of labour supplied by prospective workers. That is there is excess demand for skilled labour, but a shortage of skilled workers and a large pool of unskilled, unemployed workers unable to find employment (Bhorat & Hodge, 1999; Banerjee et al., 2008; Dias & Posel, 2007). Reversing this trend will require improved performance in industries which

utilise unskilled labour, particularly manufacturing but also agriculture and mining (Rodrik, 2006).

It should be noted that the South African economy has been negatively impacted in recent years by factors such as sluggish global economic growth (including key trade partners) and the deep seated labour market instability which has caused wide spread implications for the much needed growth and employment creation (WCG, 2013a). Real GDP growth slowed to 2.5% in 2012 with this downward trend continuing to put pressure on the economy to achieve its desired impact. The outcome from such a macro-economic environment translates into limited employment creation and lower wage increases in the mist of higher electricity, fuel and food prices.

The current structures of the South African and Western Cape economy are given in Table 1 below, indicating the relative sectoral contribution of each sector to GDP and the annual growth over the past five years. As noted earlier, the South African economy can typically be described as a tertiary economy with a relative high contribution from services. This includes finance, insurance and business services (24.8%), wholesale, retail and catering (14%), transport, storage and personal services (10.1%) and government services (15.2%).

Table 1: Economic Structure According to Sectoral Contributions: South Africa and Western Cape

Sector	Name	South Africa		Western Cape	
		Contribution to the Economy (%)	Annual GDP growth rate (2008-2013)	Contribution to the Economy (%)	Annual GDP growth rate (2008-2013)
Primary	Agriculture, forestry and fisheries	2.39	0.61	3.71	0.27
	Mining	5.52	-0.07	0.15	0.01
Secondary	Manufacturing	16.53	0.29	16.46	0.37
	Petroleum products, chemical and rubber	4.23	2.35	3.89	3.37
	Metals	3.14	-2.44	2.07	-1.35
	Food, beverages and tobacco	2.86	0.68	4.26	-0.71
	Transport equipment	1.60	1.02	1.03	0.50
	Wood, paper, publishing and printing	1.41	0.29	1.60	1.04
	Furniture and other manufacturing	1.23	-2.44	1.40	-2.35
	Textiles, clothing and leather	0.73	1.04	1.10	0.77
	Non-metal mineral products	0.56	-2.00	0.52	-2.09
	Electrical machinery	0.49	0.67	0.34	1.02
	Radio, tv, instruments	0.28	3.76	0.25	3.53
	Electricity, gas and water	1.88	0.27	1.33	1.10
	Construction	3.40	2.78	4.32	2.08
Tertiary	Wholesale	14.03	2.57	15.21	2.60
	Transport, Storage and personal services	10.09	2.13	9.86	2.10
	Finance, Insurance and business	24.86	2.95	33.84	2.83
	Community and social services	6.06	1.21	4.99	1.13
	General Government	15.23	3.10	10.13	3.39

Source: (Quantec, 2015a)

The Western Cape economy grew at 3% during 2012, greater than the 2.5% of the national economy, but still lower than the 3.5% provincial growth of 2011. Table 2 below shows the expected economic outlook for the Western Cape for the period 2013-2018 which suggests that growth will improve to around 3.6% over the next few years (WCG,

2013b). The manufacturing sector, of which most agri processing products are a part of, is expected to pick up from the low growth rate of 1.6% in 2013 to 2.8% towards 2018.

Table 2: Economic Outlook for the Western Cape, Real Growth in GDP (%), 2013-2018

Description	2013f	2014f	2015f	2016f	2017f	2018f	2013 – 2018 average growth
Agriculture, forestry & fishing	1.9	1.5	1.2	1.5	1.6	1.4	1.5
Mining & quarrying	0.8	1.2	1.4	1.5	1.6	1.5	1.3
Manufacturing	1.6	2.5	2.8	3.1	3.5	3.2	2.8
Electricity, gas & water	0.1	3.1	2.8	2.8	2.7	3.0	2.4
Construction	2.9	4.3	5.3	5.9	6.0	6.1	5.1
Wholesale & retail trade, catering & accommodation	2.0	2.5	3.2	3.3	3.8	3.7	3.1
Transport, storage & communication	2.8	3.5	4.4	4.6	5.2	5.0	4.3
Financial intermediation, insurance, real estate & business services	2.9	4.1	4.6	5.3	5.5	5.2	4.6
Community, social & personal services	2.2	3.0	3.0	3.2	3.3	3.3	3.0
General government services	2.3	2.5	2.5	2.4	2.6	2.6	2.5
GDPR at basic prices	***2.4***	***3.2***	***3.6***	***4.0***	***4.3***	***4.1***	***3.6***

Source: (WCG, 2013b)

As illustrated, the Western Cape economy is services-orientated and its manufacturing base tends to have a competitive advantage within South Africa. Table 3 further illustrates these advantages by giving the structure, growth and revealed comparative advantage (RCA) of the Western Cape, relative to the rest of South Africa. RCA is a measure used to establish whether the growth in an industry reveals a competitive edge. It is measured through the use of location quotient ratios (LQ), an LQ of greater than 1 implies comparative advantage relative to other regions, while an LQ of less than 1 implies a lack of comparative advantage (WCG, 2013b). It is clear that the majority of sectors experienced an LQ of greater than unity, indicative of superior comparative sectoral advantages in the province.

Table 3: Sector Growth and Revealed Comparative Advantage of the Western Cape Economy

	Sectors: SIC	Western Cape GDPR % share 2011	Western Cape Growth 2000 - 2011	South Africa GDP % share 2011	South Africa Growth 2000 - 2011	LQ ratio 2000	LQ ratio 2011
	Agriculture & agro-processing	8.5%					
1	Beverages & Tobacco	2.33	0.2	0.99	-0.62	2.23	2.35
2	Agriculture, forestry & fishing	3.74	1.8	2.44	2.03	1.57	1.53
3	Food	2.46	5.0	1.93	4.93	1.33	1.27
	Manufacturing (ex. Food & beverages)	10.8%					
4	Footwear	0.12	2.0	0.06	-0.07	1.47	1.81
5	Printing, publishing & recorded media	0.88	1.4	0.51	1.54	1.83	1.72
6	Wearing apparel	0.61	2.4	0.36	2.31	1.75	1.69
7	Textiles	0.34	2.4	0.25	2.38	1.42	1.35
8	Plastic products	0.60	0.9	0.45	1.46	1.47	1.31
9	Other transport equipment	0.21	5.1	0.17	5.79	1.43	1.24
10	Other industries	1.36	1.8	1.22	2.06	1.20	1.11
11	Leather & leather products	0.08	30.1	0.08	30.74	1.30	1.11
12	Furniture	0.20	5.4	0.19	5.80	1.20	1.10
13	Professional & scientific equipment	0.10	7.1	0.09	6.73	1.08	1.08
14	Non-metallic minerals	0.47	2.1	0.47	1.29	0.98	1.00
15	Glass & glass products	0.12	2.3	0.12	3.43	1.21	1.00
16	Machinery & equipment	0.98	6.5	1.00	5.55	0.92	0.98
17	Wood & wood products	0.33	0.0	0.38	0.88	1.05	0.88
	Construction	4.4%					
18	Construction	4.39	7.2	3.41	7.34	1.47	1.29
	Services	58.1%					
19	Catering & accommodation services	1.56	5.5	0.95	3.46	1.41	1.64
20	Business services	22.24	5.6	15.30	5.24	1.49	1.45
21	Finance & insurance	10.68	6.9	8.36	6.41	1.31	1.28
22	Wholesale & retail trade	13.51	4.2	12.89	3.93	1.10	1.05
23	Transport & storage	5.81	4.3	5.54	3.66	1.04	1.05
24	Communication	4.26	6.7	4.60	7.38	1.07	0.92

Source: (WCG, 2013b)

Looking specifically at the agri processing industries (food, beverages, tobacco, footwear, printing, wearing apparel, textiles and wood) listed in Table 2, it is clear that these industries showed steady growth since 2000, and all realised competitive advantages compared to the rest of South Africa. Together with agriculture, the food manufacturing industry contributed 8.5% to total GDP in the Western Cape. This indicates the relative importance of agri processing and agricultural production in the Western Cape economy.

Agri processing Output

National

The focus is now turned to specifically look at the agri processing sector in South Africa. Figure 4 shows the sector's total output, in constant 2005 prices, which is made up of all intermediary consumption (purchases from primary sectors) and gross value added (GVA) (Quantec, 2015a). The agri processing sector contributed R346 billion to the economy in

2013 and the steady increases of 2.4% annually since 2000 indicate that the sector continues to grow at a rate faster than inflation. The drop in total output witnessed in 2008 is a consequence of the economic recession on the agri processing sector, but it seems as though the economy has sufficiently recovered to possibly reach higher levels in the next few years. The sector currently employs approximately 540 000 individuals in the various industries[3] though an overall declining trend in employment numbers throughout the previous decade should be noted. This phenomenon is a typical outcome of a sector as it develops, with general productivity increases and fewer workers needed to produce a higher volume of manufacturing goods (Matsuyama, 2008). Fortunately there was some improvement in employment numbers between 2012 and 2013 for the first time since 2005.

Overall, the agri processing sector in South Africa has shown steady real increases over the period from 2000 to 2013 in both intermediary consumption and value added to the sector.

