# Agriculture Sector Analysis

**Chapter 7**

# Chapter 7 Agriculture Sector Analysis

## 7.1 Main agricultural activities

The following agricultural activities have been identified as having a significant presence within the Amathole District. (ECDC, 2015)

- Lamb and wool production
- Cattle (beef and dairy)
- Poultry
- Maize
- Horticulture
- Forestry

### 7.1.1 Lamb & wool production

Sheep farming is conducted across the length and breadth of the Amathole District Municipality. Amathole commercial fat lamb and wool producers are, however, not a homogenous group with production intensity and sheep diversity levels varying considerably from farmer to farmer.

Currently, only a very small amount of value-adding of sheep for slaughter occurs in the Amathole District Municipality even though the municipality accounts for 12.1% of total provincial production (in 2007). The bulk of slaughter lambs are transported to neighbouring provinces to be fattened and slaughtered. The primary reason for this is the transport-cost differential between grain (for feed) and livestock that makes it more cost effective to situate feedlots closer to sources of feed. This results in large proportion of the Amathole District Municipality's sheep being sent to other provinces, particularly the Free State, for further fattening and subsequent slaughter. Due to the factors discussed above, there are very few abattoirs specialising in sheep slaughtering.

Several towns within the district do, however, have small privately owned abattoirs usually linked to butcheries. These small abattoirs, however, cater for local consumption and do not have the capacity to manage the slaughtering of livestock in the volumes required by some commercial farmers.

The lack of adequate feedlots within the Amathole District Municipality means that these abattoirs are forced to rely on animals that are finished on natural grazing. Given this, animals tend to arrive during the summer months which means that provincial abattoirs are not guaranteed a continuous flow of livestock.

Small and emerging farmers, who make up a large proportion of the farmers in The Eastern part of the district, are commonly not in a position to finish off their animals to an appropriate slaughter weight. This is due to a lack of both financial and infrastructural resources such as overgrazed communal areas. This, in turn, results in farmers realising poor prices for their stock.

A common practice is for these farmers sell their stock to speculators (e.g. small commercial abattoirs) who take on the responsibility of fattening the animals on natural grazing before slaughtering them locally. The quality of these animals, however, is generally low due to the animal's age.

While the fattening and slaughter of sheep in the Amathole District Municipality is poorly developed, there are two feedlots situated in the Nxuba Local Municipality (Adelaide) and Great Kei Local Municipality (Komga).The current size of this feedlot meets the existing requirements of the district, and it is unlikely that there is much scope for expansion.

The infrastructure associated with the wool industry (e.g. auction houses, buyers, markets) is not present in the Amathole District Municipality. The bulk of wool processing, such as washing, combing, weaving, knitting etc., occurs in Port Elizabeth close to the major wool auction houses. Some small-scale processing does occur in the Amahlathi and Nxuba Local Municipalities, given that these areas account for over 80% of the total wool produced in the district (see Table 5.3). These products are sold mainly to visiting tourists. There are also similar small-scale processing initiatives in the Amathole District Municipality, mainly through cooperatives. (ECDC 2015)

**Figure 7.2: Wool production in the Amathole District Municipality**

| AREA | GREASE MASS (Kg) | | % GROWTH (2012-2013) | % SHARE (2013) |
|---|---|---|---|---|
| | 2012 | 2013 | | |
| **AMATHOLE** | **1 532 156** | **1 590 670** | **3.8%** | **10.6%** |
| MBHASHE | 198 069 | 120 999 | -7.4% | 11.5% |
| MNQUMA | | 62 343 | | |
| GREAT KEI | 15 214 | 17 705 | 16.4% | 1.1% |
| AMAHLATHI | 634 296 | 642 429 | 1.3% | 40.4% |
| NKONKOBE | 74 592 | 67 848 | -9.0% | 4.3% |
| NXUBA | 609 985 | 679 346 | 11.4% | 42.7% |

*Source: Urban-Econ calculations based on Cape Wools SA (2014)*

### 7.1.2 Cattle (beef and dairy)

The beef industry value chain and, to a lesser extent, the dairy value chain places considerable emphasis on both the import and export markets. This suggests that the beef industry in particular (mainly the value adding aspects such as hides) needs to become more geared towards meeting the needs of a global market. The export market is also increasingly viewed as the primary avenue for growth within the beef industry.

Further, the beef industry value chain is one of the most complex in the agricultural sector and increasingly requires all role-players in the value chain to adopt lean thinking that eliminates wastage and improves productivity.

The dairy industry, in contrast, is heavily impacted by the import market, particularly cheap imports of both UHT and milk powder from major international dairy producers such as Argentina and Brazil. The Amathole District Municipality, like the rest of the South African dairy industry, is also highly susceptible to international dumping practises. This further constrains the exploitation of gaps in the value chain.

Beef production takes place throughout most of the district, with the majority of farmers in the Amathole District Municipality able to attain high volumes. Beef cattle production in The Eastern part of the district however is confined primarily to small-scale emerging farmers and homestead-based subsistence farmers

Dairy production in the district occurs almost exclusively in the Ngqushwa and Great Kei Local Municipalities, with marginal production also occurring in the Amahlathi and Nxuba Local Municipalities. The dairy industry across the province, however, has been contracting over the last several years, with the number of registered milk producers decreasing from 407 in 2008 to its current figure of 264 – a decline of 35.1%. The Amathole District Municipality's industry has likewise been in decline, with both increased farm closures, as well as greater consolidation of operations.

As in the case of sheep, there are very few feedlots or abattoirs in the Amathole District Municipality. This means that higher-end, value-adding processes are conducted outside of the municipality, at a considerable loss to the local agricultural sector. While the potential exists to establish abattoirs in the district that cater exclusively to the cattle industry, the insecurity of supply make such interventions inherently risky.

Approximately six abattoirs were identified in the Amathole District Municipality that slaughter beef cattle. Two of these were located in Adelaide (Nxuba Local Municipality), while there was one each in Fort Beaufort (Nkonkobe Local Municipality), Cathcart (Amahlathi Local Municipality), Komga (Great Kei Local Municipality) and the Fish River (Nkonkobe Local Municipality). Given the lack of economies of scale within the livestock industry, many of these abattoirs also slaughter other animals (e.g. pigs, game, sheep etc.).

As indicated under the processing of mutton, there are only limited feedlot facilities in the Amathole District. These feedlots, in most cases, are operating at capacity with little capability to meet an increase in demand.

The dairy processing environment in the Eastern Cape is dominated by approximately 22 commercial buyers and 62 producer distributors. The dominant industry players (e.g. Clover, Parmalat and Woodlands) specialise in the production of milk powder, pasteurised milk and UHT respectively. These industry leaders are situated in Port Elizabeth and Humansdorp respectively, while other smaller processing facilitates are found in East London and Kareedouw. The monopolised nature of the dairy processing industry thus makes further dairy processing in the Amathole District Municipality infeasible. There is likely limited potential for the production of highly unique and/or differentiated regional dairy products (e.g. artisan cheeses). (ECDC, 2015)

### 7.1.3 Poultry

The poultry industry in the Amathole District Municipality comprises three separate sub industries, namely the day-old chick supply, broiler production and the egg industry. Broiler production, however, generally entails taking a day-old chick from its hatched state to its final processed product. This industry thus includes feed production, day-old chick breeding, broiler production and retail distribution.

Feed used in the poultry industry is derived from either white or yellow maize, which has been combined with various nutrients. Of the two types of maize produced, yellow maize is the preferred input into the feed production process. Although no feed producers were identified in the Amathole District Municipality, maize, which can be used for the manufacturing of such feed, is grown in the Mnquma Local Municipality (around the town of Butterworth).

Large-scale commercial broiler production in the Eastern Cape is confided to two geographic areas, namely the Nelson Mandela Bay Metro, and the Amahlathi Local Municipality (more specifically the area around Stutterheim). The three broiler producers located in these areas, produce approximately one million broilers per week in 2013. In addition to the two producers found in the Amathole District Municipality, there are a significant number of smaller producers scattered around the district.

Approximately 61 poultry or poultry related cooperatives were identified in the Amathole District Municipality in 2013. The majority of these cooperatives were located in and around major settlements in the district, particularly Alice (Nkonkobe Local Municipality), Elliotdale (Mbhashe Local Municipality), and Fort Beaufort (Nkonkobe Local Municipality).

Processing operations (i.e. abattoirs) linked to these production sites were identified in both Stutterheim (four) and Fort Beaufort (one). This broiler meat was processed into a variety of food products (e.g. chicken viennas, polony, chicken steaks) and used for everyday household consumption. Small-scale processing is also done at a butchery level across the district, where pieces of chicken are sold spiced and seasoned.

No major egg producers were identified in the Amathole District Municipality, however limited grading and packaging of eggs is conducted by certain producers on their farms prior to transporting. (ECDC, 2015)

### 7.1.4 Maize

Dryland and irrigated maize production is an important crop for the Amathole District Municipality as it provides a number of households with staple food consumptions and food security, particularly in the more rural parts of the district. The maize industry is also an important employer and foreign currency earner due to its multiplier effects. In terms of production, yellow maize is mostly used in animal feed while white maize is used for human consumption.

The production of maize in the Amathole District Municipality is, however, limited due to the district's shallow and erodible soils and low rainfall in the inland areas in the western part of the district. It is estimated that over 50% of the area suitable for field crops is under cultivation. Dryland field crops (mainly maize) account for only 5.3% of the district's total agriculture value add.

Insufficient maize volumes in the Amathole District Municipality severely limit any kind of processing operations that can realistically operate or be established in the area. This lack of raw material supply means that, were a production facility to locate itself near the current marginal production, it would be forced to transport additional raw material to its facility to ensure continued operation. These transport costs, in most circumstances, would make the processing facility unviable.

There are, however, several small-scale production facilities that have positioned themselves within the market in such a way as to generate a competitive advantage for themselves. These milling operations take the form of cooperatives and are primarily located in the Ngqushwa Local Municipality and, to a lesser extent, in the Nxuba and Amahlathi Local Municipalities. As indicated, the absence of raw materials means that these feed producers procure their raw materials from outside the Eastern Cape, primarily from the Free State and Western Cape. These feed producers also purchase directly from individual maize farmers rather than through Safex. This allows them to benefit from the transport differential of transporting maize from the Free State to Port Elizabeth and East London. (ECDC, 2015)

### 7.1.5 Horticulture

Horticulture plays also a significant role in the Amathole District Municipality's agricultural sector, generating R 45.8 million in gross farming income in 2007, and being the second largest agricultural industry (after livestock). Large-scale, commercial horticulture activities in the district are concentrated in the well-watered coastal belt (Ngqushwa, Great Kei, Mnquma, and Mbhashe Local Municipalities) and in the river valleys (Nxuba, Nkonkobe, and Amahlathi Local Municipalities) throughout the area. Small-scale vegetable production, usually at a homestead level, occurs throughout the district.

Important horticultural products produced in the Amathole District Municipality include vegetables (potatoes, tomatoes and cabbages), citrus, pineapples and subtropical fruits.

Horticultural crops cultivated in the Amathole District Municipality tend to perform better than field crops, even under similar conditions. Compared to dry land field crops however, horticultural crops pose major challenges related to cost and labour, as this form of farming requires a certain level of skills and expertise to be able to yield positive results. In many cases, these challenges make the cultivation of horticultural crops a non-viable option for small-scale farmers due to their lack of resources.

Although the Amathole District Municipality accounted for a significant share (19.0%) of the Eastern Cape's horticultural production in 2007, no processing facilities were identified in the district. As in the case of maize production, the area's current horticultural production volumes make the establishment of processing facilities financially unviable. Expansion of horticultural value addition is thus dependent on increased production volumes.

The value addition of horticultural products that do occur in the Amathole District Municipality is confined to the cleaning, grading and packaging of produce prior to transport. (ECDC 2015)

### 7.1.6 Forestry

Plantation forestry provides the raw materials for all downstream activities associated with the forestry industry, such as pulp milling, paper manufacturing, sawmilling and certain furniture manufacturing. The development of plantation or indigenous forestry can also play an important role in environmental services, such as through the conservation of soil, water and biological diversity.

There are two tiers of forestry processing. Firstly, the primary conversion process of plantation products, which entails the refining of raw timber into lumber through the sawmilling process; and secondly, conversion processes which involve the transformation of refined lumber into additional products such as furniture. Both of these aspects occur in the Amathole District Municipality, primarily in the Amahlathi and Nkonkobe Local Municipalities.

**Plantation Forestry**

The total commercial timber plantation area in the Amathole District Municipality in 2011 was estimated at 24 140 hectares, 17.1% of the total afforestation area in the Eastern Cape. The majority of these plantations are situated in the Amahlathi and Nkonkobe Local Municipalities which collectively account for 81.9% of total afforested areas in South Africa. These plantations have a legacy of state ownership with only 28.1% of the total plantation area in the district under private control. In addition to plantation forestry, the Amathole District Municipality also has an estimated 72 965 hectares of natural forests. (ECDC 2015)

The plantation market is defined by a large degree of vertical integration with the major plantation owners, in many cases, also being the major processors and buyers of wood. Examples of this are Mondi and Sappi in the case of purchases of wood for pulp and paper; Masonite in the case of fibreboard; and Global Forest Products and Hans Merensky for sawmilling. Given this industry structure, a large majority of the wood produced is removed from the open market which results in the dominance of few large buyers.

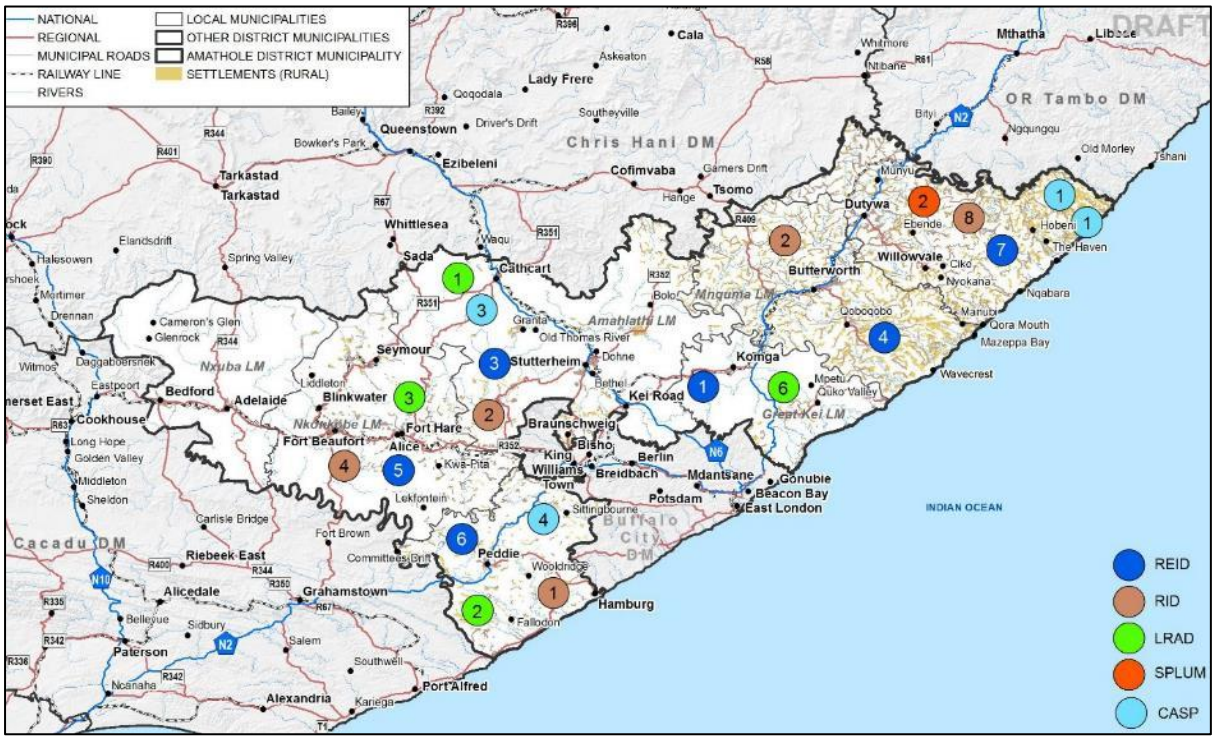
In 2007, the Department of Water Affairs and Forestry conducted a strategic environmental assessment of the Eastern Cape to determine the biophysical suitability of the province for additional forestry plantations. This assessment identified 168 533 hectares of land as having potential for additional afforestation in the Amathole District Municipality. Of this figure, 4.7% was indicated as having good potential, while the remaining 95.3% was indicating as having moderate potential.

## 7.2 Current and proposed projects in the region

Figures 7.3 and 7.4 shows numerous agriculture projects active in the Amathole District Municipality, supported by various public sector agriculture and economic development focussed government / quasi-governmental organisations, programmes and schemes.

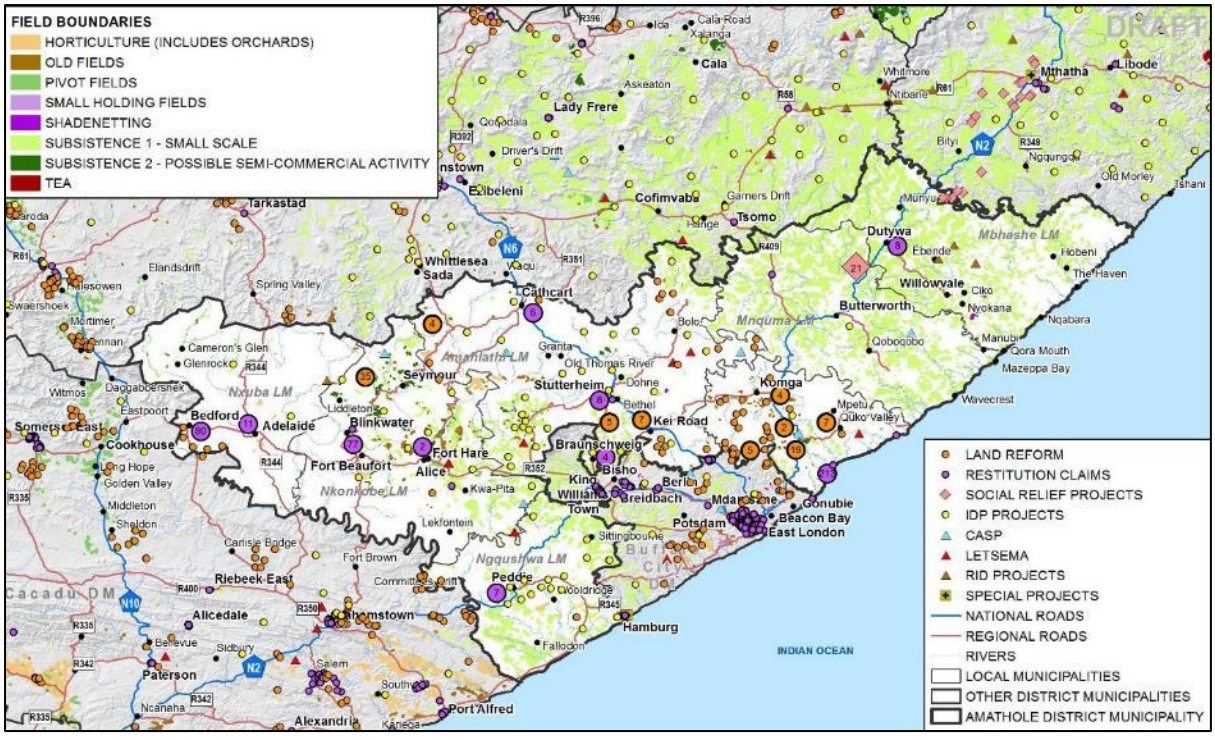
The major types of programmes / schemes in operation in the Amathole District are discussed below.

**Figure 7.3: Amathole District DRDLR projects**




*Source: Urban Dynamics. 2015*

**Figure 7.4: Amathole District agriculture projects**




*Source: Urban-Dynamics, 2015*

### 7.2.1 Rural Enterprise and Industrial Development initiative (REID)

REID was established by the Department of Rural Development. It aims to create an enabling institutional environment for vibrant and sustainable rural communities. REID consists of four units. Each unit is briefly described below.

The social organisation and mobilisation unit, which is responsible for the promotion of participatory approach to rural development.

The technical support, skills development and nurturing units, this unit provides technical support to institutions and organisations in rural communities through skills and capacity building.

The Institutional Building and Mentoring unit is responsible for facilitating, building and mentoring institutions in rural communities.

The rural livelihoods and food security unit, that is responsible for facilitating strategic partnerships that would promote economic and rural enterprise development. Strategic partners are from the private sector, government entities and international organisations. These strategic partnerships also facilitate value added services such as agri-processing and the establishment of village industries and enterprises.

### 7.2.2 Rural Infrastructure Development initiative (RID)

The Rural Infrastructure and Development initiative was established and run by the DRDLR in order to facilitate rural infrastructure development strategies for socio-economic growth. The key role of RID is to provide ICT, economic and social infrastructure necessary to uplift rural communities. The functions of the programme include provision of economic and ICT infrastructure and development services; facilitation of social infrastructure, development and adaptation of innovative and appropriate technologies within rural areas.

RID also intends to facilitate access to additional funding to implement infrastructure project services, to provide project management functional specific support to RID in provinces, to provide financial and administrative support services and finally to provide service delivery coordination services.

An example of how RID links with other projects is that it would, for example, provide the fencing for a project area while REID will provide the funding and invest in food gardens.

There are numerous RID projects that are currently being run in the ADM as can be seen in Figure 7.3 the highest concentration of which appear to be in Sundays River Valley LM and Makana LM.

### 7.2.3 Land Redistribution for Agricultural Development programme (LRAD)

The Land Redistribution for Agricultural Development (LRAD) programme was designed to help previously disadvantaged citizens from African, Coloured and Indian communities to buy land or agricultural implements specifically for agricultural purposes. The LRAD grant is made available as a non-refundable form of funding or financial contribution to help prospective farmers to purchase land by government.

The grants are made available through the Dept. Land Affairs with assistance from the Dept. of Agriculture, Fisheries and Forestry. Funds can be used for the acquisition of land or the financing of land improvements, infrastructure investments, capital assets and short-term agricultural inputs.

LRAD funding is made available to beneficiaries at various levels, these are:

- **Safety-net projects:** This is the level at which beneficiaries will acquire land to produce mainly for own consumption.
- **Equity schemes:** Members of a group will each contribute a certain amount towards accessing the grant. In turn, each member will own a certain percentage of the project according to the degree of their contribution.

- **Production for markets:** Some people will enter the programme at a much higher level than the ones mentioned above. These people will most probably have more farming experience as well as access to additional finance through normal bank loans as well as their own assets and cash to purchase bigger farms and therefore farm on a much larger scale.
- **Agriculture in communal areas:** Quite a number of people in communal areas already have secure access to agricultural land, but may not have the money to start using that land productively. Such people will be allowed to apply for assistance to start putting up productive investments on the land.

### 7.2.4 Comprehensive Agricultural Support Programme (CASP)

The Comprehensive Agricultural Support Programme is a Dept. of Agriculture, Fisheries and Forestry project, supported by National Treasury, which seeks to provide agricultural support to land and agrarian reform projects.

The strategic goals of the CASP programme are to create a favourable and supportive agricultural service environment for the farming community, including subsistence, smallholder and commercial farmers.

Grants are allocated with the aim of expanding the provision of agricultural support services and the promotion & facilitation of agricultural development by targeting smallholder and previously disadvantaged farmers.

### 7.2.5 Ilima/ Letsema

The Ilima Letsema initiative was established in 2008 and reformed in 2013 by the DAFF with the aim of encouraging food gardens among to support food security in rural areas. The funding originated with the special poverty allocations made by National Government for a specific purpose and a conditional grant enables government to ensure that specific projects are targeted. The funding will look to support small emerging black farmers and takes the form of grants given to farmers. The grant is given to farmers who apply and uses a grant framework to assist targeted vulnerable South African farming communities to increase agricultural production and improve farming skills. Some of the funding goes towards strategic interventions like the rehabilitation of irrigation schemes.

The expected outcomes from this project includes:

- Increased production efficiency
- Increased agricultural production for the targeted group
- Improved ability of targeted group to cope with high food prices.
- Improved food production at both household and national level.

In 2012 it is believed that a total of 4 021 farmers had been supported through the Ilima Letsema programme. It is believed that through this programme, farmers will be trained in appropriate agricultural practices, the number of hectares under production will increase and new irrigation schemes will be established.

In the ADM, Ilima Letsema has a strong presence with a number of projects in Baviaans, Makana and Ndlambe LM.

### 7.2.6 IDP Projects

District Municipality Integrated Development Plans (IDP) is a super plan for an area that gives an overall framework for development. It aims to co-ordinate the work of local and other spheres of government in a coherent plan to improve the quality of life for all the people living in an area. It should take into account the existing conditions and problems and resources available for development. The plan should look at economic and social development for the area as a whole. It must set a framework for how land should be used, what infrastructure and services are needed and how the environment should be protected.

All municipalities have to produce an Integrated Development Plan (IDP). The municipality is responsible for the co-ordination of the IDP and must draw in other stakeholders in the area who can impact on and/or benefit from development in the area.

Once the IDP is drawn up all municipal planning and projects should happen in terms of the IDP. The annual council budget should be based on the IDP. Other government departments working in the area should take the IDP into account when making their own plans.

The IDP develops projects in conjunction with regional and provincial government departments to aid specific development objectives. Funding for District IDP projects is accessed through these government departments, from the District IDP budget and through other funding avenues and mechanisms.

#### 7.2.7 Special Projects

Special projects are projects that are usually large and unique in nature which have specific goals that are linked to national and regional development. Examples of these projects include IDZs and large infrastructure projects such as dams and electricity projects.

#### 7.2.8 Social relief projects

Social relief projects are generally temporary assistance projects for those in dire need of support. In the case of the agricultural sector, social relief projects are generally directed at those who have experienced a natural disaster such as drought, fire or floods. Social relief projects are funded by a number of organisations, including the private sector. There are currently no social relief projects underway in Amathole.

### 7.3 Environmental profile

Amathole has a unique and interesting environment. Biodiversity in the municipality is broad and ranges greatly from one extent of the District to the other. Just as biodiversity differs, so does the temperature, rainfall and general climate. The following section details the environmental characteristics of the municipality.

#### 7.3.1 Temperature and frost, heat & chill units

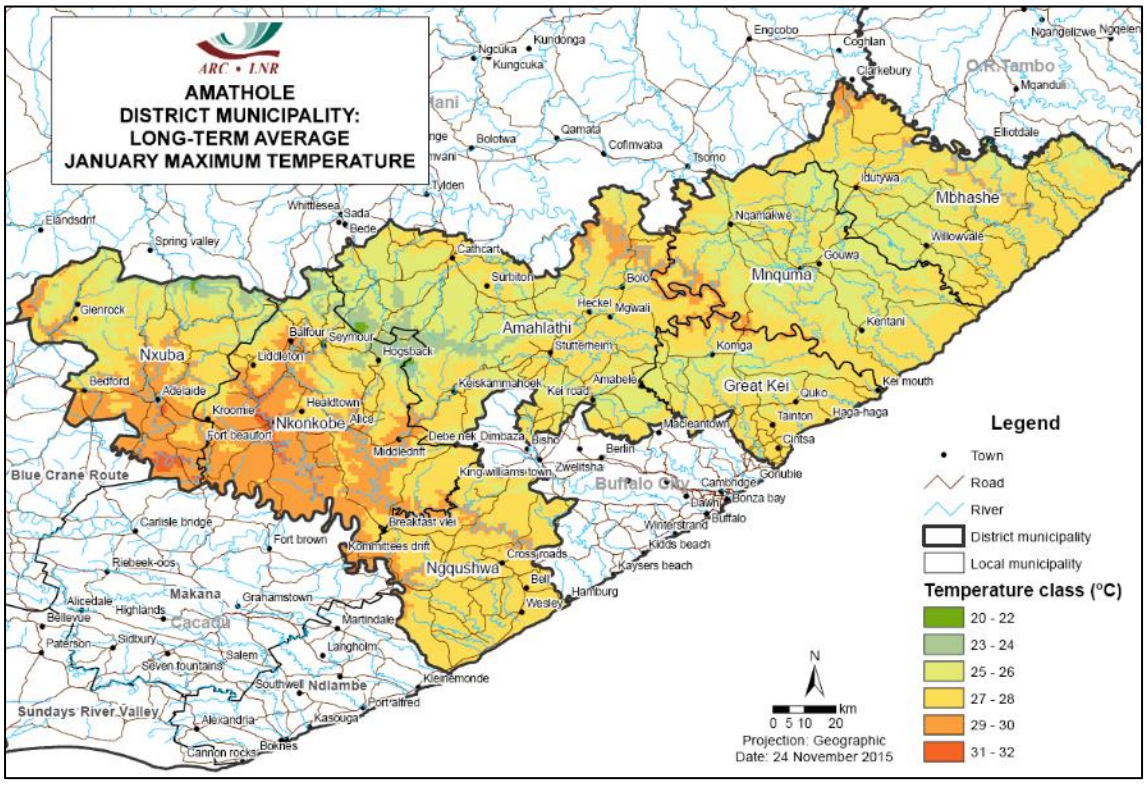
Decadel (ten day period) 1km X1km surfaces were created from temperature data (1920 to 1999) downloaded from the AgroMet databank at the ARC-ISCW (South African Weather Service and ISCW weather stations) from stations with a recording period of 10 years or more. Regression analysis and spatial modelling were utilized taking into account topographic indices such as altitude, aspect, slope and distance to the sea during the development of the surface. Monthly averages were calculated (Malherbe & Tackrah, 2003).

The climate of the Amathole District varies from mild temperate conditions (14-23$^0$C) along the coastal areas to slightly more extreme conditions (5-35$^0$C) among the inland areas. Winter snow is sometimes experienced at the higher mountains toward the northern part of the district (Jordaan, 2013).

The long-term average maximum temperatures for Amathole DM are mostly between 27$^0$ and 29$^0$C for January (Figure 7.5) and the long-term average minimum temperatures between 2$^0$ and 4$^0$ C for inland areas and between 9$^0$ and 10$^0$ C for the coastal areas in July (Figure 7.6).

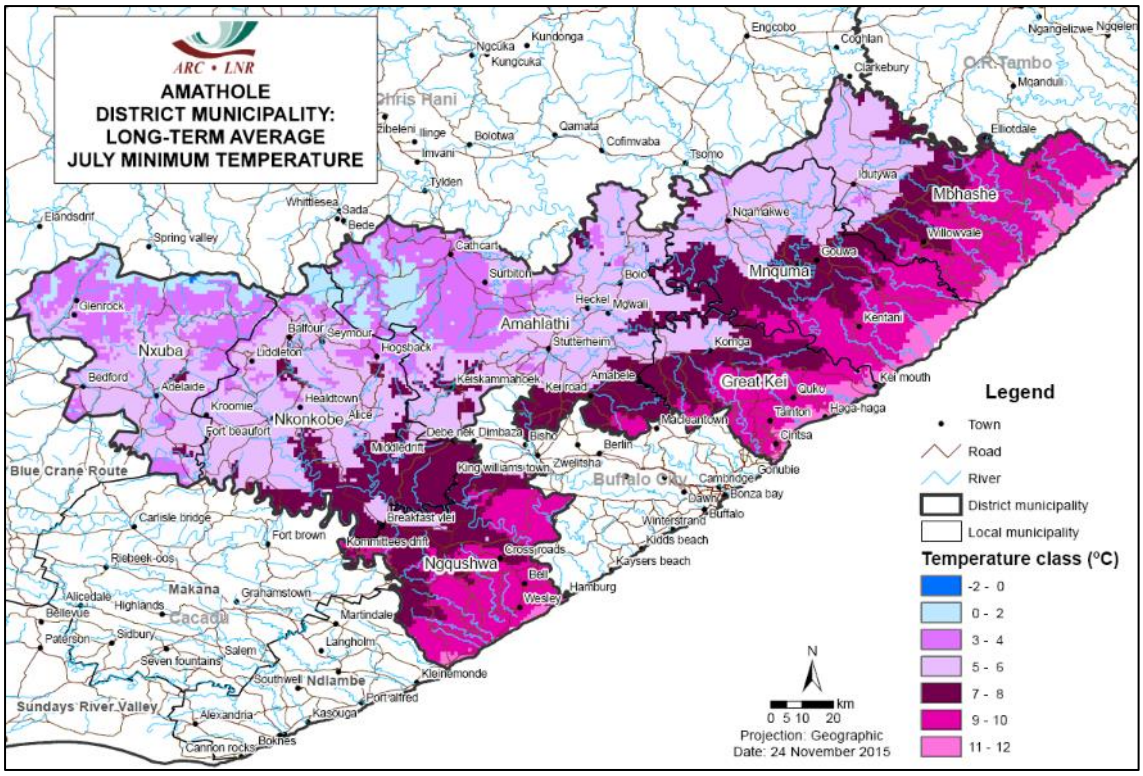
According to Schulze (2008) the heat units ($^0$ days) for January for the area is between 280 in the east to and 320 in the west. The July values is between 120 near the coast and 80 to 100 for the inland areas. The positive chill units for July is mostly between 100 and 350 PCUs for the Amathole DM.

**Figure 7.5: Long-term Average January Maximum Temperatures**




*Source: Agricultural Research Council, 2015*

**Figure 7.6: Long-Term Average July Minimum Temperatures**




*Source: Agricultural Research Council, 2015*

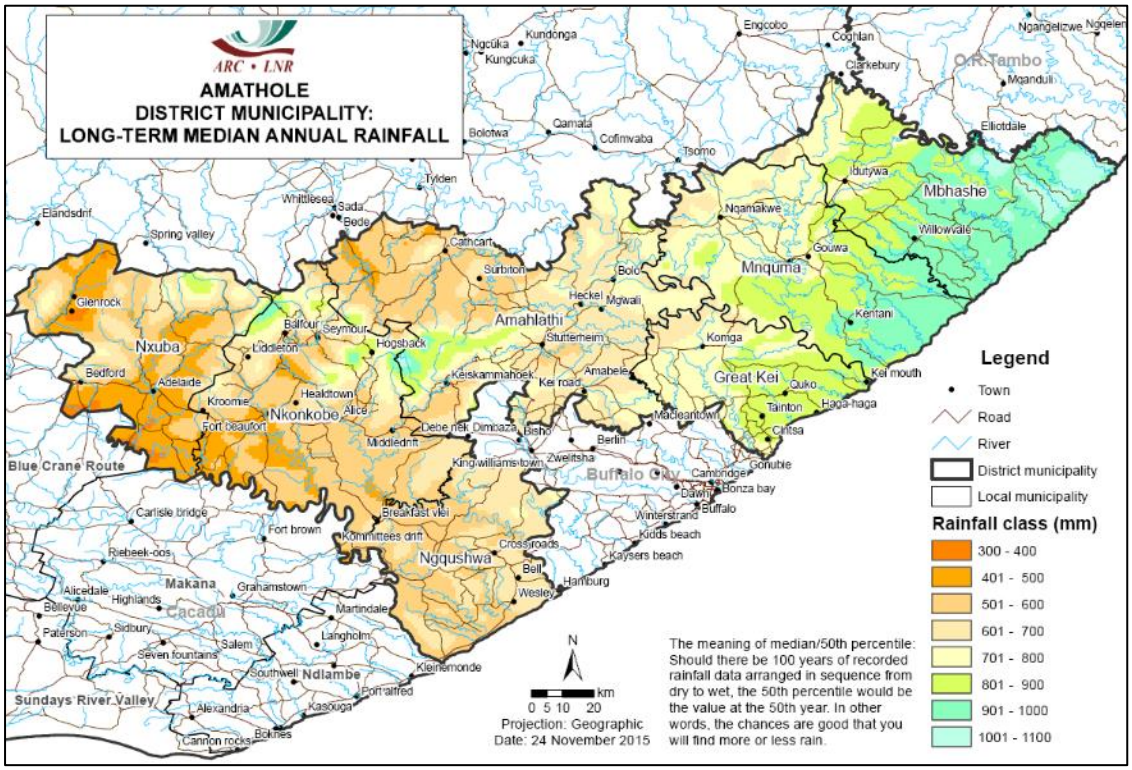
The majority of the Amathole DM are experience sufficient growth temperature during the months of the growing season as required for most fruit and vegetable crops. Frost could be a problem in the north-western part of the DM (Hogsback-Seymour) for certain crops.

### 7.3.2. Rainfall, hail risk, humidity and water availability

Decadel (ten day period) 1km X1km surfaces were created from rainfall data (1920 – 1999) downloaded from the AgroMet databank at the ARC-ISCW (South African Weather Service and ISCW weather stations) from stations with a recording period of 10 years or more. Regression analysis and spatial modelling were utilized taking into account topographic indices such as altitude, aspect, slope and distance to the sea during the development of the surface. Monthly averages were calculated (Malherbe & Tackrah, 2003).

