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# Evaluating the competitiveness of South African pork production within the global context

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A first annual progress report on the agri benchmark project, conducted by the Bureau for Food and Agricultural Policy (BFAP) in collaboration with the Thünen Institute in Braunschweig, Germany



Compiled for  
South African Pork Producers Organisation

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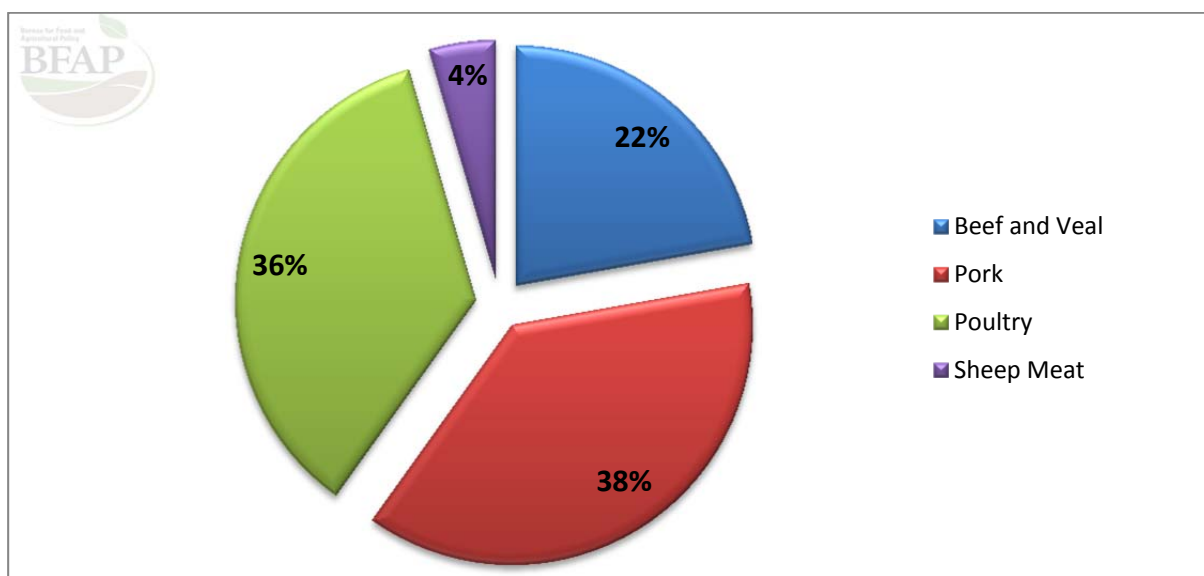
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## 1. Introduction

Modern agriculture has been exposed to an increasingly globalised society. Access to the global market has provided consumers with access to a wider range of products, at competitive prices. For the agricultural producer, competitiveness within the global context has become paramount, as increasing trade globally increases the level of competition faced by domestic producers. As demand for meat products continues to grow in the global market, production growth continues to be centred in regions where natural resources are less restrictive to expansion and surplus feed grain production results more lower feed costs (OECD, 2014). Pork remains the most consumed meat type globally (Figure 1) and over the past 8 years, global pork imports have increased by just over 5% per annum. Increasing imports can be ascribed to competitive production in countries where surplus production of feed grains has reduced the cost of producing pork, as well as imbalances in demand across regions where income levels and cultures are vastly different. Different regional preferences have allowed producers to maximise the value of a complete carcass through trade, with different cuts in high demand in different regions.

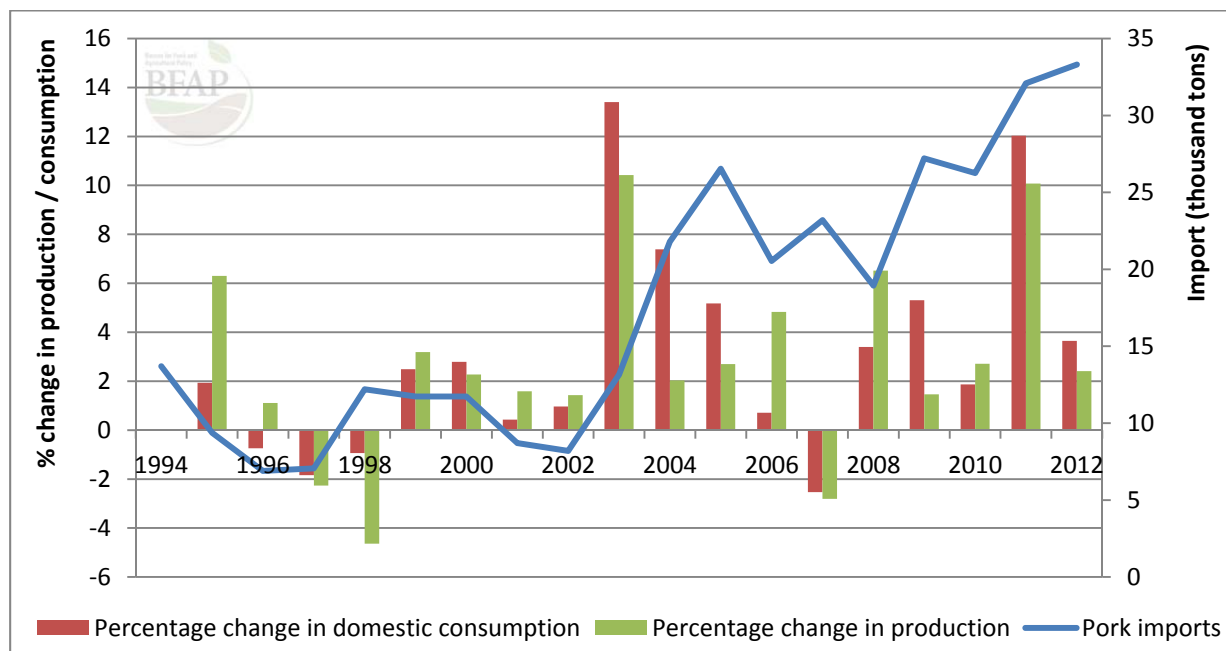


**Figure 1: Global meat consumption: Average 2011-2013**

Source: OECD, 2014

South Africa has been no exception; particularly meat imports have increased substantially over the past decade, with poultry and pork accounting for the greatest increase in import levels. In South Africa, pork remains a small industry within the larger meat complex accounting for only 7% of total meat consumption in 2013, however consumption has expanded by 53% over the past decade and with continued expansion of demand projected for the next decade (BFAP, 2014), the ability to meet growing demand with domestic production will ultimately depend on the competitiveness of the value chain in delivering high quality products to the consumer. Imported products have accounted for a substantial share of additional consumption through the past decade. Pork imports have expanded by over 9% per annum over the past 5 years (Figure 2) and while imports comprised only 6% of

domestic consumption in 2002, imported products accounted for 15% of domestic consumption in 2012. Despite providing only 15% of domestic consumption in South Africa in 2012, imports are an important component to the South African pork market.



**Figure 2: Pork imports into South Africa**

Source: BFAP, 2013

In 2013, BFAP evaluated the competitiveness of the entire pork value chain in South Africa, however the agri benchmark initiative, in partnership with the Thunen Institute in Braunschweig, Germany provides an opportunity for an in-depth comparison and benchmark study of primary pork production in South Africa relative to its most important global competitors. The agri benchmark methodology is based on a standard operating procedure, used for the identification of ‘typical farms’ in the main production regions of the countries that have partnered in the network. The standard operating procedure ensures results that are comparable across regions, due to the standardised methodology of data collection. The standardised procedure also requires specified training procedure in order to ensure credibility. In submitting South African data into the network, BFAP obtains access to the international database of partner countries, improving information available to the South African pork sector. Improved understanding of the factors that underpin South Africa’s global competitiveness is able to guide the industry in improving its competitive standing globally.

