POLICY BRIEF ON THE 2015/2016 DROUGHT

BUREAU FOR FOOD AND AGRICULTURAL POLICY

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Executive Summary

This report evaluates the impact of the current drought on the South African economy, on commercial and smallholder producers, and on consumers. Whilst the impact of the drought on current prices in undeniable, the effect of the depreciation in the value of the Rand also remains undisputed. It not only shifts the level of the import and export parity price band, but also impacts on every stage of the food value chain.

Reduced domestic production induces significant changes in trade volumes to meet domestic demand, even when it implies substantial price increases. As the most basic food staple that was hardest hit by the severe drought conditions, significant quantities of maize will have to be imported in 2016. The Crop Estimates Committee (CEC) of the Department of Agriculture, Forestry and Fisheries released the preliminary area estimates for summer crops on 27 January 2106. Contrary to 2015, when the maize crop was planted well within the optimal window, a substantial share of the 2016 maize area was only planted in January. This high share of risky late plantings, combined with an earlier than usual production forecast, raises concern that the prediction of a 7.4 million ton maize crop may be optimistic. Consequently this report illustrates 2 scenarios: the baseline, based on the official production forecast from the CEC of 7.4 million tons of maize, and a second scenario that assumes reduced yields on the preliminary area estimate presented by the CEC, reducing the total maize crop to 6.6 million tons.

In addition to domestic demand, many deficit regions across Southern Africa, such as Swaziland, Lesotho, Namibia, Botswana and southern Mozambique are dependent on South African maize. The drought conditions experienced in South Africa have been far reaching in the continent and initial production forecasts across Southern Africa have been reduced from recent norms. The fact that Zambia's crop has also been affected by the drought raises further concerns for the regional maize balance.

South Africa is expected to import 856 000 tons of white maize and 1.9 million tons of yellow maize under the CEC baseline scenario at a cost of R11.5 billion. Imports will increase to 1.2 million tons and 2.2 million tons respectively under the alternative scenario, at a cost R14.5 billion. There are ample supplies of yellow maize in the world market and the local shortfalls will comfortably be met by imports. However, Mexico's ability to provide the entire domestic shortfall of white maize remains uncertain. South Africa may need to look elsewhere towards the end of the season, with the US the most likely alternative. Current GM regulations would however have to be altered for US imports to occur. Opening the US market will reduce maize meal prices and provide a more certain source of white maize imports to the South African market to ensure availability.

As South Africa is normally an exporter of maize the total import volumes expected in 2016 are unprecedented. To ensure that imports occur timeously and efficiently, infrastructural capacity needs to be considered. The total loading capacity within the 4

ports currently used for grain trade (Durban, Cape Town, Port Elizabeth and East London), is sufficient for the additional import requirements, but continued cooperation between industry and government is essential for imports to occur timeously.

The effect of the drought is also clear in grazing conditions and the impact on extensive livestock industries that depend on grazing has been catastrophic. Beef production tends to increase in dry periods as producers cull due to poor or insufficient grazing and high feed costs. Intensive producers of pork and poultry however have little flexibility in their feeding systems so that production declines only marginally in the short term. While the weaker exchange rate helps, the increase in feed grain prices is greater than the increase in meat prices, impacting negatively on profit margins.

Coming as it did after an already below-average production season in 2015, the combination of the drought and the weaker exchange rate has already impacted severely on agricultural commodity prices in South Africa. Whilst the Agricultural GDP remains above the 3 year average and net farm income declines only marginally under the crop estimates scenario, a reduced yield scenario results in significant deterioration, as prices remain relatively unchanged at import parity levels, whilst production volumes decline. In addition, reduced production volumes will impact on South Africa's trade balance. Sectors such as maize and sugar, which would normally contribute to the sector's positive trade balance, will shift to a negative net trade position in 2016.

From a farm business perspective the current drought will not only affect the current production season, but might also have long term financial and debt implications for farm businesses. Furthermore, poor rural households continue to be dependent on household agricultural production. More than 1.2 million individuals will be affected by the current drought, which will inevitably have a significant impact on maize yields and would give rise to food insecurity. Hence, supporting the primary agricultural sector to overcome the short term effects is critical to ensure that long-term agricultural production, growth and food security is not compromised.

Agriculture has been identified as a sector to expand in the National Development Plan, with intensive, export orientated industries in particular identified as key in creating jobs within the rural economy. Ambitious job creation targets will require investment in irrigation infrastructure and consequently, the response to the current drought must continue to foster an enabling environment where investment can flourish. At the same time, the cost of basic food staples is a key consideration in responding to the current drought. Based on January 2016's preliminary retail prices, the cost of the staple basket increased by approximately 19% from January 2015 to the corresponding month in 2016 and a further increase of 10% in quarter 1 of 2016 is expected.

In the longer term it is a return to surplus production that will be most effective in reducing the cost of food staples and curbing food price inflation. Despite further depreciation in the Rand to beyond R17 to the US dollar in 2017, a return to surplus production will imply a decline of more than 30% in domestic white maize prices. In the longer term, a favourable food price inflation Outlook will depend on a vibrant and

sustainable agricultural sector and hence the short term response to the severity of the current drought should prioritise the ability of producers to stay in business, enabling them to contribute to the recovery when weather conditions improve.

ACKNOWLEDGMENT

The financial support by the Maize Trust for the development of BFAP's Integrated Value Information System (IVIS) is acknowledged. This policy brief was prepared using the resources and tools currently available to IVIS to give a comprehensive strategic picture of the agricultural sector's situation with respect to the drought and its impact on South Africa's farmers and consumers at large.

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Introduction

2015 represents the lowest national annual rainfall in South Africa since 1904 according to the South African Weather Service. In Figure 1, 2015 rainfall levels are contextualised against the severe drought in 1992, as well as the long term average annual rainfall (for the period 1970-2015). Whilst annual rainfall is a logical departure in comparing different production seasons, it does not present the entire picture, as the monthly distribution of rainfall is as important a consideration in the context of agricultural production.

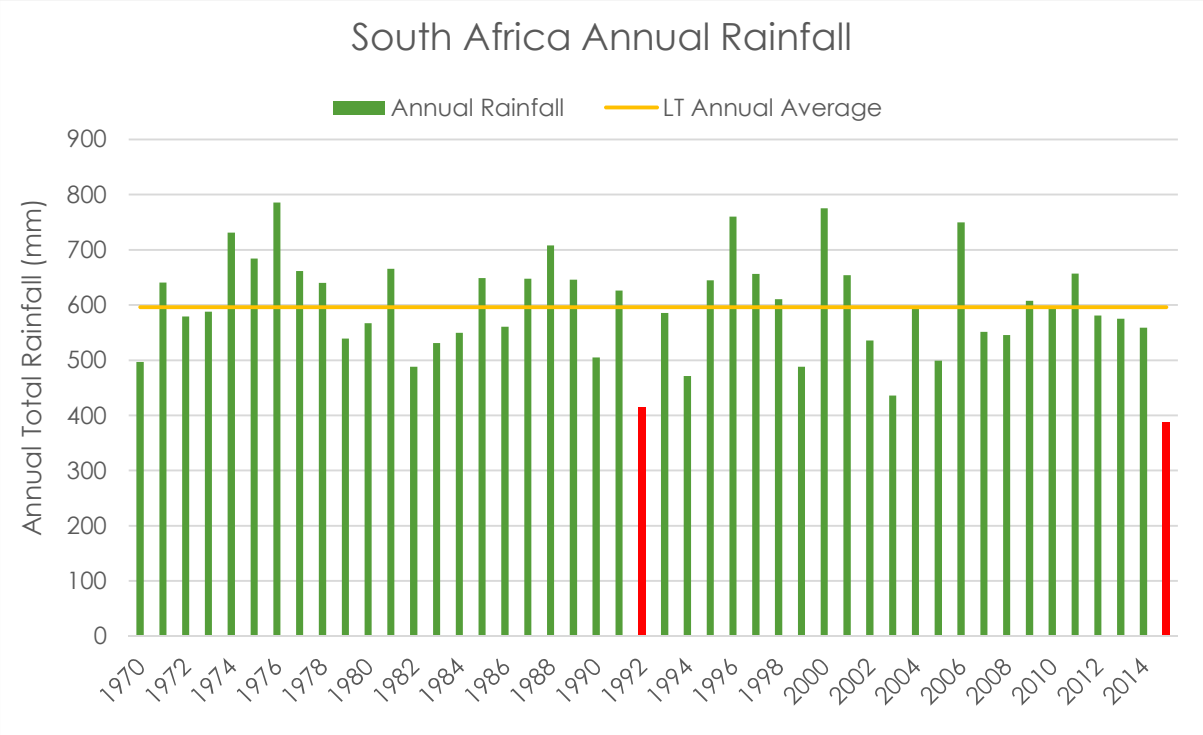
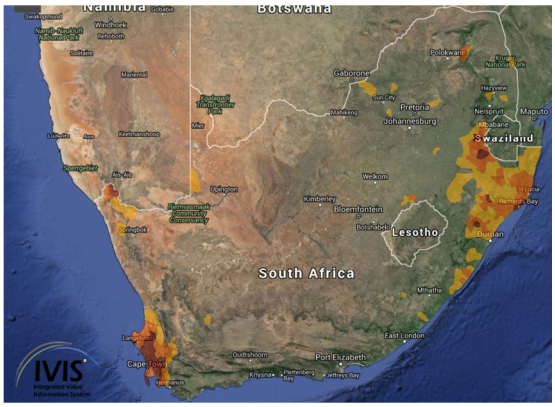
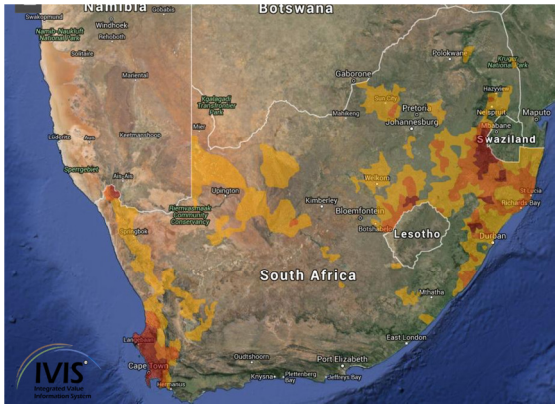
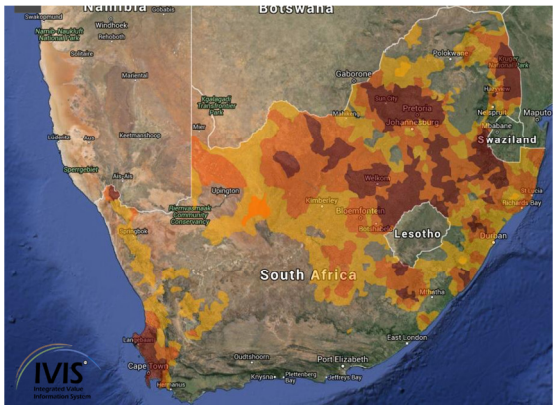


Figure 1 - South Africa Annual Rainfall
Source: Weather SA

October Moderate Severe Extreme	
November Moderate Severe Extreme	
December Moderate Severe Extreme	

The Standard Precipitation Index is an indication of the deviation from the long term mean rainfall. The index is used to monitor "less-than-usual" rainfall on a monthly basis to give an indication of the severity of the current drought. The SPI for South Africa for October, November and December 2015 are presented in Figure 2.

From Figure 2 it is clear how the drought impacts started in the coastal regions, particularly the Western Cape, just coming out of a drier-than-usual winter and KwaZulu-Natal. From there it progressed and escalated in November and December into key grain production areas as late planting windows for farmers (even in western parts of the country) rapidly closed.

Figure 2 - SPI drought 2015
Department of Water Affairs

The severity of the drought is clearly evident across the key summer crop production regions, yet its impacts range nationwide. Five provinces have been declared disaster areas as a result of the drought and while the agricultural sector contributed only 2.5% to national GDP in 2014, its influence on food security, both in terms of availability and affordability cannot be understated. Despite South Africa's negative total trade balance since 2011, the agricultural sector has attained a positive trade balance since early 2013

and while the agricultural trade balance has entered negative territory from time to time historically, it has tended to remain close to or above zero.