The district is located in a summer rainfall area with precipitation that varies from 1 000 mm in the north-east coastal zone to 600 mm in the west (Jordaan, 2013). The north-eastern part receives between 900 mm and 100 mm per annum with between 300mm and 400 mm per annum for the western part of Amathole DM (Fig 3).

**Figure 7.7: Long-term Median Annual Rainfall**

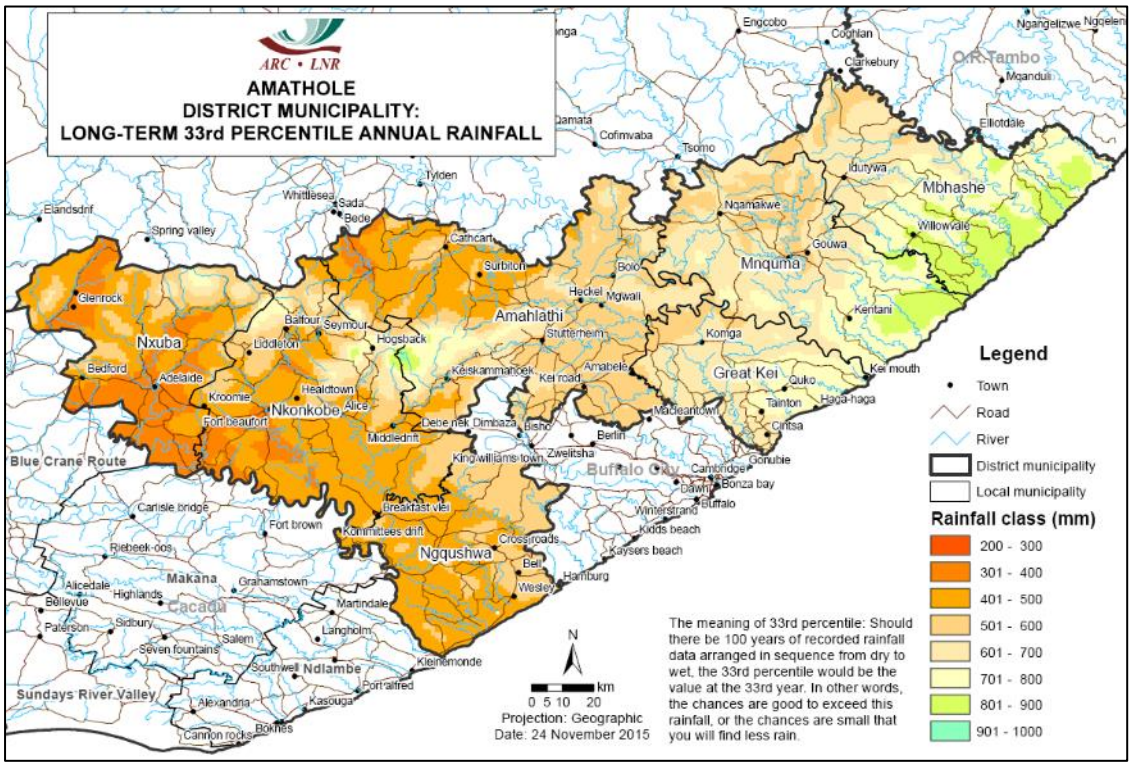



*Source: Agricultural Research Council, 2015*

From the long-term 33rd and 67th percentile annual rainfall (Figures 4 and 5) it can be seen that The Eastern part of the DM has the highest probably of high rainfall (800 to 900 mm) even during drought conditions.

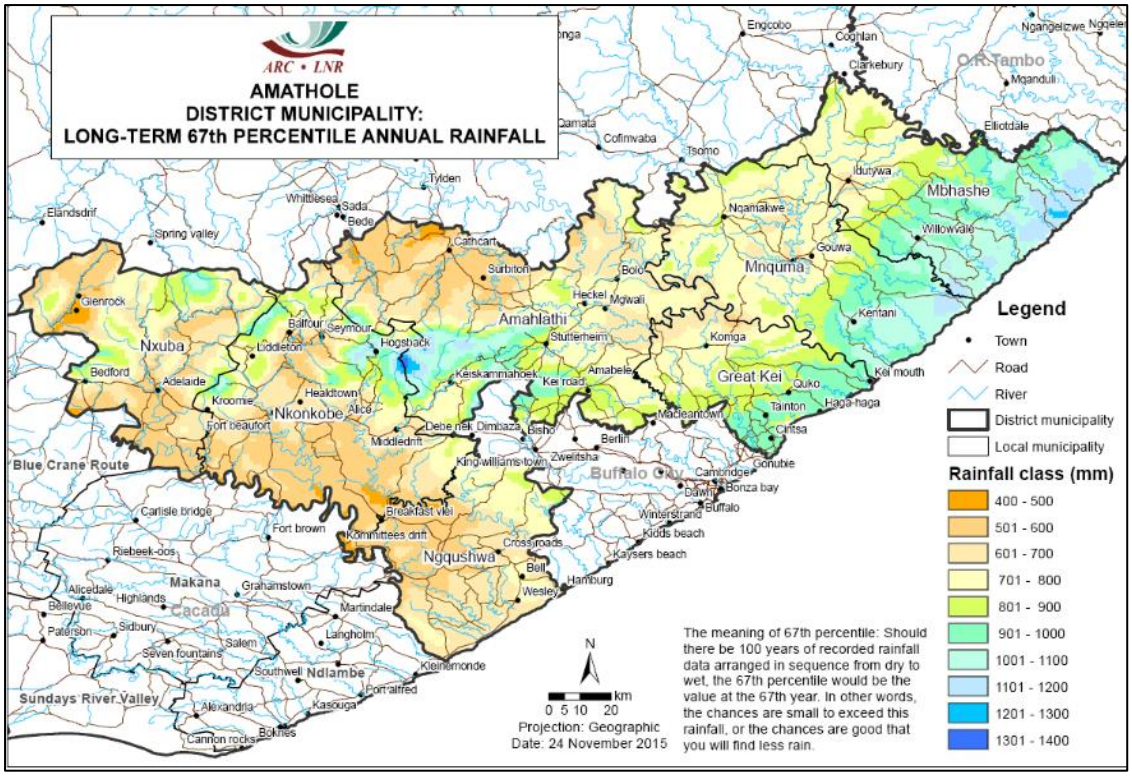
Intensive crop production in the western section of the Amathole DM is not possible without irrigation. Intensive farming only possible in this section where water and infrastructure are available (Great Fish River). The relatively high rainfall in north-eastern part of the DM is sufficient for dry land crop production for a number of crops.

**Figure 7.8: Long-term 33rd Percentile Annual Rainfall**




*Source: Agricultural Research Council, 2015*

**Figure 7.9: Long-term 67 Percentile Annual Rainfall**




*Source: Agricultural Research Council, 2015*

The four major drainage systems in Amathole are the Great Fish river catchment (Great Fish, Koonap & Kat Rivers); Great Kei River basin (Great Kei, Kubusi, Klipplaat & Gqnube Rivers); Mbhashe River basin, and Amathole catchment (Keiskamma, Buffalo, Nahoon & Gqunube Rivers.

Soils in the Great Fish river catchment (Great Fish, Koonap & Kat Rivers) is vulnerable to salinisation and sodification problems, not only due to soil conditions, but also to poor water quality. Erosion is also a problem, especially in the more rural areas.

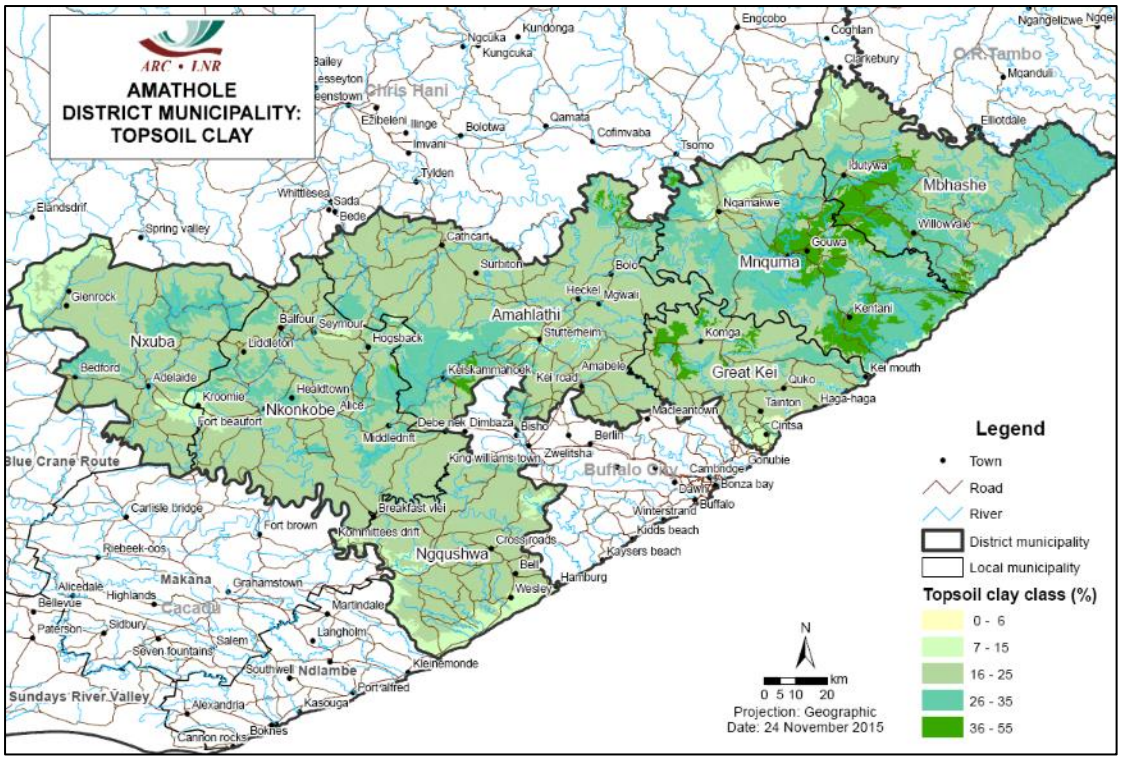
### 7.3.3 Land and soil resources

Digital Land type information and the spatial component were used to determine the top soil clay content and the soil depth. Soil depth is recorded as a range for each soil entry. A weighted average was calculated for each land type unit (Land Type Survey Staff, 1972 to 2006).

The topsoil clay is mostly between 16 and 25% (Fig.6) in the Amathole DM, an indication of a low infiltration rate and high water-holding capacity. The majority of the area has a relatively shallow soil depth between 300 and 600 mm and even shallower in western part of the DM (Fig.7), which is extremely problematic for the production of most crops.

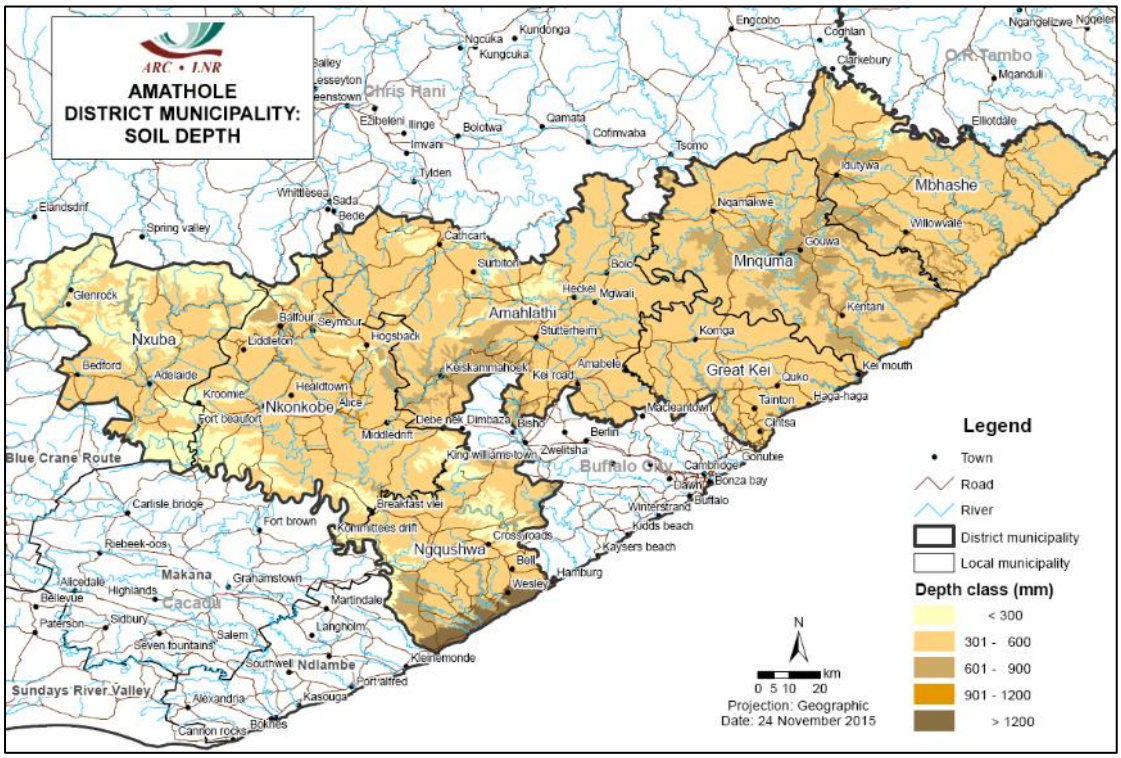
Salinity is a problem in the more arid western part and soil acidity in the more humid eastern part.

**Figure 7.10: Amathole Topsoil Clay Content**




*Source: Agricultural Research Council, 2015*

**Figure 7.11: Amathole Soil Depth**




*Source: Agricultural Research Council, 2015*

## 7.4 APAP commodity selection criteria

The Agricultural Policy Action Plan (APAP) proposed 5 criteria for the assessment of agriculture 'sectoral interventions', referred to in this report as 'commodities'. These criteria were developed to support outcomes 4, 7 and 10 and the associated objectives set out in the New Growth Path (NGP), National Development Plan (NDP) and the Industrial Policy Action Plan (IPAP).

The 2015 – 2019 APAP report stated the following:

> "For APAP to effectively speak to Outcomes 4, 7 and 10, and to the objectives set out in the NGP, NDP and IPAP, it needs to unlock the productive potential of agriculture, forestry and fisheries by considering the nature of their binding constraints, whether these be at the level of primary production, beneficiation, or marketing, or indeed a combination of these. However, different subsectors within agriculture, forestry and fisheries operate according to different dynamics and face distinct challenges, thus there is a need to be selective as to which subsectors or value chains to focus upon in the short and medium term, while also recognising that agricultural commodities in particular are often inter-related, in which case it is more helpful to speak of 'integrated value chains'. Using the following general selection criteria, this first APAP focuses on a discrete number of value chains identified as strategic in meeting the objectives of the NGP, NDP and IPAP"

The APAP criteria are listed below:

- Contribution to food security
- Job creation
- Value of production
- Growth potential

❖ Potential contribution to trade balance

### 7.5 Agri-Park commodity prioritisation matrix

This Agri-Park Business Plan report takes the APAP criteria listed in Section 7.4 further; creating commodity assessment criteria that are more comprehensive to ensure A) a more standardised approach to scoring commodities B) allow for more informed assessments of commodities and C) ensure that the spirit of the APAP criteria, the NGP, NDP, and IPAP, are adequately reflected.

The Agri-Park will predominantly support three main commodities with services, implements, training and various expertise. In order to choose the three main commodities a selection matrix was designed in order to fulfil this role. These criteria were weighted and prioritised based on their importance and placed into a matrix. All of the currently operational agricultural activities in the area were included in the matrix and the top three were selected. In this case the top four were selected as beef cattle and other red meat (lamb, mutton and chevon) have very similar value chains and could be combined. The criteria used to select the top three commodities were as follows:

- Biophysical Criteria
- Enterprise Viability Criteria
- Economic Development Criteria
- Political/ Institutional, Social and Food Security/ Sustainability criteria

Each of these criteria, which were used to select the top three commodities, were broken down into sub groups according to each of the parent criteria.

#### 7.5.1 Biophysical Criteria

Some of the most important criteria to consider is the biophysical criteria. If crops or livestock cannot cope in a certain area then the entire project will not be effective and may be too costly to continue. It is important to select crops and livestock that can cope with biophysical environment and use strains and breeds that are already present in the area.

❖ **Temperature**

Temperature is important to consider as it directly relates to how livestock and crops may grow. Some crops and animals cannot cope in certain temperatures e.g. certain types of grains and cereals cannot have extreme temperatures during their early growth periods and need a temperate climate.

The prioritisation matrix examines the:

- growth temperature during the months of the growing season as required by the particular crop
- frost risk and frost sensitivity or tolerance of the crop
- temperature ranges through the year
- ability of the animal to cope with heat and chills

❖ **Water/ moisture**

Livestock and crops need to have sufficient water in order to support growth. A reliable source of water or moisture either in the form of precipitation or irrigation needs to be adequate in order for the growth of commodity to be successful. The matrix examined the following sections with regards to water and moisture:

- sufficient rainfall during the months of the growing season;

- sufficient quantity of irrigation water potentially available from surface and/or groundwater resources that can be sustainably abstracted;
- water quality for crops and animals;
- sufficient irrigation infrastructure or schemes already available in the area;
- sufficient quantity of water available from surface and/or groundwater resources for animal watering purposes

❖ **Land type, capability and soil**

The soil section attempts to ascertain the quality and carrying capacity of the soil for the given commodity. It essentially determines if there are extensive patches of land covered by suitable soil in terms of:

- Texture
- Drainage
- Depth

It also determines land type and capability of the crop and given the land capability of the area is there enough land capable of supporting the crop or animal. Low scoring crops and animals may require finishing or feedlots before they are sold.

❖ **Weed, pest, and disease resilience**

Weeds, pests, and disease resilience is an important aspect in determining the crops and animals that are chosen. The matrix determines the competitiveness of the crop compared to weeds, if the crop requires extensive pest and disease control or if disease is common in the area. The matrix examines if certain livestock can be maintained in the area based on their resilience to pests and disease and if bush encroachment and unpalatable/poisonous plants are infesting an area that livestock occupy.

❖ **Adaptability to adverse conditions**

The crops and livestock that were chosen need to be adaptable to adverse conditions. The biggest threats to the long term sustainability of the commodity will be climate change and associated weather conditions. The solution to this is to obtain naturalised varieties and breeds that can compete with exotic breeds and be adaptable to the threat of changing climates.

### 7.5.2 Enterprise Viability Criteria

❖ **Transport, Market Access and Demand Criteria**

**Distance to Markets and Transport Costs**

This section asks the questions: “is the enterprise compatible with the general rule that it is not economically viable to transport bulky, large volume, heavy or low value products over large distances to markets, while high value products can be transported over much larger distances, even tens of thousands kilometres away, considering modes of transport, transportation infrastructure, travel friction, road conditions etc.?” and “Is the enterprise compatible with the general rule that it is not economically viable to transport highly perishable products over long distances unless fast, cost efficient cold chains are available?”

**Current Demand**

This section tries to determine the current demand for the product and if it is sufficiently strong or large. It also asks if there is an established market for the product, including existing marketing channels and demand amongst customers already having a strong preference for the product. Finally it determines if there is a possibility of creating a demand as the current demand may not be fulfilled.

**Future Market Growth Potential**

This section attempts to determine the future growth of the commodity given global and local market trends and further marketing potential for example the future of poultry growth in the South African market may be extremely limited based on the recent changes to the AGOA act between South Africa and the USA as cheaper USA imports may flood the market.

**Market Openness**

Determines the willingness of buyers of the product to purchase goods from new and emerging small-scale farmers. An example of an open market is the wool and mohair industry where the current buyers (BKB and Cape Wool and Mohair) purchase directly from small-scale farmers.

- **Human, Physical and Financial Capital Requirements**

**Familiarity and Local Knowledge and Skills**

This section determines if the crop or livestock is already familiar amongst farmers in the area or if significant awareness creation be needed. It also attempts to ascertain if local farmers and workers are likely to have the required skills or could fairly easily obtain the required skills to farm with the crop and to add value to it.

**Labour Cost and Productivity**

This section asks whether or not the local labour cost is competitive and whether the labourers would be willing to perform farm and agro-processing work. It also attempts to decide how productive a labourer would be in this sector.

**Implements and Infrastructure**

This section ascertains the availability and difficulty the process of obtaining required implements and infrastructure would be for example dairy farming is noted for being a practice that requires large number of complex implements in order to be competitive and to produce enough milk in one day. Thus this activity would score low in the matrix.

**Ease to Finance**

Determines the ease of obtaining financing for the commodity. It asks the question whether or not an enterprise would be able to secure funding through various means e.g. g be fairly easy, e.g. through tight value chain financing mechanisms, contract farming, equipment leasing rather than ownership etc.

- **Business strategy, payback period and profitability criteria**

**Business strategy and positioning**

Determines where or not a business or enterprise can be aligned to a viable business strategy for small-scale farmers in order to remain competitive e.g. being a low cost vs good value vs high quality vs highly differentiated producer, and various other competitive and business strategies.

**Payback Period**

This section determines if there will be a long payback period once the crops or livestock are in in place and how long this may take to pay back any investments. This is particularly important to emerging and small-scale farmers who may not have the funds or access to funds to last a long period without a payback to the farmer e.g. forestry will have an extremely long payback period while vegetables may be a lot less.

**Profitability**

Attempts to ascertain if the enterprise can become profitable in its particular area. For example a game or flower farm can become exceptionally profitable if managed correctly as there is a large demand abroad for their goods. Maize and Lucerne farming can also become extremely profitable as there is a demand locally for the products produced from them.

### 7.5.3 Economic development criteria

- **Forward and Backward Economic Linkages and Argo-Processing Opportunities**

**Forward and Backward Economic Linkages**

Considered the economic linkages of the commodity and whether or not they were high or low. A commodity with high economic linkages will be less vulnerable to changes in economy and can adapt to changes. A commodity with a high number of forward and backward linkages is the forestry industry which has many uses for the products that are produced.

**Agro-Processing Opportunities at District Level**

This section considers the ability of the district to value add to the product being produced in the area. This includes both primary and secondary agro-processing opportunities to be exploited. These activities will most likely take place at the Agri-Park.

- **Job Creation**

**Direct On-Farm Job Creation**

This category explains how labour intensive the activity may be. It was considered important to have activities that are sufficiently labour intensive rather than capital intensive as this contributes directly to on farm job creation and rural development.

**Direct, Indirect and Induced Job creation through the Value Chain**

This category considers whether or not jobs are created or induced through the value chain. Once again it was important to have a commodity that was creating a sufficient number of jobs throughout the value chain e.g. forestry has a very high degree of jobs that it creates throughout the value chain as the product that is produced is used extensively throughout society while lucerne is does not have a large number of induced jobs as it has a limited value chain.

**Job Decency**

Job decency is the category that examines the quality of the job that would be created by the farm and value adding process. This category attempted to identify the most skilled positions and rank them higher than semi-skilled or unskilled jobs. Generally quality jobs are created is created when labourers are integrated in the business and management of the farm in order to create buy in and develop skills around the commodity being farmed.

- **Local Development**

**Business Opportunities, Agglomeration Effects and Job Creation at Local or District Level**

This category determines the ability of the commodity to create business opportunities and job creation down the value chain and on the farm which could lead to local and economic development. This section asks whether or not the commodity has the ability to create economic opportunities for local small emerging entrepreneurs or will the opportunities be available for distant overseas companies. In this

situation wool is an example where once it is sheered and bailed it is then exported for use overseas with very little production occurring in South Africa

**Agricultural Intensification and Increased Local GDP**

Determines if the enterprise is characterised by a relative high level of agricultural intensification, and high income per surface area unit. In this situation it was preferred that low intensity agriculture be prioritised as it is associated with higher local GDP due to higher income directly from the enterprise, as well as higher associated incomes from indirect opportunities.

❖ **Global Competitiveness and Trade**

**Global Competitiveness**

This section considers if the region is truly globally or at least regionally competitive to produce the crop/animal, or if "cheap imports" likely to be or become a threat. In this category, owing to the recent changes to AGOA, poultry would rank low in this section as it would not be very competitive globally.

**Export Potential**

Export potential ascertains if the crop and its value added products have strong export potential. This section essentially considers if a crop, once successfully grown and value added, has the possibility of being exported e.g. flowers produced in the Western Cape are produced almost excusably for the export market and have a high export potential if grown in the Eastern Cape.

**Import Substitution Potential**

This section determines if the crop or its value adding products present an opportunity to contribute to import substitution, at local, regional or national level e.g. South Africa is a net importer of maize so any maize grown in the country would substitute any maize imported into the country.

### 7.5.4 Political & social criteria

❖ **Political and Institutional Criteria**

**Government Priority Including APAP**

Considers if the particular enterprise is regarded as priority by APAP and other policies, strategies, plans or programs. These programmes are given greater scores on the matrix as they align to policy and existing programmes which can be included in the Agri-Parks concept and can be promoted simultaneously.

**Existing Successful or Planned Projects**

Attempts to ascertain if there already projects in place in the area that the farms with the particular animal/ plant, or are there plans for establishment in place that are likely to be successful. Existing successful projects may indicate that the enterprise already "proofed itself" under local circumstances, and additional production may utilize existing marketing channels, infrastructure and may benefit from increasing scale efficiency.

**State or Communal Land Suitability of the Likely Business Model**

Determines if there are state or communal parcels of land that can be used or if collective models of production can be marketed and applied to the enterprise. Obviously land tenure and availability is a large issue and needs to be examined in detail on a per farm basis.

❖ **Social Criteria**

**Acceptability (Local "buy-in")**

This criteria considers if the farmers will be willing to grow the particular crop/livestock and adopt associated best practices and new technologies, or if they would be resistant to the idea of adopting the product e.g. if an area is already used to production of poultry then adoption of flower production may be resisted by the community.

**Income Equality**

Considers the economic factors described above and if it will provide significant income associated with the particular enterprise. Attempts to determine if the economic benefits will flow to low income as opposed to higher income households.

**Black Smallholder Suitability**

Attempts to ascertain if the enterprise be considered suitable for small Black farmers. This tries to identify which commodities would be suitable to Black farmers.

**Crime and Vandalism Resilience**

This sections determines if the commodity, implements, property and all associated infrastructure is vulnerable to theft and vandalism given the local crime levels. Theft and vandalism is an important consideration to determine as many emerging farmers face this challenge daily. Stock theft is an important aspect in the Eastern Cape as well as vandalism of infrastructure.

❖ **Food Security and Sustainability Criteria**

**Contribution to Food Security**

This section of the prioritisation matrix examined the ability of the crop to contribute to food security nationally, provincially and at a district level. It examined the affordability, distribution of the commodity, biomass production, nutrient density, stability throughout the year and minimisation of food losses. Commodities chosen should provide food security for the community.

**Sustainability**

Ascertains if the commodity is likely to be sustainably produced, thereby conserving the ability of the region to produce food over the long term and contributing to other social and economic services provided by the landscape.

## 7.6 Prioritisation matrix results

Figures 7.12 – 7.16 display the outcomes to the Agri-Park prioritisation matrix as described in the above sections. The three top scoring commodities will then be discussed according to the criteria against which they were assessed.

Based on the findings of the prioritisation matrix the top three commodities / products for prioritisation in the Amathole District and inclusion as core focus for the Agri-Park are red meat (Including all sub-classes: beef, lamb, chevon and pork), vegetables (irrigated open-field) and maize. These are discussed in sections 7.5.1 to 7.5.3 below.

**Figure 7.12: Prioritisation matrix – Biophysical criteria**

| A. Biophysical criteria | Beef | Lamb | Vegetables | Chevon | Pork | Maize | Poultry | Citrus | Pineapple |
|---|---|---|---|---|---|---|---|---|---|
| Temperature | 3 | 3 | 2 | 3 | 3 | 2 | 3 | 2 | 2 |
| Water/moisture | 3 | 3 | 2 | 3 | 3 | 2 | 2 | 2 | 2 |
| Land type, capability and soil | 3 | 3 | 2 | 3 | 3 | 2 | 2 | 2 | 2 |
| Weed, pest and disease resilience | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Adaptability to adverse conditions | 2 | 3 | 2 | 3 | 2 | 2 | 2 | 2 | 2 |
| Total | **28** | **29** | **20** | **29** | **28** | **20** | **23** | **20** | **20** |

**Figure 7.13: Prioritisation matrix – Enterprise viability criteria**

| B. Enterprise viability criteria | Beef | Lamb | Vegetables | Chevon | Pork | Maize | Poultry | Citrus | Pineapple |
|---|---|---|---|---|---|---|---|---|---|
| **B.1 Transport, market access and demand** | | | | | | | | | |
| Distance to markets and transport cost | 3 | 3 | 2 | 3 | 3 | 3 | 3 | 2 | 3 |
| Current demand | 3 | 3 | 3 | 1 | 2 | 3 | 3 | 2 | 2 |
| Future market growth potential | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 2 | 2 |
| Market openness | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 2 |
| **B.2 Strategy, payback and profitability** | | | | | | | | | |
| Business strategy and positioning | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| Payback period | 2 | 3 | 3 | 2 | 2 | 2 | 2 | 1 | 1 |
| Profitability | 3 | 3 | 2 | 2 | 3 | 2 | 1 | 2 | 1 |
| **B.3 Human, physical and financial capital** | | | | | | | | | |
| Familiarity and local knowledge/skills | 3 | 2 | 2 | 2 | 1 | 2 | 1 | 2 | 2 |
| Labour cost and productivity | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Implements and infrastructure | 3 | 2 | 2 | 3 | 2 | 3 | 1 | 1 | 1 |
| Ease to finance | 3 | 3 | 3 | 2 | 2 | 3 | 2 | 2 | 1 |
| Total | 61 | 59 | 53 | 48 | 51 | 56 | 45 | 44 | 42 |

**Figure 7.14: Prioritisation matrix – Economic development criteria**

| C. Economic development criteria | Beef | Lamb | Vegetables | Chevon | Pork | Maize | Poultry | Citrus | Pineapple |
|---|---|---|---|---|---|---|---|---|---|
| **C.1 Linkages and processing opportunities** | | | | | | | | | |
| Forward and backward economic linkages | 2 | 2 | 3 | 2 | 2 | 3 | 2 | 2 | 1 |
| Processing opportunities at district level | 2 | 2 | 3 | 2 | 2 | 2 | 2 | 3 | 1 |
| **C.2 Job creation** | | | | | | | | | |
| Direct on-farm job creation | 1 | 2 | 2 | 1 | 2 | 1 | 2 | 3 | 2 |
| Indirect and induced job creation | 3 | 3 | 3 | 2 | 2 | 2 | 3 | 3 | 2 |
| Job quality/decency | 1 | 2 | 2 | 1 | 2 | 1 | 2 | 1 | 1 |
| **C.3 Local development** | | | | | | | | | |
| Local opportunities and agglomeration | 3 | 3 | 3 | 3 | 2 | 2 | 2 | 2 | 2 |
| Agro-intensification and local GDP growth | 1 | 2 | 3 | 1 | 3 | 2 | 3 | 2 | 2 |
| **C.4 Global competitiveness and trade** | | | | | | | | | |
| Global competitiveness | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 2 | 1 |
| Export potential | 1 | 2 | 1 | 2 | 1 | 1 | 1 | 2 | 1 |
| Import substitution potential | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 2 |
| Total | 37 | 42 | 48 | 38 | 37 | 35 | 38 | 42 | 28 |

**Figure 7.15: Prioritisation matrix – Political and social criteria**

| D. Political and social criteria | Beef | Lamb | Vegetables | Chevon | Pork | Maize | Poultry | Citrus | Pineapple |
|---|---|---|---|---|---|---|---|---|---|
| **D.1 Political and institutional issues** | | | | | | | | | |
| Government priority including APAP | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 2 |
| Shortlisted by the district | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 2 |
| Existing successful or planned projects | 3 | 2 | 3 | 2 | 2 | 3 | 2 | 2 | 2 |
| State/communal land suitability | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 2 |
| **D.2 Social issues** | | | | | | | | | |
| Acceptability (Local "buy-in") | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Income equality | 3 | 2 | 3 | 3 | 2 | 2 | 2 | 1 | 1 |
| Black smallholder suitability | 3 | 3 | 3 | 3 | 2 | 3 | 2 | 1 | 2 |
| Crime and vandalism resilience | 2 | 2 | 2 | 2 | 1 | 2 | 1 | 2 | 2 |
| **D.3 Food security and sustainability** | | | | | | | | | |
| Contribution to food security | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 2 |
| Sustainability | 2 | 2 | 3 | 2 | 3 | 2 | 3 | 3 | 3 |
| Total | 53 | 49 | 54 | 52 | 46 | 50 | 46 | 33 | 36 |

**Figure 7.16: Prioritisation matrix – Summary table**

| Agricultural products / commodities | Beef | Lamb | Vegetables | Chevon | Pork | Maize | Poultry | Citrus | Pineapple |
|---|---|---|---|---|---|---|---|---|---|
| **A. Biophysical criteria** | 28 | 29 | 20 | 29 | 28 | 20 | 23 | 20 | 20 |
| **B. Enterprise viability criteria** | 61 | 59 | 53 | 48 | 51 | 56 | 45 | 44 | 42 |
| **C. Economic development criteria** | 37 | 42 | 48 | 38 | 37 | 35 | 38 | 42 | 28 |
| **D. Political and social criteria** | 53 | 49 | 54 | 52 | 46 | 50 | 46 | 33 | 36 |
| **Total** | 179 | 179 | 175 | 167 | 162 | 161 | 152 | 139 | 126 |

### 7.6.1 Red Meat

Red Meat and all four major sub-classes – beef (cattle), lamb (sheep), chevon (goats), and pork (pigs) – have emerged as the high scoring commodities / products in the prioritisation matrix. Due to the similarities of these value chains they have been grouped and are presented as the generalised red meat value chain.

All livestock classes showcase excellent to the local environment. Most areas of the Amathole District are suitable to the farming of livestock with lamb, beef and goats standing apart from pork and the other reviewed commodities / products. Of particular interest is lamb and goats who scored the highest of all assessed commodities in the adaptability to adverse conditions criteria.

Red Meat products scored highly in 'enterprise viability' with high scores in such areas as transport, market access, market demand, business strategy & positioning and ease to finance. The exception in this matrix section is the current market demand levels for pork in the Amathole District. Pork is a less fashionable meat choice at present in many parts of the country, however, it has been increasing in popularity in much of South Africa in recent years and should see increased demand in the Amathole District. As such the future market growth potential of pork is on par with that of the other three red meat products.

On average, for every R 1 million of production in the red meat industry, 2.07 jobs are created directly on-farm, with a further 1.61 jobs created through up- & downstream linkages and 1.88 jobs in the wider economy.

However, due to the nature of the cattle and goat farming industry, they perform less well in terms of direct on-farm job creation, job quality / decency and local GDP-growth relative to lamb and pork. The increased number and variety of on farm tasks required to manage sheep and pigs lead to a variety of opportunities of job growth and upskilling of employees.

All red meat classes score very well in the Political and Social Criteria section of the prioritisation matrix. All of the four agricultural products contribute greatly to food security.

Pork farming, due its requirements for significant levels of on farm infrastructure, is susceptible to crime and vandalism, particularly for small farming projects where local issues can affect community sentiment to farming projects. Open field livestock farming is open to the risk of stock theft but is otherwise resilient to major crime derailing farming operations.

All red meat classes barring pork (due its infrastructure requirements) are highly suitable to emerging farmers. Beef in particular scores highly due to the familiarity of local communities with cattle farming. While most cattle

farming in the district is at a subsistence level, this familiarity with the animal is likely to increase the speed and degree of skills acquisition emanating from any skills development / training programmes.

### 7.6.2 Vegetables

While vegetable farming is scored poorly relative to the red meat products, it is farmed in a different manner and at a different scale. Furthermore, the biophysical criteria score the commodities at a broad district level. Hence while there may not be as much land perfectly suited to vegetable farming – as there is with beef, lamb and goats – there are a large number of areas where vegetable farming may be successfully implemented.

The vegetable product class is incredibly broad and includes a large variety of product sub-classes which vary greatly in their requirements for water, soil condition and infrastructure etc. While this may limit the potential for specific crops in some areas it does mean that there is usually a large selection of crops that are adequately suited for production in an area.

Treating vegetables as a broad product class is beneficial for Agri-Park planning in rural areas as it allows for flexibility to changing market conditions, local skill levels and distances to markets. Thus instead of focussing intensively on the production of one vegetable product – i.e. Tomatoes – across the district the Agri-Park may identify areas for production of a variety of crops, or assist emerging farmers in growing the crop of their choice. While this may limit the potential of the Agri-Park to achieve maximum economic potential for one product class, for instance mass roll-out of commercial scale tomato farming, it will increase the potential of local communities, emerging farmers and local commercial farmers to meet the demand of the local market, better aid food security and ensure the long term sustainability of assisted projects.