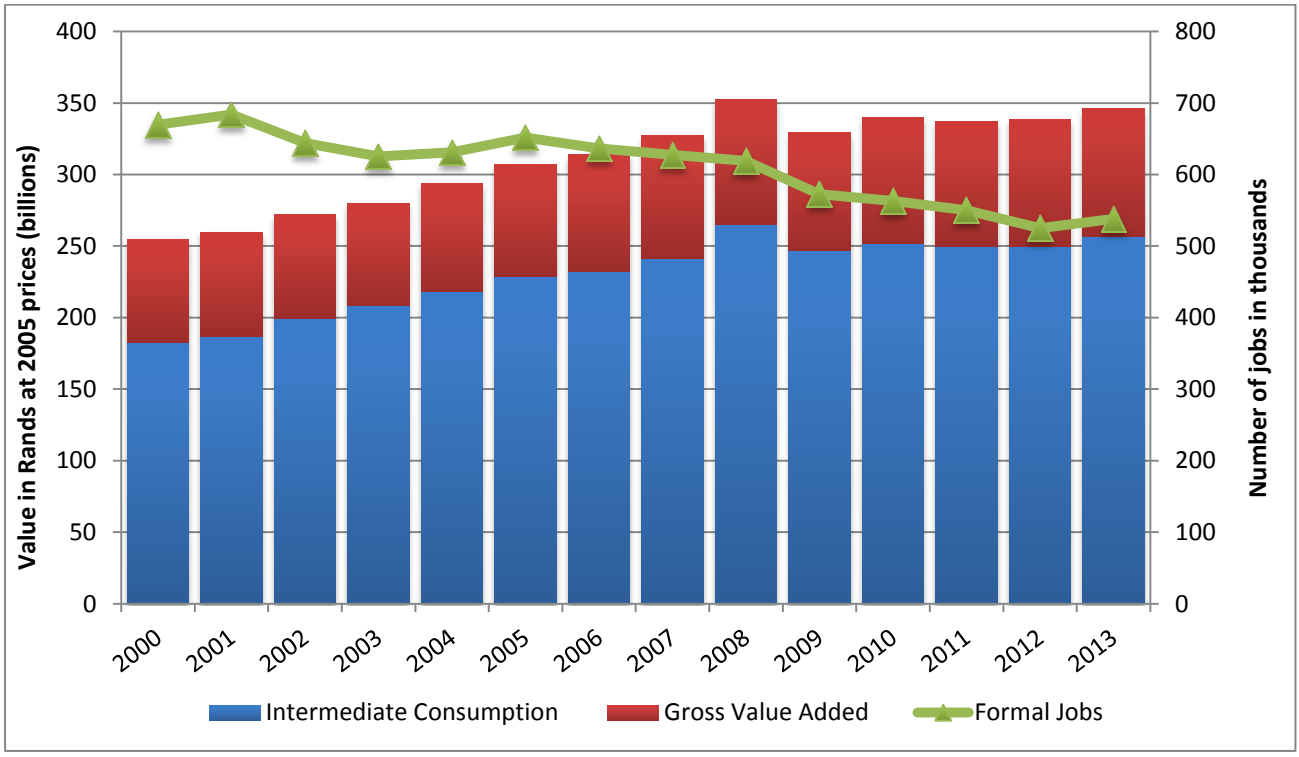

Figure 4: Real Total Output in the Agri Processing Sector[1] in South Africa

Source: (Quantec, 2015a)

Looking more specifically at industry-level performance, Figure 5 disaggregates the agri processing sector into its different industries. Following international trends, the food industry was the main contributor to total output in this sector in 2013 with 46%, equating to output of R149.1 billion. The food sector showed steady growth in output from R97 billion in 2000, growing at rate of 3.4% annually over the period under review. The paper and beverages industries followed in second and third place respectively with contributions of 14.1% and 13.9% to total output. All of the other industries included in Figure 5 (wood,

[1] This includes the following SIC [4] industries: food, beverage, tobacco, textile, clothing, leather, footwear, wood and paper.

textiles, wearing apparel, tobacco, footwear and leather products) made relatively smaller contributions to total output, together making up less than 7% of aggregate output in 2013. All grew steadily over this period.

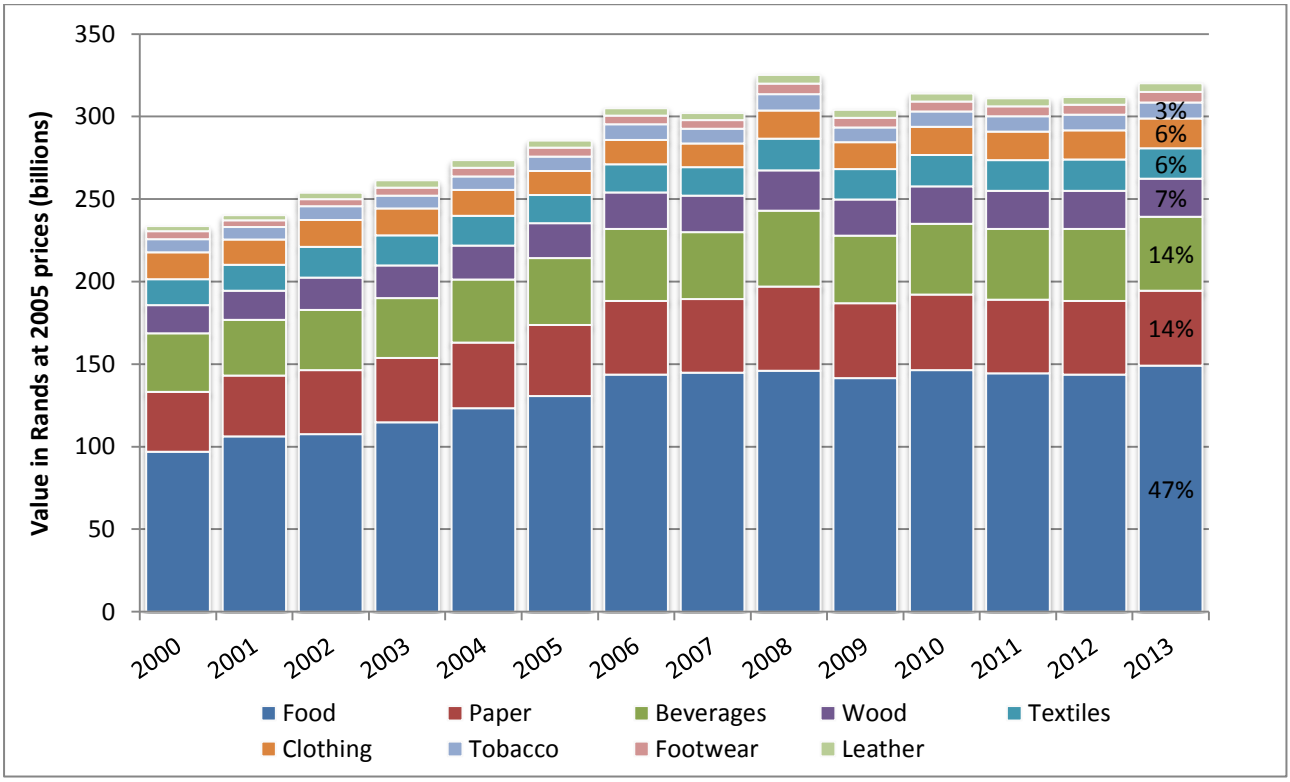

Figure 5: Relative Contribution to Total Output in the Agri Processing Sector[2] in South Africa
Source: (Quantec, 2015a)

Western Cape

Agri processing in the Western Cape follows similar trends to the national statistics given in Figure 6. The agri processing sector contributed R69 billion to total output in 2013 which consisted of R50.4 billion in intermediary consumption and R18.8 billion in GVA (see Figure 6). Total output of the Western Cape agri processing sector grew annually by 2.14%, which was lower than the national average. Similar to the national employment trends in this sector, total employment has declined over the same period, whilst also showing an improvement between 2012 and 2013 (Quantec, 2015a). Currently the sector employs approximately 115 000 workers, including both formal and informal jobs.

[2] This includes the following SIC [4] industries: food, beverage, tobacco, textiles, clothing, leather, footwear, wood and paper.

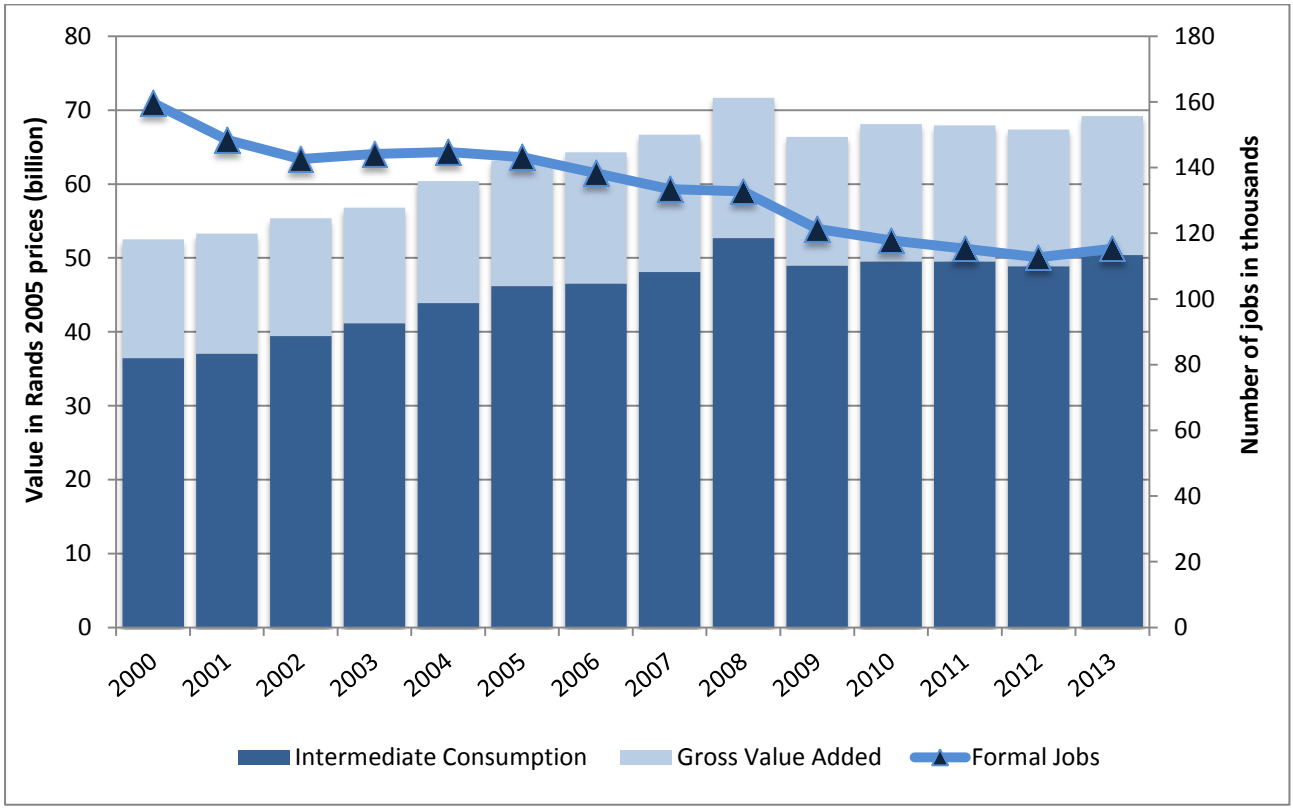

Figure 6: Real Total Output within the Western Cape Manufacturing Sector

Source: (Quantec, 2015a)

Table 4 shows the contributions that each province makes to total output and GVA in South Africa's agri processing sector. The Gauteng province was the main contributor in 2013 with 28% of total output, followed by Kwazulu-Natal with 26%. The Western Cape contributed 20% to output and 21% to GVA in South Africa, while all of the remaining provinces making significantly lower contributions (smaller than 9% for both accounts).