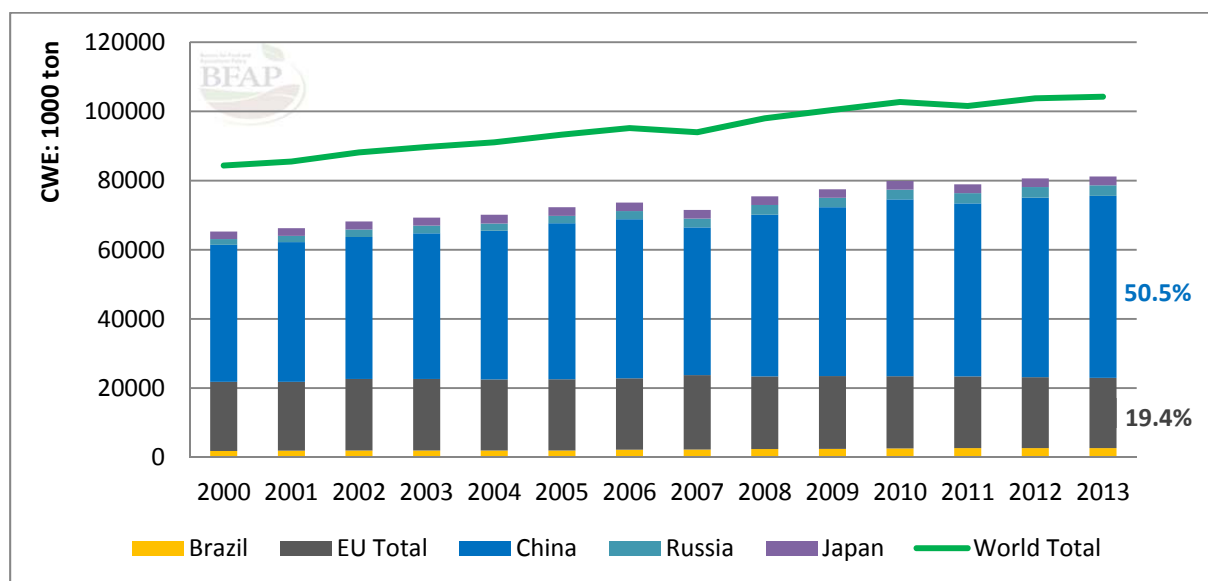
The agri benchmark network has been active for a number of years; however pork represents a new addition to the network, with the first data being collected in 2013. With the pork network still in a developmental phase, meaningful international benchmarking results are limited in the first year, with training workshops, as well as a comprehensive understanding of pork production systems in the various partner countries, being identified as the first priority within the network. Currently the pork network consists of 10 member countries

(Germany, France, Spain, Denmark, China, Vietnam, Russia, Poland, South Africa and Brazil) which represent 80% of global pork production.

In South Africa, 3 typical farms have been identified for inclusion in the network, with input from SAPPO. Detailed surveys were conducted regarding the production system and related costs of each producer, as specified by the agri benchmark methodology. A training workshop was also completed when Mr Simon Kueest, from the Thunen Institute, visited South Africa in September 2013. With international data submissions not yet complete, this first progress report provides an overview of the South African pork market, which must be understood within the global context due to its small size. The report includes a regional comparison between the 3 South African farms, based on technical and economic efficiency. An initial, limited comparison of the technical efficiency of the 3 South African farms within the global context is also included, within the limitations of the international data that has been submitted and verified in the network. Some of the planned outputs for the next year are provided in the concluding remarks.

## 2. Global market overview

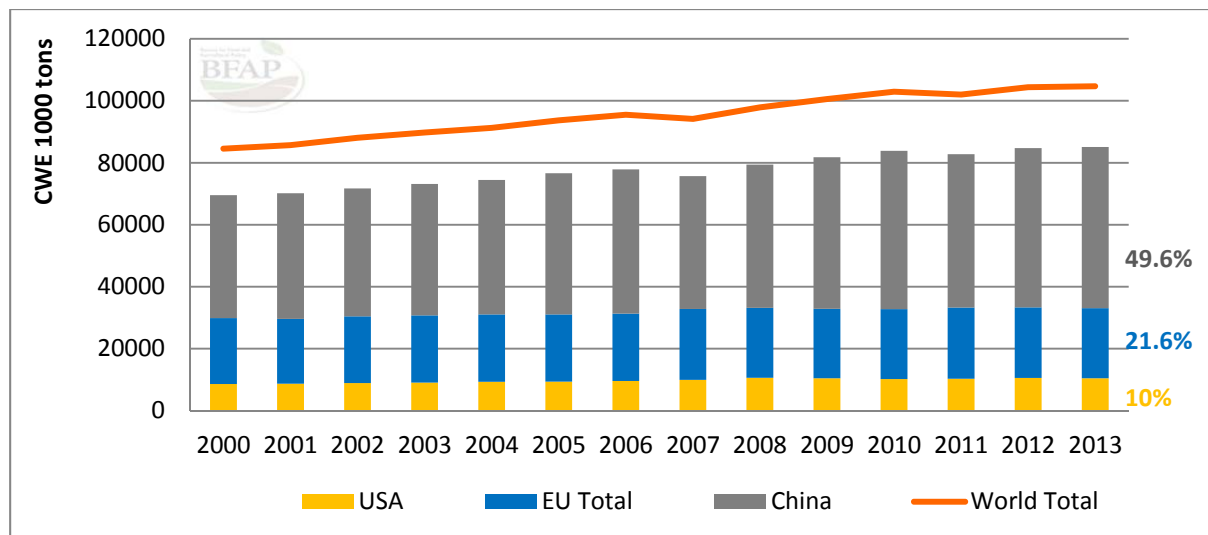
Global meat consumption has expanded significantly over the past decade, as growing population numbers, as well as growing income levels in developing countries drive changes in food consumption patterns. Pork remains the protein of choice, comprising an average of 38% of total meat consumed worldwide from 2011 to 2013 (OECD, 2014). Having grown steadily through the past decade from just over 84 million tons in 2000 to over 104 million tons expected in 2013 (USDA, 2013), global pork consumption is dominated by China, who consumed just over 50% of the world’s pork in 2012, followed by the European Union (EU) and Russia (Figure 3).



**Figure 3: Global pork consumption**

Source: USDA (2013)

In order to supply the growing demand for pork products, world production has increased steadily over the past decade. The increase in pork production can be attributed to better genetics and improved production practices, rather than increased sow numbers, as an increase in sow numbers of 17% from 1980 to 2012 has been accompanied by an increase of 114% in pork production over the same period. Environmental concerns, as well as challenges related to waste management in developed countries such as the EU has resulted in production growth being much greater in developing countries like Brazil, Russia and China. Over the past decade, pork production has increased by 18.5% worldwide, with the greatest growth being recorded in Vietnam (65.4%), Russia (49.6%), Brazil (27.1%) and China (24.7%). During the same period, pork production in the EU has grown by only 5%. Despite rapid growth in Vietnam and Russia, the most important pork producing countries remain China, the EU, USA and Brazil, accounting for more than 80% of global pork production between them.



**Figure 4: Global pork production**

Source: USDA (2013)

Global demand for pork is clearly growing, yet further expansion of production in many developed countries is limited by environmental concerns, as well as the cost of complying with welfare regulations. At the same time, a comparative advantage in producing pork products, due to more competitive feed prices and/or greater efficiency in production, allows the main exporting countries to produce pork at a lower cost. Spiralling feed grain prices further increases this competitive advantage, ever increasing the importance of international trade in the global market. The most significant exporters of pork products in 2012 were the USA, the EU, Brazil and Canada (Figure 5).