Thus vegetable farming in the prioritisation matrix is found to have slightly reduced profitability when compared to intensive livestock production and the farming of one specific vegetable crop but it scores highly in terms of business strategy and market positioning as well as the potential payback for flexible vegetable farming projects.

It is relatively common for households in the Amathole District to undertake vegetable farming on a subsistence level. While this has positive implications for the roll-out of vegetable farming projects and programmes the level to which this subsistence agriculture is conducted is very low and significant levels of skills development and training will need to be conducted for community level or emerging farming groups to approach commercial grades of crop quality and production per hectare.

The flexible approach to vegetable farming – supporting numerous crops instead of an intensive focus on one crop type – has further benefits in such rural and underdeveloped area as the Amathole District. It allows smaller farmers to access funding and promotes the development of numerous small to medium farming concerns over large single crop focussed concerns. This has positive implications for employment as well as job quality / decency. On average, for every R 1 million of production in the red meat industry, 2.49 jobs are created directly on-farm, with a further 1.37 jobs created through up- & downstream linkages and 1.89 jobs in the wider economy.

Vegetable farming scores the highest of those commodities / products assessed in the political and social criteria section. It scores especially high in such criteria as contribution to food security, sustainability, black smallholder suitability and state/communal land suitability.

### 7.6.3 Maize

Maize is the agricultural commodity / product with the third highest score according to the prioritisation matrix. In terms of biophysical criteria maize is better suited for agricultural production in the Amathole District than vegetables due to the extremely long distances over which maize can be transported compared to vegetables which, depending on crop, can only travel a short distance before significant losses in quality occur.

Although maize can travel great distances without losses in quality it is common for maize in regions outside of the major grain belt to focus primarily on the local market. Here maize can, depending on cultivar grown and quality of production, can either be utilised for human consumption or as agricultural feed. It thus plays an important role in the livestock sector.

While intensive commercial scale maize farming requires significant infrastructure investments to maintain maximum economic performance maize farming can be undertaken with more modest infrastructure on a small to medium scale if focussing on the local household / livestock feed markets. The work is however relatively low-skilled and large swathes of land can be farmed with a very low labour count. On average, for every R 1 million of production in the red meat industry, 3.49 jobs are created directly on-farm, with a further 1.34 jobs created through up- & downstream linkages and 1.91 jobs in the wider economy.

Maize scores well in the political and social criteria section. Numerous maize projects have already been established throughout the District to various degrees of success. Maize faring concerns are relatively easy to finance and well suited to small and emerging local farmers. It also contributes greatly to food security as it not only contributes to food security directly but by supporting the red meat value chain.

### 7.7 Summary

Based on the above discussion on the outcomes of the prioritisation matrix it is clear that red meat, Vegetables and Maize are the three agricultural commodities / products that should form the key focus of the Butterworth Agri-Park. Chapters 8 - 10 now follow with in-depth discussions of these three commodities / products.

# Red Meat

**Chapter 8**

# Chapter 8 Red Meat

The prioritisation matrix has identified that the red meat product classes have high potential for growth and development and to realise the goals of the Agri-Park concept. Beef and sheep farming were to the top scoring commodities, but goat (chevon) and pork also scored highly. These four commodities are discussed in this section, which provides a thorough market assessment of the four commodities, a value-chain analysis identifying opportunities throughout the value chain and a detailed SWOT analysis of each red meat sub-class.

This chapter continues under the following headings:

- Market assessment
- Value-chain analysis
- SWOT Analysis

## 8.1 Market analysis

### 8.1.1 Global Markets

Global red meat production was 191 million tons (including beef, pork, mutton and chevon) in 2013. With red meat production per region as follows:

- Asia 87 million tons (45.5%).
- North America 25 million tons (13.3%).
- Central America 4 million tons (2.3%).
- South America 21 million tons (11.2%).
- Europe 39 million tons (20.2%).
- Africa 10 million tons (5.2%).
- Oceania 5 million tons (2.4%).

Figure 9.1 provides global livestock production figures by region and heads of stock for 2013. African livestock producers are a significant contributor to global mutton and chevon production. The main global regional producers of beef are South America and Asia. Whilst the main pork producer globally is Asia.

South Africa leads Southern Africa production, producing 1.2 million tons of red meat, or 12.5% of Africa's total.

Other notable producers of red meat across the continent are Ethiopia (5.0%), Egypt (6.0%), and Nigeria (11.3%), with these three countries contributing 31.5% of Africa's total population. In Figure 9.2 the production of red meat in South Africa is compared to neighbouring trading partners in SADC, namely Botswana, Lesotho, Mozambique, Namibia, Swaziland, Zambia and Zimbabwe.

South Africa is a major red meat producer within SADC, dwarfing its neighbours in terms of beef, mutton, and total production. Mozambique produces a relatively large amount of pork, almost 10% of the African total. Southern African chevon production is relatively small compared to its production of other red meat products. The African continent is the 2nd largest producer of chevon globally, behind Asia, and chevon produced within South Africa is primarily for the export market.

**Figure 8.1: Global Red Meat Production (2013)**

| | Beef | | Pork | | Mutton | | Chevon | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|
| | (Tons) | % | (Tons) | % | (Tons) | % | (Tons) | % | (Tons) | % |
| Africa | 5 694 271 | 8,9% | 1 304 128 | 1,2% | 1 687 934 | 19,7% | 1 301 339 | 24,2% | 9 987 672 | 5,2% |
| Asia | 14 373 105 | 22,5% | 64 448 557 | 57,0% | 4 254 075 | 49,5% | 3 805 643 | 70,8% | 86 881 380 | 45,5% |
| Europe | 10 140 072 | 15,8% | 27 121 641 | 24,0% | 1 130 148 | 13,2% | 112 260 | 2,1% | 38 504 121 | 20,2% |
| North America | 12 754 389 | 19,9% | 12 486 933 | 11,0% | 90 280 | 1,1% | 2 | 0,0% | 25 331 604 | 13,3% |
| Central America | 2 502 264 | 3,9% | 1 804 085 | 1,6% | 74 155 | 0,9% | 52 342 | 1,0% | 4 432 846 | 2,3% |
| South America | 15 617 999 | 24,4% | 5 371 205 | 4,8% | 242 076 | 2,8% | 73 491 | 1,4% | 21 304 771 | 11,2% |
| Oceania | 2 901 429 | 4,5% | 498 264 | 0,4% | 1 110 589 | 12,9% | 27 329 | 0,5% | 4 537 611 | 2,4% |
| World | 63 983 529 | 100,0% | 113 034 814 | 100,0% | 8 589 257 | 100,0% | 5 372 407 | 100,0% | 190 980 007 | 100,0% |

*Source: FOASTAT, 2015*

**Figure 8.2: Global Livestock Populations (2013)**

| | Cattle | | Pigs | | Sheep | | Goat | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Heads of Cattle | % | Heads of Pigs | % | Heads of Sheep | % | Heads of Goat | % | Heads of Livestock | % |
| Africa | 304 746 910 | 20,8% | 35 732 880 | 3,7% | 328 450 262 | 28,2% | 347 957 726 | 35,7% | 1 016 887 778 | 22,2% |
| Asia | 494 982 171 | 33,7% | 589 902 648 | 60,4% | 511 796 697 | 44,0% | 571 051 689 | 58,5% | 2 167 733 205 | 47,3% |
| Europe | 122 048 722 | 8,3% | 184 006 466 | 18,8% | 129 945 891 | 11,2% | 16 527 388 | 1,7% | 452 528 467 | 9,9% |
| North America | 101 515 311 | 6,9% | 77 654 800 | 7,9% | 6 246 750 | 0,5% | 2 841 350 | 0,3% | 188 258 211 | 4,1% |
| Central America | 55 632 189 | 3,8% | 24 735 788 | 2,5% | 11 744 464 | 1,0% | 12 367 813 | 1,3% | 104 480 254 | 2,3% |
| South America | 348 401 875 | 23,7% | 60 060 193 | 6,1% | 68 340 324 | 5,9% | 21 096 760 | 2,2% | 497 899 152 | 10,9% |
| Oceania | 40 221 546 | 2,7% | 5 181 471 | 0,5% | 106 351 147 | 9,1% | 3 960 537 | 0,4% | 155 714 701 | 3,4% |
| World | 1 467 548 724 | 100.0% | 977 274 246 | 100.0% | 1 162 875 535 | 100.0% | 975 803 263 | 100.0% | 4 583 501 768 | 100,0% |

*Source: FOASTAT, 2015*

**Figure 8.3: African Red Meat Production (2013)**

| | Beef | | Pork | | Mutton | | Chevon | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|
| | (Tons) | % of Total | (Tons) | % of Total | (Tons) | % of Total | (Tons) | % of Total | (Tons) | % of Total |
| South Africa | 851 000 | 14,9% | 216 000 | 16,6% | 143 750 | 8,5% | 35 450 | 2,7% | 1 246 200 | 12,5% |
| Botswana | 47 000 | 0,8% | 500 | 0,0% | 1 876 | 0,1% | 5 760 | 0,4% | 55 136 | 0,6% |
| Lesotho | 13 500 | 0,2% | 3 700 | 0,3% | 4 250 | 0,3% | 2 240 | 0,2% | 23 690 | 0,2% |
| Mozambique | 25 500 | 0,4% | 129 600 | 9,9% | 1 008 | 0,1% | 22 200 | 1,7% | 178 308 | 1,8% |
| Namibia | 35 800 | 0,6% | 4 675 | 0,4% | 13 200 | 0,8% | 3 840 | 0,3% | 57 515 | 0,6% |
| Swaziland | 17 100 | 0,3% | 1 310 | 0,1% | 526 | 0,0% | 1 782 | 0,1% | 20 718 | 0,2% |
| Zambia | 197 827 | 3,5% | 35 244 | 2,7% | 882 | 0,1% | 9 000 | 0,7% | 242 953 | 2,4% |
| Zimbabwe | 103 750 | 1,8% | 31 900 | 2,4% | 448 | 0,0% | 13 200 | 1,0% | 149 298 | 1,5% |
| Africa | 5 694 271 | 100,0% | 1 304 128 | 100,0% | 1 687 934 | 100,0% | 1 301 339 | 100,0% | 9 987 672 | 100,0% |

*Source: FOASTAT, 2015*

**Figure 8.4: African Livestock Populations (2013)**

| | Cattle | | Pigs | | Sheep | | Goat | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Heads of Cattle | % of Total | Heads of Pigs | % of Total | Heads of Sheep | % of Total | Heads of Goat | % of Total | Total | % of Total |
| South Africa | 14 000 000 | 4,6% | 1 600 000 | 4,5% | 25 000 000 | 7,6% | 6 200 000 | 1,8% | 46 800 000 | 4,6% |
| Botswana | 2 500 000 | 0,8% | 13 500 | 0,0% | 290 000 | 0,1% | 1 700 000 | 0,5% | 4 503 500 | 0,4% |
| Lesotho | 665 000 | 0,2% | 81 000 | 0,2% | 1 230 000 | 0,4% | 850 000 | 0,2% | 2 826 000 | 0,3% |
| Mozambique | 1 690 000 | 0,6% | 1 800 000 | 5,0% | 250 000 | 0,1% | 4 350 000 | 1,3% | 8 090 000 | 0,8% |
| Namibia | 2 370 000 | 0,8% | 72 500 | 0,2% | 2 930 000 | 0,9% | 2 235 000 | 0,6% | 7 607 500 | 0,7% |
| Swaziland | 635 000 | 0,2% | 35 000 | 0,1% | 36 000 | 0,0% | 270 000 | 0,1% | 976 000 | 0,1% |
| Zambia | 4 026 658 | 1,3% | 1 098 951 | 3,1% | 240 000 | 0,1% | 2 500 000 | 0,7% | 7 865 609 | 0,8% |
| Zimbabwe | 5 150 000 | 1,7% | 650 000 | 1,8% | 375 000 | 0,1% | 2 750 000 | 0,8% | 8 925 000 | 0,9% |
| Africa | 304 746 910 | 100.0% | 35 732 880 | 100.0% | 328 450 262 | 100.0% | 347 957 726 | 100.0% | 1 016 887 778 | 100,0% |

*Source: FOASTAT, 2015.*

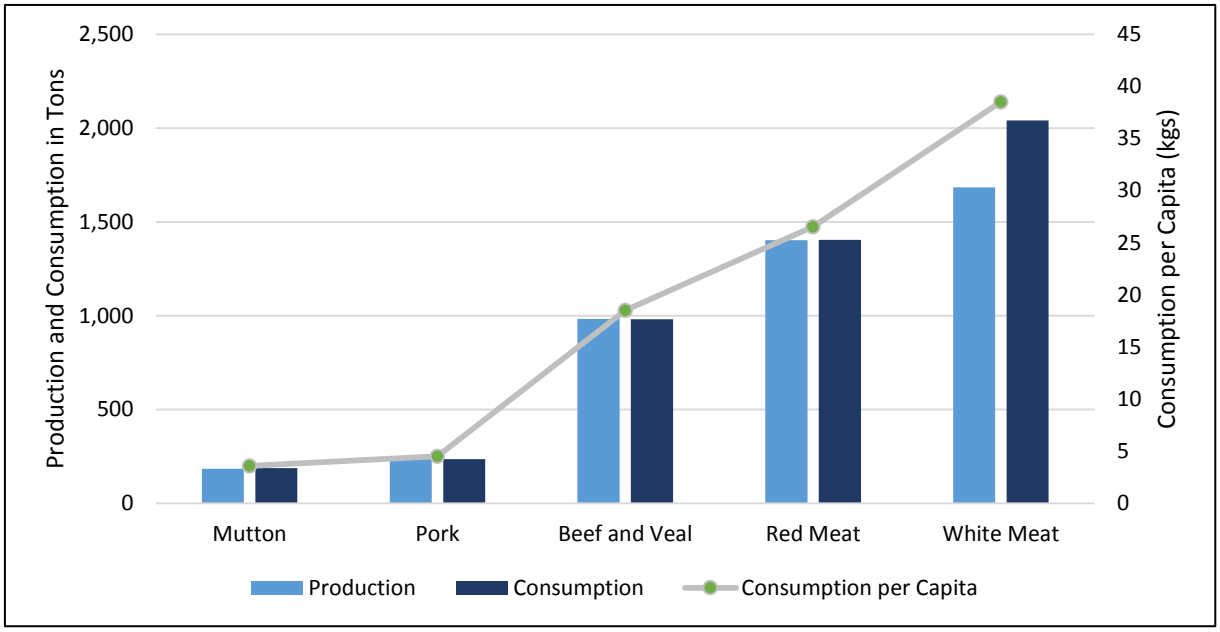
### 8.1.2 National Market

The South African red meat industry is well established and remains one of the most important agricultural sub-sectors in the country. It contributed approximately 14.0% to the gross value of agricultural production in the SA during 2013/14. It is estimated that the total number of cattle, pigs and sheep slaughtered increased by 9.5%, 3.1% and 11.2% respectively from 2012/13 to 2013/14.

The cattle and calves slaughtered market earned R 25.449 billion between April 2014 and March 2015, with the sheep slaughtered market earning R6.008 billion over the same period. In comparison, poultry meat earned R35.573 billion, and the animal product market as a whole earned R105.420 billion.

South African red meat production is largely in line with red meat consumption, with the short fall imported into the country. This is presented graphically in Figure 8.5 below. In recent years, the quantity of red meat imported for consumption has been on the decline, especially in the 2013/14. Mutton imports have declined over the 10 year period from 34 800 tons to a mere 7 100 tons, while beef imports have likewise dropped considerably from 56 000 tons to 20 000 tons. Pork import figures were unavailable, however South Africa produced 300 tons more pork than was consumed in 2013/2014. Imports of red meat decreased from 43 120 tons in 2012/13 to 23 010 tons in 2013/14, a decrease of 46.6%.

**Figure 8.5: South African Red Meat Production, Consumption and Consumption/Capita, 2013/14**



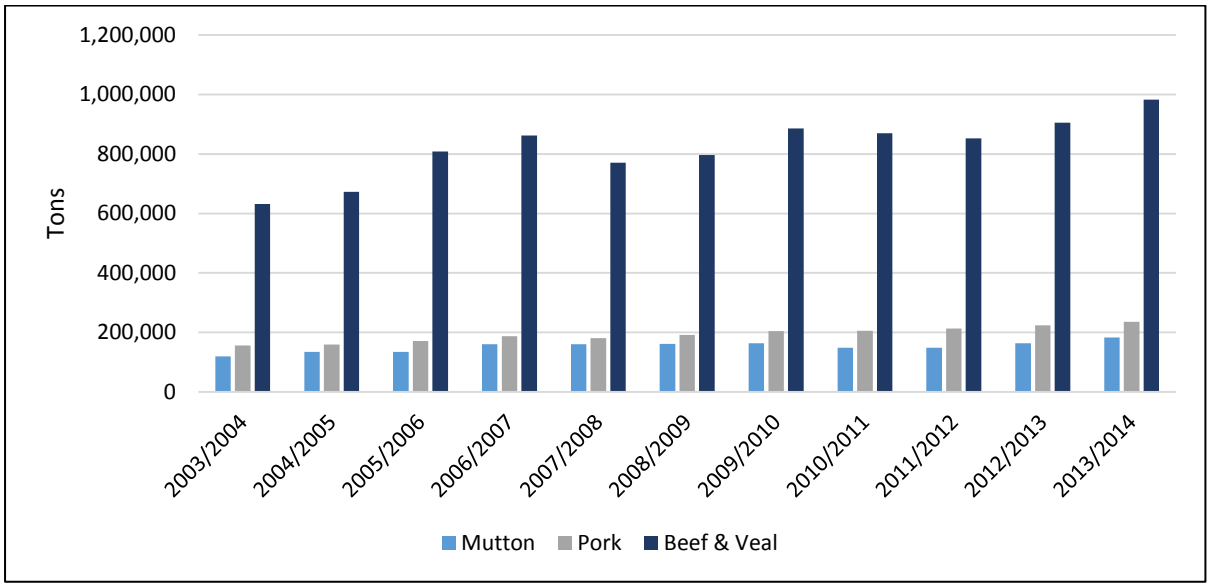

*Source: DAFF, 2015A*

**Production**

Figure 8.6 illustrates the growth in National production of beef, pork and mutton[1] since the 2003/04 season. Red meat production has increased steadily year on year over the 2003/04-2013/14 period, with mutton production increasing by 52.5%, pork production increasing by 50.7%, and beef & veal production increasing by 55.5%.

[1] Chevon, while produced within the country, is primarily for export and is not included in the statistics for consumption and production. Goat populations peaked in 1987, with 2 989 000 goats in the country, and has since been on a general decline, with average annual growth of goat herds between 2005 and 2014 as low as -0.7%. Goat herds have dropped below 2 million animals in 2014, to 1.987 million, the lowest value in the provided record (1980 to 2014).

**Figure 8.6 South African Red Meat Production**



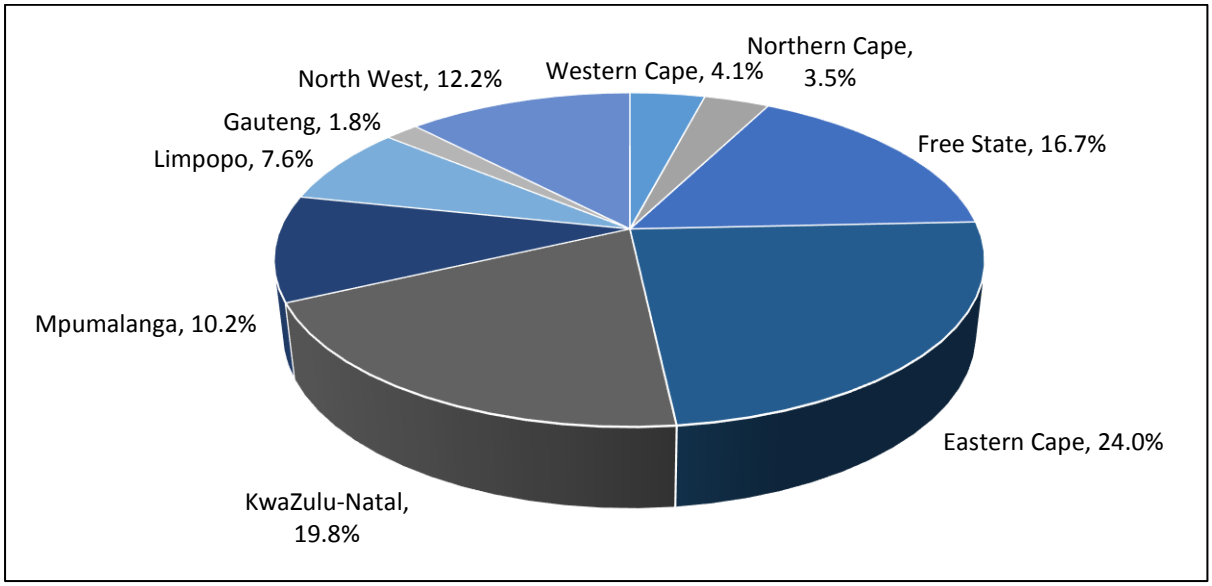

*Source: DAFF, 2015A*

❖ **Beef**

Cattle populations are found throughout the country, but predominantly within the Eastern Cape (24.0%), KwaZulu-Natal (19.8%), Free State (16.7%) and North West (12.2%) provinces. Herd sizes vary according to type of cattle. Beef cattle herds range from fairly small herds of less than 20 heads of cattle, to large farms and feedlots environments with well over 1 head of cattle. The production of weaners for the feedlot industry is the most frequent form of cattle farming in South Africa, such that feedlots account for approximately 75% of all beef produced in the country.

The total number of cattle in South Africa at the end of August 2014 is estimated at 13.81 million, comprising various international dairy and beef cattle breeds as well as indigenous breeds such as the Afrikaner and the Nguni. Beef cattle contribute approximately 80% of the total number of cattle in the country, translating into an estimated 11.04 million animals, while dairy cattle make up the remaining 20%.

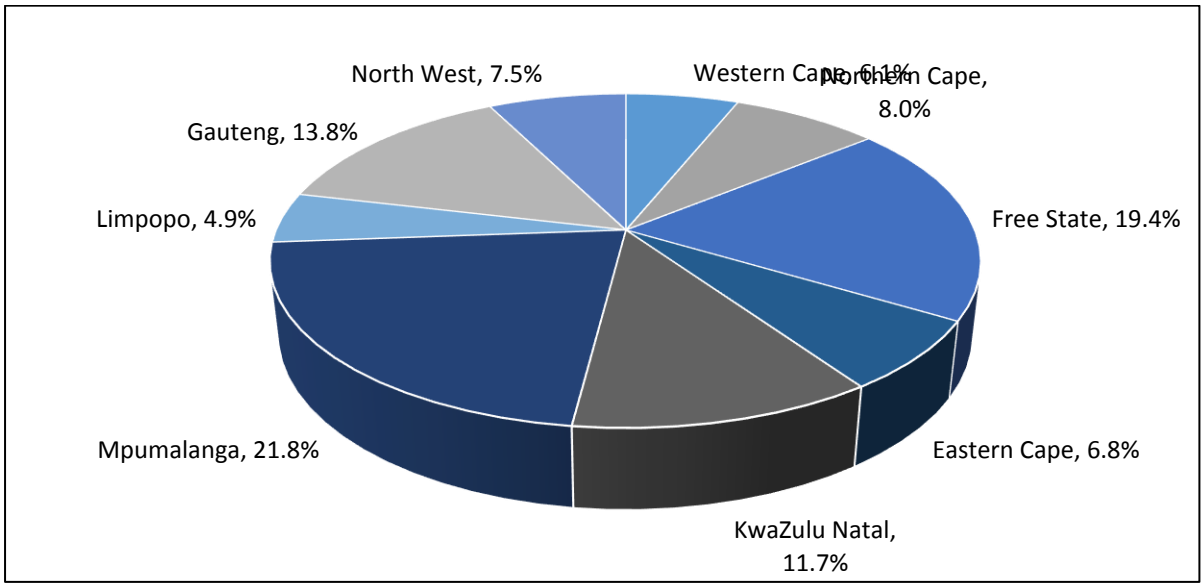
**Figure 8.7 Distribution of cattle by province**




*Source: DAFF, 2015*

In terms of production, 2.707 million cattle were slaughtered in the 2014 season, with the 1.116 million of these slaughtered in Mpumalanga and Free State. Cattle slaughtering statistics, when compared to those of sheep and pigs indicate that the slaughtering of cattle is shared somewhat evenly, especially when compared to sheep, between provinces. The provincial breakdown can be seen in Figure 8.8 below.

**Figure 8.8: Slaughtering of Cattle by province**

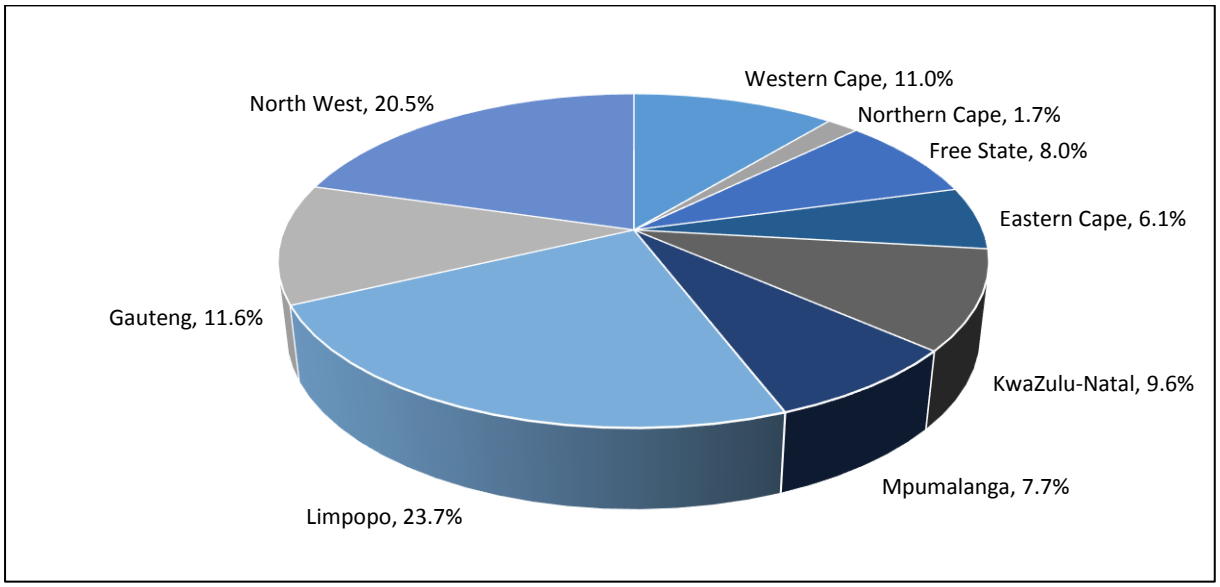



*Source: Red Meat Levy Admin, 2015.*

❖ **Pork**

The provinces with the largest pig populations are Limpopo (23.7%), North West (20.5%), Gauteng (11.6%) and Western Cape (11.0%) provinces. There are approximately 400 commercial pork producers and 19 stud breeders in South Africa, spread across the country, but predominantly located in the Limpopo, North West, Gauteng and Western Cape provinces. It is estimated that pig numbers have decreased by 1.0%, to 1.56 million in August 2014, as of the same period the previous year.

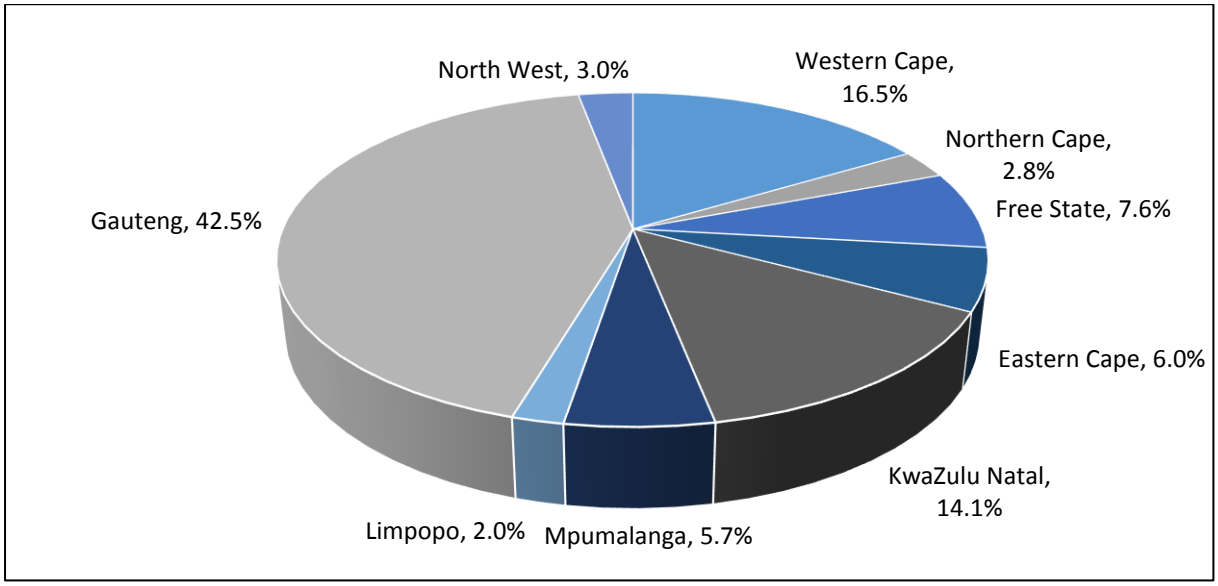
**Figure 8.9: Distribution of pigs by province**




*Source: DAFF, 2015B*

In terms of production, 2.724 million pigs were slaughtered over in 2014, with 1.157 million or 42.5% of the total slaughtered in Gauteng. The provinces which followed in terms of volume of pigs slaughtered was the Western Cape and KwaZulu-Natal. The provincial breakdown can be seen in Figure 8.10 below.

**Figure 8.10: Slaughtering of pigs by province**

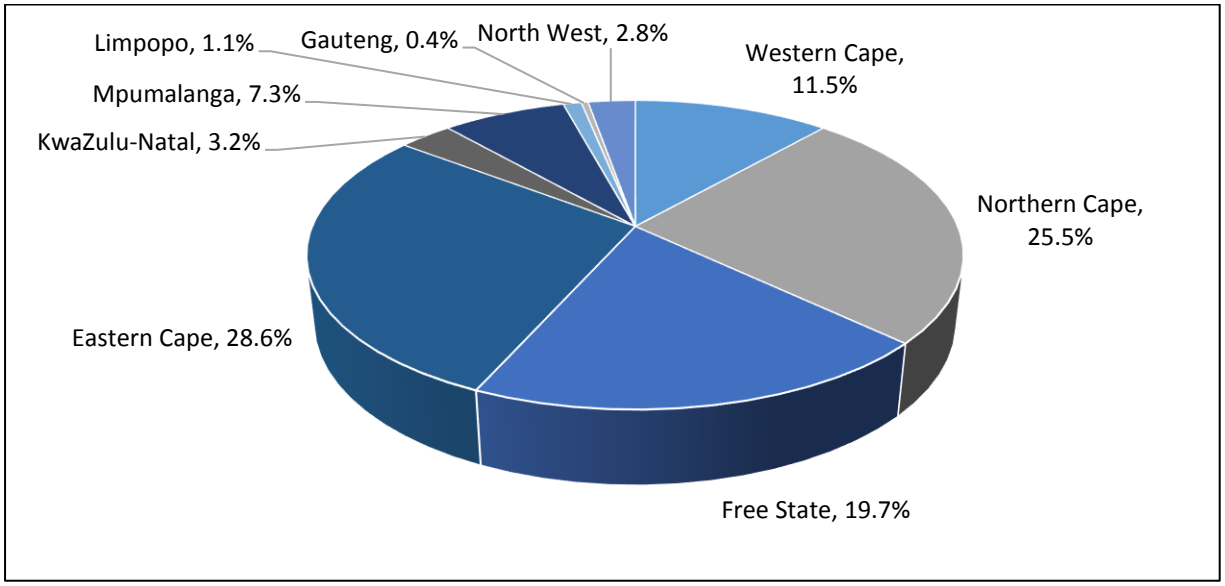



*Source: Red Meat Levy Admin, 2015.*

❖ **Sheep**

Sheep farms are found in all provinces, however, the majority are concentrated in the more arid regions of the country. The total number of sheep in South Africa at the end of August 2014 was estimated at 24.38 million, 0.6% lower than the previous year. The provinces with the largest sheep populations are the Eastern Cape (28.6%), Northern Cape (25.5%), Free State (19.7%) and the Western Cape (11.5%).

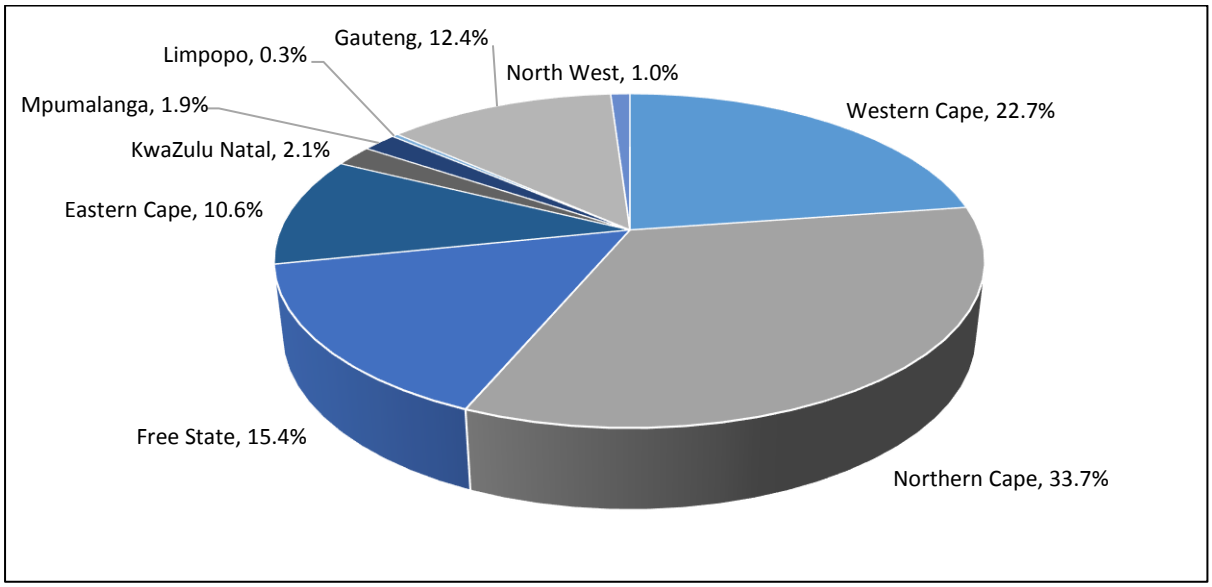
**Figure 8.11: Distribution of Sheep by Province**




*Source: DAFF, 2015B*

In terms of production, 5.492 million sheep were slaughtered in 2014, with main provinces in which this was undertaken the Northern Cape, the Western Cape and the Free State. The provincial breakdown can be seen below.

**Figure 8.12: Slaughtering of sheep by province**



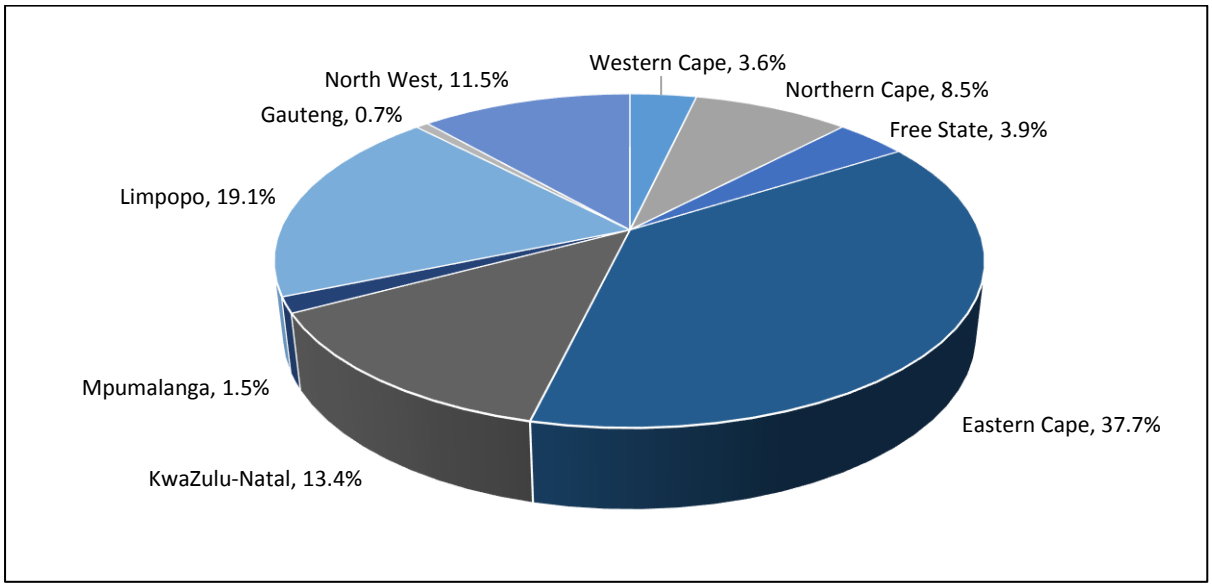

*Source: Red Meat Levy Admin, 2015.*

Flock sizes vary between less than 50 and 1 800 animals, with the larger herds found in The Eastern, Western and Northern Cape provinces.