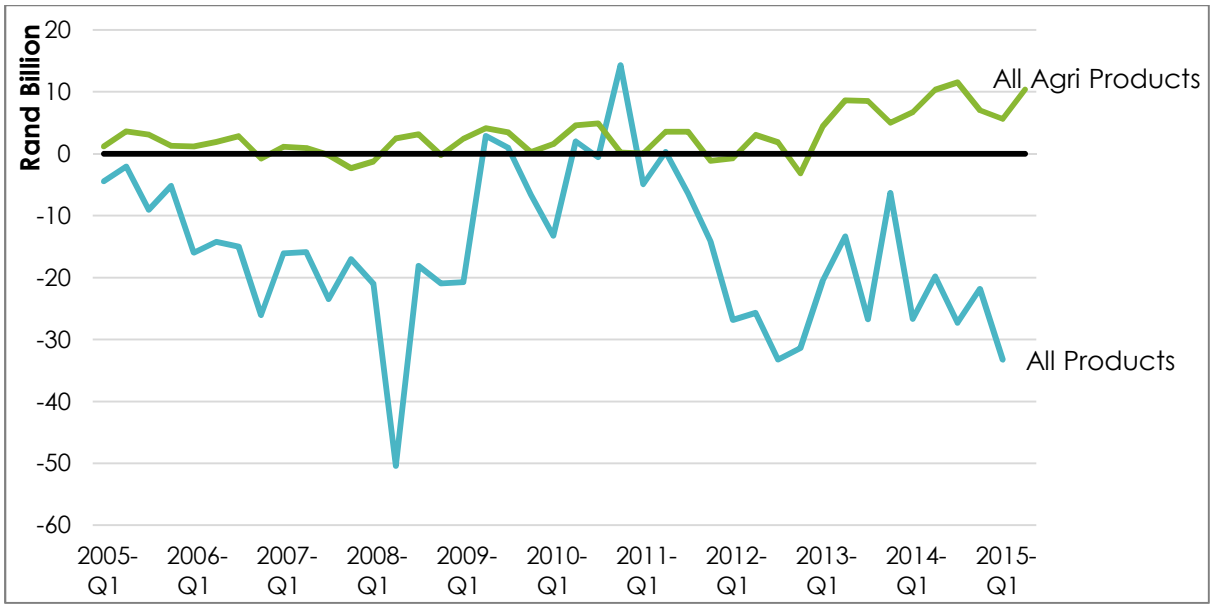


Figure 3: Agricultures contribution to South Africa's trade balance
Source: SARS and ITC, 2016

Agriculture can be disaggregated into three main subsectors namely animal production, horticulture and field crops. Animal production contributes the largest share of total income generated within the sector, accounting for almost 50% of gross production value. Historically, the contribution by the horticultural and field crop sectors is very similar, yet field crop production remains the most volatile of the 3 subsectors, due to its greater share of dry-land production and consequent dependence on weather conditions (Figure 4).

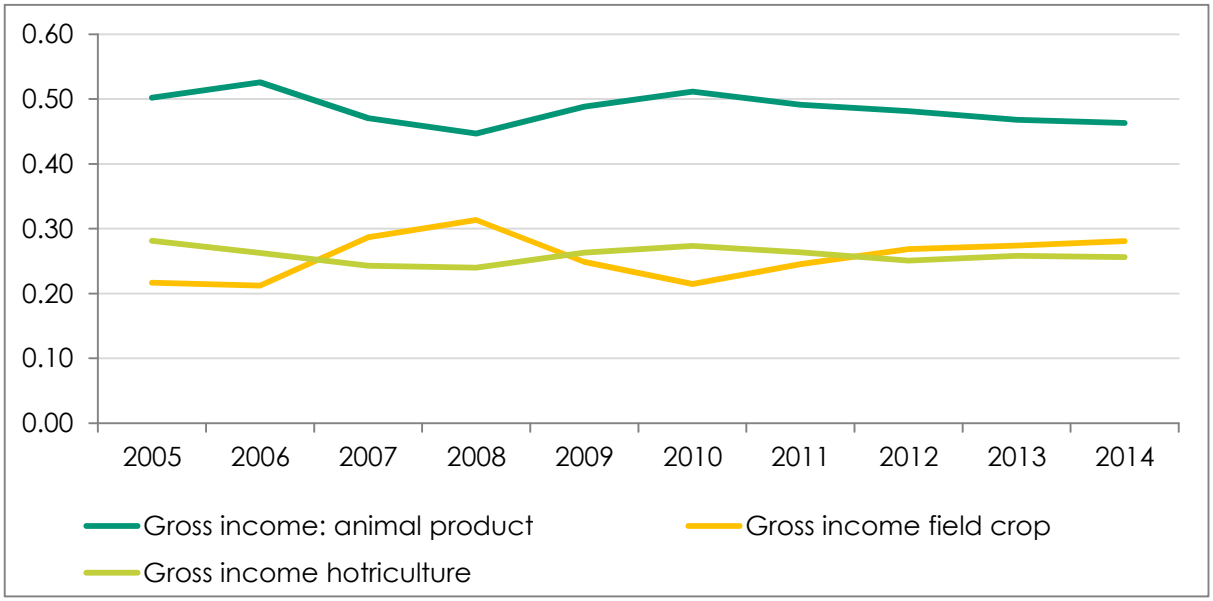


Figure 4: Contribution of different subsectors to gross income from agricultural production
Source: Department of Agriculture, Forestry and Fisheries, 2015

The magnitude and timing of the drought's impact on the different subsectors therefore also differs. The difference does not only relate to the extent of influence on production volatility, but also to the time required to respond to price signals and inherent differences in price formation within the sectors. In the field crop sector, maize is the largest crop by a wide margin and typically trades close to export parity levels. However weather impacts can cause a shift from export to import parity based pricing, as has been the case in the current drought. Whilst the impact of the drought on current prices is undeniable, the effect of macro-economic volatility, such as the sharp depreciation in the value of the Rand, also remains undisputed. It not only shifts the level of the import –export parity price band, but also has an impact at every stage of the food value chain, whether it is through imported input supplies and energy prices or the secondary effects of inflation.

Apart from beef in recent years, most livestock sectors are consistent net importers, resulting in prices that typically trade at or near import parity levels. During times of drought, beef production increases due to herd liquidation in the face of poor grazing conditions and high feed costs. A return to normal weather conditions then induces a phase of herd rebuilding, resulting in sharp price increases beyond the actual drought season. The full cycle of rebuilding a herd takes approximately 4 years. Within the more intensive pork and poultry sectors, prices tend to remain at import parity levels throughout and while higher feed grain prices impact on profitability, the short term supply response is limited by high levels of capital investment.

By contrast, the horticultural sector is predominantly export oriented, with high value crops produced under irrigation. The relative strength of the Rand influences competitiveness in export markets and unless the drought is severe enough to influence the availability of irrigation water and product quality, the price impact tends to outweigh fluctuations in production volume. Given the severity of the current drought, this remains a concern.

The nature of food products, particularly more basic food staples, results in fairly inelastic demand. Consequently the price response can outweigh changes in production volumes and while total agricultural activity decreases due to the drought, income generated by the agricultural sector may expand as a result of higher prices. This is particularly true in the current South African context, where prices across all subsectors have found support from the depreciating currency, while the bulk of the production decline has been concentrated in the field crop sector, which accounts for less than 30% of total agricultural production value. Given South Africa's liberal agricultural trading regime, reduced domestic production induces significant changes in trade volumes to meet domestic demand, even when it implies substantial price increases. As the most basic food staple that was hardest hit by the severe drought conditions, considerable quantities of maize will have to be imported in 2016. In normal years, South Africa would be exporting up to 2 million tons, implying significant trade balance implications (Figure 5). The extent to which this swing in net trade will be compensated for by high value export industries that benefit from a weaker exchange rate will depend on the extent to which the drought influences quality attributes.

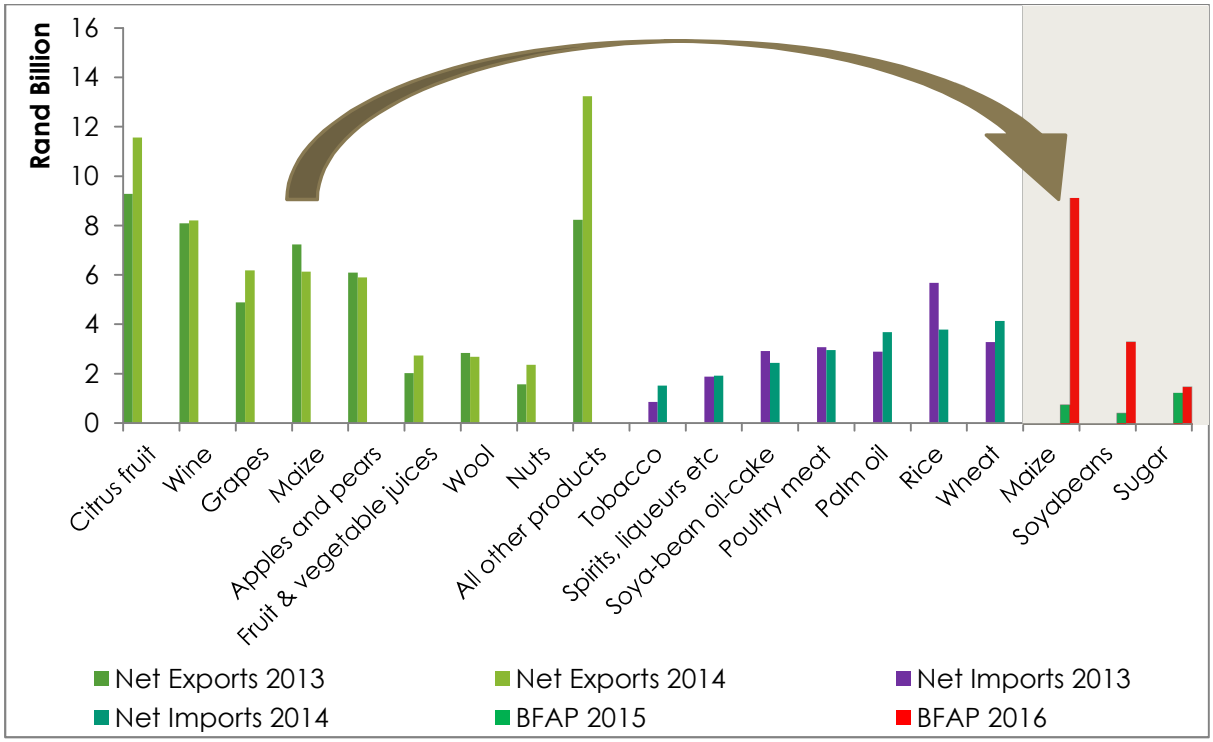


Figure 5: Export and import values of different agricultural commodities
Source: SARS and ITC, 2016

Despite its support to price levels and competitiveness in export orientated industries, the value of the Rand also impacts on the cost of production. Freight related costs to international trade are dollar based and the bulk of key inputs such as fuel and fertiliser rely on imported materials. Whilst the cost of these inputs in the global market has remained relatively stable due to the oil price reaching its lowest level since 2003, domestic prices have increased in line with currency depreciation. Further value chain costs related to processing and transportation also increase accordingly, raising the cost of food products to the consumer.

In this policy brief, the impact of the drought on farmers, households and the industry as a whole is analysed with a special focus on staple foods most widely consumed by South African consumers. The motivation for the focus on staple foods is two-fold. Firstly it represents a considerable portion of total consumer expenditure (roughly 25%, which increases for lower income consumers). It is also worth noting that although it is a quarter of average household expenditure, staples can be considered as relatively low value products and as a result, if one were to consider the quantities consumed, the reliance on staples would be much higher. Secondly, inflationary pressures resulting from the drought induced supply reductions are expected to have the most immediate impact on grains, cereals and vegetable retail products in the short run. By focusing on these products it allows for an analysis of short(er) term inflationary pressures on food prices in general. These are also the food items where prices can fall very rapidly as soon as normal weather prevails and production levels rise. In terms of a medium term view,

other key product groups should be considered. Here meats, eggs and dairy play a key role. Meat also contributes about a quarter of household expenditure on food; however the supply response to the drought takes slightly longer, especially for red meat products. If the number of slaughters driven by the current drought conditions rise significantly, one could expect to see the effect of the inflationary pressures of the drought persisting beyond 2016. The last delimitation pertaining to consumers is the focus on the expenditure decile 1 to 5, which represents the poorest 50% of the population. This group is emphasised due to the vulnerability of the poor to rapid food inflation.

Sector Level Impact

The South African agricultural sector is small in the global context and domestic markets are influenced by a number of factors, including self-sufficiency levels, global market conditions and other macro-economic factors. The impacts of the drought conditions therefore cannot be considered in isolation from global markets and the wider macro-economic environment in which the sector functions. Globally, agricultural commodity prices have declined continuously since early 2014 and by December 2015 the FAO Food Price Index had declined by almost 30% from March 2014. The sustained drop in US dollar-based prices has resulted from a variety of factors, including a decline in oil prices, the slow-down in the Chinese economy and abundant supplies of most major commodities due to record harvests in major grain and oilseed producing countries. Favourable weather conditions in the 2015/16 production season created the expectation of further good harvests, inducing rising stock levels for the third successive year (Figure 6). Consequently prices are expected to remain under pressure in the short term. However, the impact of lower world prices in the domestic market has been negated by an almost 40% depreciation in the value of the Rand since March 2014. The relative strength of South Africa's currency also remains one of the key uncertainties in projecting prices for the 2016 season. This report is based on an average annual exchange rate of R16.80 to the US dollar in 2016.