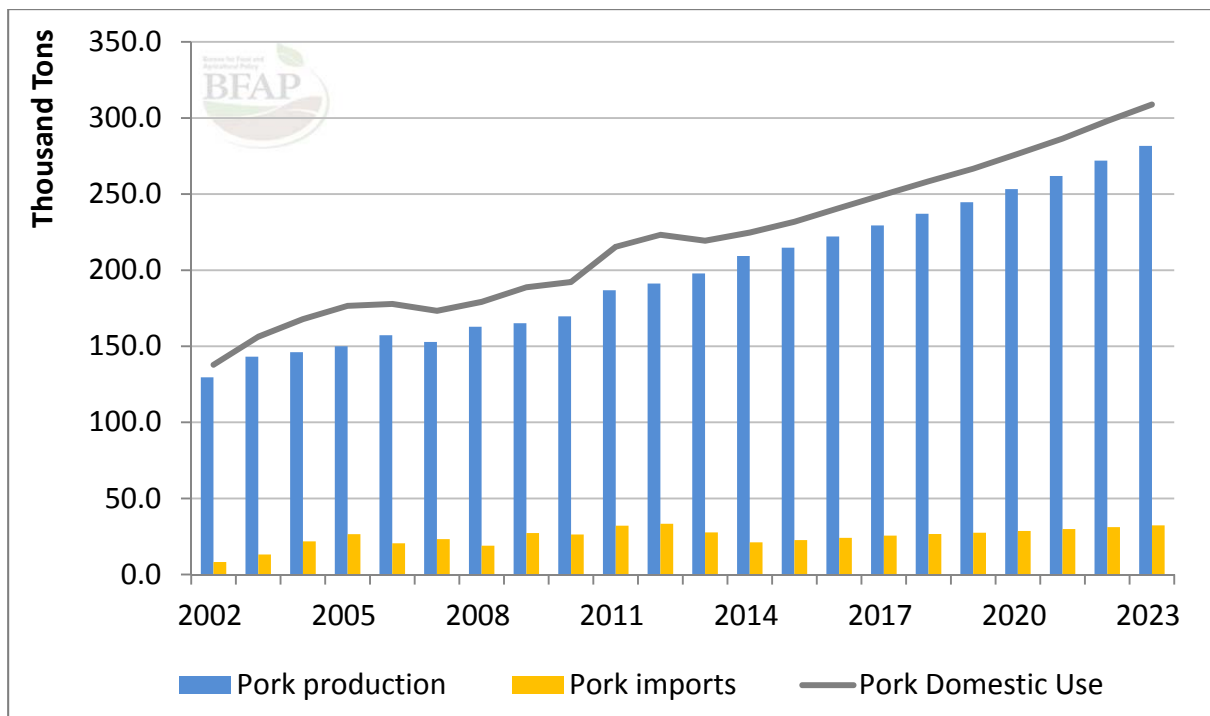




**Figure 5: Major pork exporting countries**  
Source: Trademap, 2013

### 3. Overview of domestic pork production

Within the global context, South African pork production remains very small, the South African pork industry contributes only 0.18% of total pork produced worldwide, rendering it an insignificant player in world markets while at the same time making it vulnerable to changes in global pork markets. Despite its small size, the industry has shown substantial growth through the past decade; average annual growth of 4.5% was second only to broiler production. Nevertheless, South Africa remains a net importer of pork products and given the role of imports in balancing the market, BFAP (2014) indicates that South Africa will remain a net importer of pork products over the next 10 years (Figure 6). The share of imports in domestic consumption is expected to remain relatively constant over the next decade and hence pork production is projected to expand by 42% over the next 10 years.



**Figure 6: Pork production, consumption and imports**

Source: BFAP, 2014

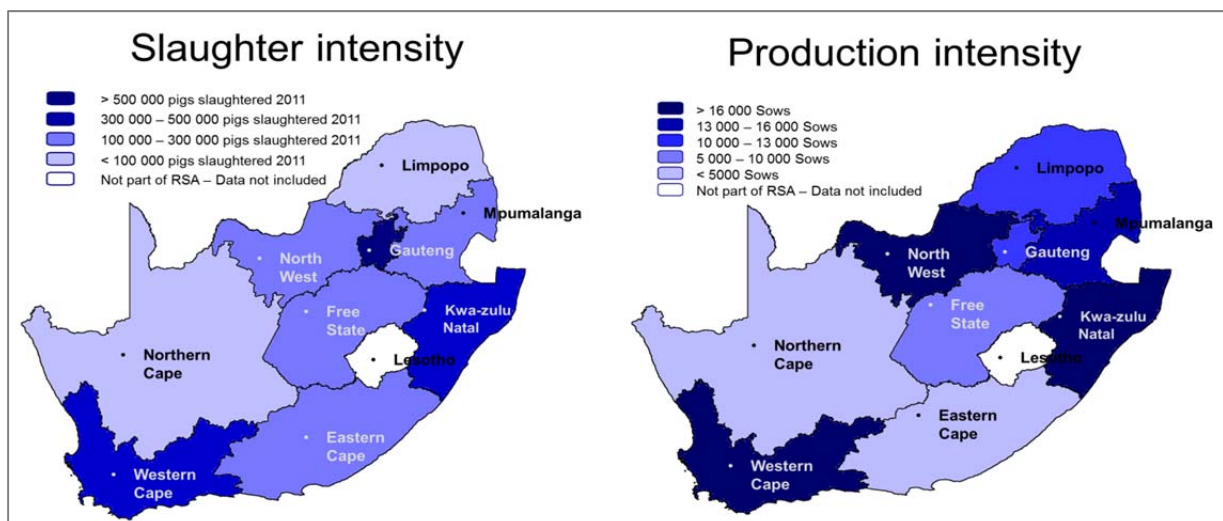
Pork production in South Africa is typically undertaken in a closed system, with producers operating farrow to finish units where breeding, weaning and finishing operations all undertaken by the same producer. This is in contrast to producers in the EU, where piglet production and finishing are typically not undertaken by the same producer. Producers often specialize in a single aspect of production, disaggregating the supply chain to an extent. While this system allows for greater specialisation in production, the farrow to finish system employed in South Africa has the benefit that piglets enter the finishing barn at cost price, rather than market price, decreasing the cost of production for the finishing unit. In addition to maintaining the entire farrow to finish unit, around 70% of South African pork producers mix their own feed rations, ensuring optimum feed conversion at the various stages of growth on the farm. While the size distribution and the accompanying economies of scale benefits of typical pork producers differ considerably, Louw, Schoeman and Geyser (2011) indicates that in order to be economically viable, a commercial pork producer must house at least 300 sows.

Production typically takes place in specialised housing with advanced climate control features, allowing the producer to optimize growing conditions through the manipulation of temperature and light conditions. The cost of specialised housing is immense however, with the capital outlay for a new pork farm estimated between R25 000 and R40 000 per sow (Louw *et al.*, 2011), while interviews suggested that this figure could be as high as R60 000 per sow in 2013, resulting in large barriers to entry for new producers. Construction of a 300 sow unit would therefore require a capital investment of R15 million at R50 000 per sow. At the same time, the high level of asset specificity associated with the investment in modern housing facilities creates a significant barrier to exist the industry. The specialised nature of production units means that the unit cannot readily be converted to another use, effectively

meaning that once the investment has been made, the producer does not have an alternative to producing pigs, regardless of market conditions.