❖ **Goats**

Goat populations are found mainly in the Eastern Cape (37.7%) followed by Limpopo (19.1%), KwaZulu-Natal (13.4%) and North West (11.5%) provinces. Estimates indicate that there was a decrease of 0.9% in the number of goats between August 2013 and August 2014, to 5.976 million in August 2014.

**Figure 8.13: Distribution of goats by province**




*Source: DAFF, 2015B*

Flocks of goats intended for meat production are usually smaller than sheep flocks, averaging approximately 300 goats per farm. Angora goats are kept primarily for mohair production, while Boer goats are for meat production, and both are included in the above statistics. Some producers have adopted a market differentiation strategy by producing goat's milk and these producers are increasing in numbers. Chevon is not consumed in significant

quantities locally, however there is a large export market contained within the African continent, that South African goat producers cater towards.

### 8.1.3 Local consumption

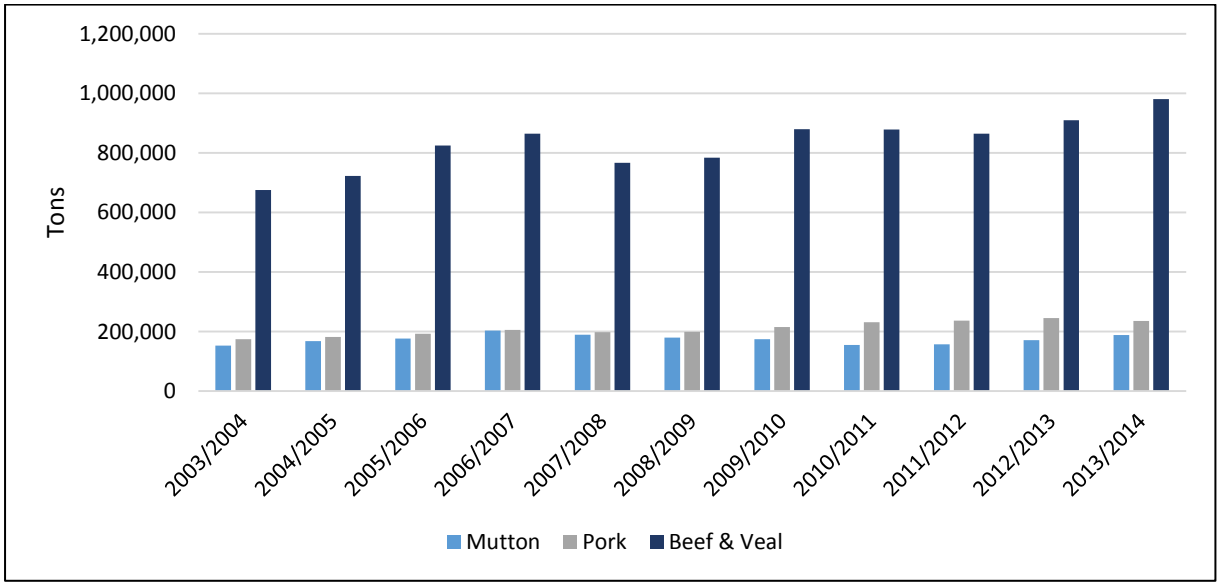
The industry is experiencing pressure from various sources, most notably increased competition from overseas producers and changes in consumer preferences towards poultry and other substitute goods. This has resulted in red meat consumed per capita remaining relatively stagnant over the last few years, fluctuating between 24kg and 26kg per capita. This can be linked to the declining per capita disposable income, which encourages the substitution of red meat for other products, such as poultry.

Although per capita consumption is stagnant, total consumption in tons has increased over the 2003/04-2013/14 period. In 2014 national consumption of red meat totalled 1 405 000 tons, including 188 000 tons of mutton, 236 000 tons of pork and 981 000 tons of beef & veal. The consumption of white meat is 45% higher than that of red meat, with 2 040 000 tons consumed in South Africa in 2014.

Figure 8.13 provides red meat consumption over a ten year period. Mutton consumption was higher than production by some 32 700 tons in 2003/04, with consumption increasing to 188 000 tons in 2013/14, with a deficit of only 4 600 tons. Mutton consumption grew 9.9% between 2012/13 and 2013/14, whilst production increased by 11.6% in the same period.

Pork production increased by 5.4% over the 2012/13 to 2013/14 period, whilst consumption decreased by 3.7%. Beef & veal production increased by 8.6% whilst consumption grew 7.6% in the same period. Since 2003/04 consumption has grown on all products with mutton, pork, beef & veal growing by 22.9%, 35.6% and 45.3% respectively.

**Figure 8.13: South African Red Meat Consumption**




*Source: DAFF, 2015A*

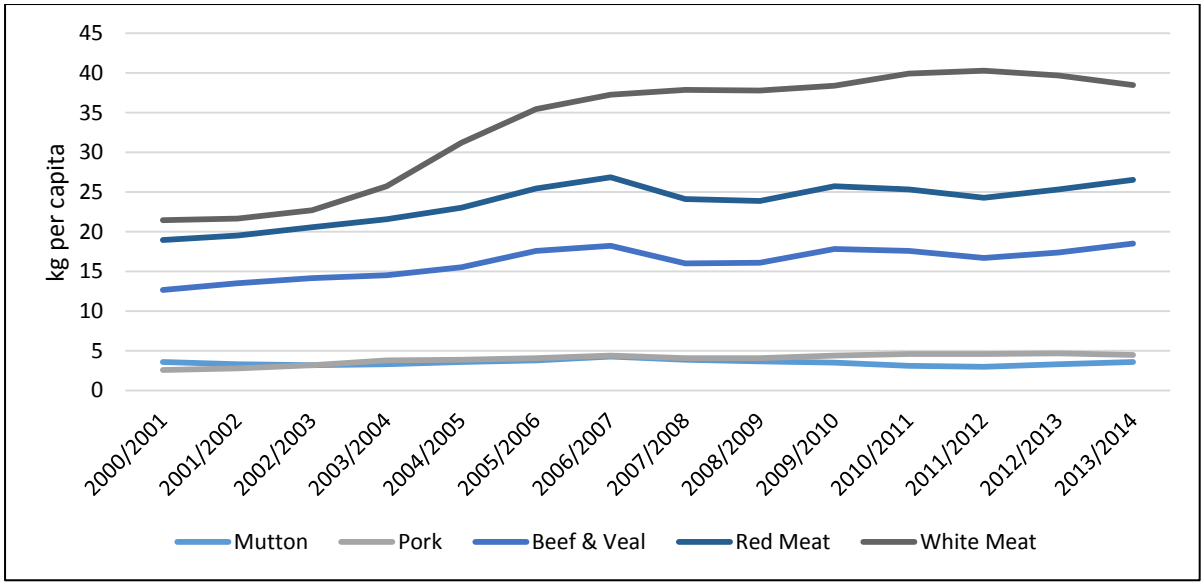
South African per capita consumption of meat products shows consumption relative to the population size, as indicated in Figure 9.14 below. The changes in the red meat per capita consumption were largely attributed to changes in consumption of beef & veal, which increased by 45.9% since 2000. In comparison white meat consumption per capita increased by 79.2% over the same period. Red meat consumption per capita can be seen to mirror the beef graph line very closely, also increasing by 39.9% over the 2000/01 – 2013/14 period. Red meat consumption per capita peaked at 26.87kg per capita in 2006/2007, higher than the current consumption per capita in 2014 at 26.53kg per capita.

Mutton consumption per capita has remained fairly stable, with 3.6kg per capita consumed in both 2000/2001 and 2013/2014, a zero percentage change. Pork consumption per capita increased by 73.1%, from 2.6kg to 4.5kg over the 2000/01 – 2013/14 period.

In 2014 consumption per capita grew for that year by 6.4% for beef & veal, 9.1% for mutton and -4.3% for pork. Red meat consumption per capita in total grew by 4.7% in 2014, in contrast to white meat, which dropped by 3.0%.

White meat consumption per capita has increased sharply since 2004/05 as can be seen when compared to the earlier years. Per capita consumption of white meat started to deviate significantly from the red meat consumption trends during that year and this trend has continued since that point. Indicating the increased competition Red Meat has received from substitute products.

**Figure 8.14: South African Meat Consumption per Capita**




*Source: DAFF, 2015A*

### 8.1.4 Local market developments

The most significant development in the red meat industry has been vertical integration, occurring through feedlots entering the red meat market; the marketing regime; and the major expansion of the abattoir industry.

Vertical integration has characterised the industry over recent years, mainly through larger feedlots establishing their own abattoirs. Furthermore, some feedlots have included further integration down the value chain and sell directly to the customer through their own retail outlets, for example Eskort.

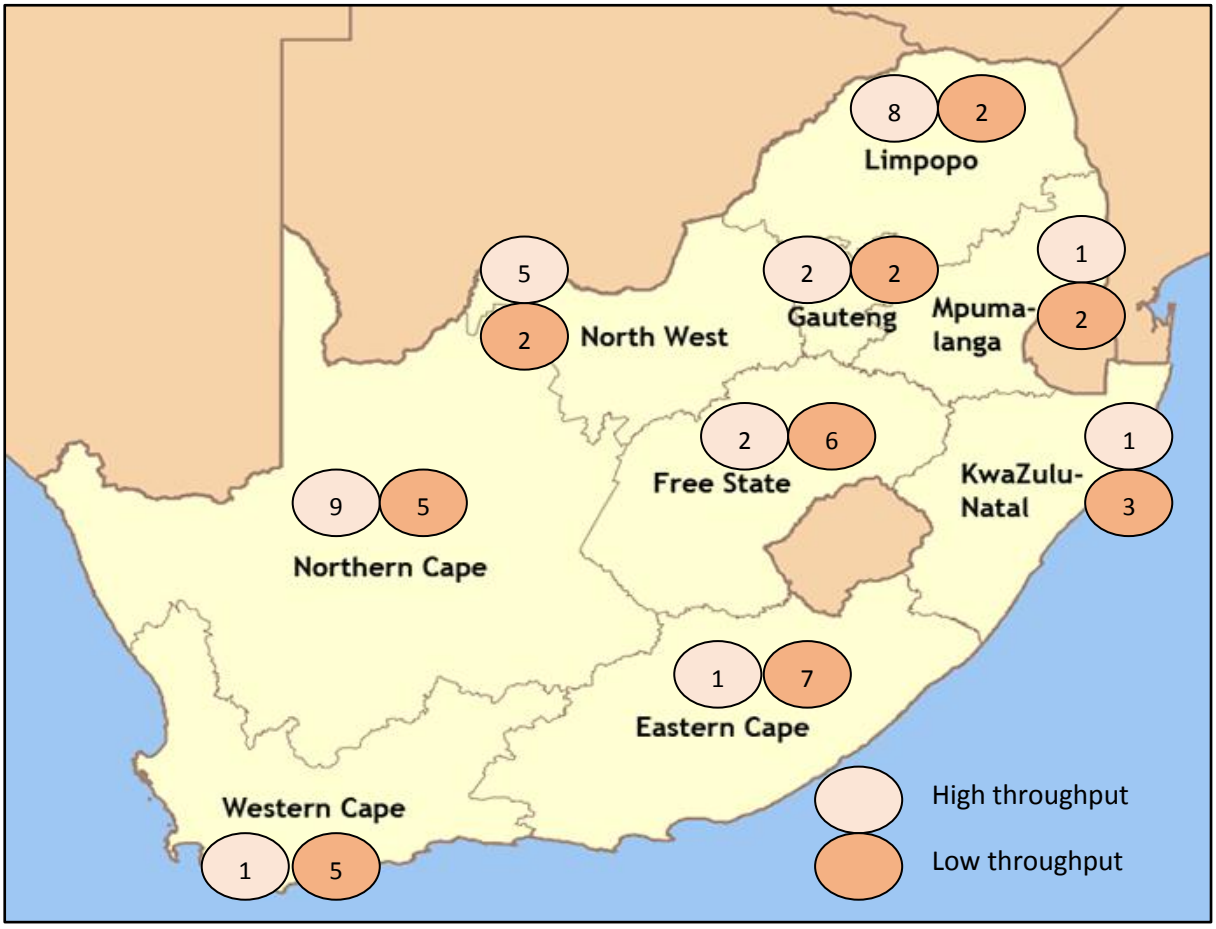
The previous market regime only allowed meat wholesalers to purchase carcasses on a wholesale system. Now, wholesalers can source live animals (excluding weaners) directly from farmers and feedlots on a willing buyer/ willing seller basis. This allows the wholesaler to take ownership of the animal prior to slaughtering. The animals are then distributed to an abattoir of the wholesalers' choice from which point the carcasses are distributed to various retailers.

The deregulation of the red meat industry in the early 1990s has seen a significant expansion in the number and capacity of abattoirs. The industry can be further divided into those abattoirs linked to feedlots, the wholesale sector, or municipal owned, and those that are owned by farmers and small, medium and micro-sized enterprises (SMME's).

Approximately 449 red meat abattoirs currently operate in South Africa. According to the Department of Agriculture, Forestry and Fisheries (DAFF) approximately 60% of all slaughtering is carried out by abattoirs that

are highly regulated with a high throughput capacity. Other large-scale abattoirs, known as low throughput abattoirs also operate within the province, with approximately 34 spread throughout the country. Many of these abattoirs have linkages with feedlots. Approximately 60% of the 80% of livestock that go through feedlots are slaughtered by abattoirs that are vertically integrated. The remaining abattoirs are considerably smaller, servicing small livestock producers and localized population centres, most commonly known as butchers and rural throughput abattoirs.

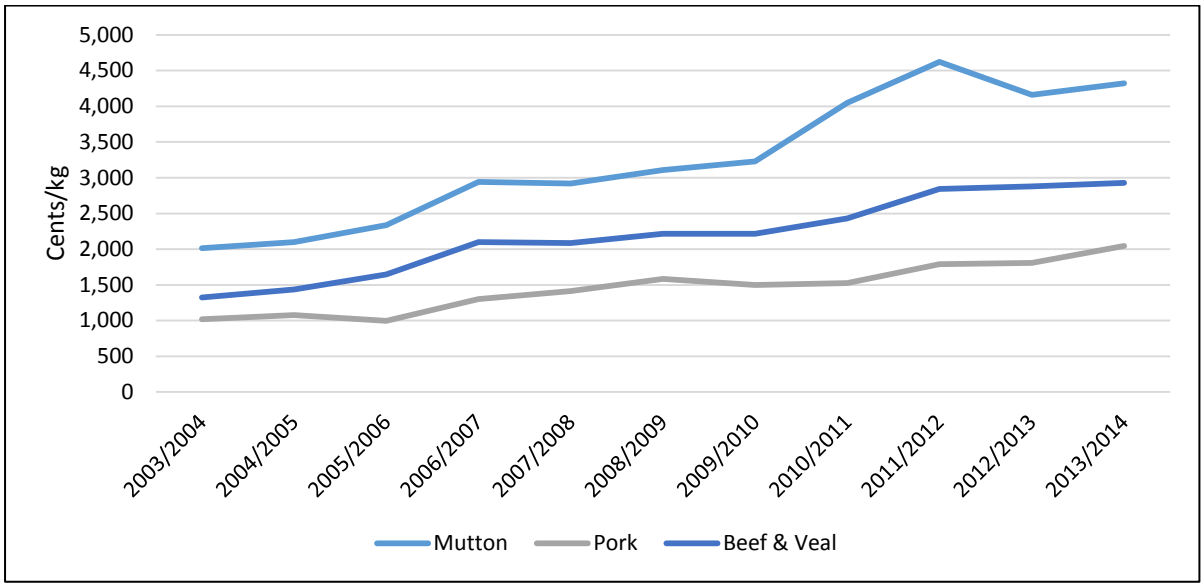
**Figure 8.15: Abattoir distribution by province**




### 8.1.5 Price

South African market price is measured through the price per kilogram of the chilled carcass post slaughter. As can be seen within the graph below, all three commodities have seen an increase in their price over the 2003/04 to 2013/14 period. Prices increased for all products in 2006/07 and 2011/12. Mutton prices have been the most vulnerable to these price increases. Pork prices are the most stable of the three, with beef and veal prices performing between the two. In terms of total growth, cattle carcasses experienced the greatest increase in value between 2003/04 and 2013/14, increasing by 120.9%. Sheep carcasses increased by 114.8%, while pig carcasses increased by only 100.5% over the same period. In the most recent period, of 2012/13 – 2013/14, the inverse is true, with pork prices increasing by 13.2%, mutton by 4.0%, and beef & veal by only 1.6%.

**Figure 9.16: South African Price per Chilled Carcass**




*Source: DAFF, 2015A*

Abattoirs generally purchase livestock from producers or feedlots at a price that is based on the cold carcass weight of the animal. The price paid for the carcass further depends on the age and type of slaughtered animal, as well as fat content. The carcass is first classified according to a classification system, and a price is then determined.

The classification system is derived from two characteristics, namely age and carcass fat content. Animal carcasses are classified into four different groups according to age which is determined by the number of permanent incisors. The carcasses are then further classified according to subcutaneous fat content on a scale of 0 to 6 (i.e. 0 = no fat, 6 = high fat content).

The below table summarises the South African carcass classification described above. Animal suppliers are penalised with lower prices for older aged animals with high fat contents.

**Figure 9.17: South African Carcass Classification System**

| Trait | Beef/Sheep/Mutton | | | | | | |
|---|---|---|---|---|---|---|---|
| Age | A | | AB | | B | C | |
| # Permanent Incisors | 0 | | 1-2 | | 3-6 | >6 | |
| Roller Mark | AAA | | ABAB | | BBB | CCC | |
| Colour Code | Purple | | Green | | Brown | Red | |
| Tenderness | Most Tender | | Tender | | Less Tender | Least Tender | |
| Fat Grade | 0 | 1 | 2 | 3 | 4 | 5 | 6 |
| Beef (Fat thickness mm) | 0 | < 1 | 1 - 3 | 3 - 5 | 7 - 5 | 7 - 10 | 10 + |
| Sheep (Fat thickness mm) | 0 | < 1 | 1 - 4 | 4 - 7 | 7 - 9 | 9 - 11 | 11 + |

*Source: Olivier, 2004*

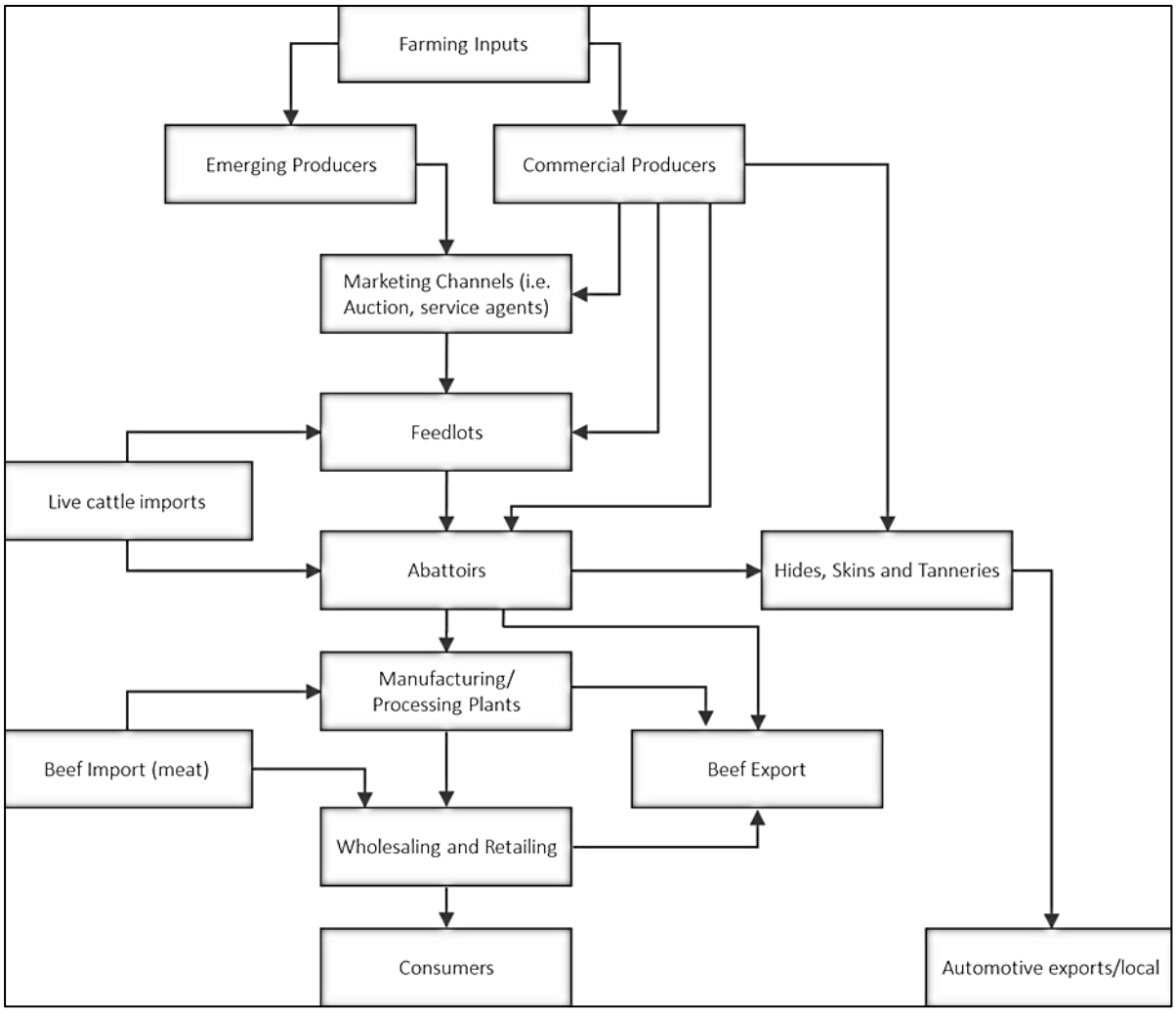
Abattoirs and meat processors sell products that are priced according to meat cut and quality. Typically, A-grade meat products fetch a higher price than C-grade products do. Lower grade products, however, can go through a value adding process in order to increase margins. For example, lower grade meats marinated, spiced, pre-cooked, or minced to produce burger patties and meat balls.

Hides are also produced from the abattoir, predominantly cattle hides, although a few sheep, goat and pig skins will also be produced. The prices for the hides are determined by hide quality and weight. Cattle hides currently trade at between R14.00 and R15.00 per kilogram, while sheep pelts trade for between R70.00 and R120.00.

### 8.2 Value-chain assessment

#### 8.2.1 Beef

**Figure 9.18: Beef value chain**




❖ **Upstream activities**

As beef production is classified as primary production the Up-stream activities relevant to the value chain are primary the input supplies used in the production system. The major inputs for livestock production include animal genetic resources, feeds and forages, veterinary drugs, vaccines, machinery equipment as well as knowledge. Most of these inputs are supplied by Agricultural Co-operatives in the respective areas. The Eastern Cape has three major Agricultural Co-operatives namely:

- OVK – TRADE
- Humansdorp Ko-op

- East Cape Agri – Co-op Ltd / BKB LTD

❖ **Primary production activities**

Beef is produced throughout South Africa. The amount of beef produced depends on the infrastructure such as feedlots and abattoirs, not necessarily by the number of cattle available in those areas. South Africa has highly developed transport infrastructure that allows movement of cattle and calves from one area to another, even from other countries such as Namibia. For these reasons, Mpumalanga commands the greatest share of beef production in South Africa accounting for 23% of the beef produced in 2009 followed by Free State and Gauteng taking up 20% and 13% respectively.

Despite all the challenges, cattle form an integral part of the economy within the communal farming sector. To unlock this potential to its fullest, the first step would be to recognize that cattle-ownership for many people remain a culturally resonant, economically rational and socially acceptable option for strategies of production and accumulation. This being the case, the role players in this sector should be safeguarded and their investments enhanced with targeted interventions that expressly increase both the productivity and overall rand value of the herds. To be successful, the focus should be on increasing both the capacity and the options of poor people to enable them to make strategic investments in their own future. Overall, the emphasis should be on providing the services and know-how for doing the basics of animal husbandry more effectively, rather than more newsworthy – but far less effective – interventions such as bull leasing schemes.

Future research should address the incomplete picture that exists of the overall distribution of cattle across livelihoods in the province. A research void exists regarding herd productivity in situ, including reproductive rates, weaning rates, mortality rates, growth rates and present marketing patterns. The average age and composition of individual herds, which has a direct influence on productivity, is also largely unknown. Research and development into the effective utilization and enhancement of the grazing resource becomes a more pertinent issue as far as cattle is concerned as they tend to react faster to and recover slower after drastic changes in the grazing resource.

❖ **Downstream activities**

The market players in the beef industry are vertically integrated. They have their own feedlots, abattoirs, processors and distributors. It is estimated that there are approximately 50 000 commercial farmers currently farming with livestock. This includes producers that keep livestock as their main enterprise and those that keep livestock as a secondary enterprise. They own around 8.2 million cattle. There are 240 000 small-scale farmers and 3 million subsistence farmers that own around 5.69 million cattle.

The beef supply chain has become increasingly vertically integrated. This integration is mainly fuelled by the feedlot industry where most of the large feedlots own their own abattoirs, or at least have some business interest in certain abattoirs. In addition, some feedlots have integrated further down the value chain and sell directly to consumers through their own retail outlets. Some abattoirs have also started to integrate vertically towards the wholesale level. Under the previous marketing regime, wholesalers mostly bought carcasses through the auction system. Currently, many wholesalers source live slaughter animals (not weaners) directly from farmers or feedlots on a bid and offer basis, i.e. they take ownership of the animal before the animal is slaughtered. The animal is then slaughtered at an abattoir of the wholesaler's choice, where after the carcass is distributed to retailers. In some instances, the public can also buy carcasses directly from wholesalers. The abattoir industry has expanded tremendously in number and in capacity.

Major beef feedlots active in the in the Eastern Cape Buying Markets

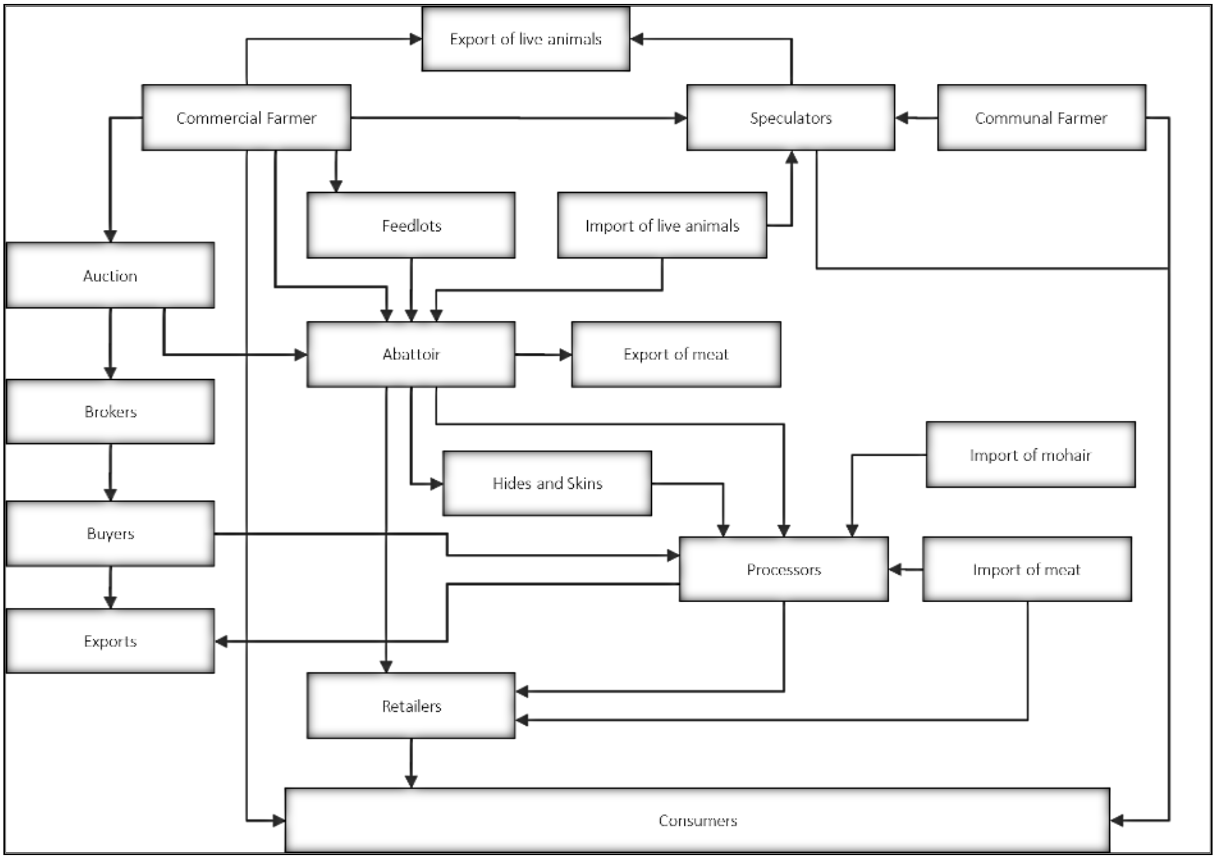
- Austin Evans Feedlot – Somerset East
- Adam Agri – Colesburg
- Beefcor – Bronkhorstspruit

- Beefmaster – Christiana
- Chalmar Beef – Wingate Park
- Dc Louw Feedlot – Adelaide
- Karan Beef – Heidelberg
- Sparta Beef – Marquad

**Abattoir:** Although an abattoir is the processing opportunity for the beef, there are several existing abattoirs (East London) that are currently not running at full capacity. It should therefore be taken in consideration before establishing a new abattoir.

### 8.2.2 Lamb & Chevon

**Figure 9.19: Lamb & Chevon value chain**




The Eastern Cape is regarded as South Africa's livestock province with significant numbers of cattle, sheep and goats. Domestic and foreign markets are available in terms of organic livestock production, product beneficiation and livestock bi-products (leather). The agricultural opportunities in the province for livestock, if harnessed, could yield significant returns in terms of the following:

Organic meat production - organic meat supply is becoming a global trend. The Eastern Cape provides opportunities for investment in primary and secondary organic meat farming for both the domestic and international market.

Livestock farmers - the province is looking to establish new commercial livestock enterprises. Interested investors can partner with community-based organisations and agricultural co-operatives to utilise local skill and knowledge around livestock farming in the Eastern Cape.

Sheep and goat breeding - sheep and goat breeding, as part of community agricultural development, has significant opportunities in the rural areas. Opportunities exist in supply of young sheep and goats to rural farmers, meat production, hide beneficiation and the provision of alternative breeding stock.

❖ **Upstream activities**

As sheep and goat production is classified as primary production the upstream activities relevant to the value chain are primary the input supplies used in the production system. The major inputs for livestock production include animal genetic resources, feeds and forages, veterinary drugs, vaccines, machinery equipment as well as knowledge. Most of these inputs are supplied by agricultural co-operatives in the respective areas. The Eastern Cape has three major Agricultural Co-operatives namely:

- OVK – TRADE
- Humansdorp Ko-op
- East Cape Agri – Co-op Ltd / BKB LTD

❖ **Primary production activities**

**Goats**

Goats are farmed throughout South Africa. In regions where bush encroachment is rife goats are farmed together with cattle. The robust Boer goats and hardy African goats fare well in these combined production systems. In the dry North West region, extensive ranching of goats is done together with Karakul, Persian and Dorper sheep. Angora goats are an important industry in the Eastern Karoo. Farming with Angoras extends into the temperate regions and to the Lesotho highlands. Milk goat farming is not a major industry. However, given the high occurrence of cow milk allergy, there are considerable opportunities for this industry to expand.

Goats make a valuable contribution to the livestock industry in southern Africa. In the rural, economically deprived regions goats are a ready source of cash-income and food and social security. The greatest need for research into the constraints in livestock production lies in these regions. Agriculture can no longer afford inefficiency in any form. Whilst traditional livestock production is a part of cultural life, inefficiency can no longer be part of it and cannot be afforded.

There are various marketing channels

- Auctions
- Production sales
- Contract Selling
- Direct Sales

Goat lambs are marketed at between six months and two years in order to obtain the best prices for quality animals. The slaughter market generally requires an animal weighing between 30kg and 45kg on the hoof.

**Sheep**

The 5 most common breeds of wool sheep in South Africa are, the Merino, the Dohne – Merino, Letelle, the SA Mutton Merino, and the Landsheep. The most common mutton breeds are Dorper, Dormer, Meatmaster, Damara and Ille de France. Most of the sheep breeds in South Africa are not seasonal breeders. The best results are achieved with autumn parings. The choice of breeding times is determined by the availability of feed at mating, lambing and weaning. The gestation period of a sheep is five (5) months. It is important that the lamb drinks colostrum within two hours of birth in order to build up immunity against disease. If this doesn't happen the lamb will weaken and get sick.

Fertility is the most important economic factor with sheep farming. A high fertility rate will ensure high lambing and weaning percentages if management is good. The ewe should have good mothering skills and produce enough milk to feed her lamb or lambs until old enough to wean. The percentage of lambs born does not ensure the success of the farmer, but rather the percentage of lambs weaned.

Ewes usually have one or two lambs. The lambing percentage ranges between 80 – 130% amongst the different breeds. This percentage is worked out by dividing the number of ewes mated by the number of lambs weaned multiplied by 100. Loss of lambs must be limited because this affects the profit of the farm. Loss of lambs is usually due to predators, cold, rain, poor mothering or poor nutrition. Special attention should be given to these aspects during lambing. Ewes usually lamb every year, but with good management and nutrition, Ewes can lamb every 8 months. At mating, 3-4% rams are placed with a flock of ewes for a period of 34 – 42 days.

Nutrition of the sheep is very important as it is the determining factor of the growth, lambing and weaning percentages. Good nutrition is also important in the preparation of sheep for shows. It is also important to make sure the sheep is not overweight. Not only is it frowned upon by the judges, but it also undermines the breeding capacity of the sheep thereafter.

Drastic increase or decrease of the feed causes a fault in the wool which negatively influences the price of the wool. Increase in the feed causes an increase in the mass of the wool, as well as a stronger wool, while poor feeding results in a lesser mass of wool, as well as a reduction in fibre quality (finer wool). Nutrition is also the single determining factor of a successful wool sheep business. Pregnant and lactating ewes should be kept on a highly nutritious feeding programme to ensure healthy and fast growing lambs. In the above mentioned breeds, castrated rams, cull rams and ewes are sold with a live weight of 25 - 45 kg's at 100 – 150 days either to the feedlots or the abattoir

❖ **Downstream activities**

**Goat Products**

The main products from goats are meat, milk, hides and fibres.

**Goat Meat products**

The Boer goat is regarded as the only breed of goat on earth that is bred exclusively for meat. Slaughter-masses vary from 35 to 40 kg for rams, and from 30 to 35 kg for ewes and adult animals.

**Goat Milk production**

- It is claimed that goat's milk is better than cow's milk for human consumption.
- A comparison of goat's milk and human breast milk shows the following:
- The protein content of goat's milk is higher than that of breast milk - 25% in the case of goat's milk, against 7% for humans.
- The total fat content in both cases is virtually identical.
- Goat's milk contains more than the required amounts of calcium and phosphate for babies, but without any detrimental effects on the child.
- As in the case of cow's milk, untreated goat's milk can also transmit diseases such as brucellosis, but not tuberculosis, since goats do not readily succumb to tuberculosis.
- Goat's milk tends to be more suitable for the treatment of stomach ulcers.
- In poor countries where the consumption of meat is low, goat's milk provides for an important daily intake of protein, phosphorus and calcium which would not otherwise have been available due to the severe shortage of cow's milk.

**Goat Fibre production**

Boer goats produce both fine and coarse fibre. A very fine fibre known as cashmere, develops on the skin beneath a longer type of hair. The long hair is combed. Any long-tooth comb may be used. Comb downwards by holding the head of the goat in the standing position. A woolly neck gives an indication that the goat has the potential to produce more cashmere.