Table 4: Provincial Contributions to the Agri Processing Sector in South Africa, 2013

Province	Total Output 2013 (millions)	Share of total Output (%)	Gross Value Added 2013 (millions)	Share of GVA (%)
Gauteng	97840	28.24	25598	28.46
Kwazulu-Natal	91564	26.43	23168	25.76
Western Cape	69195	19.97	18793	20.89
Eastern Cape	30642	8.85	7730	8.59
Mpumalanga	25365	7.32	6519	7.25
Free State	13739	3.97	3531	3.93
North West	9231	2.66	2345	2.61
Limpopo	7175	2.07	1830	2.03
Northern Cape	1674	0.48	436	0.49
Total	**346425**	**100**	**89951**	**100**

Source: (Quantec, 2015a)

To analyse the different industry contributions in the Western Cape becomes difficult due to data limitations. Whilst it is not possible to replicate Figure 5 for the Western Cape, the relative contributions of the different industries highlighted in Figure 7 can be calculated. Dating back to 1996 for information on provincial manufacturing data, Figure 7 illustrates that the food industry made the biggest contribution in the province with 35% albeit at a

lower percentage compared to the national average in 2013. However, at a national level, the food industry output did increase in the last decade relative other industries and therefore this percentage is likely to also have increased in the Western Cape.

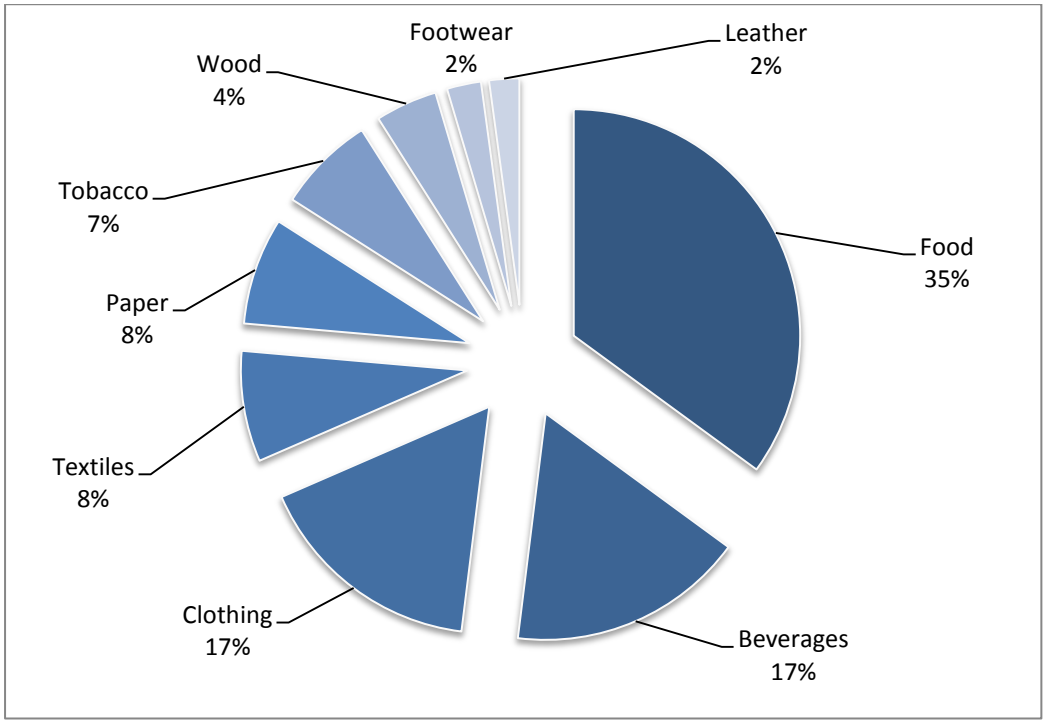

Figure 7: Relative Contributions to Output in the Agri Processing Sector in the Western Cape, 1996
Source: (Stats SA, 1996)

Beverages and wearing apparel were the second and third biggest contributors at 16.9% and 16.5% respectively. The former is to be expected due to the province's high production of wine and beer relative to the other provinces in South Africa. Textiles, paper, tobacco, wood, footwear and leather made much smaller contributions to the agri processing sector in the province.

To gain further understanding of the agri processing sector within the Western Cape, Figure 8 is compiled using 2011 input-output tables from Quantec (2011) to illustrate the flow of resources from primary agriculture, forestry and fisheries to the secondary industries in the economy. Moving from top to bottom, the value of inputs are given in green, while blue boxes indicate output of the specified industry. All values are in 2011 prices. Inputs to the primary agricultural sector amounted to R13.8 billion in value with 35% being imported. Wholesale and retail (11%), transport and storage (8%), basic chemicals (8%) and food (7%) were big contributors to supply in the sector. These inputs were used in intermediate consumption to produce output of R30.8 billion. This contributed 3.8% to regional GDP and employed 116 152 individuals in the process.

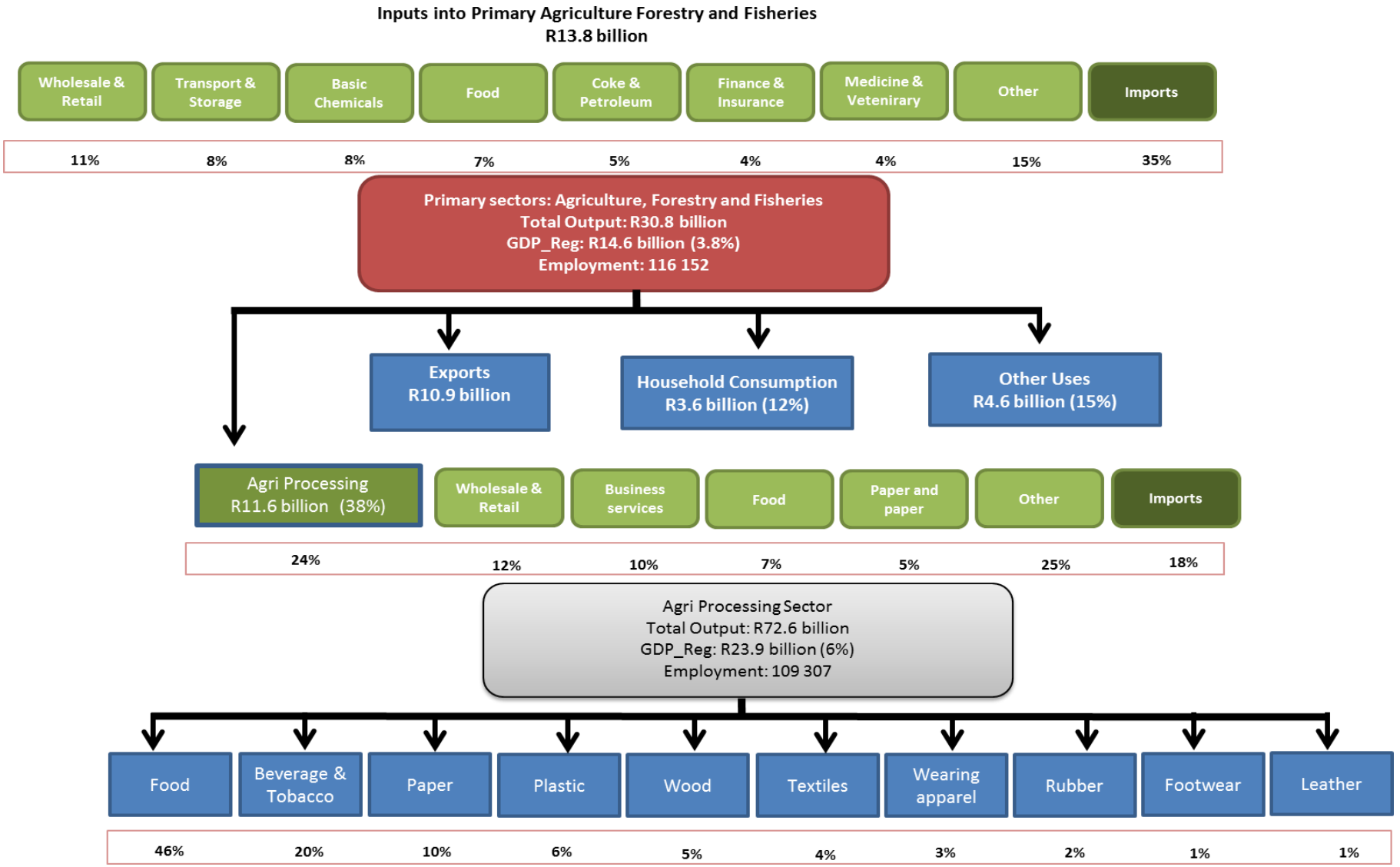

Figure 8: Input and Output Flows of the Agri Processing Sector in the Western Cape

Source: Quantec, 2011

The outputs from the primary agriculture sector can be divided into agri processing (38%), exports (35%), consumption (12%) and other uses (15%). From the primary sector, the agri processing utilises inputs of R11.6 billion, while wholesale and retail (12%), business services (10%) and food (7%) were the other main supplying industries to the agri processing sector. It should be noted that 18% of the inputs for this sector were imported and then used for further processing or value adding activities. The Western Cape agri processing sector used approximately R49.6 billion of inputs to produce a total output of R 72.6 billion in value; this contributed to 6% of the regional GDP and employed 109 307 individuals. The output from the sector then flowed into various sub-sectors of agri processing; the most notable was the food industry (46%), beverage and tobacco (20%), paper (10%), plastic (6%), wood (5%) and others. Figure 8 reaffirms the integrated linkages between the primary and secondary industries in the economy and the amount of resources flowing through the value chain toward the utilisation of final use.

Summary

Thus far this report introduced agri processing as an important sector for the Western Cape when looking for improved economic growth and job creation going forward. The overview provided highlights the dynamic nature of this sector and the problematic usage of terminology when describing the sector. A review of such descriptions found in the literature has led to the introduction of the term "agri processing" to relate to all activities (including post-harvest) applied to products that originate from primary agriculture, forestry and fisheries which involve the transformation, preservation and preparation of products for intermediary and final consumption to make them usable as food, feed, fibre or industrial raw materials. Using this definition, the review has highlighted the importance of the sector from a global perspective and identified the major trends in the development thereof.

The agri processing sector in South Africa has undergone key changes throughout the past century as the economy has seen substantial structural changes. Most notable is the strong drive in the country's manufacturing sectors, including agri processing, between the 1940's and the 1980's, after which a decline has been prevalent until the present day. This relative decline in manufacturing's contribution to the economy should be cause for concern as the sector could be employing more unskilled and semi-skilled workers, of which South Africa currently has an excess supply of in the labour market.

Finally, this part of the report has illustrated how the agri processing sector showed strong growth in output over the previous decade and still contributed to more than 6% to total regional GDP of the Western Cape.

Now that agri processing has been dissected and examined, the potential has been identified and the necessary background has been created to move forward and start to talk about developing a strategy to take hold of agri processing opportunities in the most effective way for the future. The rest of this report looks to make a significant contribution to this process by developing a detailed index to help prioritise agri processing initiatives at the product level

Part 2: Product Level Analysis

Introduction

The next step in the report is to build a strategy for how South Africa can best utilise agri processing to help reach its development goals. As discussed, agri processing is a complex sector spanning a number of different industries and levels of technology. This makes building a strategy difficult and requires comprehensive databases to provide the necessary knowledge.