The capital investment required to produce efficiently is however not the only barrier to entry or expansion faced by South African pork producers. The length of time required to enter or exit the industry poses a barrier to entry in itself. In addition to already significant capital investments required, the time from breeding to sale of the first mature, finished pigs requires significant cash flow reserves in order to carry the costs of production before the first income is generated. In addition, law requires that environmental impact studies be conducted before new production units can be erected and apart from the cost involved, the time needed for the impact studies to be completed and approved by government acts as a significant barrier to entry as well as expansion.

SAPPO (2013) estimates that the domestic sow herd in South Africa currently stands around 103 000 sows (compared to 3.8 million in Brazil and 1.1 million in France) and 7000 boars, managed by approximately 240 individual pork producers. Provincial sow numbers suggest that the majority of production takes place in the North West province, KwaZulu-Natal and the Western Cape. Despite this, 43% of pigs slaughtered in 2012 were slaughtered in Gauteng, with 15% in KwaZulu-Natal and 13% in the Western Cape (Figure 7).



**Figure 7: Provincial distribution of slaughters and sow numbers**

Source: BFAP, 2013

#### 4. Relative performance of different production regions in South Africa

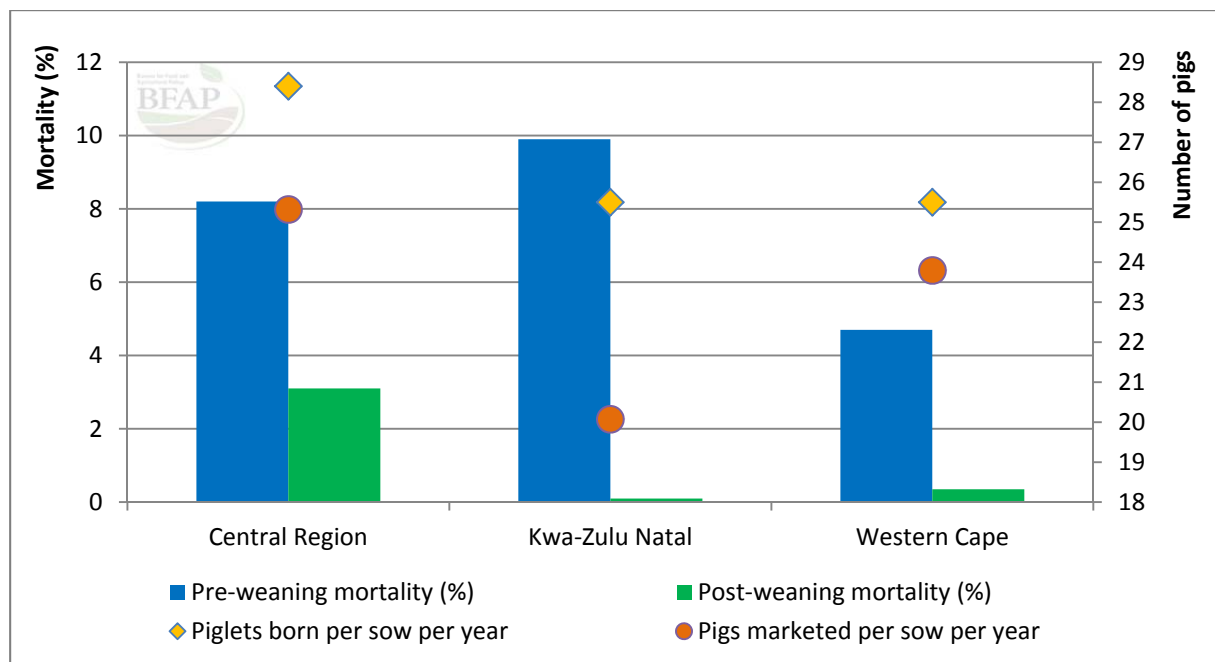
In order to compare the performance of producers in different regions of South Africa, three typical farms were identified in the most important pork production regions in South Africa. These typical farms are not considered nationally representative, but rather to be representative of the area in which they are situated and were identified in conjunction with the South African Pork Producers Organisation, based on the standard operating procedure of the agri benchmark network. The regions represented in the study include the Western Cape,

Kwa-Zulu Natal as well as a single typical farm that represents large scale producers in the central and northern regions, including Gauteng, North West and the Free State.

The relative performance of these typical farms is measured at three levels in order to benchmark technical efficiency, cost of production and economic performance. Production statistics are measured on a per sow basis in order to allow reasonable comparison of different sized enterprises. While the first progress report only includes a regional comparison of South African producers due to delays in data submission from international partners, the objective for the next annual report remains the benchmarking of the three South African regions with global partners in the network and for this purpose; performance will be benchmarked at the same three levels.

### 4.1 Technical efficiency

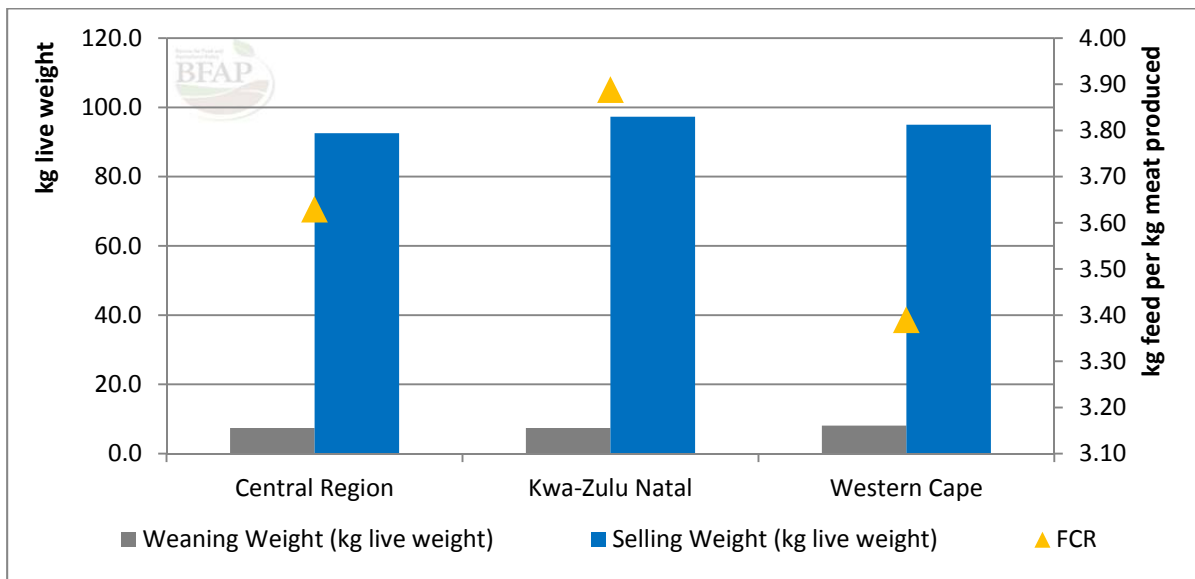
Several indicators exist for the measurement of technical efficiency of pork producers, across various stages of pork production, from piglet production to fattening and marketing. As an indicator for sow performance and the efficiency of piglet production, Figure 8 compares the relative number of piglets produced per sow per year, as well as the number of pigs marketed per sow per year in the different regions. Within the central region, the number of piglets born per sow per year was significantly higher, allowing the number of pigs marketed per sow per year to be higher than in the Western Cape, despite lower mortality rates in the Western Cape. Recorded mortality rates were the highest on the KZN farm and as a result, the central farm marketed 5 piglets per sow more than the KZN farm in 2013.