The lighter (whiter) the colour and the lower the thickness of the fibre, the higher the price it will fetch. The downy hair grows from December until June to provide protection against the winter's cold, while moulting

takes place during the early spring. All animals in a herd or flock do not moult simultaneously. Cashmere can be harvested from the age of six months.

**Sheep Wool Production**

Wool contributes approximately 30% towards the income derived from wooled sheep. Meat contributes therefore approximately 70% towards the economic value of wooled sheep. These figures are quoted for commercial farming operations where best practice management and marketing is applied. Wool sheep are sheared according to their breed standards, usually with a wool growth of 8 – 12 months. Adult ewes usually produce fleece weighing 3 – 6 kg with a length of 65 – 110 mm. Price of wool is determined by:

- Thickness of the fibre – this determined by a wool testing
- Laboratory, and is measured in microns. 18 microns is finer than 22 microns
- A clean Yield
- Length of the wool
- Strength of fibres

Finer wool usually gets a better price than stronger wool. Quality of the wool plays an important role where the hand and eye method is used to value the wool, eg at shows, judges attach value to this characteristic.

As mentioned above The Sheep are sheared in periods ranging from 8 – 12 months where after wool is classed and baled on farm before being transported to the processing facilities in Port Elizabeth where it is sold to buyers on an open floor auction system.

**Mutton Production from Woollen Sheep and haired sheep**

Mutton production contributes to approximately 70% of revenue for woollen sheep breeds like Merino, Dohne Merino, Ille de France etc. Meat production is driven by optimal reproduction, weaning %, efficient and optimal growth and eventually by the marketing % (number of animals sold) as to total number of animals. Mutton sheep and lambs are sold on Auction or via buying agents to abattoirs and feedlots which slaughter and package carcasses and cuts for the retail industry. Sheep breeds such as Dorper and Meatmaster are farmed entirely for their mutton production and are not sheared for commercial reasons. The price of meat is determined by:

- The age of the animal
- The distribution of fat on the carcass
- The conformation of the animal
- The size (body mass) of the sheep is decided by The length of the body, The depth of the body and The breadth of the body

Because meat is sold per kilogram, the body mass of the sheep, as well as the rate of growth of the animal plays an important role. Lamb is more tender than mutton, and therefore gets a better price per kilogram. The consumer does not want a lot fat and therefore it is important to sell lambs before the meat is downgraded for having too much fat. Meat on the rump and chops are the expensive cuts and therefore enjoy special attention from the judge. When the length of body is being shown, the judges judge the size of the sheep. When showing the back end of the sheep, the judges look at the grade of musculature of the sheep's outer and inner thighs

A broad chest is an indication an indication of adequate chest capacity which can house healthy lungs. The capacity of the animal for walking is important where they may have to graze in mountainous conditions. It's for this reason that the fetlock joints must be strong so that the sheep don't walk on their heels and cause lameness.

**Agro-processing opportunities**

**Meat**

Both wooled and non wooled sheep are processed through main stream Abattoirs. There are a number of abattoirs in the Eastern Cape (See section on Beef) The Distance from market is of extreme importance. Abattoirs in the Eastern Cape are generally not functioning at capacity and as such no immediate agro-processing

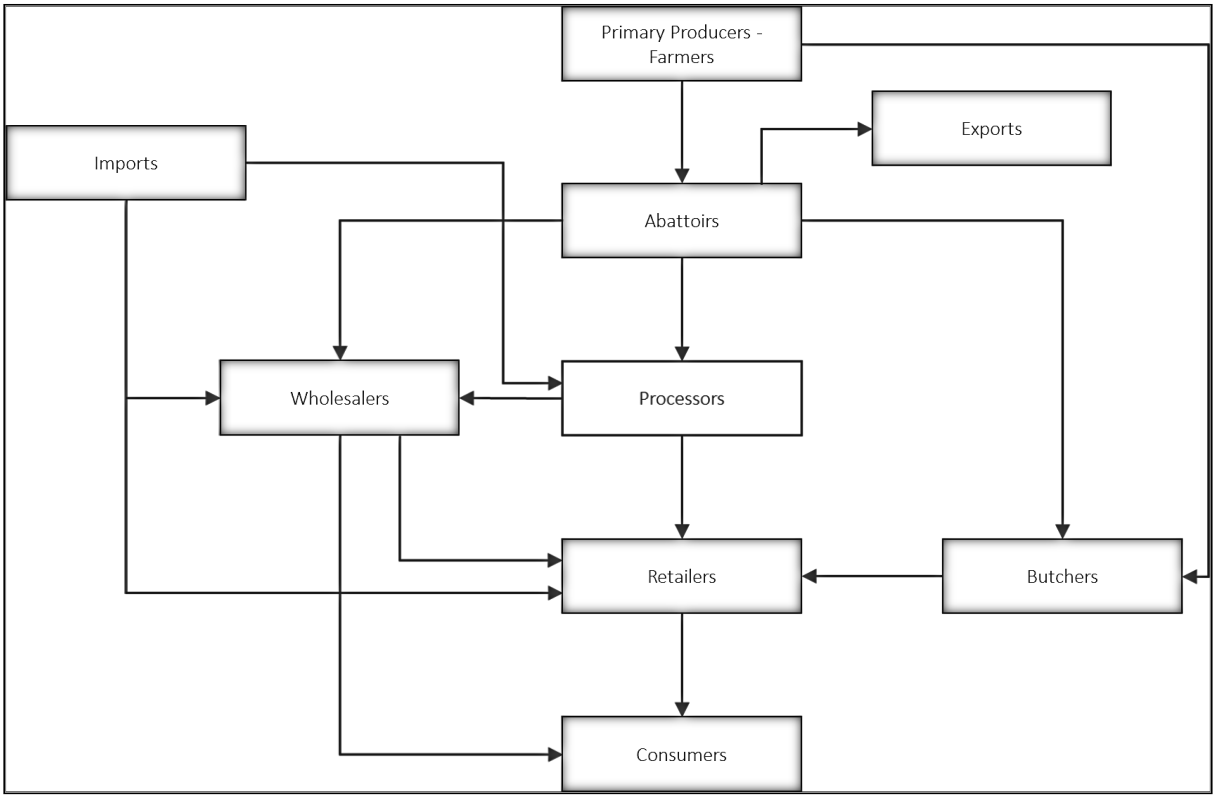
opportunities exist at present in this sphere. A vast majority of goats are transported live to Indian markets in Kwa Zulu Natal where they are slaughtered and processed.

**Wool and fibre**

Sheep and goats are sheared in periods ranging from 8 – 12 months where after wool/mohair is classed and baled on farm before being transported to the processing facilities in Port Elizabeth where it is sold on to buyers on an open floor auction system. A number of feasibility studies have recently been completed on Wool Washing facilities in Rural Eastern Cape but have not been proved viable and the existing facilities are functioning well below capacity. The large wool and Mohair processers in Port Elizabeth (Cape Mohair and Wool & BKB) Dominate this sector and smaller rural processing plants cannot compete effectively due to processing volumes.

### 8.2.4 Pork

**Figure 9.20: Pork value chain**




❖ **Upstream activities**

As pork production is classified as primary production the upstream activities relevant to the value chain are primary the input supplies used in the production system. The major inputs for livestock production include animal genetic resources, feeds and forages, veterinary drugs, vaccines, machinery equipment as well as knowledge. Most of these inputs are supplied by Agricultural Co-operatives in the respective areas. The Eastern Cape has three major Agricultural Co-operatives namely:

- OVK – TRADE
- Humansdorp Ko-op
- East Cape Agri – Co-op Ltd / BKB LTD

❖ **Primary production activities**

Pork is produced throughout South Africa with Limpopo and North West provinces being the largest producers accounting for 44% of total production. The lowest pork producing provinces are Northern Cape (2%) and

Eastern Cape (6%). There are approximately 400 commercial producers and 19 stud breeders in South Africa. Pig numbers are estimated at 1 573 million, this is a decrease of 1.3% compared to 2010. During 2011, Limpopo province produced 24% of all pork produced in South Africa followed up by North West with 20% then Western Cape and Gauteng by 11% each It is estimated that over 2.4 million pigs were slaughtered during 2011 yielding over 2 million tons of pork.

❖ **Downstream activities**

The local market is split at almost 50:50 between the fresh meat market and the processing meat market. The pork industry evolved from a highly regulated environment to one that is less regulated today. Various policies, such as the distinction between controlled and uncontrolled areas, compulsory levies payable by producers, restrictions on the establishment of abattoirs, the compulsory auctioning of carcasses according to grade and mass in controlled areas, the supply control via permits and quotas, the setting of floor prices, removal scheme, etc., characterised the pork industry before deregulation commenced in the early 1990s. Since the deregulation of the agricultural marketing dispensation in 1997, the prices in the red meat industry are determined by demand and supply forces. During 2005 when the export quantity was very high the export value remained low which indicates that it was less profitable to export pork in 2005 than any other years.

Exports value of pork was slightly fluctuating started at a decreasing trend from 2002 to 2004 and increased slightly in 2004 and then experienced a sharp increase from 2007 to 2009 before decreasing substantially from 2010 to 2011. The export value of pork increased by over R 2,951,145 in 2011 compared to 2002 and decreased by R 34 million compared to 2009 which was the peak. South African pork is mainly exported to SADC countries. Mauritius commanded the greatest shares of pork exported from South Africa during the period under analysis followed by Mozambique and Zimbabwe. Tanzania, Zambia and Democratic of Congo (DRC) received the lowest shares of South Africa during the period under review. Mauritius commanded the highest share of South African pork of in 2008 & 2010, Zimbabwe was the highest in 2009 and Zimbabwe in 2011.

**Abattoir:** Although an abattoir is the processing opportunity for the pigs, there are several existing abattoirs (East London) that are currently not running at full capacity. It should therefore be taken in consideration before establishing a new abattoir.

### 8.3 Stakeholders

There are a number of organisations involved in the red meat value chain in South Africa. One of the key organisations is Red Meat Producers Organisation (RPO). RPO is service organisation that acts as mouthpiece for South African commercial red meat producers. It is an independent producer's organisation that strives to dynamically promote the sustainability and the profitability of the red meat industry in South Africa. Figure 9.21 shows other key stakeholders in the red meat sector in South Africa. It is important to consider the buy-in of the relevant stakeholders into the Agri-Park as they can provide skills, expertise and advice to emerging farmers.

**Figure 9.21: Red Meat Stakeholders**

| Stakeholder | Description |
|---|---|
| **Red Meat Abattoir Association (RMAA)** | The RMAA is an independent membership-based organisation. Its primary aim being training at all abattoirs in South Africa. The Association is a representative forum for red meat abattoir owners in South Africa and aims to establish communication and co-operation between the members of the Association. |
| **Livestock registering federation** | The principal business and purpose of the Livestock Registering Federation shall be to unite, promote and protect its members |

| | |
|---|---|
| | acting as Independent Registering Authorities (animal Improvement Act 62 of 1998), into an affiliated federation. |
| **South African Meat Industry Company (SAMIC)** | SAMIC is a quality assurance company which was created by the Red Meat Industry of South Africa to ensure the quality and safety of meat in South Africa. |
| **National Emergent Red Meat Producers' Organisation (NERPO)** | The primary aim of NERPO is to commercialise the developing agricultural sector and ensure meaningful participation of black individuals within the mainstream commercial agribusiness sector, hence ensuring the long term sustainability of the agricultural sector in South Africa. |
| **Red Meat Industry Forum** | The Red Meat Industry Forum of South Africa represents all the most nationally representative sector specific role player organisations within the red meat value chain. |
| **South African Feedlot Association (SAFA)** | The SA feedlot industry was started during the 1960s by a few entrepreneurial cattle farmers in the grain producing areas who were forced, due to a lack of grazing, to "over-winter" their stock on grain and/or potato by-products and hay of inferior quality. |
| **International Quality Assurance Services (IMQAS)** | IMQAS services the hygiene and quality needs of the meat industry in South Africa on an independent basis. Their services are available to primary producers, abattoirs and processing establishments. |
| **South African National Halaal Authority (SANHA)** | SANHA is a non-profit organisation promoting professionalism in the certification of Halaal products. |
| **Red Meat Research & Development SA** | The specific aim of the RMRD SA and its Project Committee is to co-ordinate and fund research projects. |

### 8.4 Technology

Agri-Park farmers can make use of a wide variety of technology to improve their access to markets and the efficiency of their production. Emerging farmers in South Africa have traditionally lagged behind in the usage of technology in their production and marketing activities. There is however more information and initiatives available today to connect emerging farmers with the latest technology. The areas in which innovation is improving efficiencies in small holder agriculture include nanotechnology, genetically modified crops, GIS and remote sensing, cellular phones, information technology and applications etc. As with any technology, it is important to strike a balance of mechanisation and job creation which improves skills and creates meaningful jobs.

To farm and manage livestock various equipment and infrastructure will be needed such as management and farming software, boreholes, water pumps and storage, animal reproduction, handling, feeding, watering & health equipment and training, veld management techniques to prevent soil erosion, security technology, and other innovations.

Recent developments in farming will have to be considered in order for any farming activity to be competitive in the future. Three areas in which technology is impacting on the livestock industry is in animal health practices, veld management and automated refilling water troughs.

**Animal Health**

Animal health practices are important in livestock farming to guarantee the survival of the animal and the quality and acceptability of the product for the commercialised market structures. There are two major methods in managing the health of animals: via vaccinations and via anti-biotics. Both of those methods are practiced within commercial operations, however the importance of these activities have not fully penetrated the small-scale market.

Vaccines contains inactive parts (usually the capsid) or molecules that resembles surface proteins of a pathogenic virus or bacterium, which are introduced into the animal's blood stream so that antibodies can be developed. This will enable the animal to develop immunity and to be protected against the pathogen when and if exposed to it later in life. New vaccines are constantly developed therefore it is important to consult with an animal health professional on the most appropriate vaccination program. Vaccines have a highly positive effect on disease control and even eradication. Vaccinated animals normally exhibit high returns on investment, as there is less likelihood of losing the animal during the raising process. Costs associated with vaccination are normally low, and they require low levels of training to implement successfully.

Anti-biotics have two main applications in agriculture. The first is to treat infections, which is an important application, but too specialised a feel to discuss in detail. Infection treatments are predominantly taken care of by animal health professionals. Secondly, anti-biotics serve as a routine feed supplement to animals in intensive farming systems (feedlots, piggeries, chicken houses, fisheries etc.) which can be considered a dangerous and unsustainable practice. This second method occurs as anti-biotics encourage increased growth rates and resistances against disease. However, the cost to society could be large and devastating, due to extensive untested treatment of medication to animals not necessarily requiring prolonged exposure to the chemicals. Prolonged exposure to the anti-biotics encourage drug resistance strains to develop that can potentially be carried over to the human population via consumption. The drugs are cheap to acquire, however to correctly implement, via the trained veterinary profession, does require substantial service charges.

**Veld Management**

Veld management practices serve two primary functions. Firstly, they prevent the encroachment of indigenous brush onto grazing areas, and, secondly, they enable land rehabilitation to other purposes. Two ways in which this can occur is by brush removal for input into related markets, and land rehabilitation practices.

A good example of brush removal is the potential contained within bush-to-feed converters. Brush removal enables production feed pellets from shrubs and trees. It also enables minor forestry production with thick branches and tree stems that cannot be converted into feed, can be sold as fire wood or converted to biochar. The practice is centred on converting a liability (bushes that reduce the carrying capacity of the veld) into a valuable asset (feed for game and cattle). And could serve as an effective method of bush encroachment control. The process requires some skills training and is moderately expensive to obtain and operate.

Land rehabilitation covers a range of technological processes, that can differ in complexity from as simple as brush packing to as complex as production of biodegradable or long lasting soil cloths and mesh materials. The main purpose of the rehabilitation is to stabilise soil, control or reverse existing erosion damage and restore degraded land so that it can again be utilised for agricultural purposes. Land rehabilitation also serves as a preventative measure for future soil degradation, by enabling vegetation on the land, preventing future problems. Depending on the type, extent and location of re the rehabilitation, the required expenditure skills range from low to moderately high.

**Automated-refill watering troughs**

Providing water for livestock can be a drain on communal water resources and put unnecessary strain on communities, especially in times of drought. If animals are scattered in rural areas, it may be time consuming or difficult to access their water troughs to keep refilling them. Automated-refill water troughs seek to manage livestock water usage, by utilising water troughs fitted with a small reservoir and low pressure floating valves to enable automated re-filling.

These water-provision systems would be more resilient to evaporation, and when properly maintained ensure sufficient levels of water provision of animals, by minimising water contamination and the risk of wastage. Furthermore, the systems are consistent, preventing livestock tampering, and easy to clean. The cost of the system is relatively low, requiring an investment of a few thousand rand, and are also relatively simple to operate.

**ICT**

ICT is possibly the biggest development in the agricultural sector for emerging and commercial farmers alike. The emergence of the internet and mobile phones has led to an exorbitant amount of data at the fingertips of the farmers. If they require information then it can be obtained immediately and problems solved sooner than before (e-Agriculture, 2015). ICT has allowed the emergence of training software and applications (Apps) which people can use for the benefit of the staff who work for them and for themselves. Training can be done outside of training centres and content directly displayed on smartphones. Smartphones have also allowed for greater access to market prices and market related news as it happens and sooner than what used to occur (e-Agriculture, 2015). This can allow farmers to make adjustments before they impacted negatively. This has also allowed access to online and cell phone banking and various finance facilities (e-Agriculture, 2015). This means that farmers have access to their finances from their phones and do not have to leave the farm to bank. Online banking has also made farming safer as large amounts of cash is no longer used to pay staff and instead can be paid into bank accounts or cell phone numbers. ICT has allowed for the effective design of farms around the land that is available to farmers and has allowed for farmers to be more efficient and handle finance and information related queries over a long distance instead of being at a physical location in person. This has also allowed for the effective management and understanding changing markets as they occur which allow farmers to react in a timely manner (e-Agriculture, 2015).

Numerous smartphone apps also exist for the convenience of the farmer. *Pantheon Farming* from App Lab allows farmers to enter all data directly on location, which is synchronized with a main database. This reduces the possibility of errors and eliminates duplicate data entries. *eFarmer* is a simple app designed for the agricultural industry that allows users to construct an electronic map of fields to create a database of various crops in the fields. The app also allows users to take notes on the fields as points of interest, keep the location of specific objects on the farm and keep a diary of the operations for each field users own. *AgriApp* is an Android app that enables farmers to access large pool of relevant information related to agriculture and specific crops and animals.

Specifically for the livestock industry, the Merck Veterinary Manual Mobile App, is available for both Android and Apple and contains guidelines for the diagnosis, treatment, and prevention of animal disorders and diseases.

Online resources also exist which can be accessed through a phone, tablet or PC which is connected to the internet. Sites such as *FAO:Ecocrop* provides detailed crop requirement information for almost any crop that are cultivated throughout the world, including its uses and requirements for temperature, rainfall/water, soil type, soil depth, soil pH, salinity, altitude etc. It also include hundreds of forage crop species for extensive animal

farmers. Another site *My Agriculture Information Bank* provides a variety of general agricultural information to farmers.

The Agri-Park needs to take cognisance of the technology that is available in order to assist the emerging farmers. By integrating technology into training regimes that are provided in the Agri-Park, emerging farmers will have access to the latest events in their respective fields.

**Logistics**

In order for the Agri-Park to be successful there needs to be an effective and well run logistics system. Logistics is an extremely important part of agriculture as it relies on transport of goods to and from the farm to the processing facilities and o to markets. Trucks and other large freight vehicles which transport goods are vitally important in any industry and is also important in the vegetable industry. Goods need to be transported in such a manner that they are not damaged. If goods need preservation then it is important to consider using refrigerated trucks to transport of produce. The second aspect of logistics is the medium of transport itself. Roads or the rail system need to be in good order and should be well connected in order to reduce the loss of produce and damage to trucks which can add on unnecessary costs to the farmers.

## 8.5 Demand and Needs Analysis

The following section outlines the demand for red meat in South Africa and the district and will discuss the opportunities that exist in the district. Opportunities exist for the following in the red meat market:

- Production/supply of animal feed
- Increasing existing capacity and development of new abattoirs
- Development of cattle feedlots
- Increasing herd size of beef cattle
- Long term opportunity for SMME cattle hide processing (tanneries) for the automotive industry

It is possible to provide an estimate for demand based on historical consumption figures and populations. The figure below provides a summary on estimated demand on a national and provincial level.

At an average per capita consumption for red meat of 25.5kg per person (beef at 17.6kg, mutton at 3.3kg and pork at 4.6kg), there is a clear demand for red meat products in South Africa. Demand for red meat on a national level is approximately 1 320 149 million tons. In Amathole the demand for red meat is approximately 22 762 tonnes annually as seen in the figure below

**Figure 9.22: Annual demand for red meat (tons)**

| Area of Demand | Estimated Demand |
|---|---|
| **South Africa** | 1 320 149 |
| **Eastern Cape** | 167 332 |
| **Amathole District** | 22 762 |
| **Mbhashe** | 6 500 |
| **Mnquma** | 6 436 |
| **Great Kei** | 994 |
| **Amalhati** | 3 131 |
| **Ngqushwa** | 1 841 |
| **Nkonkobe** | 3 241 |
| **Nxuba** | 619 |
| **Buffalo City Metro** | 19 258 |

*Source: Quantec 2013, Census 2011*

### 8.6 Competition

While there are numerous established commercial farmers in the District competition is seen as an advantage rather than a disadvantage in this situation. Commercial farmers have established contacts and networks that they can take advantage of. This information can be accessed through various government various government programmes which encourage mentorship of farmers. The benefits of farming in areas that already have a strong presence of farmers is possibly more of a benefit than a disadvantage. The largest form of competition will come in the form of cheaper imports of poultry from the USA as part of the AGOA act that was recently amended.

### 8.7 Socio-Economic (Job Creation)

The Agri-Park project vision, as discussed in Chapters 1 and 2, outlines the importance of socio-economic development as an objective of the Business Plan. Socio-economic progress and development can be measured in various ways, however the primary method of measurement selected for livestock commodity is Job Creation. Job creation is measured via the use of commodity labour multipliers, measuring the number of jobs created per R1 million produced directly into commodity production. The three relevant multipliers for the Amathole District Municipality red meat market are the:

- Direct Multiplier
- Indirect Multiplier
- Induced Multiplier

The three multipliers measure the total numbers of job created in an ideal economic environment for the red meat market. However as the economic environment diverges away from the ideal environment, so do the multipliers.

The figure below displays the sectoral labour multipliers applicable to the red meat industry, i.e. the number of the job opportunities created at different levels for every additional R1-million production. The Figure below indicates that livestock creates 2.07 direct on farm jobs, 1.61 indirect jobs and 1.88 induced jobs for every R1 million produced. Livestock farming is not as labour intensive at small-scale production levels as such as vegetable production in the district, however, the cattle commodity specifically does have an extensive value chain with job opportunities at production, processing, retailing and service level. Numerous abattoirs exist in the District and thus indirect job multipliers can be expected to be marginally lower, until the need for additional abattoirs arise. Induced job creation from the income already received in the direct and indirect multiplier phases, however, could be increased, due to the receptiveness of the area to low-income earners.

**Figure 9.23: Direct, Indirect and Induced Jobs Created in the Red Meat Industry**

| Sector | Direct | Indirect | Direct + Indirect | Induced | Total |
|---|---|---|---|---|---|
| Livestock Products | 2.07 | 1.61 | 3.68 | 1.88 | 5.57 |

BFAP (2015) agrees with this outlook and states that livestock farming is not very labour intensive and can vary from approximately 0.01 person per hectare to approximately 0.05 people per hectare. Sheep and cattle are non-labour intensive but do have high growth potential and the large value chains can be exploited to increase labour.

Information that is available on the District's livestock production and the potential number of hectares, together with the Bureau for Food and Agriculture Policy, have been used to estimate the employment opportunities that livestock production can contribute in the 10-year period. The Agri-Park can provide approximately 730 employment opportunities from the programme. It must be noted however that these figures are purely indicative and will change through the development of the Agri-Park.

### 8.8 Contribution to Food Security

One of the core concepts that the Agri-Park seeks to address is the issue of food security of communities. It is believed that the Agri-Park concept can assist in increasing food security and sustainability of communities' livelihoods. DAFF launched a Zero Hunger Policy in 2012 in order to curb poverty and improve food security for vulnerable communities who are in need of support. The Zero Hunger Policy was created to uphold Section 27,1 (b) of the bill of rights which states that every citizen has the right to food and water and Section 28,1 (b) which states that every child has the right to basic nutrition shelter and basic care and social services. The policy suggest that adult daily calorie should be 1792 kcal (7502kj) per day for an adult and sets a food poverty line of R260 per individual expenditure for food every month (DAFF, 2002). Meat consumption is based largely on availability, price and tradition. Meat production is a very complex operation depending not only on demand (which is usually based on price and income) but on many social and economic influences such as official policy, price support mechanisms, and interrelations such as the interaction between beef and milk production etc (FAO, 2002). While it is clear that meat is not essential in the diet the inclusion of animal products makes it easier to ensure a good diet. Many diets in developing countries are based on cereals or root crops and are relatively bulky, especially where fats are in short supply, and this can limit the total energy intake (FAO, 2002). The importance of meat in the diet is as a concentrated source of protein which is not only of high biological value but its amino acid composition complements that of cereal and other vegetable proteins (FAO, 2002).

Meat is an adequate source of protein in the human diet and it is assumed that between 55g of meat per day provides enough protein. The quality of the meat however plays a role as the lower the quality, the more meat is needed to make up the 55g. Meat and meat products are important sources of all the B-complex vitamins including thiamin, riboflavin, niacin, biotin, vitamins B6 and B12, pantothenic acid and folacin (FAO, 2002). The last two are especially abundant in liver which, together with certain other organs is rich in vitamin A and supplies appreciable amounts of vitamins D, E and K. Meats are excellent sources of some of the minerals, such as iron, copper, zinc and manganese, and play an important role in the prevention of zinc deficiency, and particularly of iron deficiency which is widespread (FAO, 2002).

There are issues associated with consumption of large quantities of meat and having an unbalanced diet. Issues such as coronary disease and cholesterol are well known effects of eating an unbalanced diet of large quantities of red meat (FAO, 2002).

Income earned from the red meat industry can also be used to purchase food goods in order to be more food secure as well.

### 8.9 Regulatory Requirements

There are numerous legislation documents governing the production of red meat. These range from regulations as to the production inputs (National Water Act), to those governing production (Meat Safety Act) and to production standards and consumption. The most pertinent of the acts are contained in the figure below. It is extremely important to acknowledge the available legislature and policies as the Agri-Park must follow the rule of law as set out by the relevant departments. It will align itself to the legislature that is published.

**Figure 9.24: Red Meat Governing Legislature**

| Act | Description |
|---|---|
| The Meat Safety Act, 2000 (Act No. 40 of 2000) | The abattoir is responsible for the conversion of livestock to meat. The process remains critical to ensure a safe and wholesome product reaches the consumer. The Meat Safety Act addresses measures to |

| Act | Description |
|---|---|
| | promote the safety of meat and animal products and to establish and maintain essential national standards in respect of abattoirs.<br><br>Red meat regulations regulate processes and procedures under the Meat Safety Act. |
| Animal Health Act, 2002 (Act No. 7 of 2002) | To provide for measure to promote animal health and to control animal diseases; to assign executive authority with regard to certain provisions of this Act to provinces; to regulate the importation and exportation of animals; to establish health schemes; and to provide for matters connected therewith. |
| Animals Protection Act, 1962 (Act No. 71 of 1962) | The act encompasses the prevention of cruelty towards animals. The act further encompasses the code of best practices for the handling and transport of livestock. |
| Fertilisers, Farm Feeds, Agricultural Remedies and Stock Remedies Act, 1947 (Act No. 36 of 1947) | The act provides for the appointment of a Registrar of Fertilizers, Farm Feeds, Agricultural Remedies and Stock Remedies; for the registration of fertilizers, farm feeds, agricultural remedies, stock remedies, sterilizing plants and pest control operators; to regulate or prohibit the importation, sale, acquisition, disposal or use of fertilizers, farm feeds, agricultural remedies and stock remedies; to provide for the designation of technical advisers and analysts; and to provide for matters incidental thereto. |
| National Water Act, 1998 (Act No.36 of 1998) | This act encompasses laws relating to water resources and the use thereof. |
| Occupational Health and Safety Act, 1993 (Act No.85 of 1993) | The act aims to provide for the health and safety of persons at work and the health and safety of persons in connection with the activities of persons at work and to establish an advisory council for occupational health and safety. |
| Basic Conditions of Employment Act, 1983 (Act No. 3 of 1983) | The act encompasses those regulations associated with fair labour practices. |
| Municipal By-Laws and Regulations, where relevant | Municipal by-laws will need to be investigated with regard to the establishment of the abattoir in a municipal area. |
| Marketing Act, 1968 (Act No. 59 of 1968) | The Act has authorised an establishment and enforcement of regulatory measures to intervene in the marketing of agricultural products, including the introduction of levies on agricultural products. |
| Agricultural Products Standards Act, 1990 (Act No. 119 of 1990) | The act controls and promotes specific product standards from mainly a quality point of view for local as well as export purposes. A list of products for which standards have been set through regulations is promulgated under the act by the minister of agriculture. |
| Stock Theft Act, 1959 (Act No. 57 of 1959) | This Act encompasses those laws associated with the theft of animal stock and produce. |
| Consumer Protection Act (Act No68 of 2008) | To promote a fair, accessible and sustainable marketplace for consumer products and services and for that purpose establish national standards relating to consumer protection. |

### 8.10 Substitute Products and Services

Substitutes are products that can replace the product that is grown or produced. In the red meat value chain various products can be replaced. Red meat is often substituted by white meat products. This has increased as

a result of the growth in popularity in white meat and the perceived benefits of white meat over red meat (FAO, 2014). Chicken and pork is often also eaten more as they are a cheaper source of protein compared to red meat. Some groups do not eat red meat at all and substitute red meat with vegetable rich diets and with soy based alternatives such as soya-mince (FAO, 2014).

Products such as leather and hides have been increasingly replaced by cheaper plastic based textiles. Leather has increasingly been used as a luxury item for textiles and the clothing industry (FAO, 2014).

### 8.11 Red Meat Barriers to Entry

Barriers to entry are obstacles that make entry into a given market difficult such as regulations, high infrastructure costs or competition in the given area. This section will discuss the barriers to entry of the red meat industry. The table below may provide some indications as the barriers that are faced by emerging farmers in the Agri-Park.

**Figure 9.25: Barriers to entry: Red Meat**

| CONSTRAINT | DESCRIPTION | LEVEL OF INFLUENCE |
|---|---|---|
| **CAPITAL, RAW MATERIALS AND PRODUCTION ISSUES** | | |
| **Poor carrying capacity** | In many parts of the district the natural carrying capacity of the veld has been reduced due to unsound grazing practices (mainly overstocking). | - |
| **Input Costs** | There has been an upward trend in input costs, over the last several years particularly feed and electricity. This has an adverse impact on farmers bottom-line. | - |
| **Stock Theft** | The theft of stock is an ongoing challenge for both commercial and emerging/small scale farmers. | Provincial, District |
| **Start-up costs** | There is a high capital cost associated with setting up fixed structures, installing requisite technology and also the financing of the first production and the initial stock of weaners | - |
| **Poor breeding stock amongst emerging farmers** | Poor quality breeding stock and a lack of quality weaners amongst emerging and small scale farmers means that they are not able to improve the overall level of their herd which in turn negatively impacts profits. | Provincial, District |
| **Disease and high mortality rates** | The expansion of game farming in the Eastern Cape has resulted in the spread of diseases that affect sheep and goats. Sheep must be dipped regularly to avoid catching diseases. Due to a lack of technical skills, emerging and traditional farmers especially have problems with disease and mortality rates. | Provincial |
| **Availability of land for farming** | There are good opportunities for sheep and goat production, however limited land availability. Sheep farming has to compete with ostrich, cattle, and goat farming for production space. The costs and returns on each should be considered sufficiently before engaging in any of the options. | Provincial |
| **INFRASTRUCTURE** | | |

| CONSTRAINT | DESCRIPTION | LEVEL OF INFLUENCE |
|---|---|---|
| **Roads** | The poor road network and lack of connectivity within the district hampers the cattle industry, particularly given that animals have to be transported out of the area for finishing. | Provincial, District |
| **Fencing** | The lack of fencing leads to an increased incidence of stock losses, theft and poorer quality products. The provincial government does have a programme in place to address the issue of fencing; however the resources of the Department of Agriculture are spread amongst a number of priority areas and are limited. | Provincial, District |
| **COMPETITION AND ACCESS TO MARKETS** | | |
| **Consumer preference** | Red meat production faces stiff competition from poultry meat; per capita consumption in this sector is not rising as fast as in the poultry sector. Within the sector, pork production and consumption are generally growing faster than beef and lamb. | National |
| **International (SADC) competition** | Increasing competition from Southern African Development Community (SADC) and international producers with comparative advantage due to subsidies. | - |
| **Compliance with international standards** | Meeting international standards of sanitary and quality (especially proving that South Africa does meet the required standards). In short, the challenge is lack of a traceability system and a national quality assurance scheme. | Provincial |
| **Popularity of chevon** | Chevon is not as popular as beef or chicken amongst South African consumers which means that it has difficulty in finding a large domestic consumer base. It is a popular export, but the Eastern Cape currently does not contribute. | National |

*Source: Urban Econ, 2015*

### 8.12 Societal and Cultural Trends

Beef cattle production remains spatially important and is a multifunctional livelihood strategy in rural South Africa. This is especially true in marginal and remote areas with poor agricultural lands and minimal economic opportunities.

It has been estimated that 5.6 million cattle (40 % of the total cattle population) are owned by 240 000 small-scale farmers and 3 million subsistence farmers. For the livelihoods of these small-scale producers, cattle farming has multiple functions. Non-commercial motives include economic functions (e.g. wealth storage), agro-economic functions (e.g. provision of draught power), agro-ecological functions (e.g. provision of manure), nutritional (e.g. provision of milk for infants) and socio-cultural functions (e.g. dowry) (Ndoro et al., 2014).

The sustainability of cattle-based livelihoods, however, is threatened by the competition for natural resources such as land and water, and decreasing grazing areas. Despite this, cattle production has increased by a million from 1994 to 2004 (Republic of South Africa, 2011). The increase owes to recent developments in breeding,

nutrition and animal health that has contributed to potential production, efficiency and genetic gains (Ndoro et al., 2014).

Goats have long been seen as a culturally important animal in southern Africa. They are specifically used as ceremonial animals and have various connotations attached to them based on different cultural groups. Goats also have a negative connotation with consumers based on various cultural backgrounds (Roets, 2014). The goat is seen by consumers to represent cultural and traditional practices and is not eaten unless for a specific ceremony. Today these perceptions are changing but at a slow pace (Roets, 2014). Goat meat consumption is far more acceptable outside of South Africa. Thus goats and goat meat products may be difficult to sell to local consumers in South Africa.

The reason for the lack of awareness of goat consumption stems from multiple sources including the lack of research into goats during apartheid (Roets, 2014). Other livestock such as sheep and cattle were far more researched and studied. Research that was completed was not done in conjunction with commercial farmers which led to slow adoption of new farming practices. For the cultural aspects of goat's weight, milk, or meat production quality may not be as important as the goat itself, its colour, sex, or the use to which it will be put traditionally (Roets, 2014).

### 8.13 SWOT Analysis

The following section discusses the Strengths, Weaknesses, Opportunity and Threats of the red-meat commodity value chain in the Amathole District. Strengths and weaknesses refer to the positive and negative internal factors affecting the growth of the industry; whereas threats and opportunities refer to the external factors affecting the industry.

#### 8.13.1 Strengths

**Biophysical:**

- Most areas of the Amathole District exhibit good suitability for red meat / livestock production.
- Most livestock types are relatively well suited to the variable conditions in the Amathole District; able to deal with hot and dry as well as wet and cold conditions.
- Local breeds of cattle, goat and sheep – suitable for small and emerging farmers – are resilient to many common livestock diseases.

**Enterprise viability:**

- Due to the nature of livestock farming, Amathole District production can easily access regional markets far removed from the point of production.
- Local meat markets are fully accessible to new entrants; any production of the sufficient quality can be sold through local and or regional channels.
- Many local communities are very familiar with the husbandry of cattle and sheep making it easy to develop farming concerns in these areas.
- Livestock farming is relatively light on infrastructure requirements for new entrants.

**Economic development:**

- All livestock classes should contribute greatly to the reduction of meat imports into the Amathole District.
- Red Meat product classes contribute significantly to job creation when considering the indirect and induced impacts on the local economy.