This section takes a first step towards building a knowledge base to inform agri processing decisions in South Africa. Specifically this section describes how the "Agri Processing Index" (API) has been constructed. The API is a composite index developed to allow the prioritisation of agri processed products through the simultaneous consideration of a number of domestic and international factors. The API is done at the most detailed product specification level possible with the limitations in place due to data availability to allow for the most accurate assessment possible. The data limitations also required that the analysis be done at the national level, although the results can be adapted to closer fit provincial specifics.

Whilst some of the results are discussed, the main focus of this section is on the methodology used to create the API database in order that the knowledge base created can be utilised by researchers and policy makers operating in this sphere. The database has also been developed in such a way which allows for easy updating of data as new data becomes available. Additionally, index weightings can be easily adjusted and product limitations applied in order to produce tailored output towards a specific function. For the full list of products in the API database, including the API and the various sub indicators, see Appendix to this report.

Methodology and data

To prioritise agri processing products, an index is developed which gives products an overall rating based on the weighted scores of several sub indicators. This final index is called the "Agri Processing Index" (API). The API ranges from 0 to 1, with higher scores indicating products with the most potential.

In total, 17 sub indicators are used to calculate the API which can broadly be classified into five main groupings relating to production performance (4 sub-indicators), employment potential (3 sub-indicators), domestic market growth (3 sub-indicators), global market growth (4 sub-indicator) and trade barriers (3 sub-indicators)

These five main groups are made up of various variables as listed in Table 5 below. The 17 sub-indicators receive a score from 1 to 10 based on their relative performance on a specified measure. This makes the scoring ordinal in nature, such that the lowest scoring

10% receive a score of 1, the next 10% a score of 2, and so on until the top 10% which receive a score of 10.

Table 5: List of Sub Indicators and Associated Focus Areas Used in API

Focus Area	Sub Indicator	Measure	Data Sources
Production Performance	Gross Value Added (GVA)	Annual growth in GVA, 2008-2011	*Stats SA (2011a); Stats SA (2011b); DAFF (2015)*
	Intermediate Consumption	Annual growth in intermediate consumption, 2008-2011	
	Investment	Annual growth in carrying value of all property, plants equipment and intangible assets, 2008-2011	
	Horizontal Spillovers	Annual expenditure on transport and packaging as a proportion of total output, average value: 2008, 2011	
Employment Potential	Employment Growth	Annual growth in employment numbers, 2008-2011	*Stats SA (2011a); Stats SA (2011b); DAFF (2015)*
	Growth in Average Wage	Total salaries and wages as a proportion of total output, annual growth: 2008-2011	
	Labour Intensity	Total number employed as a proportion of total output, average: 2008, 2011	
Domestic Market Growth	Domestic Consumption	Annual growth in domestic consumption, 2005-2010	*Stats SA (2006); Stats SA (2011c); ITC (2015)*
	Imports: Short-Term	Annual growth in imports, 2010-2013	
	Imports:Long-Term	Annual growth in imports, 2003-2013	
Global Market Growth	Exports: Short-Term	Annual growth in exports, 2010-2013	*ITC (2015)*
	Exports: Long-Term	Annual growth in exports, 2003-2013	
	World Trade: Short-Term	Annual growth in aggregate world imports of product, 2010-2013	
	World Trade: Long-Term	Annual growth in aggregate world imports of product, 2003-2013	
Trade Barriers	Effective Tariff	Calculated for most recent year for which data available	*WTO (2015); ITC (2015); WEF (2013); CEPII (2012)*
	Effective Non-Tariff Barriers	Calculated for most recent year for which data available	
	Effective Distance	Calculated for most recent year for which data available	

Source: Own Compilation

Where annual growth rates are needed to calculate a specific sub indicator, the standard compound growth formula is used. That is:

$$G = [(EV/BV)^{(1/n)}-1]x100 \quad [1]$$

Where: G = growth rate

EV = ending value

BV = beginning value

n = time periods over which growth occurs

Where values are being used, to eliminate the impact of inflation, flows are deflated using annual deflators provided by the International Monetary Fund (Quantec, 2015b). Due to the ordinal nature of the sub-indicator scoring, deflating the values will have no impact on the scoring but allows a more accurate depiction of dynamics in the generated database. To make the database more relevant all process are adjusted to 2013 prices

In what follows in this section, there will be an explanation of the level of analysis, followed by a deeper look into the different sub-indicators by the broad focus areas, and then finally the section ends off with a discussion of how the sub-indicators are translated into the API.

Level of Analysis: Agri processing (AP) Groups

The study initially identified 175 different agri processing (AP) groups, coded AP001, AP002, …. , AP175. These groups were identified manually using the 6-digit Harmonized System (HS) codes. Every product at this level was classified as either falling under the broad definition of agri processing explained for use in this analysis, or not. Those that were classified as agri processing were then also grouped together where necessary to form the 175 AP groups used in this study. These groups were then linked to production data where it was possible. Through the linking process there were 47 AP groups with no link to the production data which were therefore dropped, resulting in a grand total 128 AP groups used in the analysis. This final elimination of 47 products was deemed to be important as it eliminated products for which there are no production records in South Africa, hence essentially helping to limit the analysis to those products which can actually be produced in South Africa.

API Sub Indicators

As discussed, the API based on the scoring of 17 sub-indicators falling under five broad groupings, namely production performance, employment potential, domestic market growth, global market growth and trade barriers.

Production Performance

The production information used in the analysis can be divided into two main categories of products, namely primary and secondary. Though the line between these categories is often fuzzy and unclear, the division is made in relation to the two main data sources that provide production information. The Abstract of Agricultural Statistics (DAFF, 2015) gives annual production information on products which are considered to be part of primary agriculture and the measure used for total output is the Gross Value of Production (GVP). Secondary products in this analysis come from manufacturing information as per the Manufacturing Industry Financials, conducted by Statistics South Africa (Stats SA, 2011a; 2011b). Here the measure for output is the value of production of products sold in the manufacturing sector for both 2008 and 2011(Stats SA, 2011a; 2011b). Thus, products included in the Abstract will be listed as "primary products", while those from the Manufacturing survey will be "secondary products".

It should be noted that certain important information in both the primary and secondary data were not enumerated at a sufficient level of disaggregation. To overcome this shortcoming in the data, the concept of multipliers is utilised. This concept is defined as the nature and extent of the impact of an autonomous change in a specific economic quantity on other economic quantities (Samuelson, 1970). Thus, we estimate values for certain variables (GVA, intermediate consumption, employment, investment) assuming that these follow the same relation as the multiplier calculated for total output. For the manufacturing data, multipliers were calculated based on more detailed information on output from the production information provided by Statistics South Africa (Stats SA, 2011a; 2011b). In the primary data, output variables were calculated using multipliers based on total value of production of each product in relation to total output, as there was no specific information on intermediate consumption (DAFF, 2015).

The following variables were included under "Production Performance" and cover a very wide range of factors. The analysis had to keep a relatively focused approach in order to avoid an overload of information. The final decision was to include four sub indicators to measure production performance:

Growth in Gross Value Added (GVA): GVA is calculated as the value of output less intermediate consumption. It represents the value added to the cost of materials used in the process of production. Growth in GVA will indicate to what extent improvements have been made in terms of output growth in the sector which will translate in higher levels of value added in the production of goods in the agri processing sector (Stats SA, 2011a). It is thus a key indicator as to whether a particular product can be produced effectively in South Africa. Growth is calculated over the short term, measuring annual growth between 2008 and 2011, measured using the standard growth formula provided in equation [1].

Growth in Intermediate Consumption: Intermediate consumption is measured as the sum of all purchases and transfers of materials and all costs associated with the production process. Growth in intermediate consumption indicates to what extent production processes have been scaled up and if more goods were purchased from upstream

industries (StatsSA, 2011a). It is therefore an indicator of the degree to which there are opportunities to boost demand for upstream industries, in particular primary agriculture. Growth is calculated over the short term, measuring annual growth between 2008 and 2011, measured using the standard growth formula provided in equation [1].

Growth in Total Carrying Value of Plant: Total carrying value is the sum of the value of property, plant, equipment and intangible assets at the end of the given year (Stats SA, 2011a). Growth in the total carrying is therefore an indicator of the amount of investment going into the production of a particular product, measuring growth in the value of assets that enhance plant capacity to produce more output. Growth is calculated over the short term, measuring annual growth between 2008 and 2011, measured using the standard growth formula provided in equation [1].

Degree of Horizontal Spill-overs: Horizontal spill-overs refer to the amount of activity that is created for transport as well as packaging firms as a result of the production in each sub industry. This is calculated by taking the sum of each industry's annual expenditure on transport and packaging, and dividing this by the total output for the industry (Stats SA, 2011a). It therefore gives an indication of how these support industries will benefit as production of that product expands. The degree of horizontal spill-overs is calculated for 2008 and 2011 and the average across the two years is used to score products in relation to this sub indicator.

Employment Potential

Employment potential is another very important area as it helps highlight products which offer the greatest potential returns in terms of employment creation. Employment potential is measured through three sub indicators which measure past employment performance of each specific sub-sector and also looks at the labour requirements to see how much employment is generated as production expands. Again the multiplier concept is utilised for this focus area where employment numbers are generated using the output multipliers calculated from the production information for the manufacturing products (Stats SA, 2011b). Employment numbers for the primary agricultural products were estimated based on the multipliers developed by the Bureau of Food and Agricultural Policy (BFAP) through industry consultations and own analysis (BFAP, 2012). The three sub-indicators used to measure employment potential are:

Growth in Employment: Employment numbers are taken to include both formal and informal jobs. This indicator shows to what extent each industry has generated employment in recent years, showing which sub-sectors have proven employment performance in the South African setting (Stats SA, 2011a). Essentially this indicator shows the past employment performance of the sub-sector which can be used to get an indication of future potential. Growth is calculated over the short term, measuring annual growth between 2008 and 2011, measured using the standard growth formula provided in equation [1].

Growth in the Average Wage: The average wage is calculated by dividing the total salaries and wages for each industry by the total number of people employed in that industry (Stats SA, 2011a). The manufacturing financials from Statistics South Africa includes information on expenditure on a wide variety of items including salaries and wages. The average wage is important because it gives an indication of the kind of jobs being created in each subsector. Growth is calculated by measuring annual growth between 2008 and 2011, measured using the standard growth formula provided in equation [1].

Labour Intensivity: Labour intensivity is measured as the number of workers per unit output, i.e. the total number of workers is divided by total output (Stats SA, 2011a). This indicator is very important as it shows the degree to which output growth will create employment. Labour intensivity is calculated for 2008 and 2011 and the average across the two years is used to score products in relation to this sub indicator.