**Figure 8: Piglet production efficiency in 2013**

Figure 9 illustrates that weaning weights and live marketing weights were found to be similar across the regions, with the KZN farm producing marginally heavier pigs. Feed conversion

ratios of the three producers showed greater variation however, which is to be expected given the different formulations used by the producers. In the central regions, as well as KZN, producers mix their own feed, formulated for their specific needs, in order to optimize feed conversion at different stages of production, at the lowest possible cost. The benefit of mixing feed on farm rests in the fact that optimal nutritional values can continuously be produced at the lowest possible cost, however the producer also takes on considerably more risk in terms of price volatility for raw materials used. In the Western Cape, many of the raw materials used have to be transported for long distances and hence producers often choose to procure pre-mixed food commercially. Feed conversion is still optimised across different stages of production, however feed costs are expected to be higher given the fact that commercial feed producers must also produce profitably.



**Figure 9: Regional comparison of feed conversion ratios**

The greatest feed conversion was achieved in the Western Cape (Table 1), where 3.39kg of feed was required to produce 1kg of pork. Genetic material also has a substantial role to play however and given the fact that the genetic material used by the three producers are not the same, differences in feed conversion cannot be attributed only to feed. Despite higher feed conversion ratios, the amount of meat produced per sow in 2013 was highest on the central farm, where every sow accounted for an average of 1757kg of meat in 2013, compared to only 1470kg per sow in Kwa-Zulu Natal (Table 1).

**Table 1: Meat production per sow per year**

	Central Region	Kwa-Zulu Natal	Western Cape
Meat produced per sow per year (kg)	1757.34	1469.80	1695.41
Feed conversion ratio	3.63	3.89	3.39

## 4.2 Economic Efficiency

### 4.2.1 Cost of production

The importance of technical efficiency in determining global competitiveness cannot be denied, however the cost of production must also be considered, due to its influence on economic efficiency. Primary pork producers in South Africa have taken several measures to reduce the cost of production, such as mixing their own feed, yet several factors beyond the control of the producer have a significant impact on production costs. Undoubtedly the greatest cost to the primary producer is feed. The intensive nature of production and large associated quantities of feed consumed per pig renders feed cost to be almost 70% of the production costs at farm level. The spike in feed grain prices in 2012 following the drought in the USA has therefore been particularly hard on pig producers. Though the cost of feed is no doubt the most important and sensitive issue for the pork producer, other variable costs that have a significant effect on profitability are fuel, electricity, wages and cleaning materials (Table 2). Modern housing facilities require large quantities of water for waste management, while electricity usage is high due to advanced environmental control within the housing facilities. Strict biosecurity practices in order to prevent the outbreak of disease are another costly component of pork production. Negligence on this matter can have disastrous consequences however, due to the intensive nature of production and the large number of pigs confined to a specific area.

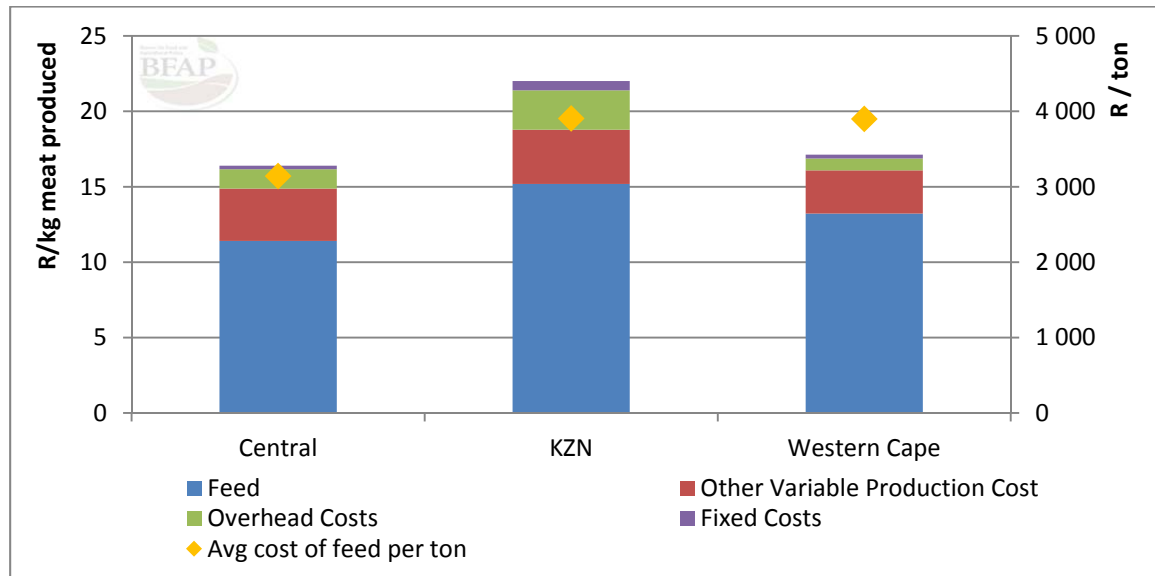
**Table 2: Variable cost structure of primary producers**

Cost Components	Share in variable cost
Feed and Medicine	70%
Labour	10%
Fuel and Electricity	4%
Admin	3%
Veterinary Costs	3%
Artificial Insemination Costs	2%
Marketing and transport	2%
Bedding and Cleaning Material	1%
Other	5%

Source: BFAP, 2013

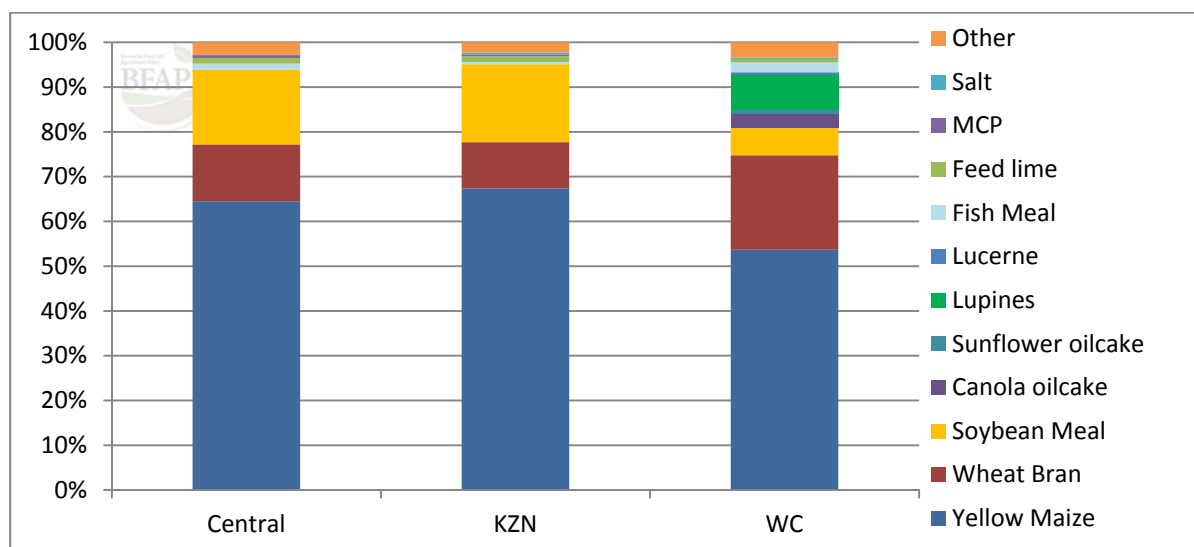
Given its share in total variable production costs, the cost of feed remains the most important factor that influences the competitiveness of pork producers. Figure 10 illustrates the cost of producing a kg of pork across the three regions, as well as the relative cost of feed per ton within each region. In this context, cost of production is also influenced by the technical efficiency parameters illustrated in Section 4.1, as the cost per kg of meat produced will be lower when the amount of pork produced per sow is higher. Despite the fact that the best feed conversion ratio was recorded in the Western Cape, feed costs per kg meat produced remains lower in the central region due to reduced feed prices. The average cost of feed on a per ton

basis was significantly lower in the central region relative to the two coastal regions (Figure 10).