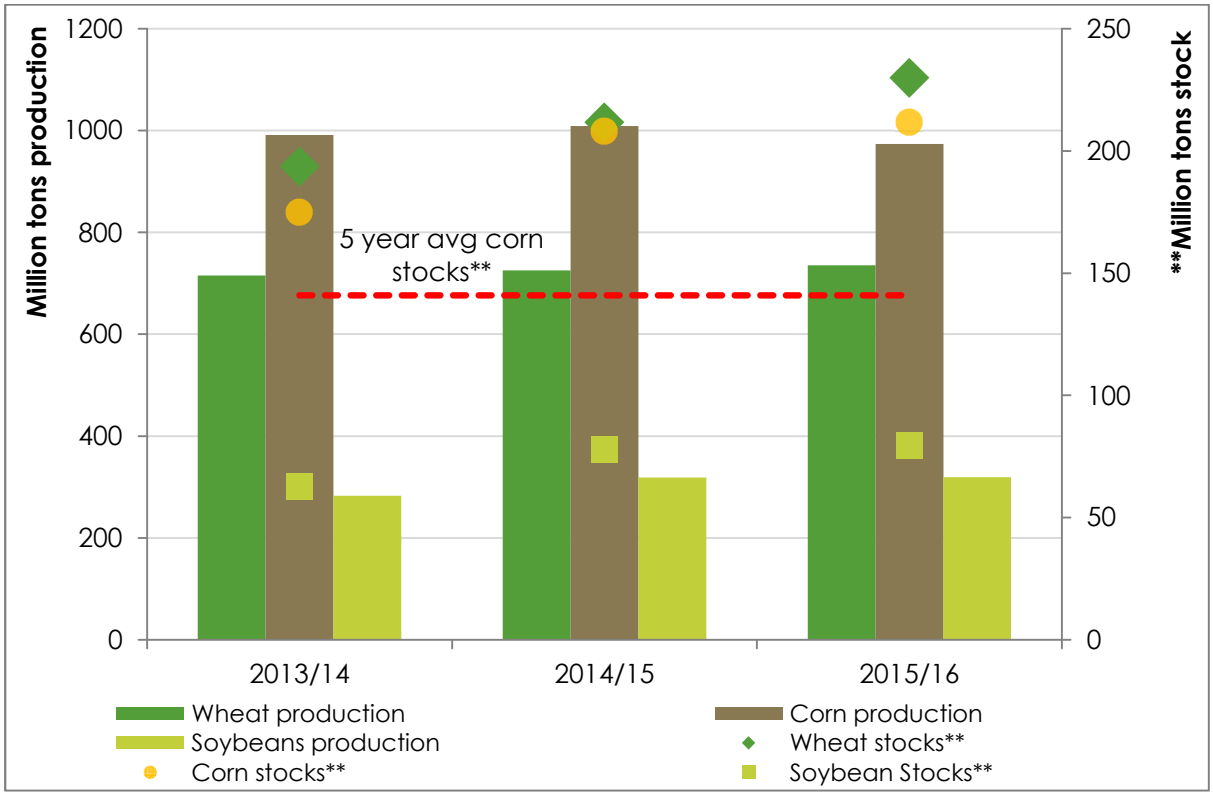


Figure 6: Global production and stock levels for wheat, maize and soybeans
Source: USDA, 2016

Field Crops

The severity of the drought, particularly through November and December during the optimal planting window for white maize in the Western parts of South Africa, resulted in a substantial share of the intentions released in October 2015 not being planted. Conditions improved in January however and by the time the Crop Estimates Committee (CEC) released the preliminary area estimates for summer crops on 27 January 2106, the assessment was more optimistic than what many had expected. Given the severity of the drought, the preliminary area estimate was also accompanied by the first production forecast, which is traditionally only released at the end of February. The early production forecast remains uncertain however due to the impact of February rainfall on eventual yields and while it currently reflects yields similar to the 2015 season, it remains subject to significant downside risk. A substantial share of the maize area was only planted in January, whereas the 2015 maize crop was planted 4-6 weeks earlier, well within the optimal planting window. This combination of an earlier estimate and high share of risky late plantings therefore raises concern that the 7.4 million ton maize crop may not be realised. Consequently this report illustrates 2 scenarios: The first is the baseline, based on the official production forecast from the CEC. The second illustrates potential downside risk, imposing a 10 – 15% reduction on different summer crop yield levels on the preliminary area estimate presented by the CEC. This results in a total maize crop of 6.6 million tons (Table 1).

Table 1: Crop Production Estimates

Commodity	5 year average	2016 Normal Weather (BFAP Baseline Aug 2015)	2016 Baseline (CEC Estimate)	2016 Scenario (Reduced Yield)	Yield reduction (Baseline vs. Scenario)
	Thousand tons				
White Maize	6 095	7 279	3 267	2 840	-13%
Yellow Maize	5 131	6 385	4 171	3 783	-10%
TOTAL MAIZE	11 226	13 664	7 438	6 623	-11%
Soybeans	810	1 294	769	693	-10%
Sunflowers	687	826	622	549	-12%
Wheat	1 812	1 769	1 831	1 831	0%

Table 1 presents the 2 production scenarios, contextualised by the 5 year average production level, as well as the projected production volumes for 2016 under an assumption of typical weather conditions that was presented in the BFAP baseline publication in August 2015. The preliminary area estimate indicates that less than 80% of the intended maize area was planted and the estimated crop of 7.4 million tons only amounts to 60% of the 5 year average. Soya bean production is also reduced, with only 77% of the intended area being planted. Soya bean production has expanded rapidly over the past decade; hence the 6% reduction in the 2016 estimate relative to the 5 year average is less relevant than comparison to the 2014/15 crop, which was 27% above the

2016 estimate. Sunflower area on the other hand remains very uncertain, as the planting window is not fully over and, following the late rains in January, sunflower plantings have accelerated. The area under sunflower is anticipated to be higher than initial intentions, yet the lower yield potential still results in a 2016 crop estimate that is 10% below the 5 year average. These late plantings are also subject to significant downside risk and a 10% yield reduction will realise a crop of 550 thousand tons, 20% below the 5 year average production level.

Table 1 further illustrates that wheat production is projected to increase relative to the normal weather projection. While this outcome assumes trend yields due to the lack of certainty regarding the winter rainfall later in the season, it incorporates a small area expansion in the Free State where some of the intended maize hectares remain unplanted. Wheat represents a risky option under dry-land conditions in the Free State; however current price levels, which are supported by the weaker exchange rate and the variable import tariff, are likely to induce some plantings.

Domestic maize consumption in South Africa exceeded 10 million tons in 2015 and in addition to the domestic requirement many deficit regions across Southern Africa, such as Swaziland, Lesotho, Namibia, Botswana and southern Mozambique are dependent on South African maize (Figure 7). Exports into the region consist predominantly of white maize, with yellow maize for the animal feed market only accounting for an annual average of approximately 150 thousand tons over the past 5 years. Given the price difference between white and yellow maize, 2016 will likely see yellow maize accounting for a greater share than normal.

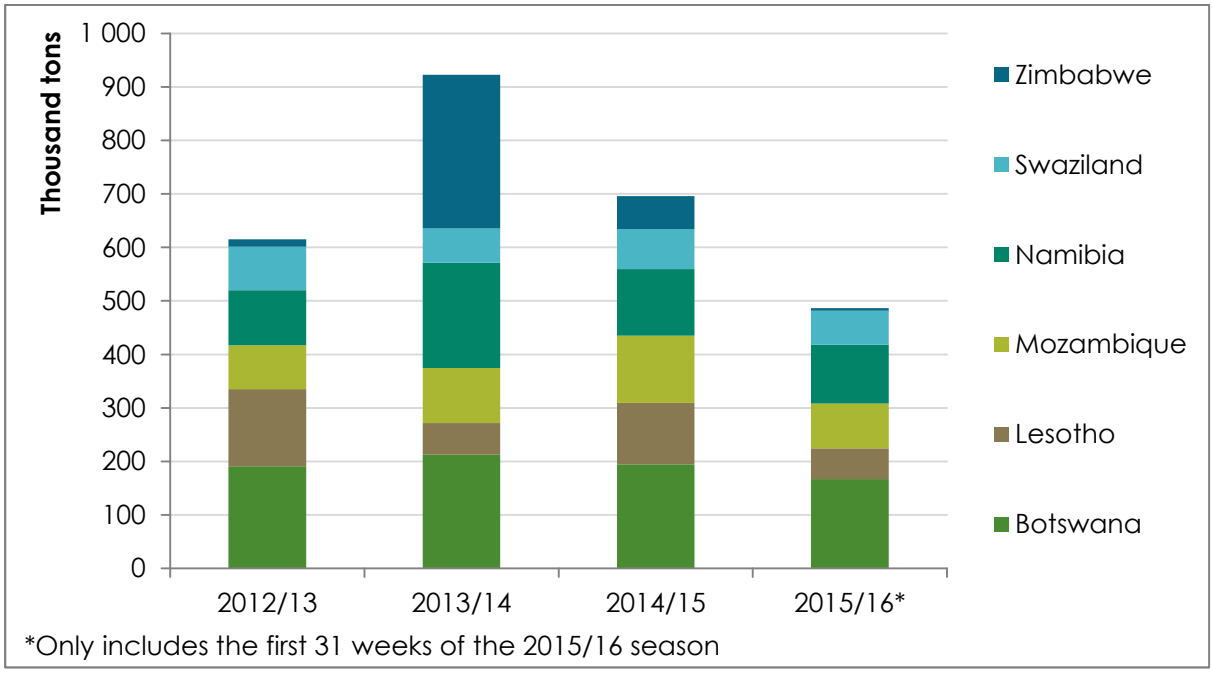


Figure 7: South African maize exports into the Southern African region (excl. ROW)
Source: SAGIS, 2016

It is important to note that there has been a significant shift in exports to Zimbabwe, since Zambia has taken over this export market in recent years. The emergence of Zambia as a relatively consistent surplus producer has reduced the volumes of South African maize exports to Malawi as well. The drought conditions experienced in South Africa have however been far reaching in the continent (Figure 8) and initial production forecasts across Southern Africa have been reduced from recent norms (**Figure 9**). The fact that Zambia's crop has also been affected by the drought raises further concerns for the regional maize balance. Consequently, projections indicate that South Africa will still export approximately 440 thousand tons of white maize and 300 thousand tons of yellow maize into the Southern African region.