Domestic Market Growth

Domestic market growth indicates whether there is growing demand for a particular product within South Africa. There are three sub indicators focused on two main areas, domestic consumption growth and import growth. All the sub-indicators measuring domestic market growth are measures of annual growth rates. The standard formula for calculating annual growth rates is used, shown in equation [1] earlier in the chapter. The sub indicators measuring domestic market growth are described below:

Domestic consumption growth: Domestic consumption growth is measured over the medium-term, measuring annual consumption growth from 2005 to 2010. Consumption data is obtained from South Africa's Income and Expenditure Surveys (IES) (Stats SA, 2006; 2011c), a nationally representative household survey which measures annual real expenditure on items (food and non-foods) purchased by South African households. These surveys are undertaken every five years and are routinely used to measure Consumer Price Inflation (CPI) in South Africa (Stats SA, 2012). The domestic consumption sub indicator was developed by calculating the consumption expenditure growth rates for every item measured in the IES and these were then merged to the specific AP group it relates to. This measure gives a good indication of local consumption changes over a 5-year period for each AP group being analysed.

Long-term import growth: Long term import growth is measured as annual growth in imports into South Africa for each product. Annual growth between 2003 and 2013 is used to measure growth over the long-term. Import values are obtained at the HS6 level from the International Trade Centre (ITC, 2015). Imports for 2003 and 2013 are then aggregated up to the relevant AP groups and then annual growth rates are calculated.

Short-term import growth: Short-term import growth is calculated the same as long-term imports (above), except growth rates are calculated between 2010 and 2013.

There are some instances where a particular product had a trade flow of zero either three (2010) or ten (2003) years ago. Looking back at equation [1], it is clear that this will result in

a beginning value of zero which is the denominator in the equation and hence cannot be calculated. Whilst this was not a common occurrence at the level of analysis employed, it did still occur. To fill in some of the gaps, where there was no figure for 2003, the figure for 2004 was used making the growth period 2004 to 2013, failing this then the figure for 2005 was used, making the growth period 2005 to 2013. Similarly where there was no flow for 2010, 2011 and then 2012 was used. Due to the fact that a particular growth rate over two years should not be as good as over three years, long term growth rates are calculated as being over ten years and short term growth rates as over three years no matter what beginning year was used.

Whilst it is good to have a strong performing domestic demand for a product, the South African population only measured a little over 53 million in 2013. Whilst this is a significant number of people, it represents only 0.75% of the global population at that point in time (World Bank, 2015). For this reason, global markets offer opportunities less constrained by limits and hence much bigger and more lucrative. In addition to being able to provide a vast supply of demand for goods, exports also allow important foreign reserves to be built up. The next sub section looks at the sub-indicators used to measure demand growth on the global scale.

Global Market Growth

Global market growth is measured in two areas, South African export growth and world trade growth. Export growth gives an indication of which products have already exhibited good export performance in South Africa, reflecting the fact that the product can be produced successfully in the South African context for global markets. World trade growth shows whether or not there is a growing international market for the product. All annual growth rates are calculated using the standard formula shown in equation [1] earlier. Both South African export growth and world trade growth are each measured over the long and short term to give four different sub indicators:

- **Long-term export growth:** Annual growth in exports from South Africa is measured for each product. Annual growth between 2003 and 2013 is used to measure growth over the long-term. Import values are obtained at the HS6 level from the International Trade Centre (ITC, 2015). Imports for 2003 and 2013 are then aggregated up to the relevant AP groups and then annual growth rates are calculated.
- **Short-term export growth:** Calculated the same as long-term exports (above), except growth rates are calculated between 2010 and 2013.
- **Long-term world trade growth:** World trade is measured as the sum of all countries' imports. Annual growth between 2003 and 2013 is used to measure growth over the long-term. Import values are obtained at the HS6 level from the International Trade Centre (ITC, 2015). Imports for 2003 and 2013 are then aggregated up to the relevant AP groups and then annual growth rates are calculated.
- **Short-term world trade growth:** Calculated the same as long-term world trade (above), except growth rates are calculated between 2010 and 2013.

Again, all values are adjusted to 2013 prices using annual deflators provided by the International Monetary Fund (Quantec, 2015b). Additionally, as was done with domestic demand growth as explained in the previous sub section, where growth rates could not be calculated due to zero base values, the following year or the year after that are used as a proxy base.

Exports are very important when looking for opportunities on a large scale. However, certain products also face trade barriers which can make exporting difficult and erode production competitiveness. The next sub section looks at such barriers to allow products to be scored on how easy it is to enter global markets for a particular product.

Trade Barriers

Trade barriers are an important consideration with regards to trade opportunities. They are also difficult to measure at the product level due to the country-specific nature of the barrier. For example, it would be strange to come across a statement along the lines of "the tariff of an orange is x%" which stands alone. Such a statement would be expected to be followed by a qualifier in terms of the export destination, "the tariff of an orange is x% in Country A". Similarly non-tariff barriers are generally defined in terms of a country and not in terms of a particular product.

The above mentioned issue is overcome through calculating "effective" variables to measure the trade barriers surrounding a particular product. There are three sub-indicators used to measure the prevalence of trade barriers:

- **Effective tariff**
- **Effective non-tariff barriers**
- **Effective distance to markets**

The starting point for the effective tariff calculation is tariff schedules provided by the World Trade Organisation (WTO, 2015). For each country for which data is available, a tariff schedule was obtained with the most recent listing of the tariff on every product at the 6-digit HS code level. For each product the average tariff is calculated weighted according to each country's share in world imports of that product. This is done using equation [2] below:

$$EFT(x) = \sum_{c=1}^{n}(w_{cx}.t_{cx}) \quad \text{[2]}$$

Where: $EFT(x)$ = effective tariff on product x

c = country {c = 1,2,3,…..,n}

w_{cx} = country c's share in world imports of product x

t_{cx} = country c's tariff on product x

For each country, the share in world imports of a particular product (w_{cx}) is calculated using equation 3 below:

$$w_{cx} = I_{cx} / I_{wx} \quad \text{.....} \quad [3]$$

Where: w_{cx} = country c's share in world imports of product x

I_{cx} = total annual imports of product x by country c

I_{cw} = total annual world imports of product x

All import values were obtained from the International Trade Centre (ITC, 2015). The year 2013 was used as the year to measure country and world imports of a specific product.

Non-tariff barriers also play an important role in trade. As mentioned, non-tariff barriers are generally referred to in relation to a country rather than a product, making measurement at the product level difficult. To do so, non-tariff barrier ratings are obtained for each country in the World Economic Forum's 2013/2014 *Global Competitiveness Report* (WEF, 2013). The report includes an indicator called "prevalence of trade barriers" which measures the degree to which trade is free from the influence of non-tariff barriers in each county. This rating is taken for each country and then these are averaged for each product using each country's share in world imports of that product. The idea is to try and avoid products where the main markets to export to are also ones where trade is difficult due to the prevalence of trade barriers.

Put more formally, the non-tariff barrier scoring for each country is calculated as in equation [4] below:

$$EFB(x) = \sum_{c=1}^{n} (w_{cx.} b_c) \quad \text{.....} \quad [4]$$

Where: $EFB(x)$ = effective non-tariff barrier on product x

c = country {c = 1,2,3,…..,n}

w_{cx} = country c's share in world imports of product x

b_c = freedom from non-tariff barriers in country c

As in the calculation of effective tariffs, each country's share in world imports (w_{cx}) is calculated using equation [3], with import values obtained from the International Trade

Centre (ITC, 2015). The year 2013 was used as the year to measure country and world imports of a specific product.

As with non-tariff barriers, the distance to markets generally applies to countries rather than products. Thus to work out an effective distance to markets at the product level, the same approach is used as was done for calculating effective non-tariff barriers. That is, the distances to each country from South Africa are averaged out based on each country's share in world imports. More formally, it is calculated according to equation [5] below:

$$EFD(x) = \sum_{c=1}^{n} (w_{cx.} d_c) \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad [5]$$

Where: $EFD(x)$ = effective distance to product x markets

c = country {c = 1,2,3,…..,n}

w_{cx} = country c's share in world imports of product x

d_c = distance to country c

As in the calculation of effective tariffs and effective non-tariff barriers, each country's share in world imports (w_{cx}) is calculated using equation [3], with import values obtained from the International Trade Centre (ITC, 2015). The year 2013 was used as the year to measure country and world imports of a specific product. The distance to each country was obtained from the Centre D'etudes Prospectives et D'informations Internationales, using their calculated "distwces" variable which accounts for the population distribution within each country (CEPII, 2012).

It was mentioned earlier that scoring on sub indicators is done by ordinally scoring products between one and 10 based on the relevant measure. Whilst this is fine for scoring on non-tariff barriers due to the measurement being one of the freedom of non-tariff barriers, for effective tariffs and effective distance less is better and therefore for these two sub indicators the scoring is reversed (i.e. the highest 10% receive a score of 1, the next highest 10% receive a score of 2, and so on until the lowest 10% which receive a score of 10).

That, in total, brings the number of sub indicators used to calculate API's to 17. In the next section, the details are given as to how exactly the API is created.

Final Index: API

As discussed, all sub indicators are scored on a relative basis from 1 to 10. The final step is to translate these sub indicator scorings into a singular rating for the API index. This is done by taking the weighted average of all sub indicators mentioned, with weightings based

on the importance of sub indicators and the desired magnitude of the impact each sub indicator has. As the sub indicators range between 1 and 10, the API needs to be divided through by 10 to get a score ranging from 0 to 1 (although the actual range will be 0.1 to 1 given the nature of the index)

Put formally, the API is calculated using equation [6] below:

$$API(x) = [\sum_{i=1}^{17}(w_{i.}s_{ix})]/10 \quad \text{[6]}$$

Where: $API(x)$ = Agri Processing Index for product x

i = sub-indicator {i = 1,2,3,…..,17}

w_i= weighting applied to sub-indicator i

s_{ix} = scoring on sub indicator i for product x

The weightings (w_i) applied to each sub indicator in the analysis were developed through numerous discussions with key policy makers and other role players working in the sector[3]. Through this process, the relative importance of each sub indicator was discussed and final weightings were agreed upon. Figure 9 shows the breakdown of the weights applied to each sub indicator in the API calculation.

The weightings displayed in Figure 9 give a balanced analysis in so far as all sub indicators exert a significant influence, with allowance made for some indicators being more important for South Africa's development goals. The balance can be further illustrated by looking at the aggregated weightings as per the broad focus areas. This is done in Figure 10 below.