**Political and social goals:**

- Government departments and the Amathole District are already active in supporting agricultural, commercial and emerging farmers in the district.
- Suitable state land is available for new entrants into the red meat market.
- Livestock farming is highly suitable for rural communities and emerging black farmers.
- Livestock farming contributes greatly to food security in the Amathole District and greater Eastern Cape region.
- Cattle, sheep and goat farming concerns, once fully established, should have good long-term sustainability in the local Amathole region.

### 8.13.2 Weaknesses

**Biophysical:**

- The area is prone to spells of water-shortages that may pose significant threats to small and emerging farmers without adequate water infrastructure.

**Enterprise viability:**

- Current demand for chevon and pork meat is relatively low in the Amathole District at present.
- Local knowledge of how to farm pork is lacking and require intensive training and skills development before pork farming projects are developed.

**Economic development:**

- Cattle and goat farming do not contribute greatly to on-farm job creation.
- Job quality / decency of cattle and goat farming is relatively low, with predominantly low-skilled job opportunities.
- Cattle and goat farming's direct contribution to local GDP is relatively low.

### 8.13.3. Opportunities

**Biophysical:**

- There are numerous areas in the Amathole District where livestock farming can be expanded into or established at either small, medium or commercial scale.

**Enterprise viability:**

Opportunities exist for the following in the red meat market:

- Production/supply of animal feed
- Increasing existing capacity and development of new abattoirs
- Development of cattle feedlots
- Increasing herd size of beef cattle
- Long term opportunity for SMME cattle hide processing (tanneries) for the automotive industry

**Economic development:**

- There are clear opportunities for new entrants, specifically black owned enterprises to enter the Amathole District red meat market.

**Political and social goals:**

- Potential for massive increase of participation in the agricultural economy

### 8.13.4 Threats

**Biophysical:**

- Climate change poses a significant threat to the future of the Amathole District agriculture sector, particularly in terms of rainfall and access to water.
- Most of the freehold land in the western part of the district is currently under production and there is limited land available to expand commercial production in these areas.
- The expansion of game farming in the Eastern Cape has resulted in the spread of diseases that affect sheep.

**Enterprise viability:**

- There has been an upward trend in input costs over the last several years particularly of feed and electricity. This has an adverse impact on farmers' bottom-lines.

**Economic development:**

- The poor road network and lack of connectivity within the district hampers the cattle industry, particularly given that animals have to be transported out of the area for finishing.

**Political and social goals:**

- Stock theft is a particular challenge to small-scale farmers and has an impact on the profitability of farms.

# Vegetables

**Chapter 9**

# Chapter 9 Vegetables

The prioritisation matrix has identified that the vegetable product class has high potential for growth and development and to realise the goals of the Agri-Park concept. This chapter provides a thorough market assessment of the vegetable farming industry, a value-chain analysis identifying opportunities throughout the value chain and a detailed SWOT analysis.

This chapter continues under the following headings:

- Market assessment
- Value-chain analysis
- SWOT Analysis

## 9.1 Market Assessment

Vegetables are produced in most parts of the country. However, in certain areas farmers tend to concentrate on specific crops; for example, green beans are grown mainly in Kaapmuiden, Marble Hall and Tzaneen, green peas mainly in George and Vaalharts, onions mainly in Caledon, Pretoria and Brits, and asparagus mainly in Krugersdorp and Ficksburg regions.

### 9.1.1 Production

The production of vegetables in South Africa for the period 2009/10 to 2013/14 compares as summarised in Figure 9.1.

**Figure 9.1: Production Volumes of Vegetable Types**

| Year July to June | 2009/10 | 2010/11 | 2011/12 | 2012/13 | 2013/142 |
|---|---|---|---|---|---|
| | '000 tons | | | | |
| Potatoes | 1 955 | 2 165 | 2 205 | 2 202 | 2 193 |
| Tomatoes | 575 | 523 | 545 | 527 | 525 |
| Pumpkins | 234 | 237 | 244 | 247 | 245 |
| Green mealies1 | 339 | 340 | 347 | 361 | 362 |
| Onions | 489 | 563 | 625 | 596 | 592 |
| Sweet potatoes | 60 | 63 | 55 | 57 | 69 |
| Green peas | 17 | 12 | 8 | 11 | 12 |
| Beetroot | 67 | 62 | 66 | 68 | 61 |
| Cauliflower | 25 | 16 | 16 | 14 | 12 |
| Cabbage and red cabbage | 141 | 153 | 141 | 136 | 145 |
| Carrots | 151 | 152 | 178 | 183 | 184 |
| Green beans | 23 | 25 | 25 | 24 | 19 |
| Other | 400 | 406 | 421 | 420 | 416 |
| Total | 4 476 | 4 717 | 4 876 | 4 846 | 4 835 |

*Source: Abstract of Agricultural Statistics, 2015*

From 2012/13 to 2012/13 (July–June), the total production of vegetables decreased by 0.22%, from approximately 4 846 000 tons to 4 835 000 tons. Concerning the major vegetable types in terms of volumes produced, the production of green mealies rose slightly from approximately 361 000 tons to 362 000 tons and sweet potato's increased by approximately 12 000 tons or 21.2%. Most of the vegetable crops, however, decreased over the period.

Relative importance of major vegetable types:

The relative importance of the major vegetable types, according to gross value of production, during the 2013/14 season, is depicted in Figure 9.2.

**Figure 9.2: Relative importance of vegetable types**

| Rank | Product | % Share |
|---|---|---|
| 1 | Potatoes | 42% |
| 2 | Tomatoes | 16% |
| 3 | Cabbages | 13% |
| 4 | Onions | 4% |
| 5 | Pumpkins | 3% |
| 6 | Carrots | 3% |
| 7 | Gem squashes | 2% |
| 8 | Sweet potatoes | 1% |
| 9 | Cauliflower | 1% |
| 10 | Green beans | 1% |

*Source: Abstract of Agricultural Statistics, 2015*

Figure 9.3 indicates that potatoes are clearly a vegetable of high relative importance, with an approximate gross value of production equal to 42% of the total for vegetables. Tomatoes and onions are the also important vegetable crops with a combined gross value of 29%.

The relative importance of the major vegetable types, according to gross value of production, during the 2013/14 season, is depicted in Figure 9.3:

**Figure 9.3: Relative importance of vegetable types (excluding Potatoes)**

| Rank | Product | % Share |
|---|---|---|
| 1 | Tomatoes | 28% |
| 2 | Cabbages | 23% |
| 3 | Onions | 7% |
| 4 | Pumpkins | 5% |
| 5 | Carrots | 5% |
| 6 | Gem squashes | 3% |
| 7 | Sweet potatoes | 2% |
| 8 | Cauliflower | 2% |
| 9 | Green beans | 2% |
| 10 | Hubbard squashes | 2% |

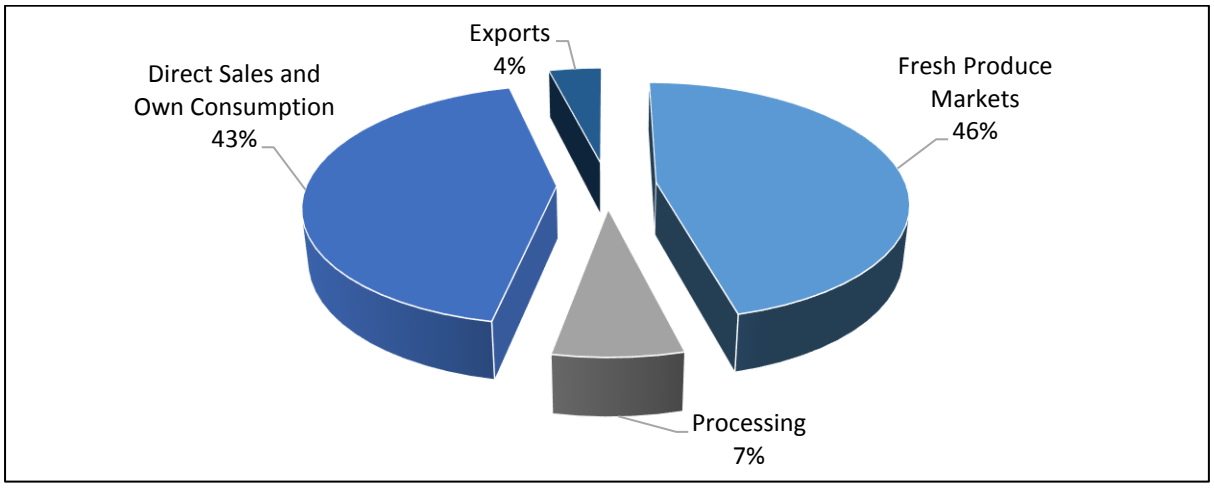
*Source: Abstract of Agricultural Statistics, 2015*

Figure 9.3 indicates that tomatoes and onions are clearly a vegetable of high relative importance, with an approximate gross value of production equal to 51% of the total for vegetables when potatoes are excluded. Squashes, such as butternut and pumpkins, and also cabbages are also important crops with over 10% of the production.

### 9.1.2 Distribution channels

Figure 9.4 indicates the volume of vegetables that are traded through various distribution channels that are available to farmers.

**Figure 9.4: Distribution Channels for Vegetables**




*Source: Abstract of Agricultural Statistics, 2015*

It is clear from Figure 9.4 that approximately 46% of the volume of vegetables produced is traded on the major fresh produce markets. The total volume of vegetables sold on these markets during 2014 amounted to 2 293.6 thousand tons, compared to the 2 107.8 thousand tons that sold during 2010, an increase of approximately 9%.

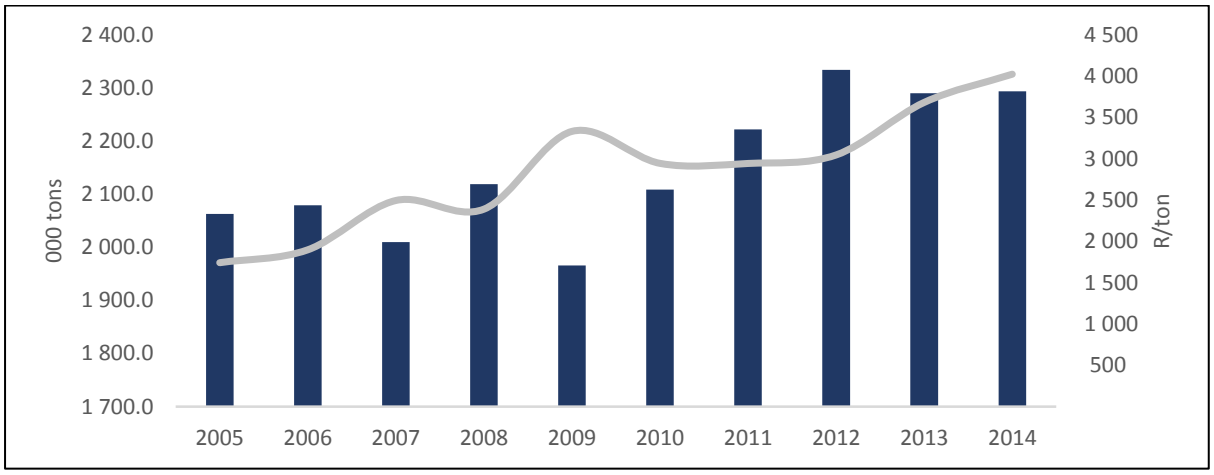
**Figure 9.5: Quantity of important vegetables sold on the major fresh produce markets**

| Year | 2010 | 2011 | 2012 | 2013 | 2014 |
|---|---|---|---|---|---|
| Total ('000 tons) | 2 107.8 | 2 222.1 | 2 334.4 | 2 290.2 | 2 293.6 |

*Source: Abstract of Agricultural Statistics, 2015*

The values of sales of vegetables on the major South African fresh produce markets for the period 2008/09 to 2012/13 are as follows:

**Figure 9.6: Average Volume and Average Price of Vegetables (2005/06 – 2013/14)**




*Source: Abstract of Agricultural Statistics, 2015*

### 9.1.3 Prices

The average prices of vegetables realised on the fresh produce markets for the period 2008/09 to 2012/13 were as follows (Figure 9.7):

**Figure 9.7: Average Price of Vegetable Types**

| Product | 2011 | 2012 | 2013 | 2014 | Average Price Increase (%) |
|---|---|---|---|---|---|
| | R/ton | | | | |
| Potatoes | 2 591 | 2 645 | 3 379 | 3 428 | 10% |
| Tomatoes | 4 339 | 4 407 | 4 847 | 6 082 | 12% |
| Cabbages | 1 516 | 1 772 | 2 109 | 2 180 | 13% |
| Onions | 2 221 | 2 587 | 3 433 | 3 334 | 15% |
| Pumpkins | 1 675 | 1 617 | 2 156 | 2 128 | 10% |
| Carrots | 2 815 | 2 633 | 3 154 | 3 644 | 10% |
| Gem squashes | 2 615 | 2 702 | 2 666 | 3 248 | 8% |
| Sweet potatoes | 2 995 | 3 636 | 2 798 | 3 724 | 10% |
| Cauliflower | 4 145 | 4 960 | 5 066 | 8 380 | 29% |
| Green beans | 6 572 | 6 815 | 7 263 | 8 454 | 9% |
| Hubbard squashes | 1 880 | 1 844 | 1 954 | 2 283 | 7% |
| Beetroot | 2 821 | 2 365 | 3 858 | 4 335 | 20% |
| Cucumbers | 5 862 | 7 337 | 7 320 | 8 487 | 14% |
| Lettuce | 4 263 | 4 828 | 4 573 | 5 508 | 9% |
| Green peas | 21 035 | 27 516 | 23 923 | 37 621 | 25% |
| Green mealies | 9 471 | 11 409 | 8 344 | 13 089 | 17% |
| Marrows | 8 575 | 7 648 | 9 085 | 10 718 | 9% |
| Turnips | 3 651 | 2 728 | 3 527 | 4 052 | 6% |
| Butternut squashes | 2 420 | 2 408 | 2 871 | 3 227 | 10% |
| All vegetables | 2 944 | 3 047 | 3 683 | 4 024 | 11% |

Source: Abstract of Agricultural Statistics, 2015

Figure 9.7 indicates that, on average, prices of vegetables have increased by 11% annually between 2011 and 2014. Of the vegetables above, cauliflower, beetroot, and green peas increased the most over the period, with increases of 29%, 20% and 25% respectively.

**Households participating in vegetable production**

According to the agricultural census survey conducted in 2011, a total of 1 123 520 households are involved on the production of vegetables. The summary of findings are summarised in Figure 9.8 below.

**Figure 9.8: Number of Agricultural Households in a Specific Activity by Province**

| Province | Livestock Production | Poultry Production | Vegetable Production | Production of other crops | Fodder/ grazing production | Other |
|---|---|---|---|---|---|---|
| Western Cape | 28,334 | 29,176 | 39,337 | 22,725 | 16,516 | 23,804 |
| Eastern Cape | 330,354 | 334,665 | 246,412 | 99,052 | 24,335 | 33,493 |
| Northern Cape | 28,040 | 25,853 | 9,334 | 11,324 | 4,518 | 5,415 |
| Free State | 45,207 | 51,414 | 106,809 | 63,193 | 11,106 | 13,811 |
| KwaZulu-Natal | 268,656 | 356,881 | 340,743 | 109,580 | 27,393 | 45,715 |
| North West | 88,633 | 117,453 | 36,620 | 42,923 | 16,013 | 25,301 |
| Gauteng | 62,047 | 82,403 | 147,870 | 89,167 | 50,650 | 78,847 |
| Mpumalanga | 72,896 | 127,759 | 91,214 | 59,885 | 11,439 | 20,595 |
| Limpopo | 172,683 | 173,681 | 105,181 | 161,888 | 13,995 | 31,067 |
| South Africa | 1,096,850 | 1,299,285 | 1,123,520 | 659,737 | 175,965 | 278,048 |

*Source: Abstract of Agricultural Statistics, 2015*

Figure 9.8 suggest that KwaZulu-Natal has the largest number (30%) of households involved in vegetable production, followed by Eastern Cape (22%) and Gauteng (13%). Gauteng has approximately 147 870 households that are involved in vegetable production. Figure 9.9 summarises gender of household heads of the vegetable producers.

**Figure 9.9: Number of Agricultural Households in Vegetable Production by Sex of Household Head and Province**

| Province | Male | Female | Total |
|---|---|---|---|
| Western Cape | 11,618 | 27,719 | 39,337 |
| Eastern Cape | 132,952 | 113,460 | 246,412 |
| Northern Cape | 3,370 | 5,963 | 9,333 |
| Free State | 50,914 | 55,895 | 106,809 |
| KwaZulu-Natal | 184,361 | 156,381 | 340,742 |
| North West | 12,869 | 23,750 | 36,619 |
| Gauteng | 51,082 | 96,788 | 147,870 |
| Mpumalanga | 41,581 | 49,633 | 91,214 |
| Limpopo | 52,159 | 53,021 | 105,180 |
| South Africa | 540,906 | 582,610 | 540,906 |

*Source: Abstract of Agricultural Statistics, 2015*

Figure 9.9 indicates that, overall, 70% of the households involved in vegetable production are headed by female members. Limpopo has an even split of male and female household heads, while Western Cape has the highest

number of households lead by women in vegetable production. Within Gauteng 65% of the households are female headed households.

### 9.1.4 Consumption

The importance of vegetables in a healthy diet is being strongly promoted by all the stakeholders in the fresh produce marketing chain. The per capita consumption of fresh vegetables was 43.01kg during 2014, approximately 2.8% lower than the previous year. Figure 9.10 summarises consumption of vegetables (excluding potatoes) between 2010 and 2014.

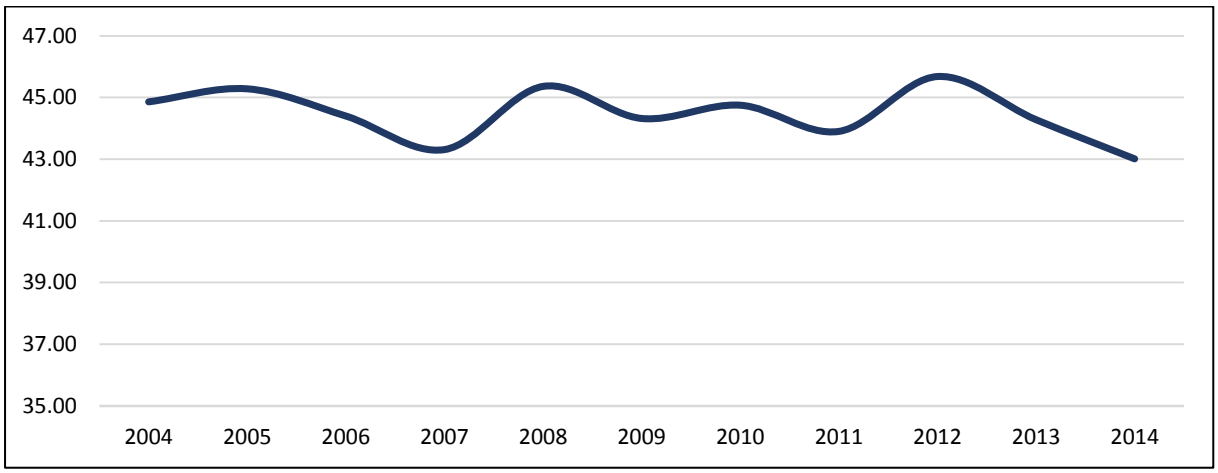
**Figure 9.10: Per Capita Consumption**

| Year | 2010 | 2011 | 2012 | 2013 | 2014 |
|---|---|---|---|---|---|
| Vegetables (potatoes excluded) (Kg/Year) | 44.75 | 43.90 | 45.68 | 44.28 | 43.01 |

*Source: Abstract of Agricultural Statistics, 2015*

Per capita consumption of vegetables has remained relatively stable over the last 10 years, ranging between 43.01kg per year to 45.68kg per year. Figure 9.11 illustrates the fluctuations in per capita consumption of vegetables between 2004 and 2014.

**Figure 9.11: Per Capita Consumption Trend**




*Source: Abstract of Agricultural Statistics, 2015*

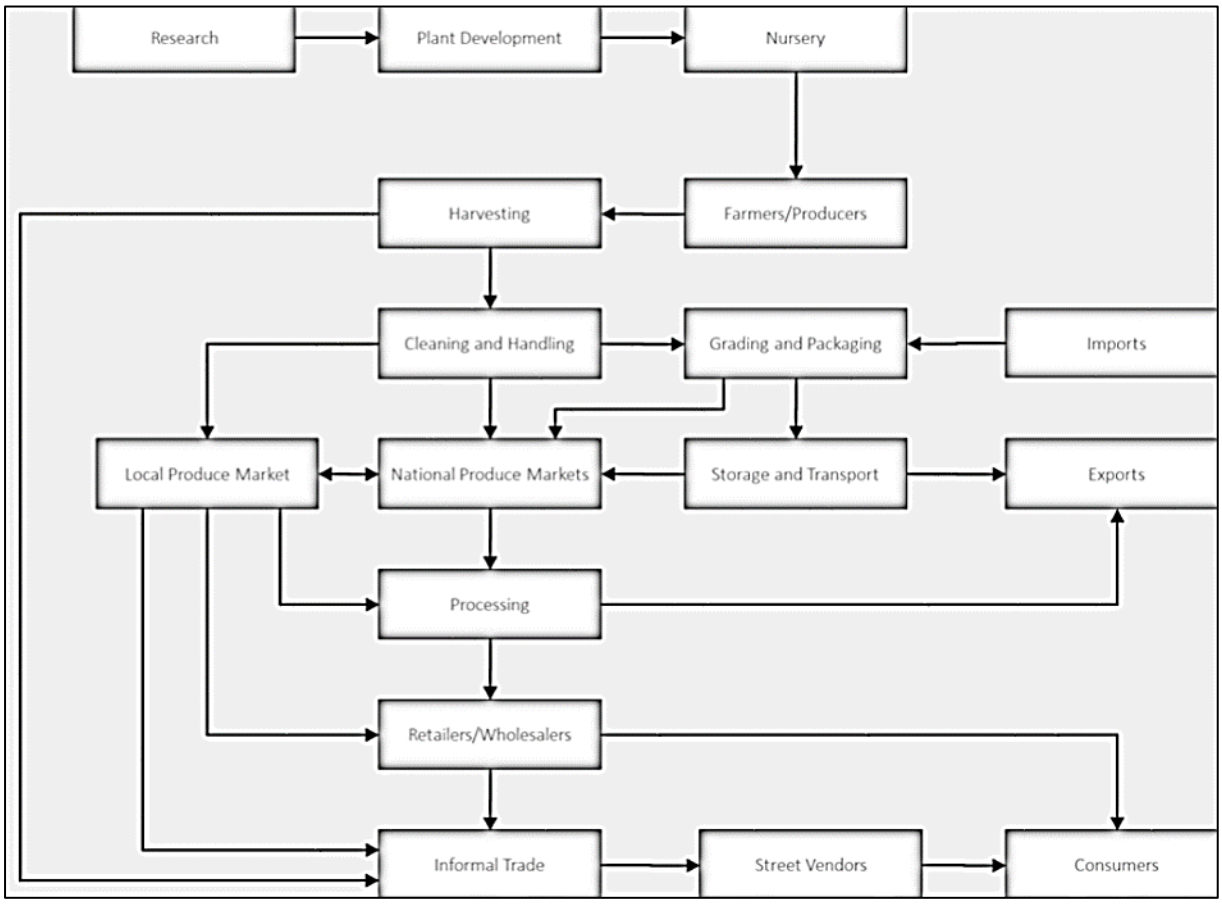
Consumption patterns with respect to vegetable have remained predominantly stable at just over 40kg per capita within South Africa. Fluctuations in per capita consumption figures may vary due to population figures as well as production figures for the year in question.

## 9.2 Value-Chain Analysis

As Vegetable production is classified as primary production the upstream activities relevant to the value chain are primary the input supplies used in the production system. The major inputs for vegetable production include seedlings, fertilizing, weed, pest and disease control, irrigation equipment, machinery equipment as well as knowledge. Most of these inputs are supplied by Agricultural Co-operatives in the respective areas. The Eastern Cape Province has three major Agricultural Co-operatives namely:

- OVK – TRADE
- Humansdorp Ko-op
- East Cape Agri – Co-op Ltd / BKB LTD

**Figure 9.12: Vegetable Value-Chain**




❖ **Primary production activities**

The horticultural industry of South Africa accounts for nearly one-third of total gross farm income in the country. There are 17 major fresh produce markets throughout South Africa, the largest being the Johannesburg Fresh Produce Market (JFPM) which comprises a 34% market share with a total turnover of nearly 900,000 tons valued at over R2.0 billion in 2006 (NAMC Section 7 Report, 2006). In 2007, tomato volumes sold at the JFPM were 107 000 tonnes (JFPM Statistics, 2008) at a value of over R300 million. Potatoes, onions, and cabbages are the other major vegetables sold nationwide.

Between 2005 and 2006, gross income from horticultural products increased by 1.3%, from R20 388million to R20 648 million. Income from vegetable production rose by 13.9% to R7 229 million. In general, the South African horticultural industry is growing in both quantities produced and prices received.

In 2005-2007, total production of vegetables produced were 2 157 579 tons. Production of major vegetables such as tomatoes, potatoes, onion and carrots increased annually f vegetables and approximately 56% of potatoes produced in South Africa are traded on the fresh produce markets. The total volume of vegetables and potatoes sold on these markets during 2006/07 amounted to 1 119 646 tons and 950 000 tons respectively. The per capita consumption of fresh vegetables was 38, 74 kg during 2006/07, approximately 4.7% lower than the 40, 64 kg of 2006/06. The promotion of a healthy diet by various stakeholders in fresh produce could be attributed to high consumption of fresh products. The total gross human consumption of potatoes during 2006 is 1.58 million tons and the per capita consumption estimated at 33 kg per annum.

Eastern Cape Province has seven district municipalities. Using the gross farm income for vegetable production as a ranking yardstick, the most important district municipalities in Eastern Cape are Amathole, Sarah Baartman, Joe Gqabi and Chris Hani, generating R6.5 million, R4.8 million, R3.5 million and R1.3 million respectively to the

gross farm income of the province. In this province, the gross farm income from vegetables runs into millions in all district municipalities except for Alfred Nzo and OR Tambo. Vegetables mainly produced are potatoes and tomatoes each contributing to a provincial gross farm income of R9.5 million and R4.3 million respectively. Fruit production in district municipalities which generate gross farm income into millions, but in a decreasing order are Amathole, Cacadu and Nelson Mandela Metro, with a gross farm income of R27 million, R22 million and R16 million, respectively mainly coming from citrus in all the districts.

❖ **Downstream activities**

Harvesting, handling, washing, trimming, grading, packing, packaging, labelling and transporting are all important practices aimed at preserving the quality of the produce, and presenting it to the best advantage. Prices achieved, and thus differences in income obtained, can be greatly affected by the emphasis placed on these practices. They must, therefore, be considered as important elements in the marketing strategy.

Most commercial producers consider only one or two of the major national markets as marketing outlets, to the exclusion of all other possibilities. The larger producers will supply even some of the far-distant national markets, provided better prices prevail there. Nationally linked information networks can supply daily prices to producers. These national markets, in all the big centres, must remain the major outlets for many of the large vegetable growers, because of the scale of their operations, but even these growers should investigate other possibilities. Smaller producers may possibly be able to dispose of the bulk of their produce more profitably through outlets other than the national markets. Outlets to consider are:

- Direct sales to hawkers or consumers on the farm. Savings may be made on packaging, agents' fees, market commission and transport and so on.
- Farm stalls. Savings as above, but require suitable reliable staff.
- Direct sales to wholesalers, retailers, consumer groups or individual consumers. Delivery costs may be disproportionately high for small consignments.
- Small municipal markets or farmers' markets. Usually not very different to the national markets, more easily glutted, and lower throughput.
- Export.

Critical points are the generally high quality specifications, chemical residue tolerances, possible pre-chilling or cooling requirements, specific packaging requirements, high transport costs (particularly air transport), the prevailing demand for the product and expected prices, specific market needs, sales agents, and so on.

Processing companies cannot compete with the premium prices paid for out-of-season produce, but are usually highly competitive with prices in peak season. However, some processing, or value-added practices, such as pre-packing of certain crops, could be done on the farm. Special markets might need to be developed for such products

Significant Points of Sale for Vegetables produced are listed below:

- Fresh Produce Markets
- Prisons and school feeding schemes
- Retailers
- Significant informal trade

Significant Marketing Considerations of Vegetables produced are:

- Size of outlet, and cost of servicing it.
- Transport availability and cost. Distances, which affects cost, as well as deterioration of the product. Condition of the roads.
- Packaging required, e.g. pre-packs, cartons, boxes, pockets and their relative costs in relation to prices attained.
- Market or consumer preferences.
- Product quality or specifications.

- Contact person or agents.
- Seasonal price trends.
- Market commission and agents' fees.
- Possible delays in payment for consignments.
- Various other possible requirements for the specified outlet.

Approximately 46% of the volume of vegetables in South Africa is traded on the major fresh produce markets and 43% are direct sales and for own consumption. Roughly 7% are destined for processing.

Even though Fresh Vegetables poses stiff competition for Frozen Vegetables the latter experiences major growth due to the increase of the global urban population, which has less access to fresh fruits and vegetables than rural populations .

According to IBISWorld (2015), "Sales of frozen fruit and vegetables represent the Global Fruit and Vegetables industry's second most important source of revenue, accounting for an estimated 36.0% of revenue. Within this segment, frozen potatoes, the popularity of which is growing across the world, account for the most important specific product type. Other popular frozen vegetables are peas, carrots, beans and vegetable mixes for stir-fries. In the developed nations of the Organisation for Economic Co-operation and Development (OECD), consumers have become more health consciousness and increasingly time-poor, which has driven demand in these countries for frozen fruit and vegetable products. In the developing world, the expansion of middle-classes has led to increased durable good ownership rates. This includes expanded freezer ownership, which are necessary for storing frozen fruits and vegetables. As a result, economic growth and rising incomes have led to expanding demand for products within this segment from the developing world. As a result of this widespread increase in global demand for products within this segment, this product segment has expanded as a share of overall industry revenue over the past five years".

This phenomenon is underlined by the growth of frozen vegetables exports that worldwide grew with 37% from 2005 to 2014 and with 23% for dried vegetables over the same period.

The development of sustainable supply and value chains in the vegetable sector from production through processing to markets, where there are unequal power relationships between large retailers/wholesalers and agro processors, and primary vegetable producers is a constraint. Producers are vulnerable to demand volatility and price fluctuations and are "price takers" because of the buyers' market power. The major vegetable processing players in South Africa are:

1. **Fresh**
   - Various
2. **Canning and Pickling**
   - Rhodes
   - Langeberg Food Processors Ltd
   - Giants Canning - Everyday
   - Koo
   - All Gold
   - SA Fruit & Vegetable Canners' Association (SAFVCA),

3. **Frozen**
   - McCain Foods SA
   - Just Veggies
   - Nature's Choice Products
   - Lamberts Bay Foods
   - Tender Harvest
   - Findus Foods

4. **Slice and Dice**
   - Retailers own products

5. **Drying & Dehydration**
   - Just Veggies
   - Carbocraft (Pty)Ltd

### 9.3 Stakeholders

Vegetable associations are largely based off of what commodity is grown by the farmers such as potatoes (Potatoes South Africa) and onions (Onion Producers' Organisation). Industry specific organisations assist farmers growing those crops in providing information on the markets and recent developments in the industry. They provide valuable support networks which farmers can take advantage of in order to solve problems or further expand their business. Other general stakeholders are provided in the figure below. It is important to consider the buy-in of the relevant stakeholders into the Agri-Park as they can provide skills, expertise and advice to emerging farmers.

**Figure 9.13: Vegetable Stakeholders**

| Stakeholder | Description |
|---|---|
| **The South African Society of Crop Production** | The SASCP is a science-based organisation which provides leadership in crop science to promote training, research and technology transfer involving all crops. |
| **South African Fruit and Vegetable Canners Association** | SAFVCA was founded in January 1954 with 20 members representing the 3 main industry sectors with regards to Deciduous Fruit, Pineapple, Vegetables and Tomatoes.<br>The Association is a voluntary grouping of fruit and vegetable canning industry members and its mission is to protect and promote their interests and provide its members with synergistic services of value. |
| **Potatoes South Africa** | Potatoes South Africa is an association incorporated under the South African Companies Act No 71 of 2008 whose main objective is to serve, protect and promote the interests of the South African potato industry. In terms of its role in the potato industry, Potatoes South Africa operates as an organisation and its structure represents a network of participating role players and individuals. |
| **Onion Producers' Organisation** | OPO is an association whose main objective is to serve, protect and promote the interests of the South African onion industry. |
| **Consumer Goods Council of South Africa** | The Consumer Goods Council of South Africa (CGCSA) is a member organisation that acts as the representative body of the entire consumer goods industry. Established in 2002, the CGCSA has more than 12 000 member companies across the consumer goods value chain – including the retail, wholesale and manufacturing sectors. |

### 9.4 Technology

Technology is an important aspect to consider in the Agri-Park. Despite the increasing mechanisation of agriculture and decrease in reliance on manual labour, it is important to strike a balance of mechanisation and job creation which improves skills and creates meaningful jobs.

It will vitally important to acquire the correct equipment needed to create a successful Agri-Park. To produce vegetables various equipment will be needed such as tractors, trailers, ploughs, planters (seeds), irrigation, fencing, basic farming implements (spades, hoes etc.) and trucks or LDVs for transporting goods.

Recent developments in farming will have to be considered in order for any farming activity to be competitive in the future. Three such changes have occurred in the vegetable industry; hydroponic tunnels, vertical farming and multi-layered farming.

**Hydroponic Agriculture**

Hydroponic agriculture is a system where plants are grown in growth media other than natural soil. All the nutrients are dissolved in the irrigation water and are supplied at a regular basis to plants. In a South African context hydroponic systems are always grown under protection (ARC, 2015). The advantages of such a system are numerous namely;

- Hydroponically produced vegetables can be of high quality and need little washing.
- Soil preparation and weeding is reduced or eliminated.
- It is possible to produce very high yields of vegetables on a small area because an environment optimal for plant growth is created. All the nutrients and water that the plants need, are available at all times.
- Soil quality is of limited importance.
- Water is used efficiently.
- Pollution of soil with unused nutrients is greatly reduced (ARC, 2015)

Some of the disadvantages however, include;

- Hydroponic production is management, capital and labour intensive.
- A high level of expertise is required.
- Daily attention is necessary.
- Specially formulated, soluble nutrients must always be used.
- Pests and diseases remain a big risk.
- Finding a market can be a problem (ARC, 2015).

**Vertical Farming**

Similarly to hydroponic agriculture is the idea of vertical farming. Vertical farming is the act of growing plants using hydroponics but stacked vertically on top of each other (AVF, 2015). It utilises LED lights to simulate sunlight and thus can be placed in doors in old buildings and underutilised spaces. Crops can grow 40% faster than in a field and often do not require poisonous substances as pest are kept at bay (AVF, 2015). The exact nutrients and minerals are provided through the irrigation system with little to no use of soil. The overall impact is that more plants can be grown in a limited space with little concern for the outdoor temperature or soil conditions. The pioneers of this industry are the USA, Japan and Singapore. The biggest negatives of this system is that it utilises a large amount of electrical power (AVF, 2015). Additionally, depending on the method used to produce electricity then it could be possible that vertical farming is more dangerous to the environment than field farming.

**Multi-layered farming**

Although not a novel concept multi-layered farming has emerged as important part of the global livelihoods strategy and a possible way forward for emerging farmers. While commercial farmers have the opportunity to grow extensive amounts of a single crop, emerging farmers may not have the luxury of large tracts of land and

need to utilise the land as much as possible while maintaining the soils integrity (Agricultures Network, 2015). Multi-layer farming is using the different layers of soil to grow different crops. Tubers can be grown deep in the bottom layer of soil, carrots or other bulbs in the mid layer and lettuce or cabbage in the top layer of soil. It should be noted that it is important to choose crops that are complimentary and not choose crops and that use the same minerals (Agricultures Network, 2015).

This method of farming was used extensively in the Himalayas and is seen as a solution to not having extensive tracts of land to grow crops. It provides emerging and small farmers with many marketable options and sustainability as well as livelihood resilience. If one crop is undesirable or is not successful then other crops can cover any losses experienced. The biggest pitfalls of this system is that it requires extensive knowledge of the area and of the crops that can be grown together (Agricultures Network, 2015).