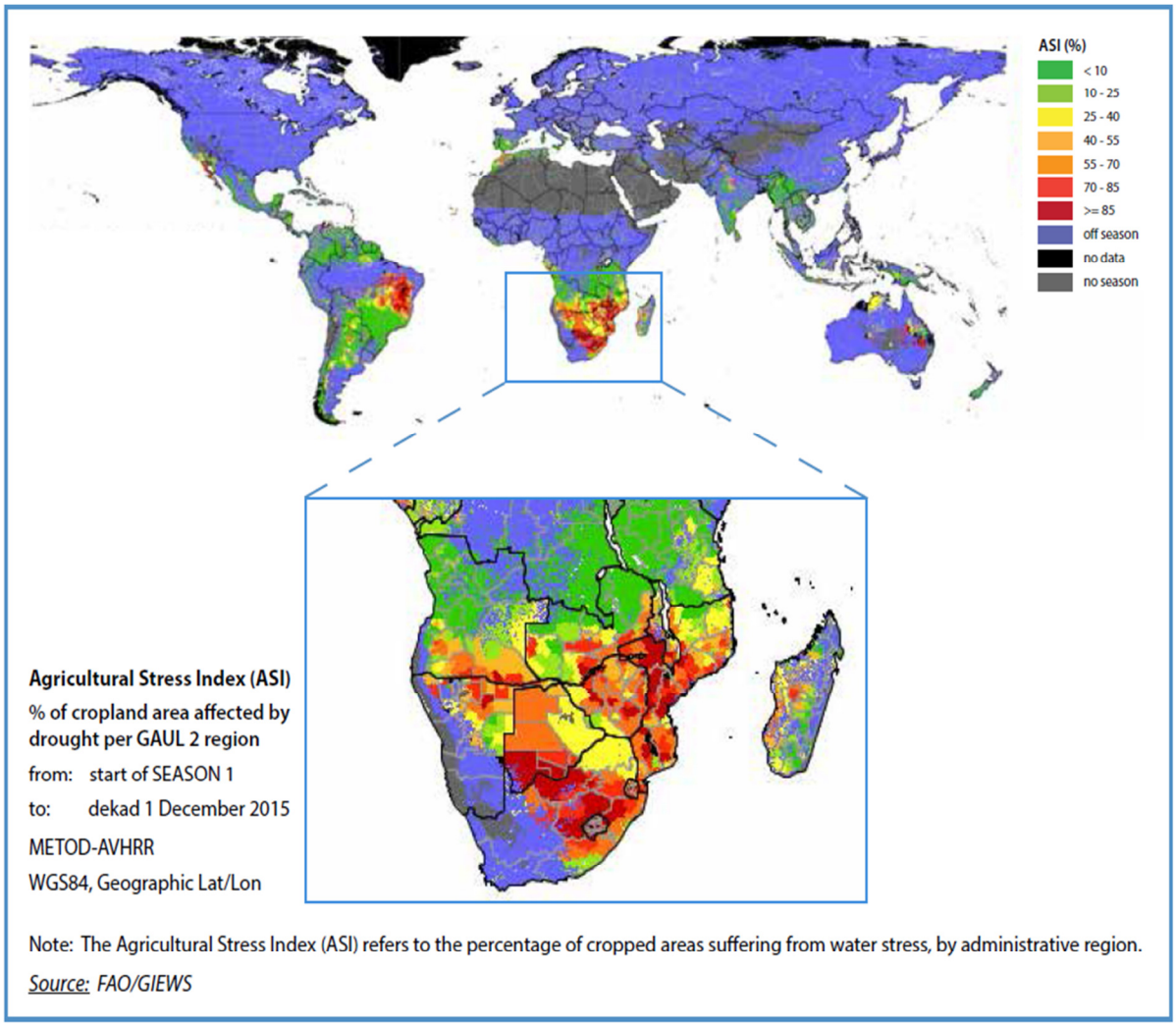


Figure 8: Agricultural Stress Index - December 2015
Source: FAO GIEWS, 2016

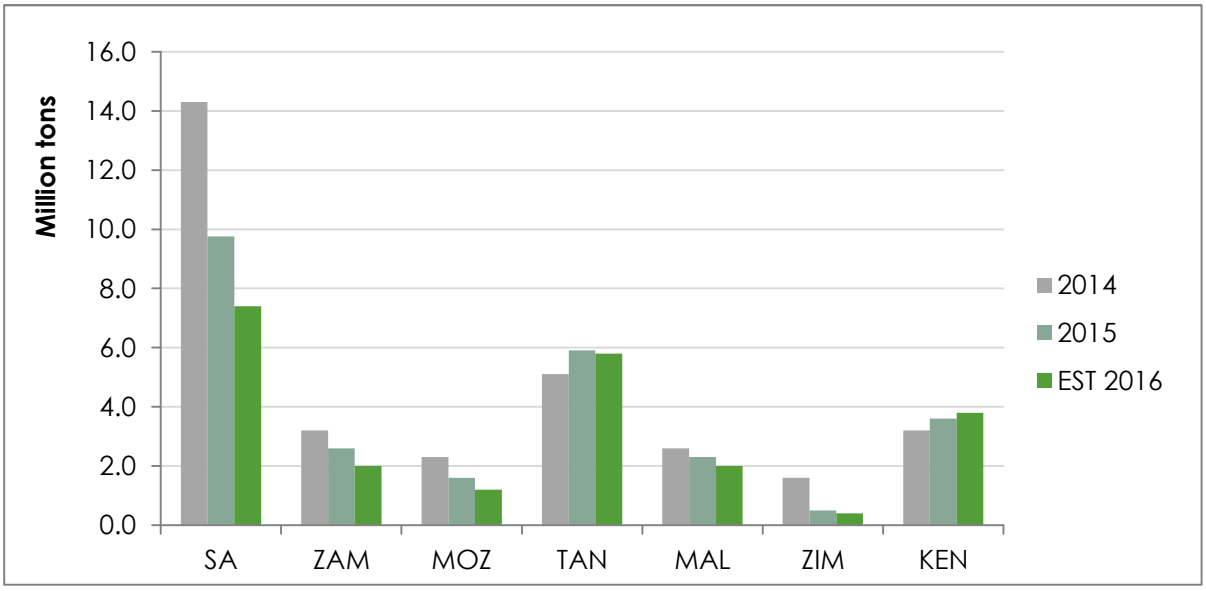


Figure 9: Maize production estimates across Eastern and Southern Africa

Currently, maize stocks at the end of the 2015/16 marketing season are estimated at 1.6 million tons (1 Mt white and 0.6 Mt yellow). Considered within the context of domestic and regional demand, this implies that even if the domestic crop reached the 7.4 million tons anticipated by the Crop Estimates Committee, significant import volumes will still be required (Table 2). Consequently prices will remain near import parity levels, which in turn will depend on the origin of imports, as well as the exchange rate. Given that the drought has also impacted on the rest of Southern Africa (Figure 8), imports will have to be sourced from outside of the region. Yellow maize is freely available in the world market, but white maize represents a very small share of total production in the global context. This not only limits potential sources of imports, but also results in a premium for white maize over yellow.

Table 2: Projected import volumes for key crops in 2016

Commodity	Import Requirement (1000 tons)		Price (R/ton)
	CEC Baseline	Reduced Yield Scenario	CEC Baseline (Annual Avg. 2016)
White Maize	856	1 240	R 4 751
Yellow Maize	1 932	2 236	R 3 613
Soya Beans	223	299	R 6 414
Sunflower	42	134	R 6 575
Wheat	1 753	1 753	R 5 206
TOTAL	**4 806**	**5 662**	

Mexico and the United States have been identified as potential sources for white maize; however US imports are not currently an option due to GM certification, leaving Mexico as the most likely alternative. Quotes indicate that FOB prices in Mexico for white maize are trading at approximately $245 FOB, compared to yellow maize from Argentina at $170 FOB. International shipping costs of approximately $16/ton, combined with further handling and discharge costs in the harbour imply that Mexican white maize can be landed and offloaded at Durban harbour for approximately R4 400 per ton. Additional

inland transportation costs of approximately R450 results in an import parity price of R4 850, which brings it closer to the current spot market price. Arguably, all of the imported maize will not be transported inland, with some being processed in coastal regions, where the cost of imported maize will be more competitive. Price competitiveness does however not only relate to the cost per ton, but also to quality. The South African Grain Laboratories (SAGL) have tested Mexican white maize as No 2, which can be milled in South Africa, but implies a lower extraction rate. While it is difficult to put a premium on extraction rates, current estimates are in the range of R300 per ton. Hence, this brings the import parity price for Mexican white maize adjusted for quality up to R5150 and right in line with the current SAFEX spot price for white maize.

Mexico is not traditionally a surplus producer and availability remains a concern. Estimates of potential Mexican exports to South Africa range from 1 million tons to 1.3 million tons. Domestic consumption in Mexico could potentially be supplemented with imports from the US market, which would increase availability of exports to South Africa. Nevertheless, Mexico's ability to provide the entire domestic shortfall remains uncertain if the South African harvest is small. This implies that South Africa may need to look elsewhere towards the end of the season, with the US the most likely alternative. US maize would be approximately R400 / ton cheaper, but will only be available in the new season harvest (October to November 2016). Current GM regulations would also have to be altered for US imports to occur.

Maize represents the principal staple in South Africa and, given the shift from export parity to import parity levels, price impacts resulting from the drought are greater than most other sub-sectors. As a basic food staple, demand remains inelastic; some substitution to other starches is possible, yet even at current price levels maize remains the cheapest option and large scale substitution to other staples is unlikely. Hence any relief in the inflation rates for maize meal, which is already estimated at 37% year on year in January, will particularly benefit the lower income consumer. The econometrically estimated transmission elasticity of 0.52 implies that a 10% reduction in maize prices originating from the US would likely result in a 5% reduction in the cost of maize meal in South Africa. Thus opening the US market will reduce maize meal prices, as well as providing a more certain source of white maize imports to the South African market to ensure availability.

South Africa is normally an exporter of maize and therefore the total import volumes expected in 2016 are unprecedented. To ensure that imports occur timeously and efficiently, infrastructural capacity needs to be considered. The optimistic crop estimates imply that that there will be less pressure on infrastructure than had been anticipated towards the end of December, yet in a scenario where precipitation levels through February are insufficient for yields to materialise, the import requirement could still rise well above the 2.8 million tons presented in Table 2. Consideration of the port capacities, discharge rates, storage facilities and loading rates presented in Table 3, therefore remains important. Port capacity reflects both shipment possibilities, discharge rates and loading capacity. Table 3 indicates that currently, loading capacity is the constraining

factor within South African ports rather than draft capacity, whilst concern has also been expressed regarding inland transportation logistics. Considering total loading capacity within the 4 ports currently used for grain trade (Durban, Cape Town, Port Elizabeth and East London), South Africa could handle in excess of 7 million tons per annum, while an additional 960 thousand tons is available in Richards Bay. South Africa already imports almost 1.8 million tons of wheat and 460 thousand tons of soybean meal, hence additional import requirements can be handled, but continued cooperation between industry and government will be required for imports to occur timeously so that the logistics work well. This becomes even more critical if the ultimate domestic crop is reduced. For imports into the rest of the Southern African region, additional capacity is available from the ports in Maputo and Beira.

Table 3: Infrastructure related to grain imports

Port / Berths	Draft	Discharge Rate	Rail Loading	Road Loading	Total Loading	Storage Capacity
	Mt p.a	Tons/day				Tons
Cape Town *Transnet (MPT)*	11.9	6000	3500	2500	6000	None
Fruit Terminal (FPT)	10.8	6000	3500	2500	6000	None
Port Elizabeth Transne (MPT)	10.8	4000	2000	2000	4000	None
Fruit Terminal (FPT)	9.5	4000	2000	2000	4000	None
East London	10.4	4000	660	1020	1680	66000
Durban Agriport	10.2	6000	1500	3000	4500	60000
Rennies Bulk Terminal	9.3	10000	3000	4000	7000	120000
Durban Bulk Shipping	12.2	6000	3000	3500	6500	70000
Richards Bay	12	4000	0	4000	4000	17000
Maputo Stema	10.5	4000	800	1400	2200	45000
Beira	9.5	4000	600	900	1500	30000
TOTAL DAILY: Current grain ports*		36 000	13 660	16 020	29 680	316 000
TOTAL Annual: Current grain ports*		8 640 000	3 278 400	3 844 800	7 123 200	

*Current ports include only grain ports in Cape Town, Port Elisabeth, East London and Durban, excluding Fruit Terminals.

Source: South African Ports Authority

While the impact of the drought has been particularly severe in the maize production areas, several other subsectors are also affected, both directly and indirectly. Current spot prices for soya beans and sunflower implies negative crushing margins, placing severe pressure on newly established crushing plants that compete with imported oil and oilcake.

Furthermore, sugar production was already well below normal levels in 2015 and is projected to remain at similar levels for the second consecutive year in 2016, representing a 28% reduction from the normal harvest in 2014. Sugar therefore represents another exporting industry that will be a net importer in 2016.

Livestock

The effect of the drought is also clear in grazing conditions and the impact on extensive livestock industries that depend on grazing has been catastrophic. Unlike the crop sector where production declines in a drought year, beef production tends to increase, as producers cull due to poor or insufficient grazing and high feed costs. Commercial beef slaughters already increased by 8% year on year in 2015, rising almost 18% above the 5 year average. While the current drought influenced this expansion, it is not the sole cause, as rising export demand has also driven feedlot expansion. In 2016, beef production is projected to expand further, rising 13% above the 5 year average (Table 4). The strong export demand arising from the combination of firm world prices and the weak Rand however prevents a price decline. A return to normal weather conditions should induce a phase of herd rebuilding, which limits availability and will result in prolonged significant price increases. Milk production is also projected to decline, due to the impact of high temperatures on productivity, as well as reduced feed use in flexible production systems arising from high feed costs.

Table 4: Impact of the drought on livestock production, thousand tons

Commodity	5 year average	2016 Normal Weather (BFAP Baseline Aug 2015)	Drought Scenario (January 2016)	% Change from baseline
	Thousand tons			% change
Beef	664	710	750	6%
Poultry	1 561	1 636	1 612	-1.5%
Pork	196	214	197	-8%
Milk	2 901	3 176	3 102	-3%

The impact of poor grazing conditions is lower in sectors where intensive production systems dominate, such as beef feedlots, pork and poultry. Pork and poultry production in particular have little flexibility in the feeding system and, given high capital requirements, production declines only marginally in the short term. Both industries are net importers already and prices have found support from the weaker exchange rate; however the increase in feed grain prices is much greater than the increase in meat prices, impacting negatively on profit margins. Maize is the single largest ingredient in typical feed rations and Figure 10 presents meat to maize price ratios for beef, pork and chicken, as a basic indicator of profitability. Meat to maize price ratios are projected to decline sharply in 2016, before recovering somewhat from 2017 onwards, when feed costs reduce on the assumption of normal weather conditions.