[3] Whilst consultations were held with numerous parties in the public and private sphere, special mention should be made of the contributions from senior members of the Western Cape Department of Agriculture, Western Cape Department of Economic Development and Tourism, Western Cape Ministry of Economic Opportunities and Wesgro

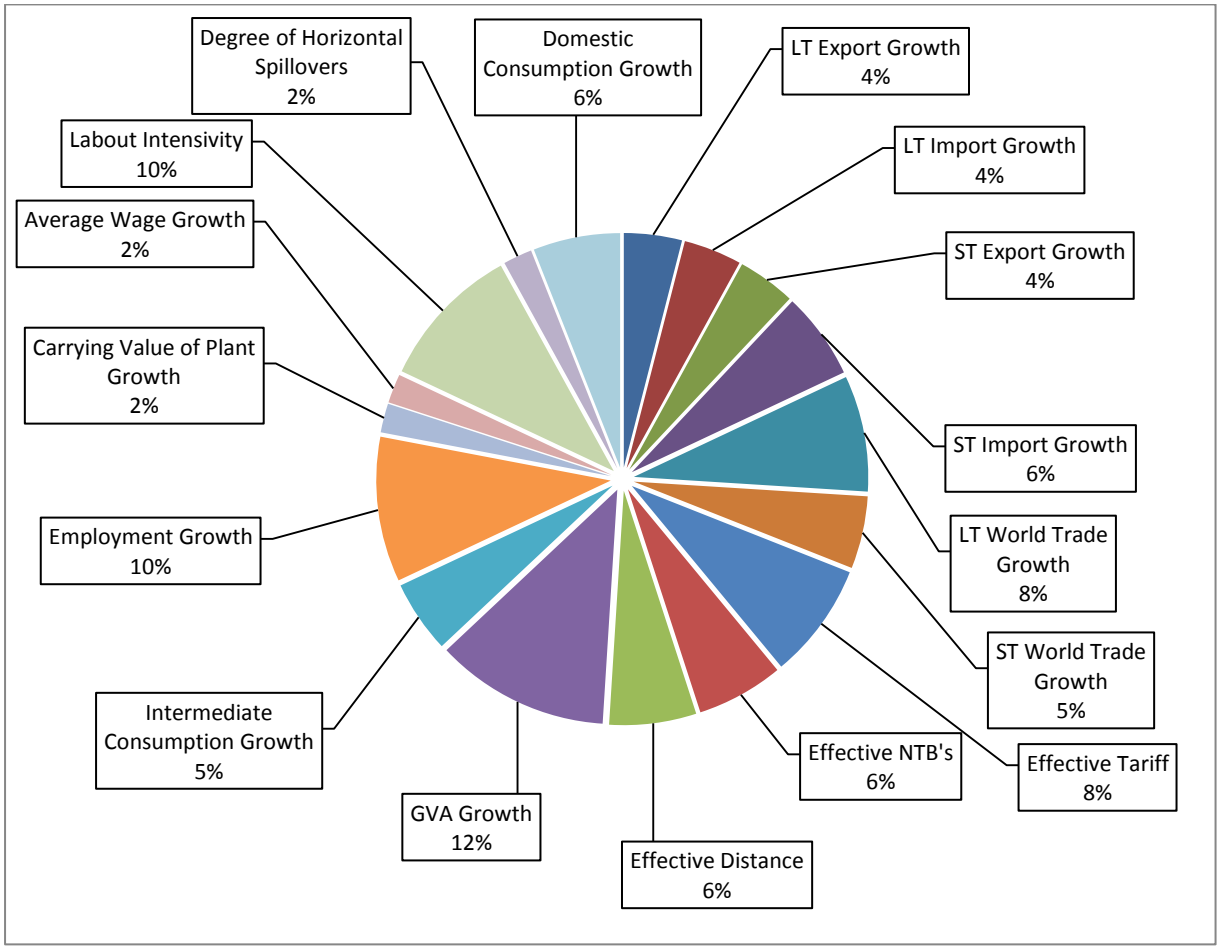

Figure 9: Weighting of All API Sub Indicators

Source: Own Compilation

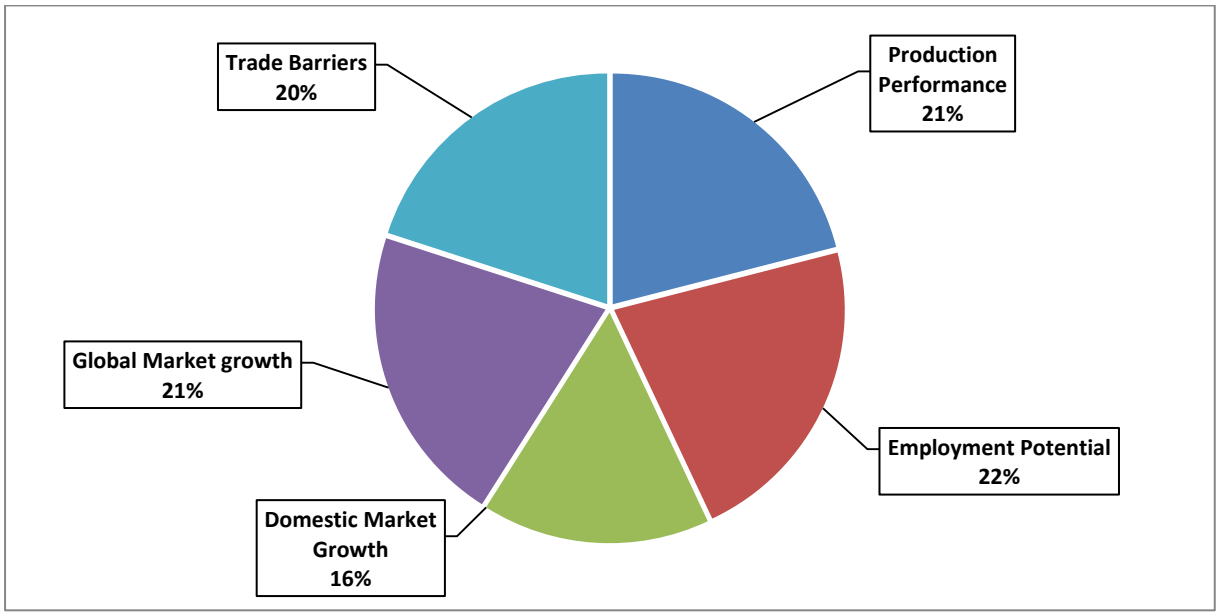

Figure 10: Weightings of Broad API Sub-Indicator Groups

Source: Own Compilation

The API index is created using the initial weighting as given in Figure 9. Where a particular indicator was not available for a product, the weightings are adjusted accordingly to keep the same ratio between the different weights. The following hypothetical example will help to explain how this is done. Let us assume that a product index is based on four sub-indicators with weightings provided in Table 6 below. As was done when calculating the API, all weightings are percentage contributions, so that the total sum of all the weights is equal to 100.

Table 6: Sub-Indicator Weighting in Hypothetical Example

Sub-Indicator	Weight
s1	10
s2	30
s3	25
s4	35
Total	100

Source: Hypothetical Data

If there is no data for sub-indicator s2 for a product, it needs to be removed from the calculations for that particular index. To make up for the lost 30%, the other sub-indicator weightings are reworked based on their current weights. This process is laid out in Table 7 below which shows the final weightings which would be used under the hypothetical scenario. The new weights to be used will be those displayed in bold in the far right of the table.

Table 7: Sub-Indicator Weight Conversions in Hypothetical Example

Sub-Indicator	Weight	% Data available	Pre-conversion weights based on availability	New weight calculation *(convert from /70 to /100)*
s1	10	100%	(10 * 100%) = 10	10/70 * 100 = **14.29**
s2	30	0%	(30 * 0%) = 0	0/70 * 100 = **0.00**
s3	25	100%	(25 * 100%) = 25	25/70 * 100 = **35.71**
s4	35	100%	(35 * 100%) = 35	35/70 * 100 = **50.00**
Total	100	-	70	100

Source: Own Compilation

Whilst the weightings have been developed based on applied thinking and consultations with experts in the field, the model has been developed in a way which allows for flexible outputs. That is, should there be the need for different weightings to be applied either as a permanent adjustment or even just to produce a tailored report, say for example to look specifically at the best products in terms of the absence of trade barriers, this can be done by a simple quick adjustment to the model code and the tailored output then produced automatically.

The API is finally used to rank all 128 AP groups according to their performance. The next section proceeds to give provide some select results and discussions thereof. The full list of API rankings is available in the Appendix to this report along with the scorings for each AP group under the 5 main focus areas,

Results and Discussions

Table 8 shows the top 25 ranked products according to the Agri Processing Index (API). The API value for each AP group is provided in the fourth column, as discussed this ranges from 0 to 1 with higher values indicating the products with the most potential. For the full list of API scores see the full table in the Appendix to this report.

Readers may notice that there are several products included in the top 25 which may not be traditionally classified as processed products. These are included to give a broad analysis as expressed in the section defining agri processing. This is an important consideration as there are lots of value added activities relating to primary agricultural products such as packaging, cleaning and preparing. These activities do not only significantly contribute to the economy but also tend to be more labour intensive than the more sophisticated processing activities which typically have higher capital intensities (Morris & Fessehaie, 2013).

Due to multiplier restrictions, data was not available for some products on employment performance. Where this was the case, there is no score in Table 8 and, as discussed in the previous section, the weights are recalculated in order to maintain the relative ratios between the remaining sub-indicators.

The top API score was for berries, which excludes strawberries, receiving an API of 0.78. This high score was driven by exceptional scores for production performance and global market growth. It should also be noted that there is no information available on employment potential for this AP group. The highest scoring product group in terms of traditionally classified higher end processed products was mixes and doughs for bread, pastry, biscuits etc. This was driven by high scores for production performance as well as domestic market growth, whilst it also showed strong global market growth.