**Figure 10: Pork production costs across regions**

Reduced feed costs can be attributed to factors such as differences in formulation, as well as the cost of raw materials. In the Western Cape, feed is procured commercially, in pre mixed form and hence the expectation would be for feed to be more expensive, however the highest feed costs on a per ton basis was recorded in KZN, where feed is mixed on farm. Figure 11 also illustrates that raw material usage is very similar in KZN and the Central region, both regions where producers mix their own feed on the farm. The difference in the cost of feed is therefore attributable to the cost of raw materials, rather than differences in the raw materials used. This provides a clear indication that proximity to the main feed grain producing regions provides a significant cost advantage for pork producers.

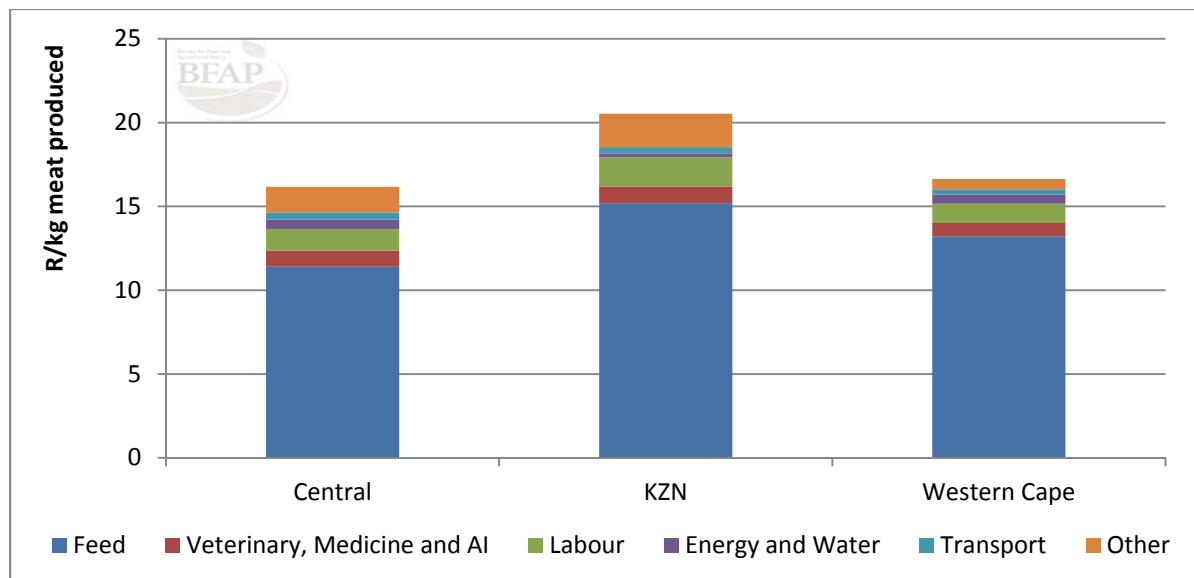


**Figure 11: Regional breakdown of raw material usage for pig feed**



In the Western Cape, raw material usage in feed rations differed significantly from the other two regions, as usage of locally available raw materials such as lupines and wheat bran is much higher, while yellow maize and soybean meal usage is much lower in order to increase the competitiveness of feed costs. Nevertheless, yellow maize still accounts for more than half of the total feed ration and given the transport costs, feed rations remains substantially more expensive than in the central regions.

Apart from feed costs, the regional differences in other variable production costs are marginal (Figure 12). Veterinary, AI and transport costs are almost identical, while small differences are evident in labour costs, which are marginally higher in Kwa-Zulu Natal. The observed differences are minor however and hence the low variable production costs in the central region relative to the coastal regions can be attributed to improved technical efficiency as well as reduced feed costs resulting from cheaper raw materials.



**Figure 12: Regional breakdown of variable production costs**

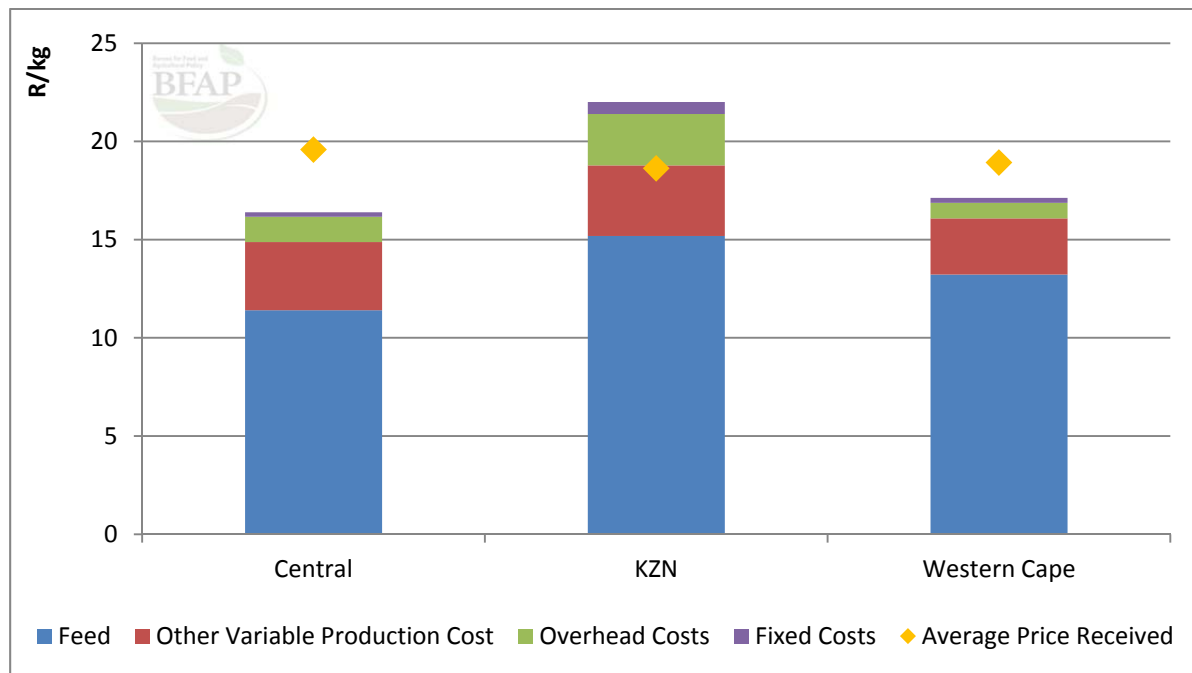
#### 4.2.1 Profitability

In addition to the cost of production, farm profitability remains the ultimate indicator of economic efficiency. Typical performance measures include net farm income, gross margin, net margin and return on investment. Louw *et al.* (2011) indicate that acceptable net profit margins for South African pork producers are between 10%-15%, with returns greater than 15% considered exceptional. Returns below 10% were however considered too risky given the capital investment required as well as the associated levels of risk.

Due to the costs and risks associated with transportation of pigs to abattoirs, producers have few realistic options of delivery when pigs are marketed and hence differences in profitability across regions will be a result of differences in production costs, as well as differences in prices received. While significant variability is evident in the cost of production across regions, producer prices recorded in 2013 are similar (Figure 13). Marginally higher prices



were recorded in the central region, however porkers are generally marketed at a premium to baconers and as the share of porkers in total number of carcasses marketed is much higher in the central region, higher average prices per kg are to be expected



**Figure 13: Regional comparison of production costs and prices**

Margins obtained per kg meat produced were highest in the central region, where returns were the highest and cost of production the lowest. Returns in the coastal regions were similar, however high costs of production in KZN resulted in negative margins in 2013, while a small positive margin was achieved in the Western Cape (Figure 13). Table 3 illustrates the differences in Net Farm Income across the different regions in the form of an index, where the average net farm income across all 3 regions is equal to 100.