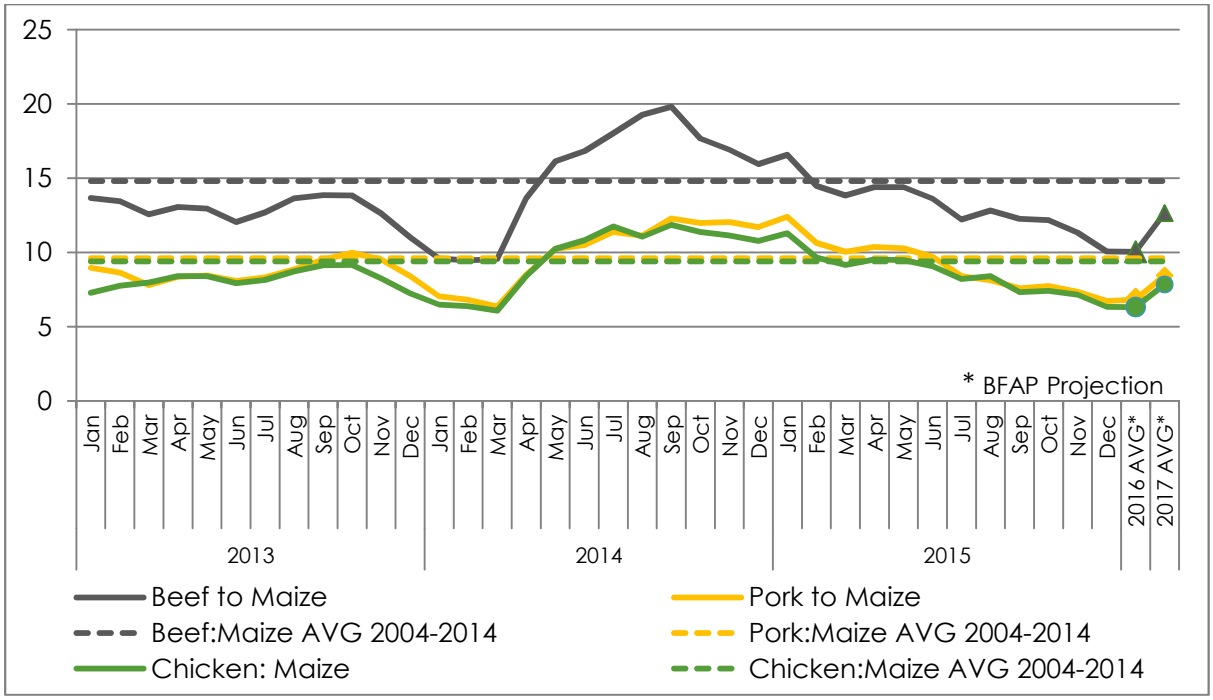


Figure 10: Profitability in livestock sectors

While the depreciation in the value of the Rand has increased the cost of imported products, it also improves the competitiveness of sectors that are able to maintain a positive trade balance. This is evident in the beef sector, where exports are projected to expand by almost 70% year on year, albeit from a small base. Export orientated horticultural industries that produce under irrigation also stand to benefit, provided that access to irrigation water is not influenced negatively by the drought conditions and quality standards are maintained.

Horticulture

The 2015/16 drought was accompanied by above average temperatures in the major fruit growing areas as heat waves lasted longer than normal between September 2015 and January 2016. The impacts of these conditions will differ across different horticultural subsectors, growing areas and even individual producers. Physiologically, the irrigation and development requirements of different subsectors vary, with apples for instance requiring ±146 days from anthesis (full-bloom) to harvest, whilst the requirements for different stone fruit varieties and table grapes range from 80 to 110 days. Naturally, crops requiring a longer period will be more vulnerable to the drought, as the irrigation requirement is greater. Producers use a variety of irrigation sources, such as boreholes, water or irrigation scheme, rain or snow fed dams and rivers, resulting in marked differences in the extent of the drought impacts, and complexity in measuring the irrigation impacts.

Reduced water availability not only impacts negatively on fruit size and quantities, but also has far reaching quality implications. Plants that experience any form of stress will be more susceptible to viruses and diseases, delayed flowering, uneven ripening of fruit, as well as early ablactation of flowers and fruit, all of which can potentially impact negatively on fruit quality. Furthermore, prioritisation of current harvests results in newly established plantings often being neglected during periods of water shortages, which impacts on the longevity of young orchards or vines. Given the differences across regions and production systems, quantification of quantity and quality impacts at national level is very challenging, yet Table 5 presents a qualitative view on possible impacts on perennial crops in the horticultural sector.

Table 5: Drought impacts in the horticultural sector

Fruit type	Current harves 2015/2016	2016/2017 harvest	2017/2018 harvest
Stone fruit	Overall smaller size. Fruit quantity is available but smaller individual fruit, hence, lower yields. Sunburn on later-maturing varieties. Earlier varieties are already harvested.	Reduced yield Uneven quality distribution	Reduced yield, but to a lesser extent than previous season. Ceteris paribus, the following season may be "normal".
Pome fruit	Overall smaller size. Fruit quantity is available but smaller individual fruit, hence, lower yields.	Reduced yield Effect more negative than stone fruit, as bearing units/buds are developed two seasons in advance. Uneven quality distribution	Reduced yield, but to a lesser extent than previous season. Ceteris paribus, the following season may be "normal". Effect more negative than stone fruit.
Table grapes	Lower yields "specific gravity" down.	Reduced yield Uneven quality distribution	Reduced yield, but returning to more average levels.
Wine grapes	Lower yields "specific gravity" down. Quality down from previous year as the ratio of Sugar: Acid is impacted negatively.	Decreased yield Uneven quality distribution	Decreased yield, but returning to more average levels.
Citrus	Lower yield expected Quality issues related to sunburn.	Ablactation of flowers/fruit, hence decreased yield	Decreased yield

The extent to which export orientated horticultural industries are able to benefit from the weaker currency will ultimately depend on the drought's impact on volume and quality

on individual farms. Given the role of the horticultural sub-sector both in terms of contributing to total agricultural GDP (Figure 4) and the positive trade balance generally maintained in the agricultural sector (Figure 5), consideration of such impacts are vitally important. Across the horticultural subsector, production volumes are expected to decline, with projections ranging from 5 to 15% for different industries. Given the assumed 32% depreciation in currency value from 2015 to 2016, price impacts are likely to outweigh reduced production volume, provided that quality is sufficient to enter the export market. For individual producers, the profitability impact of higher prices is negated by rising input expenditure, as costs tend to be dollar based and therefore also rise as a result of the weaker exchange rate.

Aggregate Macro-Economic Considerations

Coming as it did after an already below-average production season in 2015, the combination of the drought and the weaker exchange rate has already impacted severely on agricultural commodity prices in South Africa. In the face of continued currency depreciation, price impacts outweigh reduced activity, a fact reflected in the aggregated contribution of the sector to the South African economy. In the volatile field crop sector, production decreases by 25% year on year under the CEC baseline, yet the gross value of field crop production expands marginally in nominal terms, due to an average increase of just over 50% in projected prices. The uncertainty associated with ultimate yield levels could impact significantly on this number however, as prices are already at import parity levels. Field crops typically account for less than 30% of total gross production value and within the livestock and horticulture sectors, where production levels are less volatile, prices also find support from considerable exchange rate depreciation. As a net importer of key inputs such as fuel and fertiliser, the exchange rate also increases the domestic cost of inputs, despite the low crude oil price.

With price impacts outweighing reduced activity, the gross value of agricultural production still increases year on year, despite the decline in total efficiency, measured as output per unit of intermediate input expenditure. Considered at national level, the Crop Estimates Committee scenario yields similar levels of agricultural GDP and Net Farm Income in 2016 relative to 2015. Arguably 2015 was also a below average year, where the price impact of reduced production was mitigated to some extent by high stocks from the record season in 2014, hence Table 6 contextualises some key indicators for the agricultural sector against 2015 values, as well as a 3 year average in real (inflation adjusted) terms. Whilst the Agricultural GDP remains above the 3 year average and net farm income declines only marginally under the crop estimates scenario, a reduced yield scenario results in significant deterioration, as prices remain relatively unchanged at import parity levels, whilst production volumes decline.

Table 6: Drought impacts on key agricultural and macro-economic indicator, Million Rand

	5 year average	2015 (Est.)	2016 Projections - % change vs. 2015		2016 Projections - % change vs 3 year average	
			Baseline (Crop Estimate)	Scenario (Reduced Yield)	Baseline (Crop Estimate)	Scenario (Reduced Yield)
Agricultural Sector	**Million Rand**		**Percentage Change**			
Real Gross value of productionPr	87 591	92537	2.94%	0.48%	3.89%	1.40%
Real Intermediate Input Expenditure	44 320	46541	5.07%	5.04%	6.75%	6.72%
Real Agricultural GDP	45 526	48378	0.92%	-3.76%	1.48%	-3.23%
Real Net Farm Income	32 156	34194	0.43%	-6.20%	-0.20%	-6.79%

In addition to the implications for value addition, reduced production volumes will impact on South Africa's trade balance. Sectors such as maize and sugar, which would normally contribute to the sector's positive trade balance, will shift to a negative net trade position in 2016 (Figure 5) and therefore instead of earning foreign revenue, the cost of imports must now be considered. Under the CEC scenario the cost of importing maize will amount to R11.5 billion, whilst the reduced yield scenario implies maize imports to the value of R14.5 billion. At the same time, assuming that international prices remain relatively constant, depreciation in the exchange rate also increases the revenue from export orientated industries in the horticultural subsector. Despite reduced volumes, the 32% year on year decline in currency value increased the value of projected exports and at aggregate level, the agricultural sector is expected to retain a positive trade balance in 2016.

Despite primary agriculture's small share in national GDP, the severity of the current drought implies that its impact on the rest of the South African economy should also be considered. In order to quantify such impacts, the sector level implications described in this section were introduced as a shock into a Computable General Equilibrium (CGE) model of the South African Economy. Table 7 presents the percentage change from the norm in key macro-economic indicators in 2016 relative to a 3 year (2013-2015) average. The percentage changes in Table 7 do not refer to absolute year on year changes in the relevant indicators, but rather to the percentage increase / decrease from normal levels resulting from of the drought shock. General inflation increases and the exchange rate depreciates further, hence significant reductions are observed in government expenditure, household consumption and total GDP. Income from all factors of production declines, but the impact is the greatest on the less skilled labour force.

Table 7: Economy wide impacts of the drought

	CEC Baseline – Percentage change from 3 year average
Economy-wide impacts	
Real GDP	-3.38%
Inflation (CPI)	1.41%
Exchange Rate	-1.10%
Government-Expenditure	-0.77%
Household consumption	-4.26%
Factor Income	
Labour: Unskilled	-6.40%
Labour: Semi-skilled	-6.72%
Labour: Skilled	-6.26%
Labour: Highly skilled	-1.87%
Capital	-2.56%

The impact of the 2015/16 drought is no doubt severe, but it remains a single year consideration and while the effect in some subsectors such as horticulture and livestock production may be evident beyond the current production season, one must not allow current distress to obscure the longer term objectives within the sector. Within the National Development Plan, agriculture is identified as a potential creator of employment opportunities, with intensive, export orientated industries in particular identified as key in creating jobs within the rural economy. Ambitious job creation targets will require investment in irrigation infrastructure and consequently, the response to the current drought situation must continue to foster an enabling environment where investment can flourish. The predominantly export orientated horticultural sector also remains critical to South Africa's positive agricultural trade balance (Figure 5), as the value of surplus commodity exports such as citrus fruit, wine, grapes, apples and pears offset imports of deficit commodities such as wheat and poultry. The weaker currency outlook implies that South African products will remain competitive in the international market going forward. A return to improved production volumes in 2017 relates to a significant expansion of agricultural GDP as well as net farm income (Figure 11).

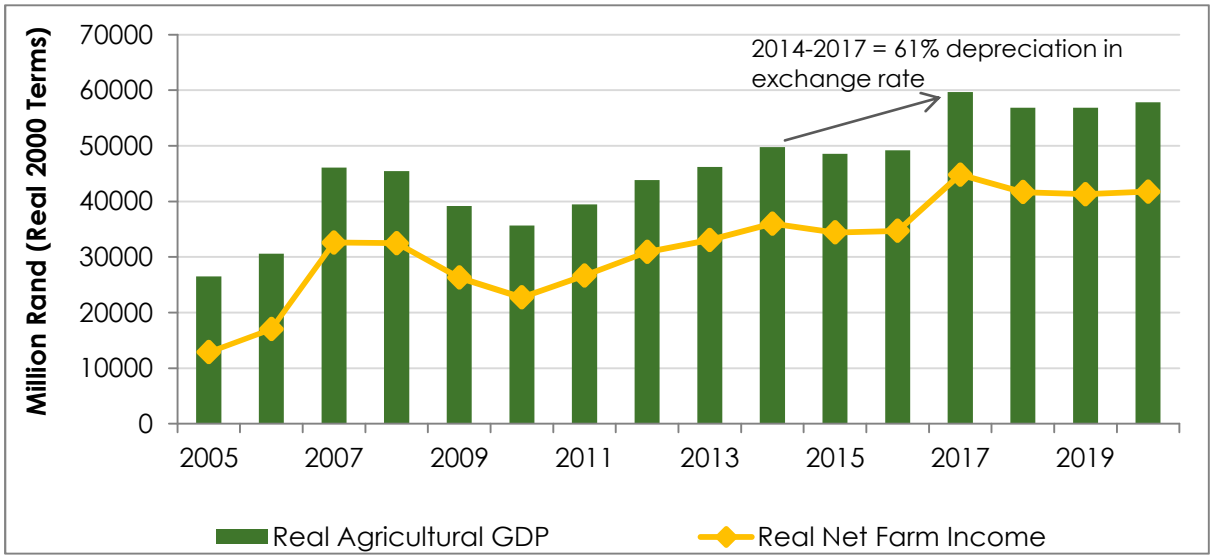


Figure 11: Outlook for agricultural GDP and national net farm income in real terms

At the same time, the cost of basic food staples is a key consideration in responding to the current drought and in the longer term it is a return to surplus production that will be most effective in reducing the cost of food staples and curbing food price inflation. Despite further depreciation in the value of the Rand to beyond R17 to the US dollar in 2017, a return to surplus production will imply a decline of more than 30% in domestic white maize prices. In the longer term, a favourable food price inflation Outlook will depend on a vibrant and sustainable agricultural sector and hence the short term response to the severity of the current drought should prioritise the ability of producers to stay in business so that they are able to contribute to the recovery when weather conditions improve.