**ICT**

ICT is possibly the biggest development in the agricultural sector for emerging and commercial farmers alike. The emergence of the internet and mobile phones has led to an exorbitant amount of data at the fingertips of the farmers. If they require information then it can be obtained immediately and problems solved sooner than before (e-Agriculture, 2015). ICT has allowed the emergence of training software and applications (Apps) which people can use for the benefit of the staff who work for them and for themselves. Training can be done outside of training centres and content directly displayed on smartphones. Smartphones have also allowed for greater access to market prices and market related news as it happens and sooner than what used to occur (e-Agriculture, 2015). This can allow farmers to make adjustments before they impacted negatively. This has also allowed access to online and cell phone banking and various finance facilities (e-Agriculture, 2015). This means that farmers have access to their finances from their phones and do not have to leave the farm to bank. Online banking has also made farming safer as large amounts of cash is no longer used to pay staff and instead can be paid into bank accounts or cell phone numbers. ICT has allowed for the effective design of farms around the land that is available to farmers and has allowed for farmers to be more efficient and handle finance and information related queries over a long distance instead of being at a physical location in person. This has also allowed for the effective management and understanding changing markets as they occur which allow farmers to react in a timely manner (e-Agriculture, 2015).

Numerous smartphone apps also exist for the convenience of the farmer. *Pantheon Farming* from App Lab allows farmers to enter all data directly on location, which is synchronized with a main database. This reduces the possibility of errors and eliminates duplicate data entries. *eFarmer* is a simple app designed for the agricultural industry that allows users to construct an electronic map of fields to create a database of various crops in the fields. The app also allows users to take notes on the fields as points of interest, keep the location of specific objects on the farm and keep a diary of the operations for each field users own. *AgriApp* is an Android app that enables farmers to access large pool of relevant information related to agriculture and specific crops and animals.

Online resources also exist which can be accessed through a phone, tablet or PC which is connected to the internet. Sites such as *FAO:Ecocrop* provides detailed crop requirement information for almost any crop that are cultivated throughout the world, including its uses and requirements for temperature, rainfall/water, soil type, soil depth, soil pH, salinity, altitude etc. It also include hundreds of forage crop species for extensive animal farmers. Another site *My Agriculture Information Bank* provides a variety of general agricultural information to farmers.

The Agri-Park needs to take cognisance of the technology that is available in order to assist the emerging farmers. By integrating technology into training regimes that are provided in the Agri-Park, emerging farmers will have access to the latest events in their respective fields.

**Logistics**

In order for the Agri-Park to be successful there needs to be an effective and well run logistics system. Logistics is an extremely important part of agriculture as it relies on transport of goods to and from the farm to the processing facilities and o to markets. Trucks and other large freight vehicles which transport goods are vitally important in any industry and is also important in the vegetable industry. Goods need to be transported in such a manner that they are not damaged. If goods need preservation then it is important to consider using refrigerated trucks to transport of produce. The second aspect of logistics is the medium of transport itself. Roads or the rail system need to be in good order and should be well connected in order to reduce the loss of produce and damage to trucks which can add on unnecessary costs to the farmers.

## 9.5 Demand and Needs Analysis

Per capita consumption of vegetables has remained relatively stable over the last 10 years, ranging between 43.01kg per year to 45.68kg per year. Figure 9.11 illustrates the fluctuations in per capita consumption of vegetables between 2004 and 2014.

With respect to the importance of, and opportunities posed by the specific marketing channels, the following market segments are the most promising that should be focused on:

- National Fresh Produce Markets during the initial start-up phase.
- Street hawkers including bakkie traders, however, it is essential to establish a logistical and supply coordination system as discussed.
- Government institutions, as soon as the farmers become reliable suppliers.
- Large retail chains should become a major priority after the farmers have gained experience in production and the Agri-Parks system successfully established quality control and streamlined logistical arrangements
- Packhouses (vegetable packers and wholesalers) and processors in case of farms that are situated near packers or processors that handle cabbages.

It is possible to provide an estimate for demand based on historical consumption figures and populations. The figure below provides a summary of estimated demand on a national and provincial level. At an average per capita consumption of vegetables at 43kg, there is clear demand for vegetables in South Africa. Demand for vegetables is approximately 2.2 million tons per year. In Amathole the demand for vegetables is approximately 38 383, 38 tonnes as seen in figure 9.14. The areas of highest demand are Mbashe and Mnquma

**Figure 9.14: Annual demand for vegetables (tons)**

| Area of Demand | Estimated Demand |
|---|---|
| **South Africa** | 2 226 134,09 |
| **Eastern Cape** | 282 168,28 |
| **Amathole District** | 38 383,38 |
| **Mbhashe** | 10 961,08 |
| **Mnquma** | 10 852,79 |
| **Great Kei** | 1 676,59 |
| **Amalhati** | 5 279,44 |
| **Ngqushwa** | 3 104,17 |

| | |
|---|---|
| **Nkonkobe** | 5 465,95 |
| **Nxuba** | 1 043,35 |
| **Buffalo City Metro** | 32473,60 |

*Source: Quantec 2013, Census 2011*

### 9.5 Competitors

While the area has a few competing commercial farmers in the immediate area of Addo, there are a few commercial vegetable farmers located in the Hankey and Patensie area. Any competitors in the area however, will provide significant input in terms of skills and expertise in the municipality. The benefits of farming in areas that already have a strong presence of commercial farmers is possibly more of a benefit than a disadvantage. This in turn can lead to agglomeration and greater focus from the public sector in providing services that are needed.

### 9.7 Socio-Economic (Job Creation)

The Agri-Park project vision, as discussed in Chapters 1 and 2, outlines the importance of socio-economic development as an objective of the Business Plan. Socio-economic progress and development can be measured in various ways, however the primary method of measurement selected for livestock commodity is Job Creation. Job creation is measured via the use of commodity labour multipliers, measuring the number of jobs created per R1 million produced directly into commodity production. The three relevant multipliers for the Amathole District Municipality vegetable market are the:

- Direct Multiplier
- Indirect Multiplier
- Induced Multiplier

The three multipliers measure the total numbers of job created in an ideal economic environment for the vegetable market however, as the economic environment diverges away from the ideal environment, so do the multipliers.

The Figure below displays the sectoral labour multipliers applicable to the vegetable industry, i.e. the number of the job opportunities created at different levels for every additional R1-million production. From the Figure below it can be determined that 2.49 jobs are directly created while 1.37 are indirectly created for every R 1 million produced. Overall 5.75 jobs are created throughout the value-chain for every R 1 million produced.

**Figure 9.15: Direct, Indirect and Induced Jobs Created in the Vegetable Industry**

| Sector | Direct | Indirect | Direct + Indirect | Induced | Total |
|---|---|---|---|---|---|
| Vegetables | 2.49 | 1.37 | 3.86 | 1.89 | 5.75 |

Vegetables are considered labour intensive and have a high growth potential according to the BFAP (2015). Vegetables can provide work for upwards of 1.3 people per hectare. This is a vastly superior to many other industries in the district. This can be considered suitable to small and emerging farmers as the high growth potential allows for stable employment and growth of income.

Information that is available on the District's vegetable production and the potential number of hectares, together with the Bureau for Food and Agriculture Policy, have been used to estimate the employment opportunities that vegetable production can contribute in the 10-year period. The Agri-Park can provide between 2 500 – 7 500 employment opportunities from the programme. It must be noted however that these figures are purely indicative and will change through the development of the Agri-Park.

### 9.8 Contribution to Food Security

One of the core concepts that the Agri-Park seeks to address is the issue of food security of communities. It is believed that the Agri-Park concept can assist in increasing food security and sustainability of communities' livelihoods. DAFF launched a Zero Hunger Policy in 2012 in order to curb poverty and improve food security for vulnerable communities who are in need of support. The Zero Hunger Policy was created to uphold Section 27,1 (b) of the bill of rights which states that every citizen has the right to food and water and Section 28,1 (b) which states that every child has the right to basic nutrition shelter and basic care and social services. The policy suggest that adult daily calorie should be 1792 kcal (7502kj) per day for an adult and sets a food poverty line of R260 per individual expenditure for food every month (DAFF, 2002). Vegetables are an extremely important part of food security as they provide valuable nutrients and minerals required in the day to day diet of all community members. Vegetables provide an abundant, cheap source of fibre and several vitamins and minerals. In general, they have the highest nutritional value when eaten fresh, although an exception may be fermented foods, in which the process of fermentation can increase the content of B-vitamins (FAO, 2001). Vegetables can often be used as staples such as potatoes and various others. Processes which can improve the quality and taste of vegetables are also important and can be performed such as drying, fermenting and pickling (FAO, 2001). These can prolong the life of the goods so that they are used at a later stage when food is scarce or sold on as a value added good. Bottling, canning and packing are important to preserve food for later consumption.

Income earned from the vegetable industry can also be used to purchase food goods in order to be more food secure as well.

### 9.9 Regulatory Requirements

There are numerous legislation documents governing the production of vegetables. These range from regulations as to the production inputs (National Water Act), to those governing production (Draft Plant Health (Phytosanitary) Bill) and to production standards and consumption. The most pertinent of the acts are contained in Figure 9.15. It is extremely important to acknowledge the available legislature and policies as the Agri-Park must follow the rule of law as set out by the relevant departments. It will align itself to the legislature that is published. Various other acts and policies are also apply to the citrus industry which are included in Figure 9.15 below.

**Figure 9.15: Polices Affecting the Vegetable Industry**

| Act | Description |
|---|---|
| **Agricultural Product Standards Act, 1990 (Act No. 119 of 1990) Various vegetables** | This act aims to standardise quality norms for agricultural and related products by establishing the criteria for such norms and distributing the information to all interested parties. These criteria may include the quality, packaging, marking and labelling as well as the chemical composition and microbiological contaminants of the products. |
| **Draft Plant Health (Phytosanitary) Bill 2014** | Provides phytosanitary measures to prevent the introduction, establishment and spread of regulated pests in South Africa and the control of regulated pests. It also provides regulation of the movement of plants, plant products and other regulated articles into, within and out of South Africa include exports of agricultural goods. |
| **Agricultural Pests Act, 1983 (Act No. 36 of 1983)** | The purpose of the Agricultural Pests Act, 1983 (Act No. 36 of 1983) and its subordinate legislations is to |

| Act | Description |
|---|---|
| | provide for measures by which agricultural pests may be prevented and combated and for matters connected therewith. The Act also mandates the Directorate Plant Health to regulate plants, plant products and other regulated articles when imported into South Africa. Plants, plant products and related materials are capable of harbouring quarantine pests, which if they enter South Africa with imported commodities and establish, may endanger the South African agricultural sectors. Similarly, pests that occur in South Africa may endanger countries to which we export and as a result South Africa may lose its export markets. |
| **Fertilisers, Farm Feeds, Agricultural Remedies and Stock Remedies Act, 1947 (Act No. 36 of 1947)** | The act provides for the appointment of a Registrar of Fertilizers, Farm Feeds, Agricultural Remedies and Stock Remedies; for the registration of fertilizers, farm feeds, agricultural remedies, stock remedies, sterilizing plants and pest control operators; to regulate or prohibit the importation, sale, acquisition, disposal or use of fertilizers, farm feeds, agricultural remedies and stock remedies; to provide for the designation of technical advisers and analysts; and to provide for matters incidental thereto. |
| **National Water Act, 1998 (Act No.36 of 1998)** | This act encompasses laws relating to water resources and the use thereof. |
| **Occupational Health and Safety Act, 1993 (Act No.85 of 1993)** | The act aims to provide for the health and safety of persons at work and the health and safety of persons in connection with the activities of persons at work and to establish an advisory council for occupational health and safety. |
| **Basic Conditions of Employment Act, 1983 (Act No. 3 of 1983)** | The act encompasses those regulations associated with fair labour practices. |
| **Marketing Act, 1968 (Act No. 59 of 1968)** | The Act has authorised an establishment and enforcement of regulatory measures to intervene in the marketing of agricultural products, including the introduction of levies on agricultural products. |
| **Stock Theft Act, 1959 (Act No. 57 of 1959)** | This Act encompasses those laws associated with the theft of animal stock and produce. |
| **Consumer Protection Act** | To promote a fair, accessible and sustainable marketplace for consumer products and services and for that purpose establish national standards relating to consumer protection. |

### 9.10 Substitute Products and Services

Vegetables are generally not substituted by any other products and play a pivotal role in the diet of the population and are very important part of society. Value added products from vegetables are also generally not substituted by many other products.

### 9.11 Vegetable Barriers to Entry

Barriers to entry are obstacles that make entry into a given market difficult such as regulations, high infrastructure costs or competition in the given area. This section will discuss the barriers to entry of the vegetable industry. The table below may provide some indications as the barriers that are faced by emerging farmers in the Agri-Park.

**Figure 9.16: Barriers to entry: Vegetables**

| CONSTRAINT | DESCRIPTION | LEVEL OF INFLUENCE |
|---|---|---|
| **POTATO BARRIERS TO ENTRY** | | |
| **Irrigation intensive** | Irrigated potato crops have substantially higher yields than non-irrigated (or dry) crops. The irrigation system needs to be installed and correctly monitored. | - |
| **CAPITAL, RAW MATERIALS AND PRODUCTION ISSUES** | | |
| **Climatic conditions** | The prevailing climatic conditions determine where horticultural products can be grown. This limits production to certain parts the district. | - |
| **Capital intensive** | The establishment of new high volume producing vegetable farms is capital intensive. This could prevent small scale and emerging farmers from entering the industry. Farming in hydroponic tunnels is also extremely capital intensive and could prevent entry into the market. | - |
| **COMPETITION AND ACCESS TO MARKETS** | | |
| **Industry Concentration** | The Limpopo Province accounts for the vast majority of South Africa's vegetable production. Accordingly support services, input suppliers, etc. are located in this province. | - |
| **Lack of post-harvest processing** | With the exception of a few industries, the majority of processing for Amathole District Municipality harvests is outside of the district, meaning that the profits associated with these value-adding activities are not captured by the district. | District. |
| **INFRASTRUCTURE** | | |
| **Roads** | Inadequate secondary road maintenance and development leads to high transportation costs, difficulties in accessing markets and long delivery times, which subsequently can affect all downstream activities. | Provincial |
| **Land** | The availability of land to expand vegetable fields is the largest infrastructural challenge facing the forestry in the district. | District |
| **Water** | A potential barrier to entry could be the distribution of water rights to new entrants into the industry. | Provincial |

*Source: Urban Econ, 2015*

### 9.12 SWOT Analysis

The following section discusses the Strengths, Weaknesses, Opportunity and Threats of the vegetable commodity value chain in the Amathole District. Strengths and weaknesses refer to the positive and negative internal factors affecting the growth of the industry; whereas threats and opportunities refer to the external factors affecting the industry.

#### 9.12.1 Strengths

**Biophysical:**

- There are numerous areas around the Amathole District strongly suited to the production of vegetables.

**Enterprise viability:**

- Demand for vegetables is strong across the Amathole District
- Markets for vegetables are relatively open and able to accommodate most production from a variety of sources including small and emerging farmers.
- Vegetable farms can begin production very soon after establishment

**Economic development:**

- Vegetable farming contributes significantly to down-stream economic opportunities and job-creation.

**Political and social goals:**

- The District and other public sector role-players are already very active in supporting vegetable farming projects.
- Vegetable farming contributes significantly to food security.
- Vegetable farming concerns are very sustainable in the long run if the land is managed correctly.

#### 9.12.2 Weaknesses

**Biophysical:**

- The prevailing climatic conditions determine where horticultural products can be grown. This limits production to certain parts of the district.

**Enterprise viability:**

- Significant investment in skills development and training in vegetable farming is required before significant levels of production can be achieved.
- The nature of certain vegetables limits them from being transported large distances.

**Economic development:**

- The establishment of new high-volume producing horticultural farms is capital intensive. This could prevent small-scale and emerging farmers from entering the industry.

#### 9.12.3 Opportunities

**Biophysical:**

- By approaching and supporting vegetables in a broad way, local farmers have the flexibility to select crops that are best suited to their local area, ensuring good quality production and high yields.

**Enterprise viability:**

Opportunities exist for the following in the Vegetable market:

- Construction processing facilities;

- Expand production capacity of horticultural farmers by assisting in quality production, financial support and technical requirements;
- Production of sundried tomatoes and tomato puree;
- Powdered products (for powdered soups, e.g. “Cup a Soup”);
- Frozen vegetables
- Mixed vegetable processing and packaging; and
- Introduction of high value, niche crops

**Economic development:**

- Vegetable farming has numerous agro-processing opportunities
- There are large opportunities to supply the local Amathole market with both fresh, frozen and processing vegetable products.
- By increasing local vegetable production and consumption in the local market, imports of vegetables into the area can be reduced.

**Political and social goals:**

- Vegetable farming can offer numerous opportunities for small and emerging farmers.

### 9.12.4 Threats

**Biophysical:**

- Climate change poses a significant threat to the future of the Amathole District agriculture sector, particularly in terms of rainfall and access to water.

**Enterprise viability:**

❖ A large portion of the Amathole District Municipality comprises former homeland areas. As a result, much of this land is held under communal land ownership. Releasing good quality land for commercial development is therefore likely to be difficult.

**Economic development:**

❖ Theft and vandalism of farm infrastructure / crops poses a moderate threat to vegetable farming in the Amathole District.

**Political and social goals:**

❖ Delays or complications in securing land to farm threatens to derail any planned vegetable farming projects.

# Maize

**Chapter 10**

# Chapter 10 Maize Commodity Analysis

The prioritisation matrix has identified that the maize product class has high potential for growth and development and to realise the goals of the Agri-Park concept. This chapter provides a thorough market assessment of the maize industry, a value-chain analysis identifying opportunities throughout the value chain and a detailed SWOT analysis.

This chapter continues under the following headings:

- Market assessment
- Value-chain analysis
- SWOT Analysis

## 10.1 Market assessment

Maize is one of the most important grain crops in South Africa and is the staple food of a large portion of the population. The South African maize industry was deregulated in 1997 and is operating in a free-market environment where producers sell to whomever they wish and the prices are determined by supply and demand.

### 10.1.1 Production

Maize is produced throughout the country in various environments. The production is dependent on rainfall that exceeds 350 mm per year. The figure 10.1 provides an overview of the production of maize in South Africa between 2003/04 and 2013/14.

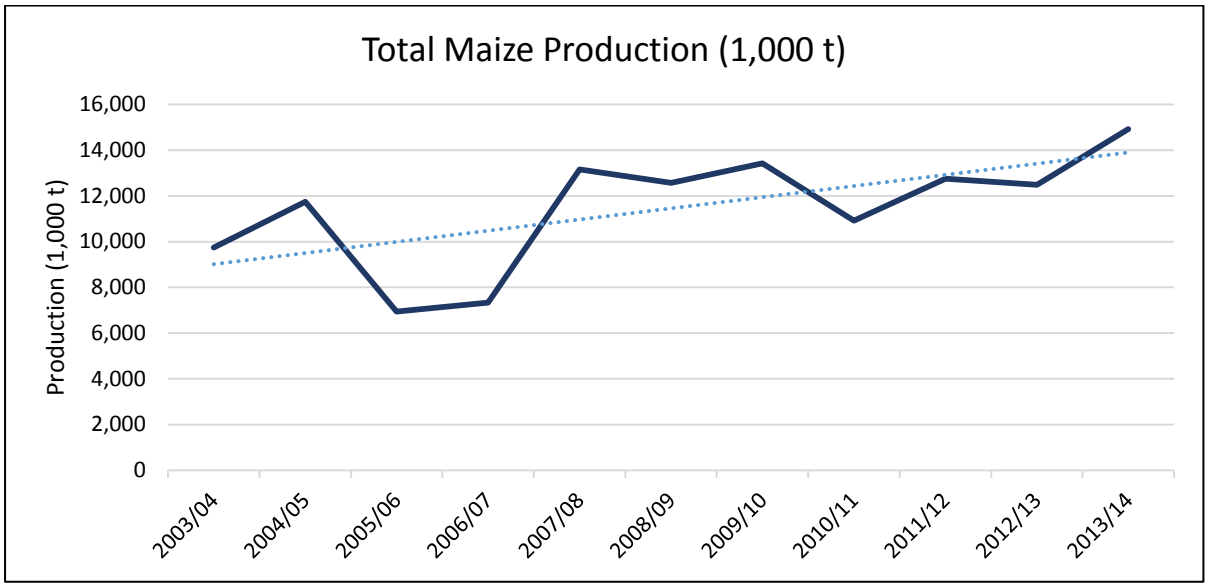
The total maize production for 2013/14 was 14,925,000 tons. The production volume increased by 19.5% between 2012/13 and 2013/14. The figure 10.2 indicates the maize production per province throughout South Africa for 2014/15.

The three provinces that made the largest contribution to maize production in South Africa in 2014/15 were the Free State (40.5%), Mpumalanga (22.3%) and the North West Province (16.1%). These three provinces together contributed a total of 78.9% of South Africa's maize production. The figure 10.3 indicates the area planted within South Africa for the period 2003/04 to 2013/14.

Between the period 2003/04 to 2013/14, the area planted stayed fairly constant between around 2,800,000 ha and 3,300,000 ha except for 2005/06 when it was at a low of 2,032,000 ha. The area planted in 2013/14 was 3,096,000 ha. The figure 10.4 provides an overview of the split between white and yellow maize that was delivered directly from farms in South Africa for the period 2003/04 to 2014/15.

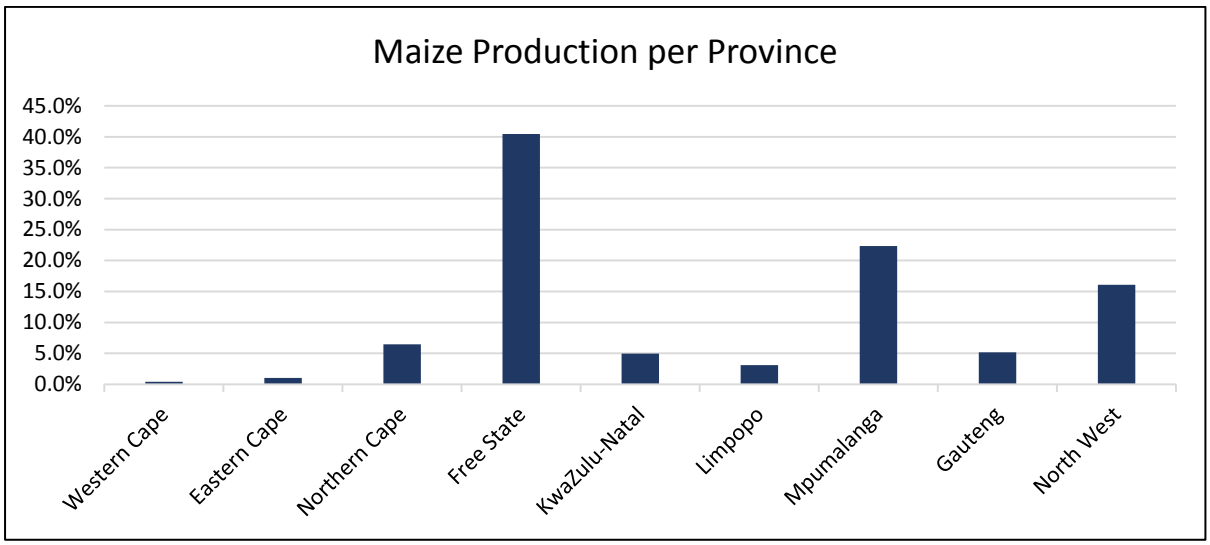
There has been a noticeable change in the split between white and yellow maize. In 2003/04, 70% of maize was white maize, while 30% was yellow maize. The contribution of yellow maize has increased over the years to such an extent that in 2013/14 yellow maize contributed 51%. In 2014/15 55% of maize was white maize, while 45% was yellow maize.

**Figure 10.1: Total Production Volumes, 2003/04 – 2013/14**



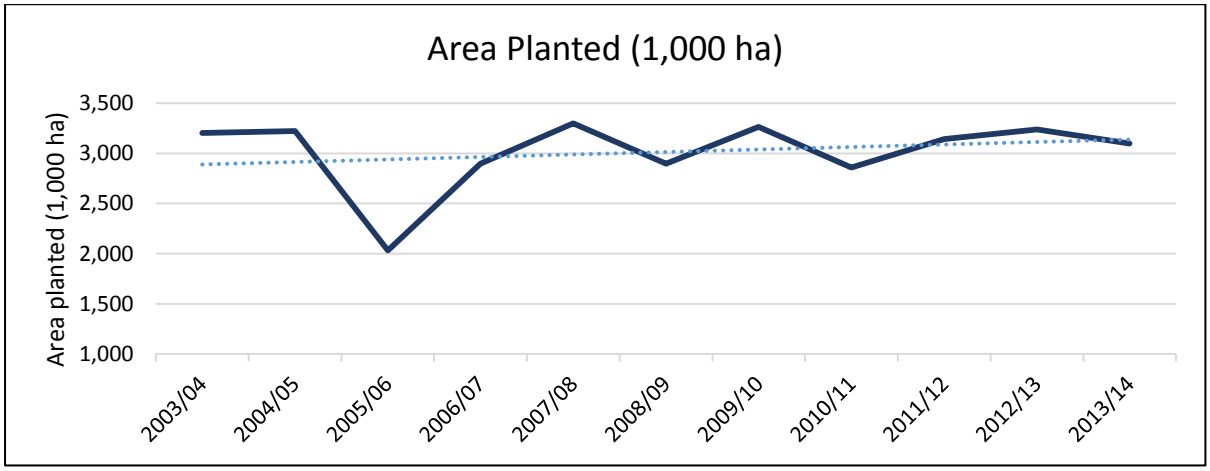

*Source: DAFF, 2015*

**Figure 10.2: Maize Production Per Province, 2014/15**



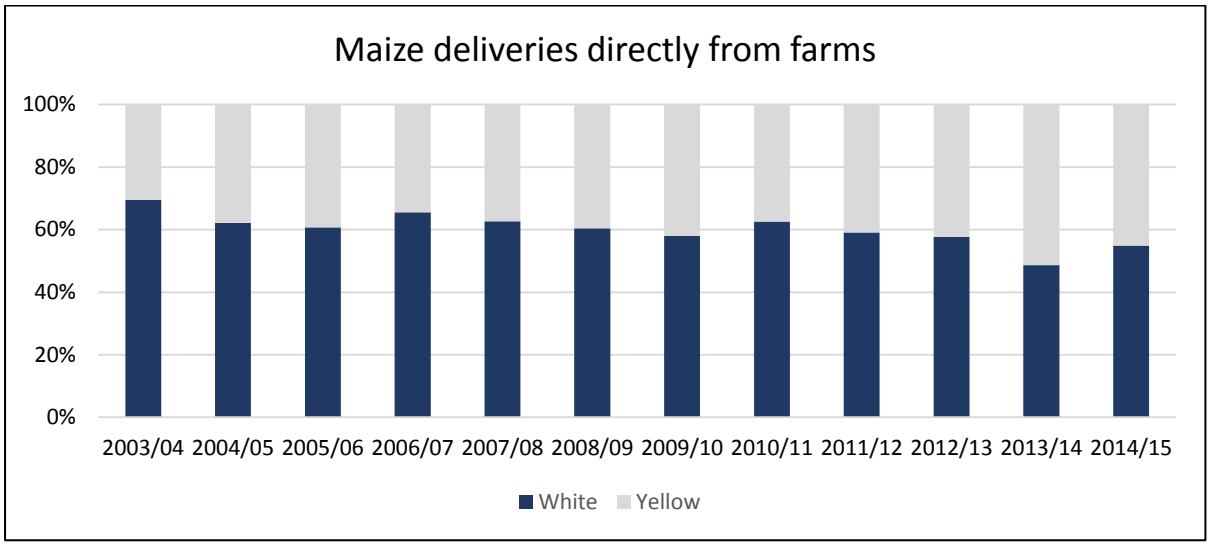

*Source: DAFF, 2015*

**Figure 10.3: Area Planted, 2003/04 – 2013/14**




*Source: DAFF, 2015*

**Figure 10.3: White and Yellow Maize Deliveries Directly from Farms, 2003/04 – 2014/15**

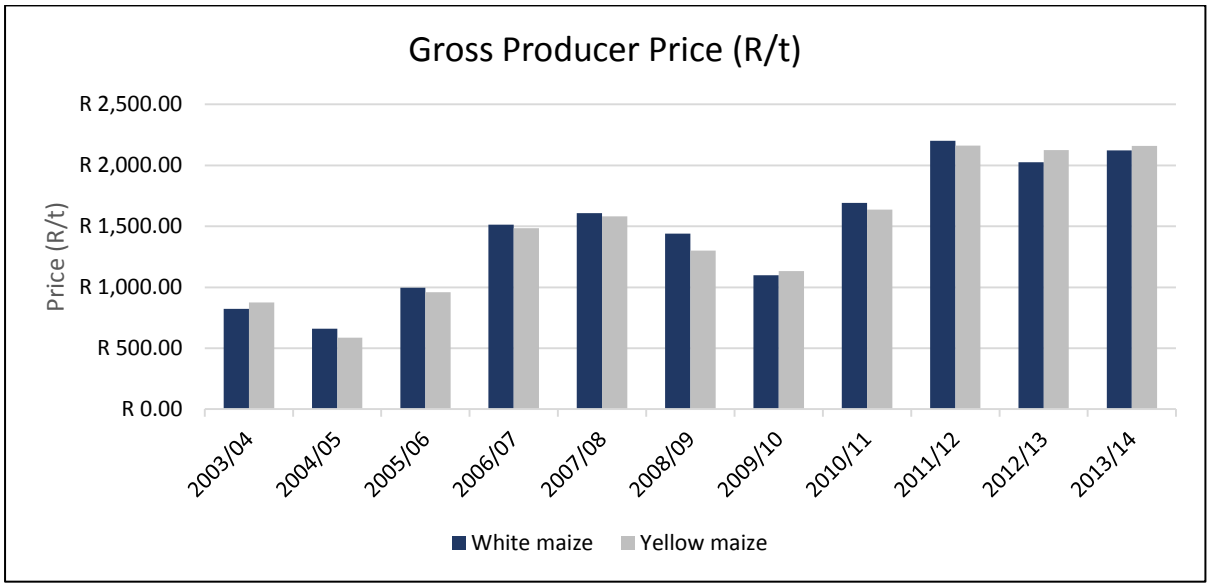



*Source: South African Grain Information Service, 2015*

### 10.1.2 Price

Figure 10.5 indicates the gross producer price for white and yellow maize between 2003/04 and 2013/14.

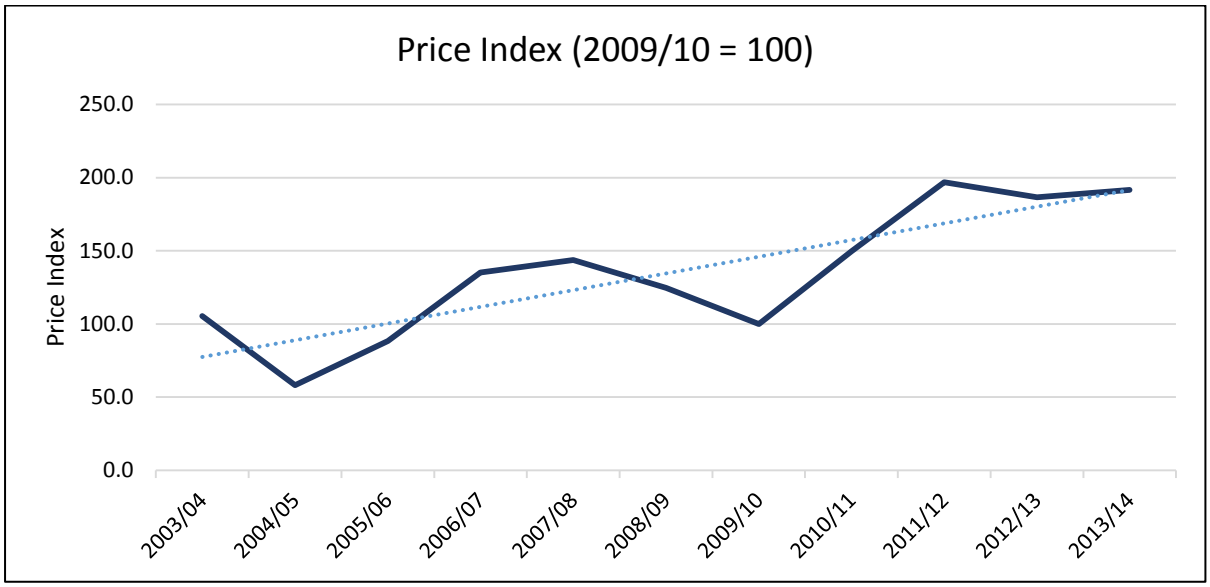
**Figure 10.5: Gross Producer Price, 2003/04 – 2013/14**




*Source: DAFF, 2015*

The gross producer price for white maize was R 2,122 per ton in 2013/14 and R 2,160 per ton for yellow maize. Figure 10.6 indicates the price index for maize between 2003/04 and 2013/14.

**Figure 10.6: Price Index for Maize, 2003/04 – 2013/14**



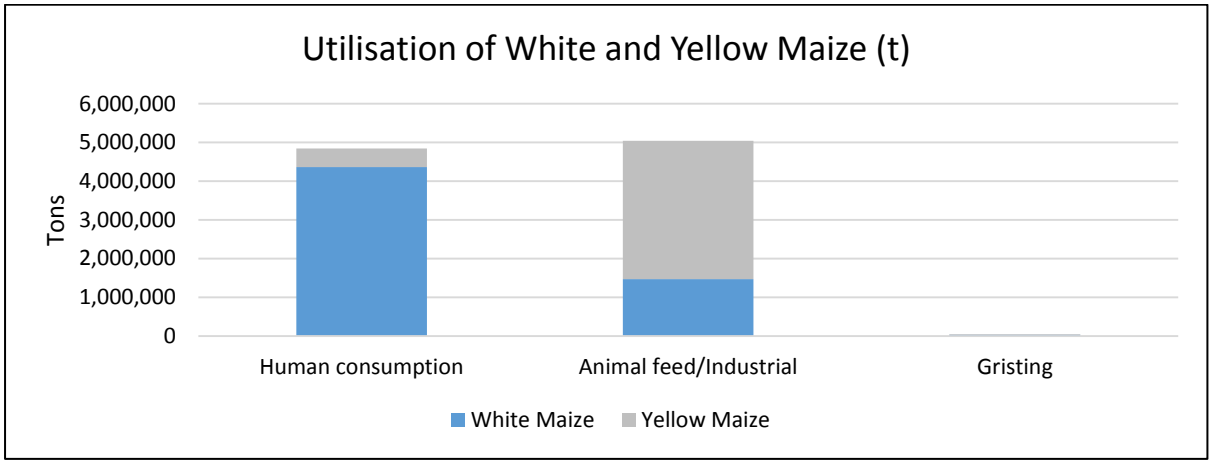

*Source: DAFF, 2015*

From the above figure it is evident that the price for maize has increased by an average of 6.2% per annum between 2003/04 and 2013/14. The price index stood at 191.5 in 2013/14.

### 10.1.3 Utilisation & consumption

Figure 10.7 provides an overview of the utilisation of maize that was processed for the local market in 2014/15.

**Figure 10.7: Utilisation of Maize, 2014/15**

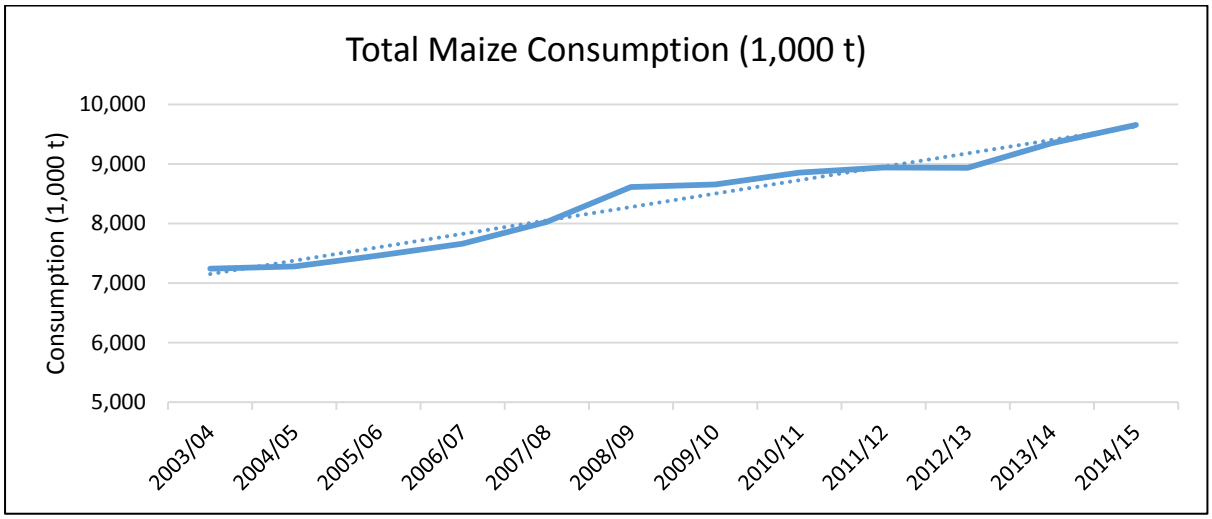



*Source: South African Grain Information Service, 2015*

The majority of maize (50.8%) is utilised for animal feed or industrial uses, while 48.8% is utilised for human consumption (maize processed for drinkable alcohol included). Only 0.5% of maize was utilised for gristing and no maize was utilised for biofuel. The majority of white maize was utilised for human consumption, while the majority of yellow maize was utilised for animal feed or industrial uses.