**Table 3: Net farm income across regions**

	Central Region	Kwa-Zulu Natal	Western Cape
Net Farm Income Index (Average = 100)	228	-22	95
Net Farm Income Index (Average = 100) per sow	227	-60	133
Return on Investment	10.45%	-26.66%	

Net farm income is however not expressed on a per sow basis and hence comparisons between the different producers should be interpreted with care. The benefits of economies of scale are also evident, as the medium scale producer in KZN recorded a loss, mainly attributable to high feed costs, while the large scale producers in the Western Cape and Central regions maintained a positive margin in a year when feed grains were particularly expensive as a result of draught conditions. The net farm income index calculated on a per sow basis indicates that higher net farm income in the central region relative to the Western Cape is attributed to greater economic efficiency, in terms of higher margins per kg pork

produced, as well as its greater size and resultant higher quantities of pork produced per annum. When margins are tight, as was the case in 2013, scale of production becomes an even greater advantage. Achieving economies of scale benefit in a capital intensive industry is costly and hence the return on investment presents a credible comparison of economic performance, regardless of the size of the enterprise.

## 5. Preliminary global comparison

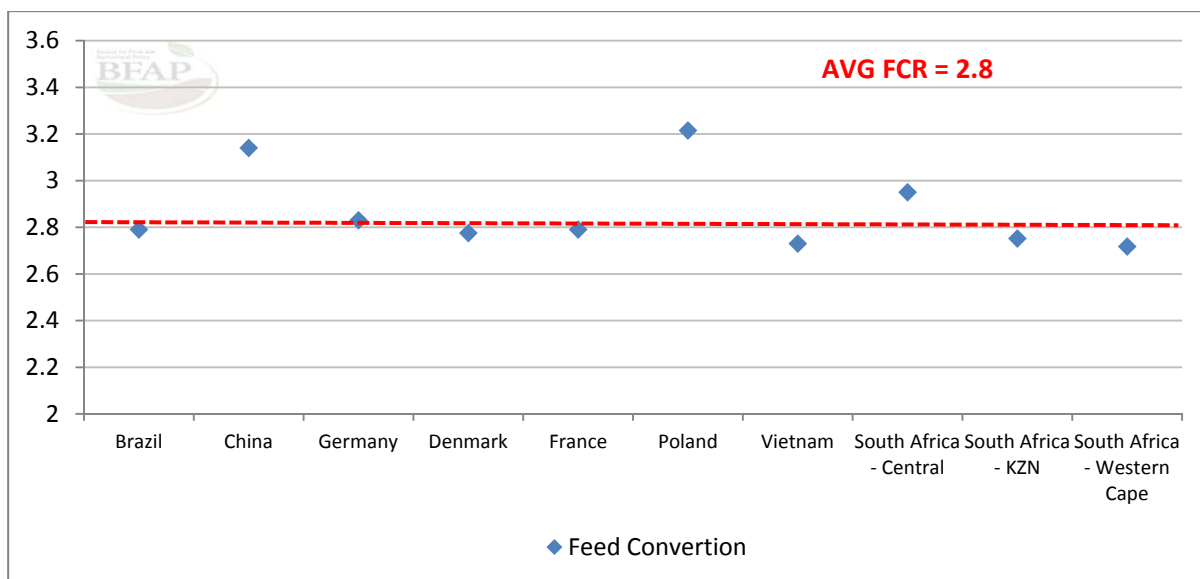
Data availability from international partners in the early stages of the agri benchmark network has limited the extent of international comparisons for 2013, however some information was submitted in 2012, which allows for a basic, high level comparison of technical efficiency, as well as raw material costs in feed use.

A basic comparison of technical performance of the three South African farms in the global context is illustrated in Table 4 and Figure 14. Considering breeding performance, the large scale producer in the central region achieved results comparable to top exporters like Brazil, France and Germany (Table 4), while the two coastal producers weaned fewer piglets per sow.

**Table 4: Comparing breeding performance**

	<b>Brazil</b>	<b>France</b>	<b>Germany</b>	<b>RSA - KZN</b>	<b>RSA - WC</b>	<b>RSA - Central</b>
Cycles per year	2.48	2.33		2.31	2.45	2.4
Piglets weaned per sow per year	26	26	25.5	23.0	24.3	26.2

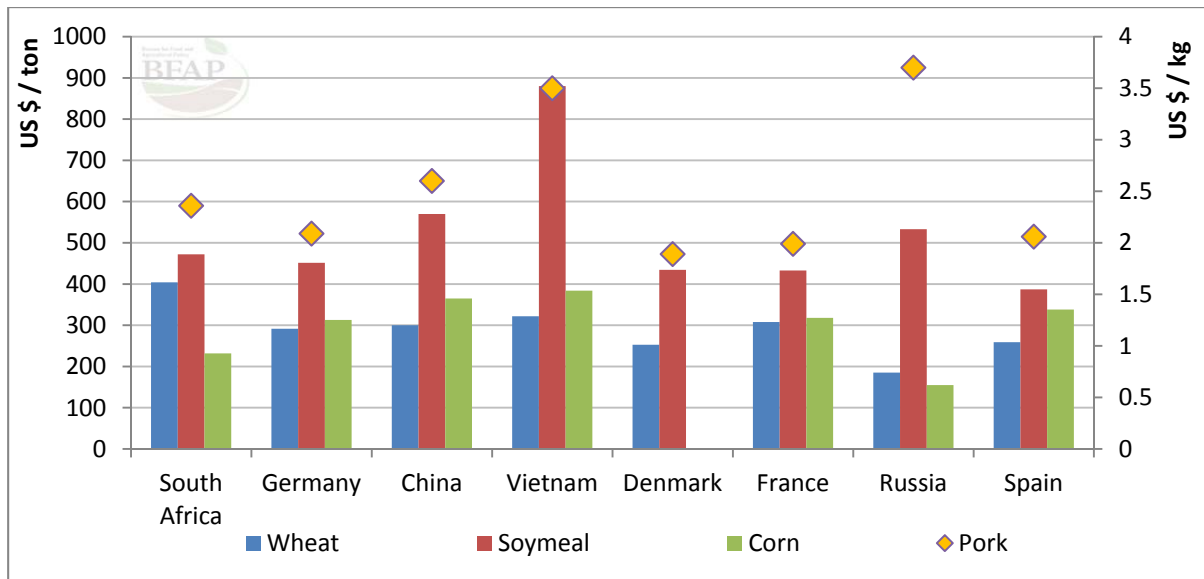
Given the difference in production systems globally, total feed conversion ratios calculated for farrow to finish systems are not comparable to feed conversion ratios calculated on specialised finishing farms in Germany for example. In order to compare feed conversion credibly, feed conversion ratios were recalculated only for grower pigs, based on feed usage and weight gained in the grower barn. South African producers performed very well relative to global competitors in this context, with feed conversion ratios in all three regions being recorded below the average achieved in the network. In fact the feed conversion achieved in the Western Cape was the best recorded for all producers in the network.



**Figure 14: Feed conversion ratios - Global comparison**

Feed conversion in the grower barn only was higher in the central region than in the two coastal regions. This fact is attributable to the fact that piglets enter the grower barn at a later stage. Feed conversion performance declines as pigs grow older and heavier and as such, the recorded feed conversion in the grower barn of the central producer is expected to be higher relative to other producers. Starting weights recorded in the other countries illustrated in Figure 14 were similar to those achieved in South Africa’s coastal regions.