Commercial Farmers

At national aggregate level, increased prices are sufficient to offset reduced activity and hence the baseline associated with the crop estimate relates to a similar contribution to GDP from the agricultural sector as in 2015. However the impacts of the drought differ across regions and even amongst individual producers. The extent to which producers in the different regions were able to plant the intended crops, as well as the volume and distribution of rainfall is key and while producers that are able to harvest a reasonable crop will benefit from higher prices, multitudes were unable to plant, or planted well outside the optimal planting window, which increases the downside risk on yields.

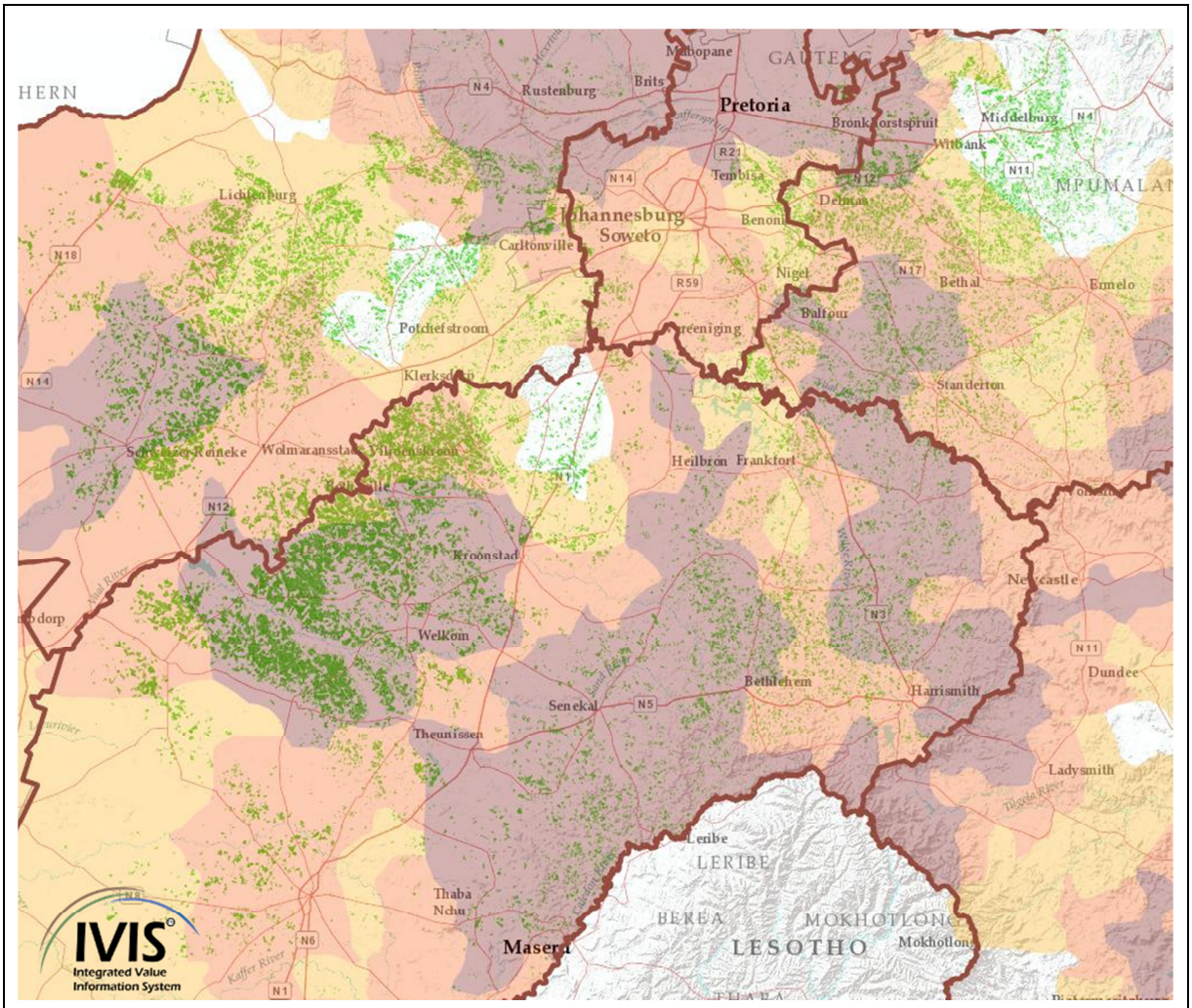
Cash Crops

Optimal planting dates for the maize production area range from 1 October to 15 November for the cold Eastern regions (Mpumalanga) and to the 30th of November for the Eastern Free State region. The optimal planting date shifts further into December as one moves into the western regions. Gauteng and the Central Free State can optimally plant maize between 1 November and 10 December. A large area of the maize cultivated in South Africa (Western Free State and Eastern parts of the North West) can be planted from the 20th of November until the 25th of December whereas the remaining Western parts of the North West can push plantings until the 7th of January.

The dryland maize production areas in Mpumalanga, Free State and North West provinces are super-imposed with the December SPI map which clearly shows how the maize production areas were affected by the drought (Figure 12). The number of hectares which would typically be allocated to maize production and are affected by the different drought severities are calculated in Table 8. It is important to note that this table does not reflect actual plantings but only the affected area where maize can potentially be planted.

Table 8: Potential maize production area per drought severity area

	Drought Severity			**Total maize production area affected**
Date	**Moderate**	**Severe**	**Extreme**	
Oct-15	45 269	15 433	3 465	64 168
Nov-15	639 065	132 657	23 682	795 404
Dec-15	944 040	361 411	817 361	2 122 812



	Legend		
	Moderate Drought		Extreme Drought
	Severe Drought		Maize Production Areas (2014)

Figure 12 - December SPI and dryland maize production areas 2014
Source: DWA (January 2016), BFAP (2014), DAFF (2014)

The Free State, Mpumalanga and North West provinces typically produce 42%, 30.7% and 19.4% of the total South African maize production (own calculations from 2014 areas and yields). Figure 13 compares monthly rainfall during the optimal summer crop planting period for the current season (2015/16) in the Free State with the monthly rainfall in the drought year 1991/92 as well as the last 5 years. The images in the 4th column show the proportion of total national dryland maize production originating from the district in question in a normal or good harvest year. The proportions under normal or good conditions give an indication of the proportional size of the crop lost or at risk in specific regions due to insufficient rain.

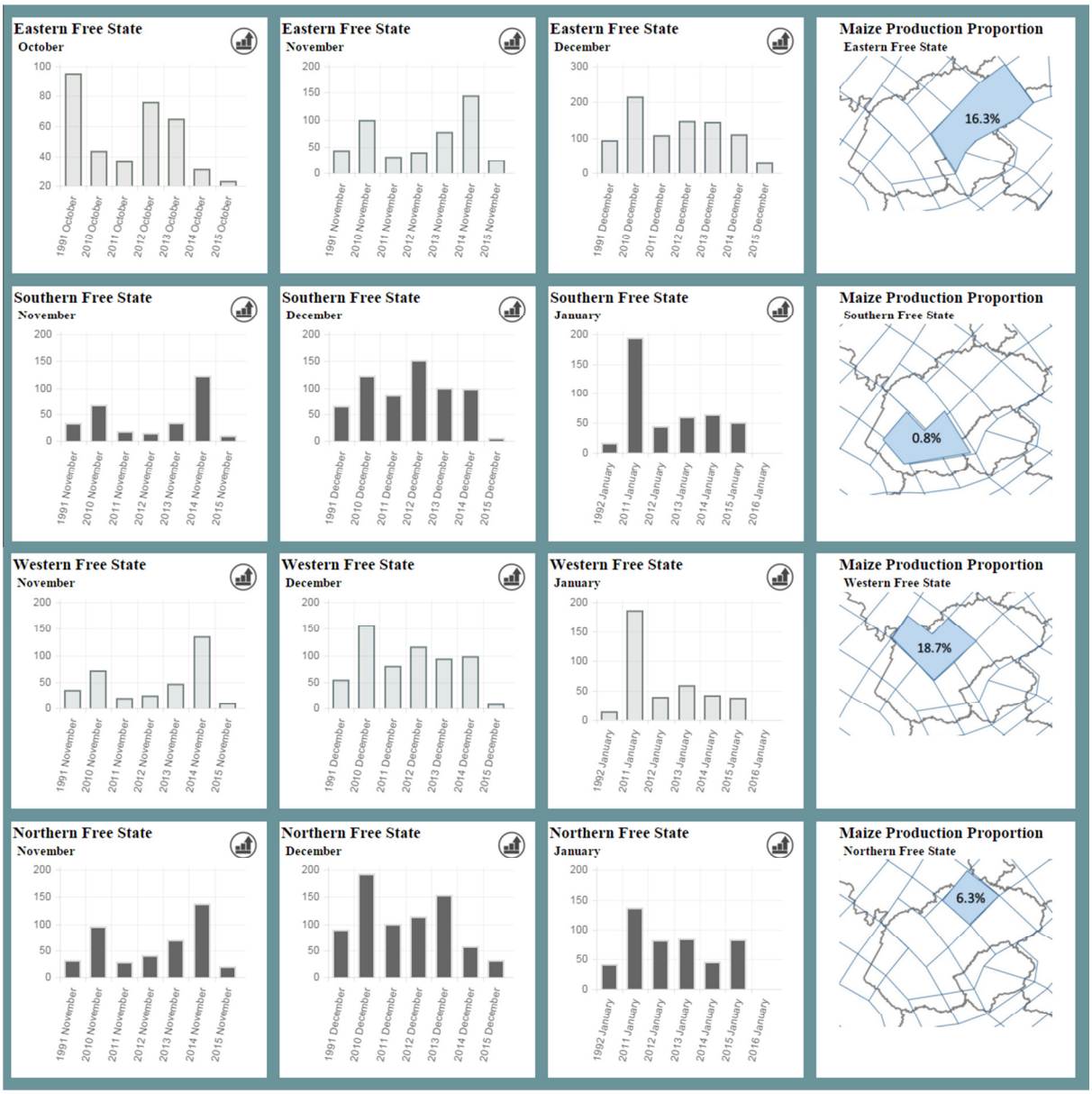


Figure 13 - Monthly Rainfall in the Free State by Production District
Source: Weather SA

It is clear from Figure 13 that only a fraction of the usual monthly rainfall was recorded throughout the Free State over the optimal planting period. Many North West farmers faced a similar situation. Farmers in Mpumalanga received more rain during optimal planting periods (compared to other regions), but generally still planted later than usual which exposes them to higher risk in terms of yields. As a result of the dry conditions many farmers were forced to refrain from planting any crops, especially in the North West and Free State.

From a farming business perspective, the current drought will not only affect the current production season, but might also have long term financial and debt implication on the farm business, especially since the 2014/15 production season was also characterised by

extreme dry conditions over a large part of the summer rainfall area, particularly in North West and the northern and western parts of the Free State.

Figure 14 indicates the yield trends for the BFAP prototype farms situated in the key producing regions in South Africa. The grey bars indicate the BFAP yield estimates for 2016, which are significantly below the 5 year average (yellow bars), mainly due to the downside risk of late plantings and the uncertainty of sufficient yield-determining rainfall. The low yield levels result in low gross margins and hence low farming income which places the cash flow positions of many producers under pressure.

The subsequent section highlights the implications of the drought on a farm business from an income and cash flow perspective. Scenarios reflect differences in area under production and therefore shows the potential financial implications on the farm business, ultimately impacting sustainability of producers and hence, food security in the long term.