Figure 10.8 shows the total commercial maize consumption in South Africa between 2003/04 and 2014/15.

**Figure 10.8: Total Commercial Maize Consumption, 2003/04 – 2014/15**

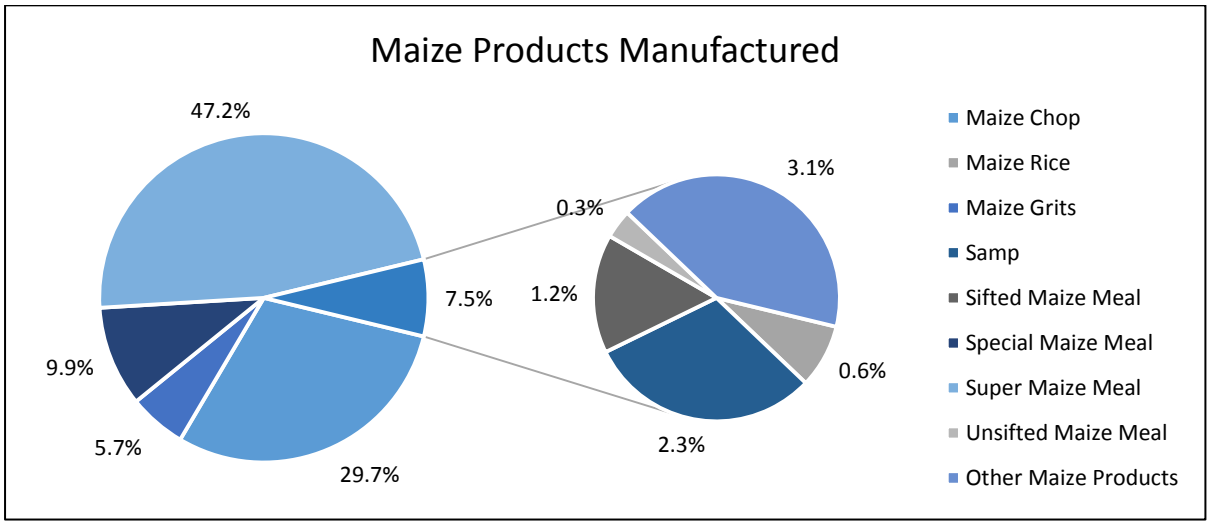



*Source: DAFF, 2015*

South Africa has seen a steady increase in the amount of maize consumed with an average increase of 2.9% per annum between 2003/04 and 2014/15. In 2014/15, a total of 9,659,000 tons of maize was consumed.

Figure 10.9 indicates the breakdown of the various maize products manufactured per month based on the average between July and September 2015.

**Figure 10.9: Breakdown of Maize Products Manufactured Per Month**



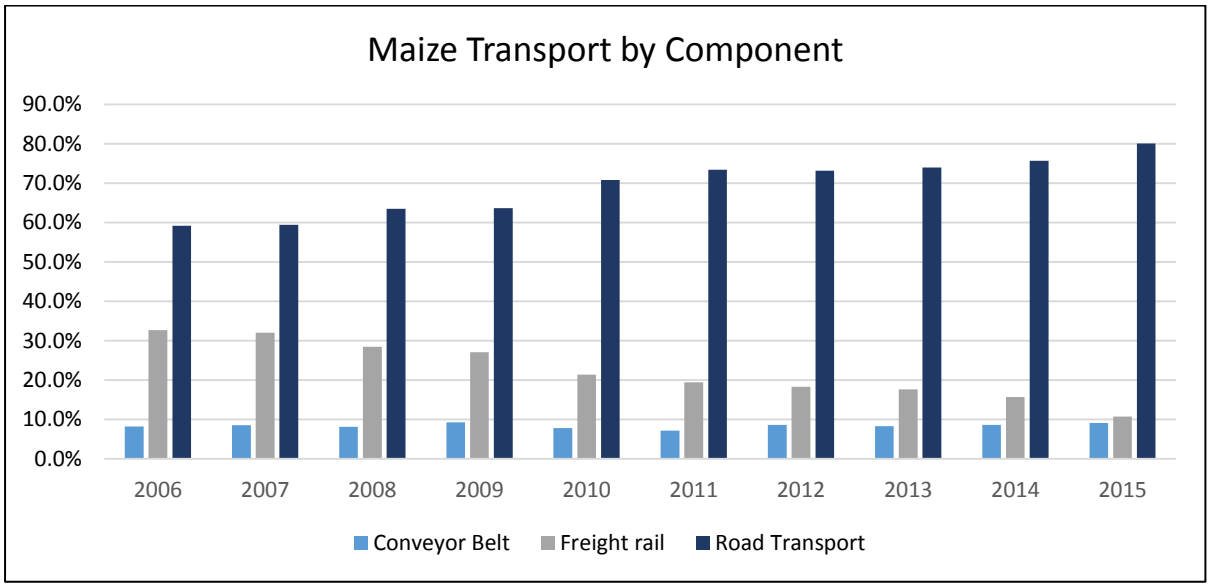

*Source: South African Grain Information Service, 2015*

The top maize products manufactured are Super Maize Meal (47.2%), Maize Chop (29.7%), Special Maize Meal (9.9%) and Maize Grits (5.7%).

### 10.1.4 Transport

Figure 10.10 indicates the means by which maize was transported in South Africa between 2006 and 2015. The percentage of maize transported by road has increased from 59.2% in 2006 to 80.1% in 2015, conversely, the percentage of maize transported by freight rail has decreased from 32.7% in 2006 to a mere 10.8% in 2015. The percentage of maize transported by conveyor belt has stayed fairly constant fluctuating between 7.2% and 9.3% over the period.

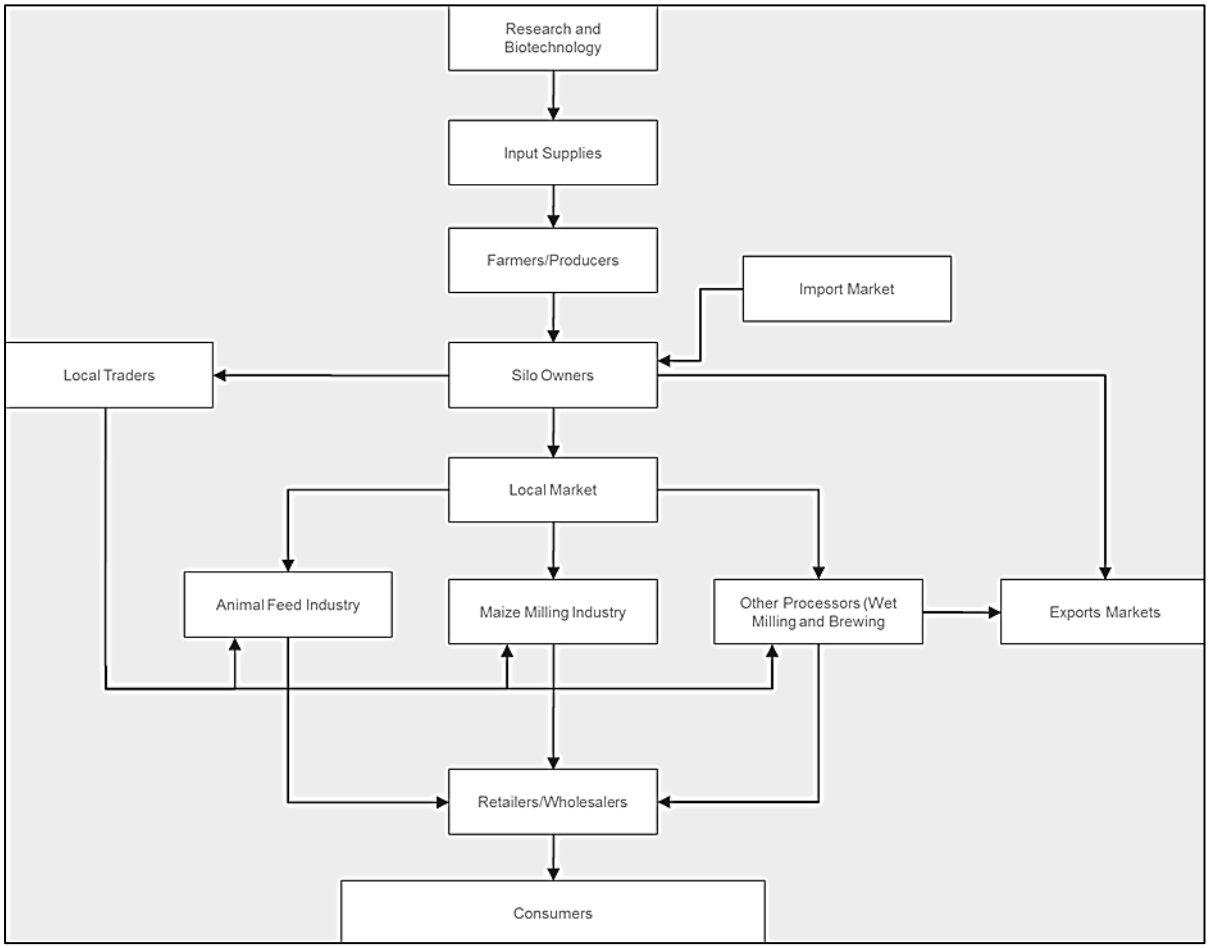
**Figure 10.10: Maize Transport by component, 2006 - 2015**




*Source: South African Grain Information Service, 2015*

## 10.2 Value-Chain Analysis

**Figure 10.11: Maize Value-Chain**



❖ **Upstream activities**

As Maize production is classified as primary production the upstream activities relevant to the value chain are primary the input supplies used in the production system. The major inputs for maize production include seed, fertilizing, weed and pest control, machinery equipment as well as knowledge. Most of these inputs are supplied by Agricultural Co-operatives in the respective areas. The Eastern Cape Province has three major Agricultural Co-operatives namely:

- OVK – TRADE
- Humansdorp Ko-op
- East Cape Agri – Co-op Ltd / BKB LTD

❖ **Primary production activities**

Experts suggests that the Eastern Cape has the potential to produce 1.2-million tons of maize a year. In Grain SA's revised crop estimate for the 2015-16 season, it is estimated that the current drought situation might lead to SA having to import an estimated 1.29-million tons of maize this year. The traditional and state land policy in former homelands is "communal tenure", which refers to the system in most rural African communities that expresses an order of ownership and access to regulate the use and transfer of land. The rights to use the land are regulated by the chiefs or customary law.

Production figures indicate that Eastern Cape farmers have the potential to participate in mainstream commercial maize farming. The NCE figures indicate that in 1990 the Eastern Cape's maize production was 62,000 tons and 111,000 in 2014, a growth of 79%. This growth can be attributed to improved agricultural practices and technological improvements, but most importantly, to the contribution made by organised agriculture. When facing situations such as the current drought, where 75% of SA's maize production is at risk, the Eastern Cape farmers are enjoying fairly stable climatic conditions allowing for acceptable production levels. The agro-ecological base of the Eastern Cape, while prone to degradation, is fairly robust. In 2003, the Eastern Cape Department of Agriculture estimated that the province had approximately 500 000 hectares of moderate to high potential, rain-fed cropland available for development while only 15 000 hectares was under production.

❖ **Downstream activities**

It is estimated that the Eastern Cape has the potential to produce 1.2 million tonnes of maize per annum. In a typical year, Eastern Cape-based maize millers purchase 15 000 tonnes of maize grain and 80 to 90 percent of this is sourced outside the province. If maize grain could be produced in the Eastern Cape and delivered to local millers at below the cost of intra- provincial imports, maize meal prices for local consumers may be reduced. This could have a strong impact on reducing poverty since the ultra-poor in South Africa spend more than 50 percent of their monthly income on food. Of this amount, approximately 20 percent is spent on maize meal (Traub and Jayne, 2006).

Opportunity for storing (silos), milling (animal feed and maize meal for human consumption) and processing to various alternative produce. Packaging, transporting and branding are important requirements. Require sufficient supply - economies of scale. Require high level management capacity.

It should be noted that there are various mills in East London and should be taken in consideration before establishing new facilities.

Large storage facilities/silos exist in Butterworth but needs upgrading.

### 10.3 Stakeholders

There are a number of organisations involved in the maize value chain in South Africa. One of the key organisations is Grain SA. Grain SA is a voluntary association that provides commodity strategic support and

services to South African grain producers to support sustainability. Figure 10.12 shows other key stakeholders in the maize sector in South Africa. It is important to consider the buy-in of the relevant stakeholders into the Agri-Park as they can provide skills, expertise and advice to emerging farmers.

**Figure 10.12: Maize Sector Stakeholders**

| Stakeholder | Description |
|---|---|
| **Marketing/Trade** | |
| **SA Grain Information Service (SAGIS)** | SAGIS is a section 21 company founded in November 1997, after the deregulation of agriculture in South Africa, to provide certain agricultural industries with vital marketing information. |
| **Industry bodies** | |
| **AFMA (Animal Feed Manufacturers Association)** | AFMA represents the animal feed industry on various committees and platforms where it is necessary to enhance or protect the interests of Industry. |
| **GOSA (Grand Handling Organisation of Southern Africa)** | The main objective of this organisation is to create an environment in which all institutions and individuals who are directly involved in the handling, storage, marketing, financing, distribution and processing of grain and related industries can fulfil their roles effectively. |
| **NCM (National Chamber of Milling)** | NCM is a trade association not for gain, representing the interest of the South African flour and maize milling industry. The organisation promotes, encourages and assists in the common interest of the milling industry in South Africa. |
| **Industry trusts** | |
| **Maize Trust** | The Maize Trust provides funding for the benefit of the maize industry in South Africa and more specifically to financially support market- and production-related scientific and/or technical research in respect of maize and market access in respect of South African maize. |
| **Grading equipment** | |
| **Ronin Grain Management Services** | Ronin Grain Management Solutions supplies grain management system solutions, analytical grading equipment and grain handling services to the Southern African Grain Handling and Storage Industry. |
| **Laboratories** | |
| **SA Grain Laboratory (SAGL)** | This non-profit company delivers market driven analytical laboratory services. |
| **International grain industry bodies** | |
| **Grain Elevator and Processing Society (GEAPS)** | GEAPS has dedicated itself to becoming the Knowledge Resource of the Grain Handling Industry through its strategic plan, and the Core Competencies that GEAPS developed to define those areas of skills and technologies that are most relevant to GEAPS members and their industry. |
| **World Grain** | The Grain and grain processing information site |

*Source: AgbizGrain, 2015*

## 10.4 Technology

Agricultural research and technological innovation have been attributed to the African continent's higher than expected agricultural productivity rate (at 1.8%) over the last three decades (Juma, 2011). Small holder farmers

linked to the Agri-Park will have an opportunity to make use of leading technology to support the production, marketing, logistics and processing of their commodity. Maize as with other commodities has benefited from developments in genetics, nanotechnology, GIS and remote sensing, information systems and communication technology.

The basic equipment required by farmers involved in the Agri-Park, to produce maize will include tractors, trailers, ploughs, planters (seeds), irrigation, fencing, basic farming implements (spades, hoes etc.) and trucks or Light Delivery Vehicles (LDVs) for transporting goods.

Recent developments in farming will have to be considered in order for any farming activity to be competitive in the future. Two such major considerations must be acknowledged for maize industry, this is mechanisation and farm energy.

**Mechanisation**

Mechanisation is the process of using agricultural machinery to industrialise work in the agricultural sector, leading to increased farm productivity. The advancements in mechanisation for maize have been:

- New generation small hand tools
- Small-scale implements and tractors: New generation of farming implements and tractors tailored for small-scale farming

Many farming activities, especially repetitive day-to-day work, can be greatly enhanced by hand tools designed for the particular task, speeding up production and reduce health and safety risk. This is especially suited to small-scale farmers. Farmers benefit from modern mechanisation and large leaps in productivity even though they farm at small scale, and at a much lower cost compared to conventional implements used by large commercial farmers. The cost of small-scale implements and tractors may be high enough to prohibit small-scale farmers.

**Farm Energy**

This refers to new sources of energy being incorporated in the agriculture process, this includes renewable energy. The advancements in farm energy in relation to maize has been:

- Wind energy: Wind energy has been used for a long time in South Africa in the form of wind pumps. New generation wind technology allows for uses beyond wind driven water pumping, including electricity generation at micro or farm level scale.
- Solar technology incl. photovoltaic and thermal panels and solar drying and cooking: There are two main forms of solar energy harvesting, i.e. photovoltaic panels that produces electricity, and thermal solar panels or tubes that heat water. Solar energy is also widely used on farms for solar drying and solar cooling.

Wind is a renewable form of energy and some areas in South Africa do have sufficient wind development potential, especially when micro-climatic and small-area topographic factors are considered which is appropriate for very small-scale operations. Wind energy is also less vulnerable to theft compared to solar panels. Solar is a renewable form of energy that should be considered if wind development potential is not sufficient.

Other technological advancements in the maize sector that should be considered for the Agri-Park are:

- Recombinant DNA technology and genetic modified varieties: The process of natural selection by traditional breeders can be accelerated by deliberate insertion of genes that code for a particular trait into the host organism, thereby it is possible to develop crop varieties that have more desirable traits.

- No-till or conservation tillage: Land preparation for crop production without tilling the land at all, or just partially breaking up of the soil.
- Remote sensing: Interpreting satellite images to make farming decisions. Satellite images provide valuable information on biomass production, soil and air mass temperature, soil moisture, plant stress levels, fire warnings etc.
- Integrated weed and pest management incl. biological control agents: Pests and weeds are major threats to farmers and food security. Chemical control has been effective for some pests and diseases but it is expensive and causes harm to human health and the environment. Consumers and governments locally and to export markets place increasing pressure on farmers to adopt integrated management practices to reduce reliance on only chemical control. Especially important is biological control where the natural enemy of the weed or pest are released locally to control population levels. It is not only applicable to crop farmers but to all extensive and semi-intensive animal farmers as well (pasture or veld management).

Recombinant DNA technology and genetically modified varieties can lead to large gains in traits such as drought, salt, pest, pathogen or herbicide tolerance, superior yields, nitrogen uptake ability, taste and texture etc. It is particularly important to sustain future expanding populations and to compensate for climate change effects such as drought and salt tolerance, nitrogen metabolism and even fixation, herbicide tolerance (to facilitate weeding, a major agricultural problem) and general yield improvements. No-till conservation tillage can have significant cost savings in terms of diesel, increased moisture retention and reduced soil erosion. Remote sensing enables the farmer to make well informed decisions based on information that otherwise would have been too difficult or expensive to obtain. It provides complete information of the entire farm and some information is provided daily or instantly. Integrated weed and pest management is generally more effective and sustainable than chemical control on its own (Maastraat, 2015).

**ICT**

ICT is possibly the biggest development in the agricultural sector for emerging and commercial farmers alike. The emergence of the internet and mobile phones has led to an exorbitant amount of data at the fingertips of the farmers. If they require information then it can be obtained immediately and problems solved sooner than before (e-Agriculture, 2015). ICT has allowed the emergence of training software and applications (Apps) which people can use for the benefit of the staff who work for them and for themselves. Training can be done outside of training centres and content directly displayed on smartphones. Smartphones have also allowed for greater access to market prices and market related news as it happens and sooner than what used to occur (e-Agriculture, 2015). This can allow farmers to make adjustments before they impacted negatively. This has also allowed access to online and cell phone banking and various finance facilities (e-Agriculture, 2015). This means that farmers have access to their finances from their phones and do not have to leave the farm to bank. Online banking has also made farming safer as large amounts of cash is no longer used to pay staff and instead can be paid into bank accounts or cell phone numbers. ICT has allowed for the effective design of farms around the land that is available to farmers and has allowed for farmers to be more efficient and handle finance and information related queries over a long distance instead of being at a physical location in person. This has also allowed for the effective management and understanding changing markets as they occur which allow farmers to react in a timely manner (e-Agriculture, 2015).

Numerous smartphone apps also exist for the convenience of the farmer. Pantheon Farming from App Lab allows farmers to enter all data directly on location, which is synchronized with a main database. This reduces the possibility of errors and eliminates duplicate data entries. eFarmer is a simple app designed for the agricultural industry that allows users to construct an electronic map of fields to create a database of various crops in the fields. The app also allows users to take notes on the fields as points of interest, keep the location of specific objects on the farm and keep a diary of the operations for each field users own. AgriApp is an Android app that

enables farmers to access large pool of relevant information related to agriculture and specific crops and animals.

Online resources also exist which can be accessed through a phone, tablet or PC which is connected to the internet. Sites such as FAO:Ecocrop provides detailed crop requirement information for almost any crop that are cultivated throughout the world, including its uses and requirements for temperature, rainfall/water, soil type, soil depth, soil pH, salinity, altitude etc. It also include hundreds of forage crop species for extensive animal farmers. Another site My Agriculture Information Bank provides a variety of general agricultural information to farmers.

The Agri-Park needs to take cognisance of the technology that is available in order to assist the emerging farmers. By integrating technology into training regimes that are provided in the Agri-Park, emerging farmers will have access to the latest events in their respective fields.

**Logistics**

In order for the Agri-Park to be successful there needs to be an effective and well run logistics system. Logistics is an extremely important part of agriculture as it relies on transport of goods to and from the farm to the processing facilities and o to markets. Trucks and other large freight vehicles which transport goods are vitally important in any industry and is also important in the vegetable industry. Goods need to be transported in such a manner that they are not damaged. If goods need preservation then it is important to consider using refrigerated trucks to transport of produce. The second aspect of logistics is the medium of transport itself. Roads or the rail system need to be in good order and should be well connected in order to reduce the loss of produce and damage to trucks which can add on unnecessary costs to the farmers.

## 10.5 Demand and Needs Analysis

Maize is a critically important agricultural product for South Africa both for its use as food and as a major input into the red and white meat value chains in the form of animal feed. Maize is produced throughout the country in various environments. The production is dependent on rainfall that exceeds 350 mm per year and is very susceptible to drought. Low rainfall figures and other adverse weather conditions experienced during the critical points of the growing season can see maize production levels for a season drop drastically worsening food-security and – through its various value-chain linkages – result in a sharp rise in food prices, particularly in the prices of meat.

Much of this vulnerability is due to maize growing being centred in the Free State, Mpumalanga and North West provinces. Increasing the production of maize in other parts of the country will assist in sheltering the maize market, and other agricultural markets, from this risk.

Maize is grown in South Africa primarily for local consumption. Production of both white and yellow maize has increased steadily over the past decade and expectations are that demand for maize will remain strong across the country in the medium to long term.

It is recommended that maize is marketed collectively in the ADM and that the Agri-Hub acts as a silo business. In the short-term the most promising channels will be to supply to existing silos and/or to sign forward contracts with large feedlots, piggeries and poultry producers that are situated as near as possible to the production areas. It is possible to provide an estimate for demand based on historical consumption figures and populations. The figure below provides a summary on estimated demand on a national and provincial level.

At an average per capita consumption of maize at 82.13kg, there is a clear demand for maize and maize products in South Africa. Demand for maize on a national level is approximately 4.2 million tons. In Amathole DM the demand for maize is approximately 73 312, 25 tons.

**Figure 10.13: Annual Demand for Maize (tons)**

| Area of Demand | Estimated Demand |
|---|---|
| **South Africa** | 4 251 916,11 |
| **Eastern Cape** | 538 941,42 |
| **Amathole District** | 73 312,25 |
| **Mbhashe** | 20 935,66 |
| **Mnquma** | 20 728,82 |
| **Great Kei** | 3 202,29 |
| **Amalhati** | 10 083,74 |
| **Ngqushwa** | 5 928,96 |
| **Nkonkobe** | 10 439,97 |
| **Nxuba** | 1 992,81 |
| **Buffalo City Metro** | 62 024,58 |

*Source: Quantec 2013, Census 2011*

## 10.6 Competitors

The maize sector in ADM is not as well-established as other sectors. Competition from commercial farmers within the district should therefore be relatively low in comparison to the other commodities. The ADM maize sector will however face substantial competition from the maize sector in OR Tambo DM, where there are a number of producers. The implications of this is that the ADM Agri-Park can easily penetrate the local market to meet the demand for maize within the district. The ADM Agri-Park can also create linkages with the OR Tambo or Chris Hani maize sector in order to grow the maize sector in the region.

## 10.7 Socio-Economic

Socio-economic progress and development can be measured in various ways, however the primary method of measurement selected for wool commodity is job creation. Labour input is a key element of the production process and one of the main production factors in any economy. The Figure below displays the sectoral labour multipliers applicable to the maize industry, i.e. the number of the job opportunities created at different levels for every additional R1-million production. The Figure below indicates that maize creates 3.49 direct on farm jobs, 1.34 indirect jobs and 1.91 induced jobs for every R1 million produced.

**Figure 10.14: Maize employment multipliers**

| Sector | Direct | Indirect | Direct + Indirect | Induced | Total |
|---|---|---|---|---|---|
| Other Agricultural Products | 3.49 | 1.34 | 4.83 | 1.91 | 6.74 |

The three multipliers measure the total numbers of job created in an ideal economic environment for the maize commodity. Small-scale production is notorious for utilising more labour per unit produced than large-scale commercial production endeavours. Small-scale production requires a small to medium investments in infrastructure and farming implements, while large-scale operations would require significant investments for planting, harvesting, storage and potentially processing, increasing the direct labour multiplier above that of the identified 3.49 jobs. Maize processing is likely to occur within the Agri-Hub at the Lady Grey processing facilities, leading to the expected increase in indirect job creation. Induced multiplier job creation within the district can be as expected.

Information that is available on the District's maize production and the potential number of hectares, together with the Bureau for Food and Agriculture Policy, have been used to estimate the employment opportunities that maize production can contribute in the 10-year period. The Agri-Park can provide approximately 730 employment opportunities from the programme. It must be noted however that these figures are purely indicative and will change through the development of the Agri-Park.

### 10.8 Contribution to Food Security

In October 2013, the government launched the food security programme, Fetsa Tlala. Government has made available R2 billion to support Fetsa Tlala. The programme is managed by DAFF.

The government's Integrated Food Security Production Intervention Programme was introduced in 2012 to afford smallholder farmers, communities and households the ability to increase production of basic food. This intervention will be managed over a period of 10 years from 2012 to 2022. The programme is intended to promote self-sufficiency and food security by getting communities to plant their own food.

Maize, wheat and rice are some of the most important staple foods in developing countries. According to CIMMYT (2011), between 2011 and 2050, the demand for maize will more than double. By 2025 maize will have become the crop with the greatest production globally and in the developing world. It was estimated that current levels of maize productivity growth will still fall short of demand and millions of farm families will remain in poverty. The report therefore provides a strategy that should improve food security and the livelihoods of the resource-poor (CIMMYT & IITA, 2011).

Rice, wheat and maize have been identified as global food security crops. While it is recognised that the world does not only consume rice, wheat and maize, challenges facing these crops should be addressed to avoid major negative implications for the poor. Climate change challenges has resulted in lower expected growth in maize production over the next few decades (IFPRI, 2010). Climate change challenges have been felt in 2015, with large parts of South Africa experiencing droughts, resulting in a considerable drop in production and an increase in prices. For food prices to remain relatively constant, annual yield gains must increase. It was estimated that maize yields should be increased internationally from 1.6% to 2.4%, using the same level of resources/inputs (IFPRI et al, 2010).

### 10.9 Regulatory Requirements

There are numerous legislation documents governing the maize sector. These range from regulations as to the production inputs, to those governing production. The pertinent of the acts are contained in Figure 10.15. It is extremely important to acknowledge the available legislature and policies as the Agri-Park must follow the rule of law as set out by the relevant departments. It will align itself to the legislature that is published.

**Figure 10.15: Maize Regulatory Requirements**

| Regulation | Description |
|---|---|
| **Agricultural Product Standards Act, 1990 (ACT No. 119 OF 1990)** | • Regulations relating to the grading, packing and marking of maize products intended for sale in the Republic of South Africa.<br>• Maize quality is determined by official grading regulations promulgated under the Agricultural Products Standards Act, which governs the classification and grading of maize based on several qualitative factors. The quality of the maize destined for export is confirmed with an export certificate issued by the Perishable Products Export Control Board (PPECB) as the official assignee of DAFF. |

| Regulation | Description |
|---|---|
| **Fertilisers, Farm Feeds, Agricultural Remedies and Stock Remedies Act, 1947 (Act No. 36 of 1947)** | • The act provides for the appointment of a Registrar of Fertilizers, Farm Feeds, Agricultural Remedies and Stock Remedies;<br>• for the registration of fertilizers, farm feeds, agricultural remedies, stock remedies, sterilizing plants and pest control operators;<br>• to regulate or prohibit the importation, sale, acquisition, disposal or use of fertilizers, farm feeds, agricultural remedies and stock remedies;<br>• To provide for the designation of technical advisers and analysts. |
| **National Water Act, 1998 (Act No.36 of 1998)** | • This act encompasses laws relating to water resources and the use thereof. |
| **Conservation of Agricultural Resources Act No. 43 OF 1983** | • Control over utilization of natural agricultural resources<br>• Promote conservation of soil<br>• Promote conservation of water sources<br>• Promote conservation of vegetation<br>• Combating of weeds and invader plants |
| **Genetically Modified Organisms Act** | • Promote the responsible development, production, use and application of genetically modified organisms.<br>• To limit possible harmful consequences to the environment.<br>• To give attention to the prevention of accidents and the effective management of waste.<br>• To limit, evaluate and reduce potential risks.<br>• To establish a council for GMO's<br>• To ensure GMO's do not present a hazard to the environment.<br>• To establish appropriate procedures for the notification of specific activities involving the use of GMO's. |
| **Marketing of Agricultural Products Act** | • To establish and enforce regulatory measures to intervene in the marketing of agricultural products, including the introduction of levies.<br>• To establish a National Agricultural Marketing Council |
| **Plant Breeders Rights Act** | • Plant breeder's rights are granted for certain kinds of plants.<br>• Establish rights to be complied with to grant the rights.<br>• For the protection of rights and exercise thereof. |
| **Plant Improvement Act** | • To provide for the registration of premises from which the sale of certain plants or the cleansing, packing and sale of certain propagating material may be undertaken.<br>• To prescribe the conditions for such plants, or propagation material to be sold.<br>• To provide recognition for such plants.<br>• To provide for a system of certification with the objective of maintaining quality.<br>• Control of imports and exports |
| **Agricultural Pests Act** | • To provide for measures by which agricultural pests may be prevented and combated. |
| **Foodstuffs, Cosmetics and Disinfectants Act (Act No. 54) of 1972** | • To control the sale, manufacture and importation of foodstuffs, cosmetics and disinfectants. |

| Regulation | Description |
|---|---|
| **Occupational Health and Safety Act, 1993 (Act No.85 of 1993)** | • Aims to provide for the health and safety of persons at work and the health and safety of persons in connection with the activities of persons at work and<br>• To establish an advisory council for occupational health and safety. |
| **Basic Conditions of Employment Act, 1983 (Act No. 3 of 1983)** | • Encompasses those regulations associated with fair labour practices. |
| **Marketing Act, 1968 (Act No. 59 of 1968)** | • The Act has authorised an establishment and enforcement of regulatory measures to intervene in the marketing of agricultural products, including the introduction of levies on agricultural products. |

The abovementioned legislation outlines the legal framework pertaining to the Agri-Park. The Agri-Park is intended to operate as an Agribusiness and therefore must adhere to the abovementioned legislation.

### 10.10 Substitute Products and Services

Maize and maize products do not have many substitutes. Maize serves as a stable food within the district, with the agricultural community revolving around subsistence production of the commodity. Maize production and processing often serve as substitutes to products further down the value chain.

### 10.11 Barriers to Entry

Barriers to entry are obstacles that make entry into a given market difficult such as regulations, high infrastructure costs or competition in the given area. This section will discuss the barriers to entry of the maize industry. The table below may provide some indications as the barriers that are faced by emerging farmers in the Agri-Park.

**Figure 10.16: Barriers to entry: Maize**

| Constraint | Description | Level Of Influence |
|---|---|---|
| **Capital, Raw Materials And Production Issues** | | |
| **Climatic conditions** | The prevailing climatic conditions determine where maize can be grown effectively, limiting production to only certain areas in the district. | - |
| **Farmland availability** | The identification of sufficient vacant land within the district on which to begin/expand maize production is a challenge for the industry. In the homeland areas, various land uses create a challenge. Related to this are the land tenure issues that will need to be addressed if land in these areas is to be released for commercial production. | Provincial |
| **High production costs** | A large proportion of production inputs are imported, resulting in relatively high input and capital costs. There are also significant costs associated with transporting maize to major markets. | - |

| Constraint | Description | Level Of Influence |
|---|---|---|
| **Human Resource Issues** | | |
| **Lack of skills** | Skill levels in ADM are relatively poor and there is a need for appropriate skills transfer programmes to improve production practices and subsequently, yields. | Provincial, District |
| **Infrastructure** | | |
| **Silos** | Since maize production is a once a year activity, harvested maize has to be stored in silos until utilised. This adds to the cost of the price of grain for the consumer, millers and the industry. There is also currently insufficient maize storage capacity in the Amathole District Municipality. | Provincial, District |
| **Competition And Access To Markets** | | |
| **Industry price setting** | The price of maize in South Africa is controlled by the import and export parity prices. The revenue received by individual farmers can therefore vary significantly, making it difficult for famers to properly manage their cash flow. | - |

*Source: Urban Econ, 2015*

### 10.12 Societal and Cultural Trends

Maize has an important cultural significance within the rural areas, with many households producing subsistence levels of production to supplement their diets. Maize has historically been produced at subsistence levels within the region, utilised by migrant farmers after bartering with Portuguese traders (Richards, 2003). Socially, maize still provides important usages, substituting large parts of the rural household's diet with production produced locally, with multiple uses, such as food for the household and the livestock, corn-bread, maize meal, etc.

### 10.13 SWOT Analysis

The following section discusses the Strengths, Weaknesses, Opportunity and Threats of the **maize** commodity value chain in the Amathole District. Strengths and weaknesses refer to the positive and negative internal factors affecting the growth of the industry; whereas threats and opportunities refer to the external factors affecting the industry.

#### 10.13.1 Strengths

**Biophysical:**

- There are numerous areas around the Amathole District strongly suited to the production of maize.

**Enterprise viability:**

- Demand for maize and maize products is relatively strong across the Eastern Cape.
- The market for maize are relatively open and able to accommodate most production from a variety of sources including small and emerging farmers.
- Maize farms can begin production relatively soon after establishment

**Economic development:**

- Maize farming contributes significantly to down-stream economic opportunities and job-creation.

**Political and social goals:**
- The District and other public sector role-players are already very active in supporting maize farming projects.
- Maize farming contributes significantly to food security both directly and by supporting the livestock value chain through the supply of feed.
- Maize farming concerns are very sustainable in the long run if the land is managed correctly.

### 10.13.2 Weaknesses

**Biophysical:**
- The prevailing climatic conditions determine where maize can be grown. This limits production to certain parts of the district.

**Enterprise viability:**
- Maize production does not generate large profits unless conducted on a very large scale.

**Economic development:**
- Maize farming does not contribute greatly to direct on-farm job creation.
- Maize farming jobs are relatively low-skilled and offer few opportunities for advancement.

### 10.13.3 Opportunities

**Enterprise viability:**
Opportunities exist for the following in the Maize market:
- Supply of maize inputs, particularly seeds
- Milling for maize meal as well as animal feed production
- Wet milling
- Development of silos and other storage facilities
- Brewing of maize (beer, etc.)

**Economic development:**
- Maize farming has numerous agro-processing opportunities that can be exploited at a District Agri-Park level.
- There are large opportunities to supply the local Amathole maize market.

**Political and social goals:**
- Maize is relatively accessible and easy to grow crop for small and emerging farmers.

### 10.13.4 Threats

**Biophysical:**
- Climate change poses a significant threat to the future of the Amathole District agriculture sector, particularly in terms of rainfall and access to water.

**Enterprise viability:**
- A large portion of the Amathole District Municipality comprises former homeland areas. As a result, much of this land is held under communal land ownership. Releasing good quality land for commercial development is therefore likely to be difficult.

**Economic development:**

- Theft and vandalism of farm infrastructure / crops poses a moderate threat to vegetable farming in the Amathole District.

**Political and social goals:**

- Delays or complications in securing land to farm threatens to derail any planned vegetable farming projects.