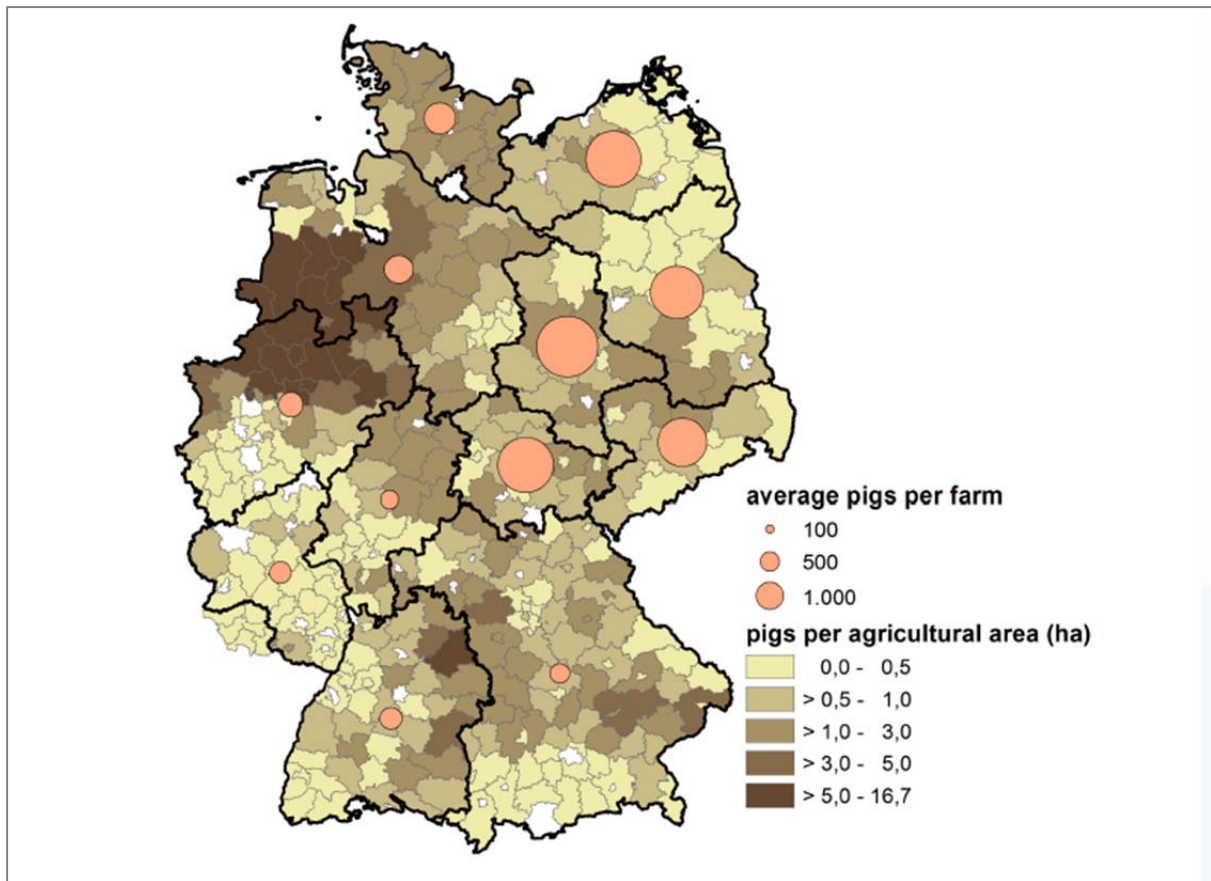
Feed constitutes the greatest component of variable production cost and while total feed cost data is not yet available from the various partners in the network, Figure 15 relates the cost of the three most important raw materials used in pig feed, as well as prices received per kg carcass weight in various countries. As a surplus producer, South African maize costs compare well with global norms, however as a net importer, the cost of wheat in South Africa was higher than any other country in the network. South African soybean meal was also more expensive than in European countries, however soybean meal costs compared well relative to Asian countries (Figure 15).



**Figure 15: Prices of pork and feed grains**

The highest pork prices were recorded in Asia, particularly Russia and Vietnam, while South African pork producer prices reported in 2011 was above EU prices and below Asian prices.

Germany represents South Africa’s most important trade partner, with the bulk of imports into South Africa originating from Germany. Pork production in Germany is much bigger than in South Africa, with more than 30 000 producers compared to approximately 240 commercial producers in South Africa. Pork production in Germany is typically specialised in piglet production or pig fattening, as opposed to the South African system which is typically farrow to finish units. The bulk of German production occurs in the North-Western part of the country (Figure 16). As a net exporter of pork products, German prices reported in 2011 were higher than in South Africa. Wheat and Soybean meal prices were reported lower in Germany than in South Africa, while maize prices in South Africa were below those reported in Germany.



**Figure 16: German pork production**  
 Source: agri benchmark, 2012

## 6. Concluding remarks

The agri benchmark initiative is a global network of specialists aimed at improving the understanding of global pork production. South Africa joined the network with the objective of measuring and understanding the competitiveness of primary pork production within the global context, as well as guiding the understanding of the underlying factors that drive the competitiveness of South African pork producers. The pork network is a new inclusion within the agri benchmark initiative, with the first round of data being collected in 2013. With the network being newly established, the benefits of joining the network will be evident in the longer term, as time series of annually collected data becomes available that can be used for meaningful global comparisons and cost benchmarking.

According to the standardised agri benchmark methodology, detailed surveys were conducted on 3 typical farms, identified to be representative of different production regions in South Africa. The selected regions include the Western Cape, KZN and a single representative farm for large scale production in the Central and Northern regions. These farms will be submitted into the global network, to be included in a results database that is available to all partners. Being in a developmental phase, the standardised models are still being improved and new, improved tools are currently being developed, resulting in delays by the international partners in generating the results database. As a result, the first annual progress report is focused on a

regional comparison of the 3 typical farms surveyed, both from a technical and economical perspective. The same methodology will be expanded for the international benchmark, which will be reported in the second annual progress report in 2015.

Comparison of the regional production systems provided a clear indication of the competitive advantage that producers in the Northern and Central region have over coastal production regions in terms of feed costs. Average cost of feed on a per ton basis was significantly higher in the coastal regions than in the central region, while the cost of feed per ton in the coastal region showed little variation in the Western Cape, where feed is commercially procured compared to Kwa-Zulu Natal, where feed is mixed on the farm. Technical efficiency was found to be much greater in the Western Cape and Central regions, where large scale producers were surveyed as opposed to the medium scale producer surveyed in Kwa-Zulu Natal. The benefit of greater technical efficiency was also evident in significantly lower costs of production. Reported pork prices showed little regional variation, with marginally higher prices reported in the Central Region being ascribed to the fact that the Central producer markets a much greater share of porkers relative to the 2 coastal producers.

The first round of data collection provided useful insight into the key factors that drive production costs higher in specific regions. Collected data only provides a static snapshot however and comparisons of this nature will become increasingly valuable when data is updated on an annual basis to provide a time series, which can be evaluated and linked to the BFAP baseline projections. Collection of farm level data to be included into the farm-level financial simulation model also increases the available tools for policy evaluation within BFAP, allowing improved simulations to guide decision making within the sector. Collected data for 2013, as well as the updates for the 2014 financial year, will be included in the global results database within the next funding cycle, while the network is also currently working on a book to be completed in 2015, containing a detailed description of the pork sectors of all member countries.

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