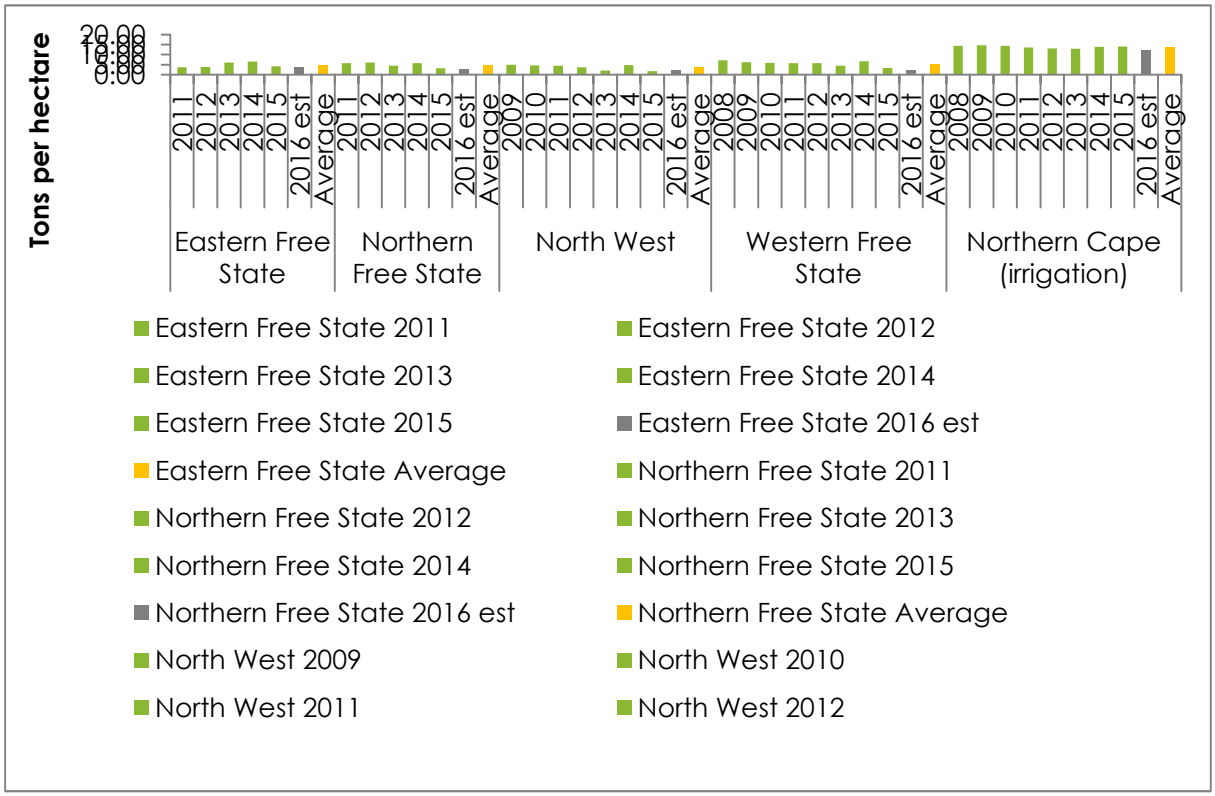


Figure 14: BFAP Prototype farm maize yield trends
Source: BFAP, 2016

To demonstrate the impact of reduced plantings, different scenarios are illustrated for a cash crop prototype farm situated in the Northern Free State, which traditionally cultivates maize and sunflower on 1300 hectares of farmland. The whole-farm analysis approach captures all financial variables (gross margins and overhead structure). The 2013/14 production season was used as base year (real farm data). The simulations

included mainly area scenarios where the producer was limited in terms of the area cultivated under maize.

Scenario 1 – The scenario demonstrates the case where the producer was only able to plant 50% of his intended area to maize due to the dry planting period. Yield levels were also adjusted lower for both maize and sunflower. Commodity output prices were simulated by the BFAP sector model, based on the CEC crop estimations published on 27 January 2016. It is assumed that the area under sunflower will increase marginally. The scenario also assumes that the producer has already acquired a portion of the fertilizer, chemicals and seed which indicates that various expenses have already occurred for the season. Due to the nature of the 2014/15 production season, the assumption was made that the producer's production loan / overdraft facility had been used to its maximum and that interest is chargeable on the extended facilities (up until August 2017). The overhead cost structure remains the same. Scenario 2 and 3 follow the same fundamental assumptions, however, area under production was further decreased.

Scenario 2 – 20% of traditional maize area was planted. Sunflower area marginally increased.

Scenario 3 – The scenario assumes that no maize was planted and hence only sunflower production followed. The sunflower yield was also adjusted downwards.

Figure 15 illustrates the impact of the various scenarios on the net farm income of the farm business. Since certain land preparations had already occurred (mainly after the previous harvest), it is assumed that a portion of fertilizer, chemicals and seed have been purchased and lastly that the overhead costs remain the same. Under all three scenarios, projections illustrate that the farm will make a significant loss in 2016. The low anticipated gross margin from sunflower does not provide sufficient financial relief. It is projected that the farm will make a total loss of more than R8 million in 2016 in a scenario where no maize is planted.

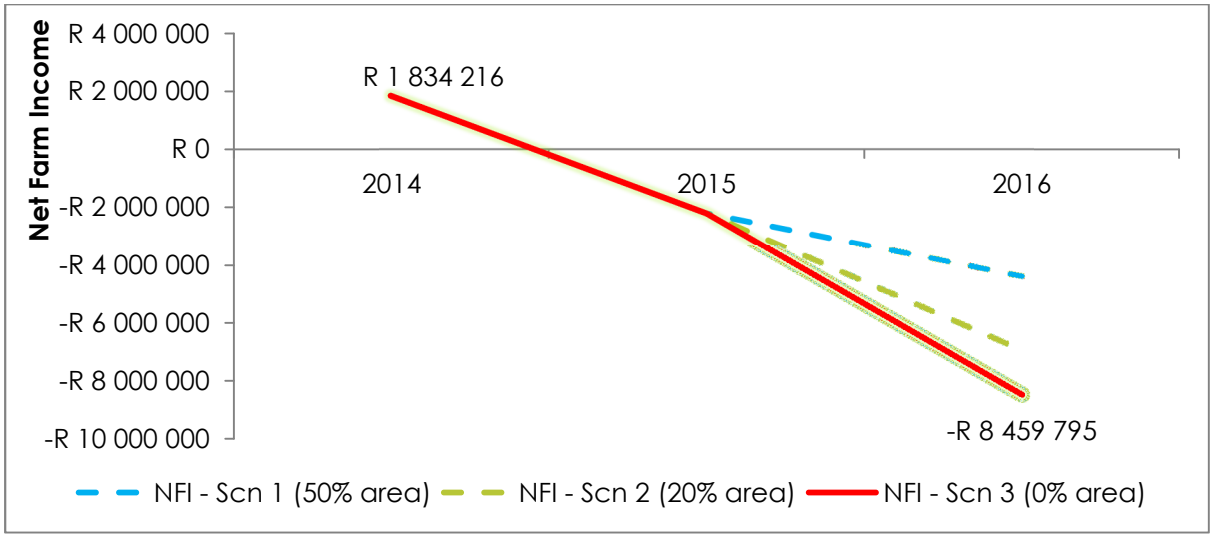


Figure 15: Net farm income for a Northern Free State cash crop farm
Source: Own calculations

From Figure 15 it is clear that the drought in 2015 already placed significant pressure on farm income, which affects the cash flow position of the producer negatively (Figure 16). Once a loss is realised in any particular year, that deficit needs to be transferred to the subsequent year. Unfortunately, 2016 did not materialise as a normal season and hence the cash flow position is expected to deteriorate even further. Under the 0% maize area scenario, it is projected that the cash flow position will only restore to positive levels in 2019, given that typical weather conditions prevail from 2017 onwards. It should be noted that alternative scenarios such as planting wheat in some areas where it is possible or early sunflower or maize were not included in this simulation and could improve the situation.

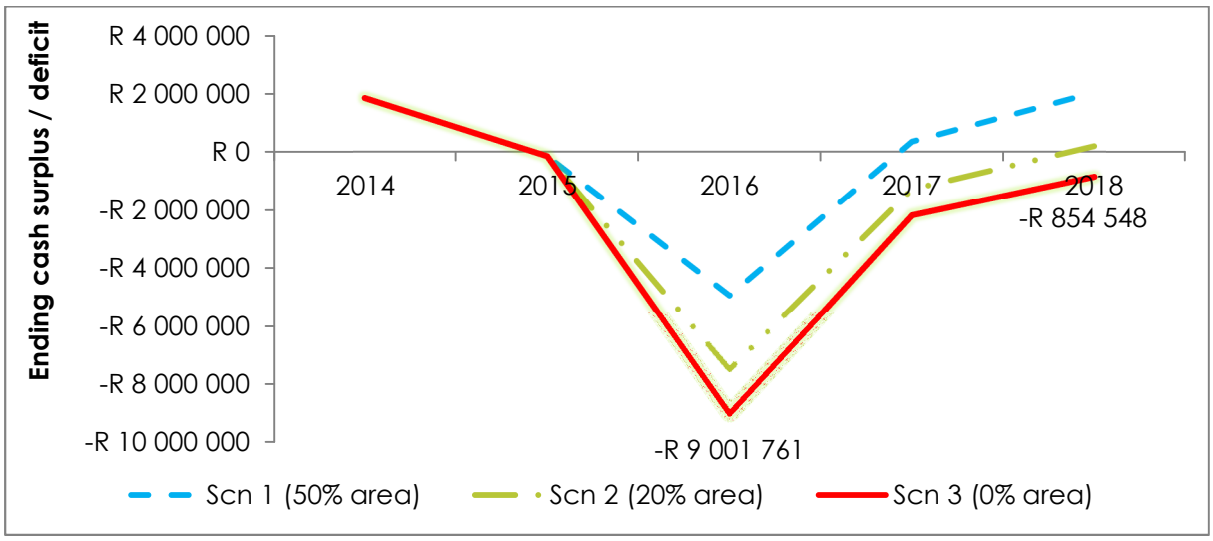


Figure 16: Estimated cash flow position of the Northern Free State farm business (2014-2018)
Source: Own calculations

The above illustrations indicate that, despite high commodity prices, producers that were unable to plant intended areas fail to generate income and face major challenges. Realistically, input acqisition occurred prior to planting, hence production loans remain subject to interest, affecting the cash flow position of the business. The situation is further exacerbated by the drought in the 2014/15 production season which already created cash flow constraints.

The Department of Agriculture, Forestry and Fisheries indicates that farming debt levels have reached record levels, exceeding R116 billion in 2014. The recent 50 basis point increase in the repo rate by the South African Reserve Bank, as well as market anticipation of further increases will therefore affect the financial position and debt levels of producers.

Apart from the financial pressures related to decreased production in current drought conditions and the impact on farm income discussed above, South African farmers are faced with higher input costs compared to their counterparts in other countries. Figure 17 compares the input costs incurred by typical farms in South Africa to produce a ton of maize to costs incurred by farmers in the US, Argentina, Brazil and Ukraine to do the same. South African farmers pay significantly more for their inputs: in particular for fertilizer, which costs 78% more than comparable countries (Figure 18). The two main reasons for higher domestic costs are:

- Lower domestic yields when compared to countries such as Brazil, Argentina, the US and Ukraine which drives up the cost of producing a ton of maize. The reason for lower yields is mainly the difference in suitability and availability of natural resources like soil quality and climate.
- More importantly, the costs for fertilizer and chemicals are substantially higher because South Africa is a net importer of these inputs or key components thereof. Thus, supply chain related costs such as deep sea freight, landed costs, margins and inland transportation to key producing regions are expensive. The weakening of the exchange rate is therefore also a key driver and contributor to the high input costs.