Table 8: Top 25 Products on the Agri Processing Index (API)

#	Code	AP Group Description	*API*	PP *Production Performance*	EP *Employment Potential*	DMG *Domestic Market Growth*	GMG *Global Market Growth*	TB *Trade Barriers*
1	AP062	Berries other than strawberries (fresh)	***0.78***	9.2		4.8	9.8	6.6
2	AP119	Mixes and doughs for bread, pastry, biscuits, etc.	***0.76***	9.4	6.3	9.0	8.0	5.8
3	AP040	Raw Nuts in Shell, Excluding Ground Nuts	***0.75***	7.0	9.0	4.6	10.0	5.2
4	AP087	Soya Beans	***0.74***	7.8	8.5	5.8	7.5	6.5
5	AP065	Roasted Coffee and Coffee Substitutes	***0.71***	8.5	5.9	7.8	7.7	5.8
6	AP106	Sunflower oil	***0.70***	9.0	4.5	7.9	8.1	5.8
7	AP061	Strawberries (fresh)	***0.70***	5.9	6.5	9.6	6.4	7.2
8	AP053	Watermelons (fresh)	***0.69***	4.9		8.9	6.2	8.3
9	AP045	Avocados	***0.69***	6.8	8.0	4.6	8.7	5.9
10	AP075	Rice (Semi-Milled, Wholly Milled or Broken)	***0.69***	9.3	6.4	8.3	6.9	3.8
11	AP140	Flavoured wine and other alchoholic bevarages derived from fruit (excluding wine)	***0.68***	7.5	4.8	9.8	7.6	5.3
12	AP034	Pumpkins, squashes and gourds (fresh or chilled)	***0.68***	5.3	5.5	6.0	9.0	9.3
13	AP038	Sweet Potatoe	***0.68***	6.8		6.0	6.3	7.8
14	AP049	Lemons and limes	***0.67***	7.8	6.5	8.9	5.1	5.9
15	AP082	Breakfast Cereals	***0.67***	9.3	6.3	6.3	5.5	6.2
16	AP078	Wheat Meal and Wheat Flour	***0.67***	8.2	5.8	8.4	8.0	3.4
17	AP032	Peas (fresh or chilled)	***0.67***	5.3		6.8	7.0	7.8
18	AP142	Brandy	***0.66***	7.1	4.3	6.4	8.2	7.2
19	AP111	Infant food preparations and formula	***0.66***	8.3	5.9	6.0	7.7	4.8
20	AP041	Bananas and Plantains	***0.66***	5.9	7.5	8.1	5.6	6.2
21	AP098	Sugar Cane, Raw	***0.65***	6.2	6.0	10.0	5.5	7.3
22	AP039	Processed Nuts (Includes Ground Nuts)	***0.65***	8.5	6.4	5.4	6.1	6.0
23	AP120	Pasta	***0.65***	8.0	6.0	7.3	5.8	5.5
24	AP058	Cherries (fresh)	***0.65***	5.3	7.0	5.6	7.2	7.1
25	AP146	Essential oils	***0.65***	9.4	6.1	5.2	5.1	5.8

Source: Own Calculations

In addition to being able to rank different products, the API database can also be used to compare products on their different merits. As an example, take AP140, "Flavoured wine and other alcoholic beverages derived from fruit (excluding wine)", and AP142 "Brandy". Both these products utilise wine, a product which is produced abundantly in the Western Cape. The former is mainly made up of drinks derived from wine, such as port and sherry, but will also include a small portion being made up from ciders and other alcoholic drinks derived from fruit. It excludes brandy, which is the latter group and is made from the distillation of wine. These 2 groups are ranked 11th and 18th with API's of 0.68 and 0.66 respectively.

Figure 11 shows a spider diagram for how well the two products scored in terms of the 5 broad areas looked at in the API. Whilst flavoured wines etc. performed better in terms of the overall score, this was primarily due to very strong growth in the domestic market. Brandy actually performed better in terms of global market growth, possibly influenced by a better trade environment indicated by the significantly higher score in terms of trade barriers.

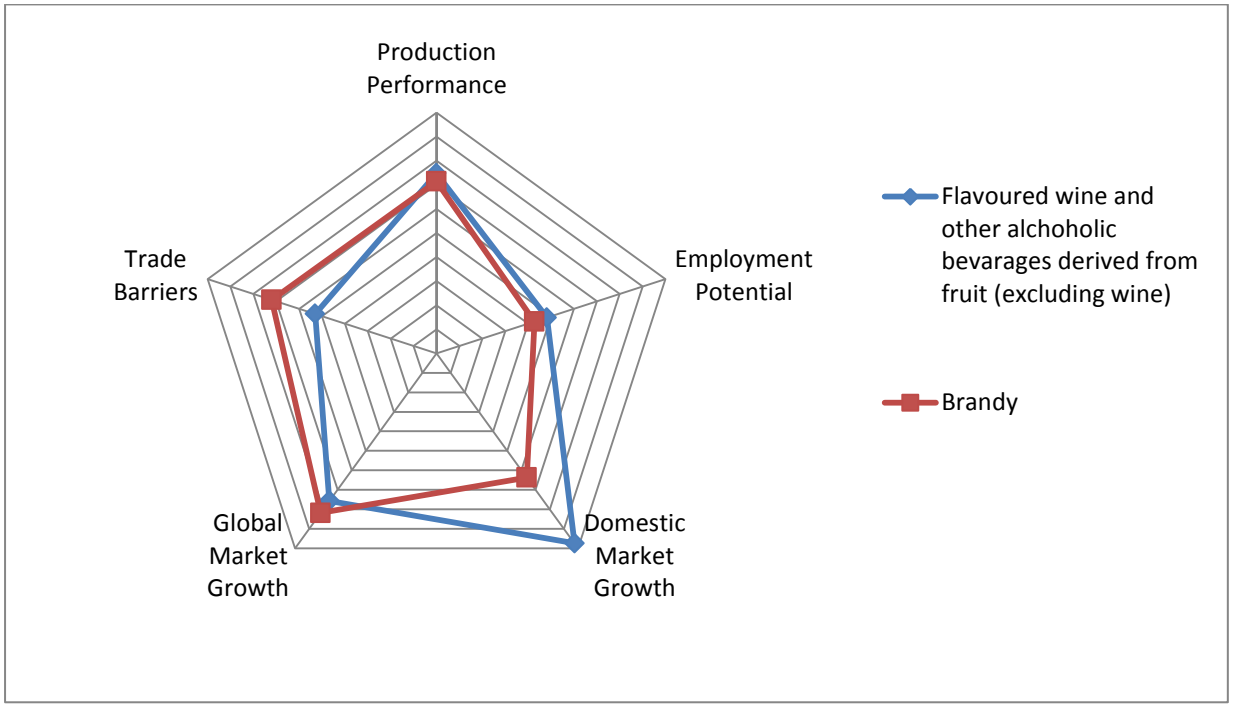

Figure 11: Comparison of Further Processed Wine Products in Terms of Scoring in Broad Areas
Source: Own Compilation

The comparison in Figure 11 illustrates just one way the API database could be utilised. To outline all the possibilities would take forever. The complete ranking of all products and corresponding scores under the five main focus areas is provided in the Appendix to this report. The underlying data used and links between the AP groups and the different databases can be made available by contacting the authors.

Conclusion

The main aim of this report was to unpack the complex and dynamic agri processing sector in the Western Cape. This was done in order to get a better understanding of the sector and to possibly highly areas of growth and development. This was done by establishing a formal definition of "agri processing" which is aligned to international terminology applied, by giving a broad literature review on the role of this sector in development. The sector analysis which followed indicated the performance of the sector in terms of its contribution to the economy and its impact on job creation.

The report then moved on in this section to take the initial steps towards building an informed and effective strategy to take hold of agri processing opportunities for the Western Cape province, and more generally for the South African economy as a whole. Through this study a comprehensive database has been developed which will serve as a reliable knowledge base to assist with agri processing prioritisation and decisions. Whilst some preliminary results have been discussed, the main strength of this output is the actual database developed and the flexible nature of the output which can be used to inform a vast range of purposes going forward.

In short, this report gives a good overview of the agri processing sector in South Africa and the Western Cape and, in the light of data limitation, also gives a tool to measure relative performance at product level.

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Table Appendix

All Products by Agri Processing index (API)

#	Code	AP Group Description	*API*	PP *Production Performance*	EP *Employment Potential*	DMG *Domestic Market Growth*	GMG *Global Market Growth*	TB *Trade Barriers*
1	AP062	Berries other than strawberries (fresh)	***0.78***	9.2		4.8	9.8	6.6
2	AP119	Mixes and doughs for bread, pastry, biscuits, etc.	***0.76***	9.4	6.3	9.0	8.0	5.8
3	AP040	Raw Nuts in Shell, Excluding Ground Nuts	***0.75***	7.0	9.0	4.6	10.0	5.2
4	AP087	Soya Beans	***0.74***	7.8	8.5	5.8	7.5	6.5
5	AP065	Roasted Coffee and Coffee Substitutes	***0.71***	8.5	5.9	7.8	7.7	5.8
6	AP106	Sunflower oil	***0.70***	9.0	4.5	7.9	8.1	5.8
7	AP061	Strawberries (fresh)	***0.70***	5.9	6.5	9.6	6.4	7.2
8	AP053	Watermelons (fresh)	***0.69***	4.9		8.9	6.2	8.3
9	AP045	Avocados	***0.69***	6.8	8.0	4.6	8.7	5.9
10	AP075	Rice (Semi-Milled, Wholly Milled or Broken)	***0.69***	9.3	6.4	8.3	6.9	3.8
11	AP140	Flavoured wine and other alchoholic bevarages derived from fruit (excluding wine)	***0.68***	7.5	4.8	9.8	7.6	5.3
12	AP034	Pumpkins, squashes and gourds (fresh or chilled)	***0.68***	5.3	5.5	6.0	9.0	9.3
13	AP038	Sweet Potatoe	***0.68***	6.8		6.0	6.3	7.8
14	AP049	Lemons and limes	***0.67***	7.8	6.5	8.9	5.1	5.9
15	AP082	Breakfast Cereals	***0.67***	9.3	6.3	6.3	5.5	6.2
16	AP078	Wheat Meal and Wheat Flour	***0.67***	8.2	5.8	8.4	8.0	3.4
17	AP032	Peas (fresh or chilled)	***0.67***	5.3		6.8	7.0	7.8
18	AP142	Brandy	***0.66***	7.1	4.3	6.4	8.2	7.2
19	AP111	Infant food preparations and formula	***0.66***	8.3	5.9	6.0	7.7	4.8
20	AP041	Bananas and Plantains	***0.66***	5.9	7.5	8.1	5.6	6.2
21	AP098	Sugar Cane, Raw	***0.65***	6.2	6.0	10.0	5.5	7.3
22	AP039	Processed Nuts (Includes Ground Nuts)	***0.65***	8.5	6.4	5.4	6.1	6.0
23	AP120	Pasta	***0.65***	8.0	6.0	7.3	5.8	5.5
24	AP058	Cherries (fresh)	***0.65***	5.3	7.0	5.6	7.2	7.1
25	AP146	Essential oils	***0.65***	9.4	6.1	5.2	5.1	5.8
26	AP028	Edible brassicas (cabbage, cauliflower, broccoli etc.) (fresh or chilled)	***0.64***	5.0		8.5	5.3	7.5
27	AP011	Whey, milk powder, creamers and other milk products	***0.64***	5.5	4.5	5.9	10.0	5.9
28	AP136	Soda drinks and flavoured water	***0.63***	6.9	4.8	6.4	6.3	7.5
29	AP104	Soya bean oil	***0.63***	9.2	5.5	6.0	4.7	6.3
30	AP124	Sweet biscuits, waffles and wafers	***0.63***	8.2	6.5	5.5	6.6	4.5
31	AP051	Grapes: fresh	***0.63***	5.0	7.0	7.2	4.4	8.3

#	Code	AP Group Description	*API*	PP *Production Performance*	EP *Employment Potential*	DMG *Domestic Market Growth*	GMG *Global Market Growth*	TB *Trade Barriers*
32	AP010	Buttermilk	***0.63***	9.6	6.3	4.8	5.9	4.5
33	AP043	Figs	***0.63***	5.9		3.8	8.8	5.3
34	AP105	Olive oil, canola oil and other vegetable oils (excluding soya bean and sunflower)	***0.63***	9.1	4.5	5.5	8.0	4.0
35	AP005	Animal Offal	***0.63***	5.2	5.5	6.4	7.1	7.1
36	AP108	Margarine, edible animal or veg oil preparations nes	***0.63***	9.0	5.0	4.5	7.0	5.4
37	AP001	Bovine Meat	***0.62***	6.8	6.5	5.4	6.4	5.9
38	AP079	Meal and Flour from Oats, Barley, Rye and Malt	***0.62***	8.5	6.3	2.3	7.1	6.0
39	AP143	Whisky, gin vodka and other spirituous liquors	***0.62***	8.4	4.8	4.6	5.0	8.0
40	AP135	Beverage waters, ice and snow	***0.62***	9.5	5.6	6.9	3.4	5.8
41	AP002	Swine Meat	***0.62***	8.6	6.9	6.1	5.0	4.3
42	AP060	Plums and sloes (fresh)	***0.61***	7.1	7.5	6.3	3.8	6.1
43	AP008	Milk and Cream	***0.61***	7.3	5.8	4.5	7.7	4.7
44	AP125	Bread	***0.61***	6.1	5.1	7.2	6.8	5.3
45	AP080	Maize Meal and Maize Flour (includes samp and mielie rice)	***0.60***	8.5	5.8	4.3	8.4	2.6
46	AP115	Processed non-confectionary sugars, sugar syrups and molasses	***0.60***	5.2	3.8	7.0	6.7	7.9
47	AP031	Carrots, beetroots and other similar edible roots (fresh or chilled)	***0.60***	6.2	5.5	5.9	5.7	6.9
48	AP052	Dried Fruit	***0.59***	9.0	7.5	1.9	4.3	5.8
49	AP131	Sauces, other than soya sauce and chutney	***0.59***	6.2	4.5	5.6	6.5	6.7
50	AP149	Manufactured leather products	***0.59***	4.0	5.8	6.6	5.7	7.8
51	AP012	Dairy Fats and Oils (e.g. Butter)	***0.59***	7.9	6.3	5.8	5.0	4.4
52	AP067	Condiments and Seasonings	***0.59***	5.5	3.6	7.1	7.3	6.3
53	AP112	Raw sugar, from sugar cane	***0.58***	7.1	6.5	6.0	5.2	4.4
54	AP024	Potatoes and potato seed (fresh or chilled)	***0.58***	6.0	5.5	5.5	5.9	6.0
55	AP009	Yoghurt	***0.57***	6.8	4.9	7.2	6.4	3.7
56	AP144	Dog or cat food (retail)	***0.57***	7.6	5.1	5.0	5.7	5.1
57	AP013	Cheese and Curd	***0.57***	6.9	5.8	4.8	5.6	5.2
58	AP090	Canola Seeds	***0.57***	4.1	7.5	4.8	7.5	4.0
59	AP133	Ice cream and other edible ice	***0.57***	6.5	5.4	8.4	3.9	4.8
60	AP107	Animal and vegetable fats or oils, hydrogenated only	***0.56***	9.2	5.0	2.6	5.0	4.8
61	AP044	Pineapples	***0.56***	4.1	9.5	3.3	3.6	7.4
62	AP063	Fruit jams, marmalade, chutney and frozen fruit	***0.56***	2.6	4.8	6.4	6.7	7.9
63	AP171	Wool, not carded or combed	***0.56***	4.1	7.0	4.4	4.9	7.0
64	AP123	Bakery products other than bread and biscuits	***0.56***	7.4	6.0	3.8	5.5	4.7
65	AP127	Pure Fruit Juice	***0.55***	3.5	5.7	6.5	4.4	7.9
66	AP130	Soya sauce and other soya products (excluding soya milk)	***0.55***	5.1	3.7	4.6	6.0	8.2
67	AP047	Oranges	***0.55***	5.9	7.0	5.8	2.9	6.3

#	Code	AP Group Description	*API*	PP *Production Performance*	EP *Employment Potential*	DMG *Domestic Market Growth*	GMG *Global Market Growth*	TB *Trade Barriers*
68	AP132	Soups and broths	***0.55***	4.6	3.3	6.6	5.6	8.1
69	AP025	Tomatoes (fresh or chilled)	***0.55***	5.3	8.0	7.4	3.7	3.7
70	AP059	Peaches / nectarines (fresh)	***0.55***	5.0	7.5	5.5	3.3	6.1
71	AP139	Wine: Bulk (>= 2l)	***0.55***	8.4	4.7	1.0	7.7	4.4
72	AP014	Birds Eggs	***0.54***	5.0	5.0	6.0	6.8	4.4
73	AP103	Unrefined animal fats and vegetable oils	***0.54***	7.8	2.3	4.0	7.1	5.2
74	AP116	Sugar confectionery, non-cocoa	***0.54***	6.2	5.1	4.1	4.4	6.9
75	AP048	Soft Citrus	***0.53***	6.1	7.5	6.5	5.0	1.9
76	AP046	Guavas and Mangoes	***0.53***	2.9	6.0	5.9	5.6	6.6
77	AP029	Lettuce (fresh or chilled)	***0.53***	5.9		6.3	2.8	6.8
78	AP033	Beans (fresh or chilled)	***0.53***	4.3		4.9	7.4	4.6
79	AP006	Poultry Meat	***0.53***	2.8	4.2	7.4	5.8	7.0
80	AP026	Onions (fresh or chilled)	***0.53***	4.0	5.5	7.0	4.7	5.5
81	AP110	Sausages and other processed meat (excluding seafood)	***0.52***	1.9	3.7	5.5	7.6	7.7
82	AP091	Sunflower Seeds	***0.52***	2.9	6.5	5.4	8.9	2.4
83	AP072	Barley	***0.52***	5.0	7.0	1.0	7.5	3.3
84	AP099	Rooibos	***0.52***	2.0	5.5	6.0	6.7	5.9
85	AP068	Herbs and Spices	***0.51***	5.5	4.1	4.9	5.4	5.7
86	AP022	Flowers, Bulbs and Other Ornamental Plants	***0.51***	3.8	8.5	3.4	2.4	7.0
87	AP050	Grapefruit	***0.50***	6.2	7.0	6.5	2.5	3.3
88	AP017	Feathers, Down, Skins, Other Parts of Birds	***0.50***	4.0		6.0	6.2	4.1
89	AP055	Apples (fresh)	***0.49***	4.0	7.0	4.3	5.2	4.1
90	AP003	Mutton/Lamb Meat	***0.49***	5.5	6.0	3.0	3.4	6.1
91	AP158	Wooden furniture	***0.49***	5.5	7.1	3.6	2.4	5.4
92	AP056	Pears and quinces (fresh)	***0.49***	5.0	6.5	3.0	5.6	3.4
93	AP138	Wine: Bottled	***0.49***	5.6	2.5	7.9	2.7	6.6
94	AP054	Pawpaws (papayas) (fresh)	***0.48***	3.2		5.5	4.2	6.8
95	AP118	Chocolate and other food preparations containing cocoa	***0.48***	6.1	5.2	4.1	3.4	5.2
96	AP137	Beer	***0.48***	5.6	2.5	6.9	4.2	5.6
97	AP101	Animal Feed	***0.48***	3.4	3.7	4.8	8.2	3.8
98	AP076	Grain sorghum (excl. for sowing)	***0.47***	2.0		6.4	6.4	4.9
99	AP114	Refined sugar	***0.47***	4.4	3.7	8.5	4.8	2.8
100	AP069	Wheat	***0.47***	1.9	4.5	6.2	8.0	3.4
101	AP030	Chicory (fresh or chilled)	***0.47***	8.5		1.0	2.0	5.2
102	AP057	Apricots (fresh)	***0.46***	4.0	6.5	1.0	5.3	5.2
103	AP126	Canned Fruit	***0.46***	1.5	3.5	6.3	3.8	8.5
104	AP148	Leather	***0.43***	4.0	5.9	2.0	3.1	5.5
105	AP156	Particle board, including veneer faced	***0.43***	1.8	3.8	7.2	4.7	5.7
106	AP035	Frozen, canned or otherwise prepared vegetables	***0.42***	1.6	3.9	4.0	4.8	6.9
107	AP036	Dried/Dehydrated Vegetables	***0.41***	1.8	3.9	3.9	6.1	4.9
108	AP007	Fish, fish products and other aquatic animals (shellfish, crutaceans, molluscs etc.)	***0.40***	1.4	3.8	4.8	4.1	6.4

#	Code	AP Group Description	*API*	PP *Production Performance*	EP *Employment Potential*	DMG *Domestic Market Growth*	GMG *Global Market Growth*	TB *Trade Barriers*
109	AP166	Stationery paper and paperboard	***0.40***	5.0	5.3	5.3	1.4	3.5
110	AP145	Tobacco & tobacco products	***0.40***	4.6	4.4	2.0	2.6	6.1
111	AP016	Natural Animal Fibres, including carded wool, and fabrics thereof	***0.38***	5.0	5.8	2.1	1.8	4.1
112	AP165	Newspapers	***0.38***	5.2	4.9	5.3	1.2	2.9
113	AP073	Oats	***0.38***	4.0		2.0	3.9	4.6
114	AP066	Tea: Packaged or Otherwise Processed	***0.38***	3.2	2.3	5.4	4.9	3.6
115	AP174	Vegetable textile fibres (e.g. cotton, flax, jute)	***0.38***	2.5	4.9	3.5	3.3	4.6
116	AP159	Wooden containers	***0.37***	2.0	3.8	3.4	4.2	5.1
117	AP169	Cartons and containers made from paper and paperboard	***0.37***	1.9	3.8	6.8	3.2	4.4
118	AP157	Fibreboard of wood or other ligneous materials	***0.36***	2.0	3.7	6.2	3.0	4.5
119	AP175	Fabrics made from woven vegetable fibres (e.g. cotton, flax, jute)	***0.35***	1.6	4.9	3.2	2.6	5.1
120	AP152	Wood for fuel	***0.35***	1.2	3.4	3.4	5.9	3.7
121	AP153	Wood in the rough, asides from wood for fuel	***0.35***	1.3	3.4	3.4	5.7	3.7
122	AP161	Builders joinery and carpentry, of wood	***0.35***	1.8	3.8	5.8	3.4	3.8
123	AP164	Waste/scrap paper paper pulp products	***0.34***	1.2	3.4	4.0	5.2	3.4
124	AP154	Treated wooden poles, blocks and beams	***0.31***	2.0	4.3	3.2	2.2	4.0
125	AP088	Ground Nuts In Shell	***0.31***	2.0	7.5	1.6	1.8	2.1
126	AP172	Fine or coarse animal hair, not carded or combed	***0.31***	3.1		1.6	5.0	1.6
127	AP163	Wood pulp	***0.29***	1.2	3.4	5.8	2.3	3.4
128	AP167	Toilet paper, tissues, napkins etc.	***0.28***	1.2	3.4	3.6	2.0	4.1