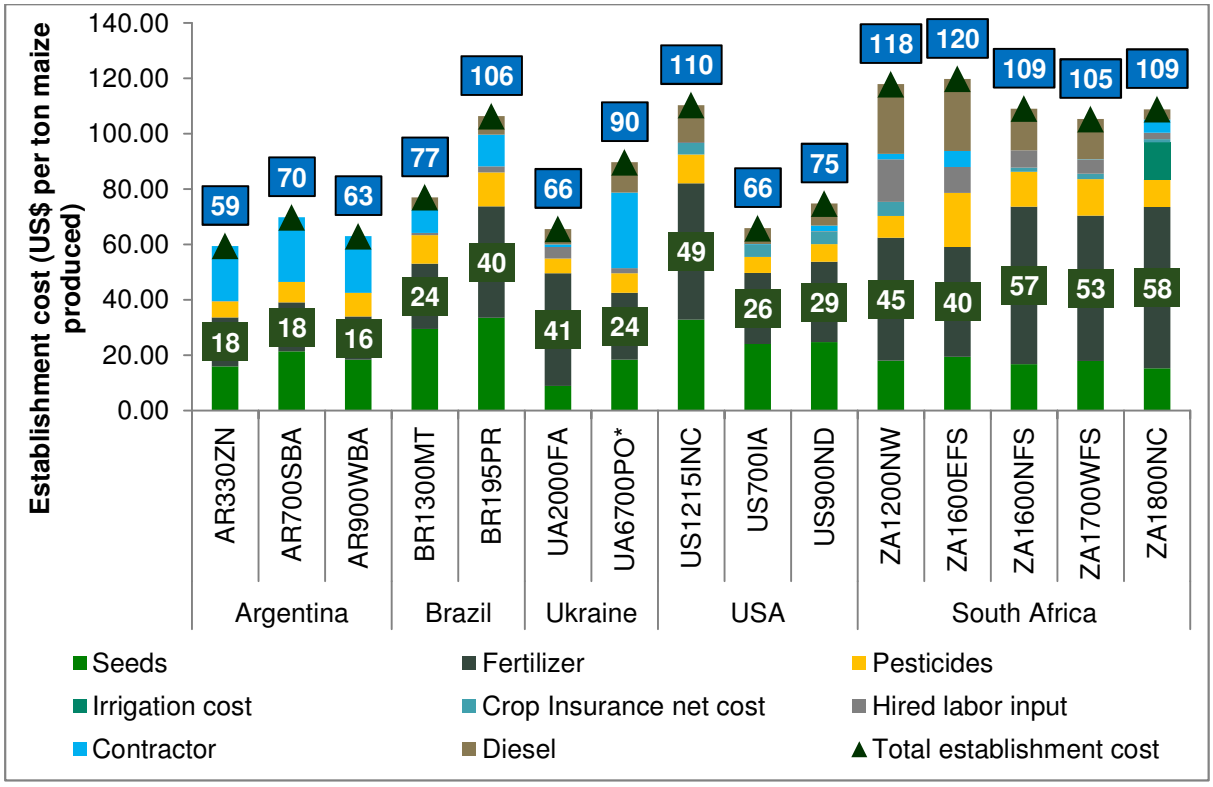


Figure 17: Maize establishment cost (US$ per ton maize produced)
Source: BFAP & agri benchmark, 2015

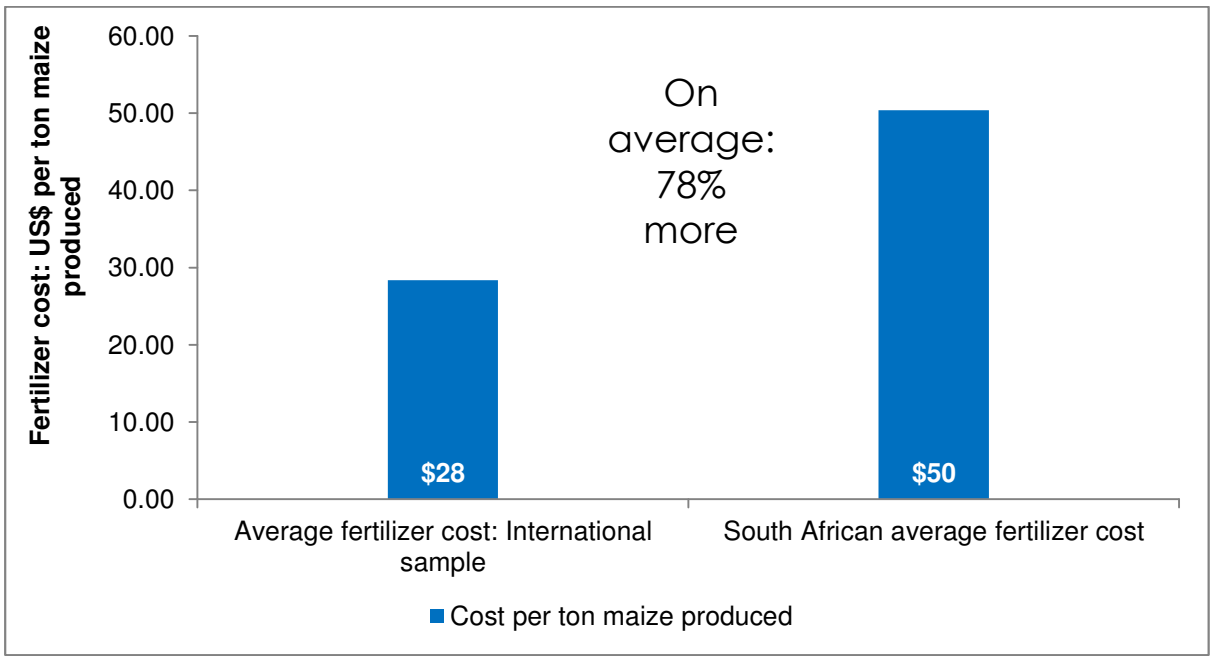


Figure 18: Fertilizer cost: International key meize producing countries vs. South Africa
Source: BFAP & agri benchmark, 2015

Livestock

Livestock farmers can be affected in many ways, of which the reduced grazing capacity of natural pastures is the worst, since reduced pasture availability will have prolonged effects on their ability to recover from the drought in the seasons to follow. Large parts of the major livestock producing areas have been experiencing reduced rainfall over the past three seasons and lagged natural pasture re-growth is evident. Diversified producers (cash crop & livestock farmers) will also be affected since producers cannot benefit from crop residues during the winter months. Consequently producers are selling more older female cattle (C2 animals) to the abbitoirs. The average number of C2 beef cattle slaugthered during October to January (2015/2016) increased considerably relative to the previous 5 years (Figure 19). Despite the increased number of slaughters, prices remained stable, which is at least a positive in the livestock sector when compared to previous drought years. However, some producers have no reserve pasture or feed and hence are unable to feed animals prior to marketing.

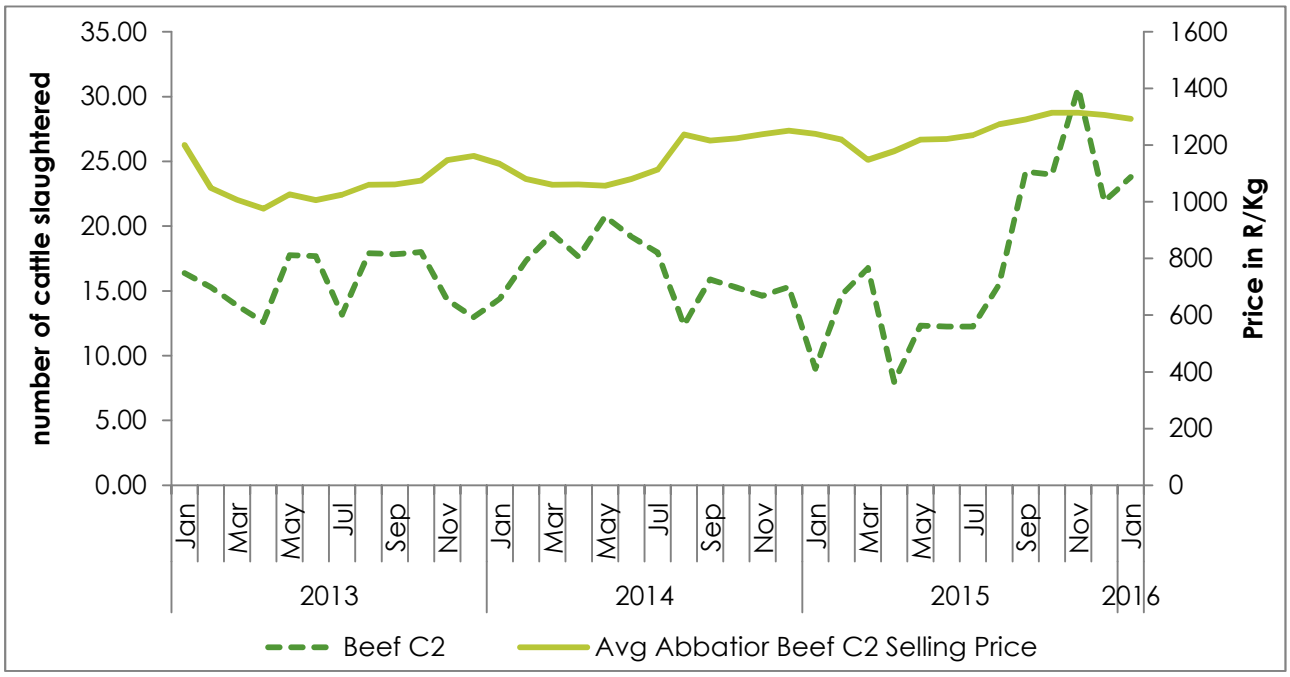


Figure 19: Monthly beef C2 slaughters and average prices
Source: Abattoir Association

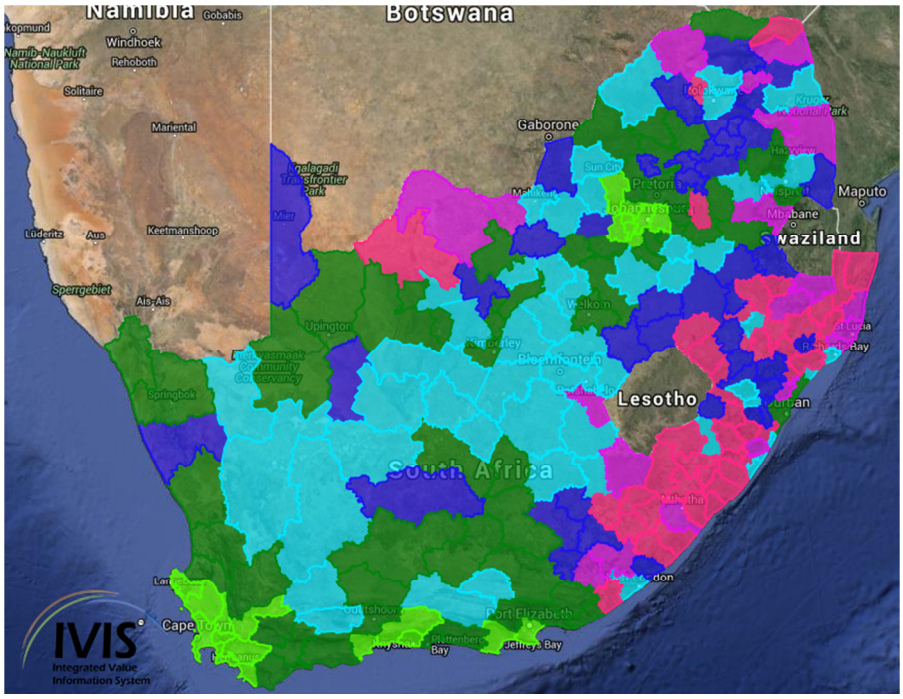
Small-scale Agriculture

Smallholder farming in South Africa is characteristically concentrated in specific regions. Figure 20 indicates the proportion of households that include at least one farmer (agriculturally active households) per local municipality. Furthermore, the percentage of these households involved in livestock and grain (mostly maize) farming respectively is illustrated per local municipality. It is clear that most smallholder farmers are still located in the former homelands where communal property rights are the order of the day. It is also evident that these areas are home to the poorest households in the country.

These rural poor households continue to be dependent on household agricultural production. Most of the more than 2.5 million agriculturally active households engage in these activities to boost existing food consumption, while only a small proportion do so as a form of income generation. (Figure 21)

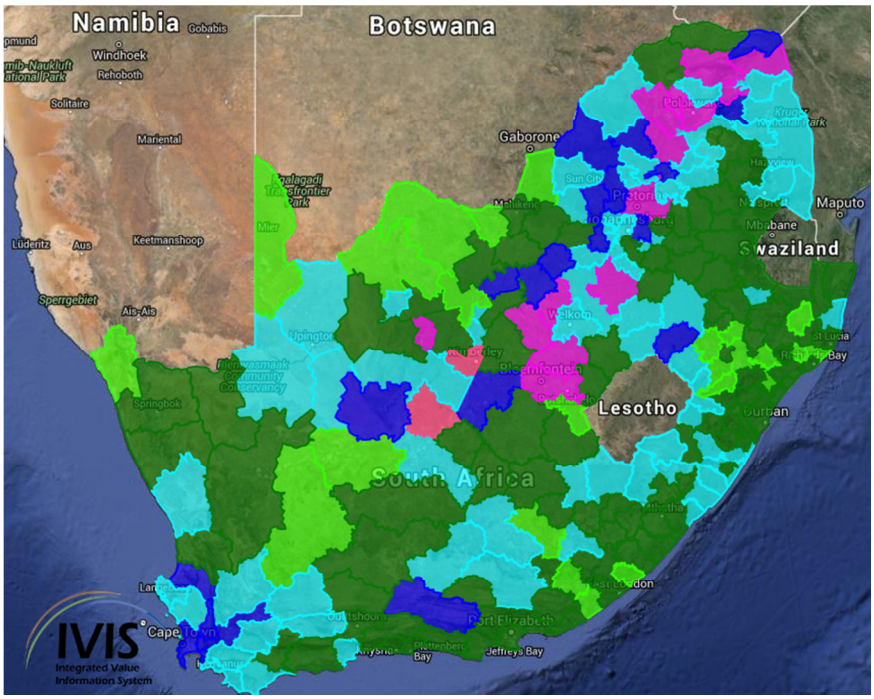
Percentage of Agriculturally Active Households to Total number of Households in per LM

0-10%
10-20%
20-30%
30-40%
40-50%
>50%



Percentage of Agriculturally Active Households involved in grain farming

0-10%
10-20%
20-30%
30-40%
40-50%
>50%



Percentage of Agriculturally Active Households involved in livestock farming

0-10%
20-30%
30-40%
40-50%
>50%

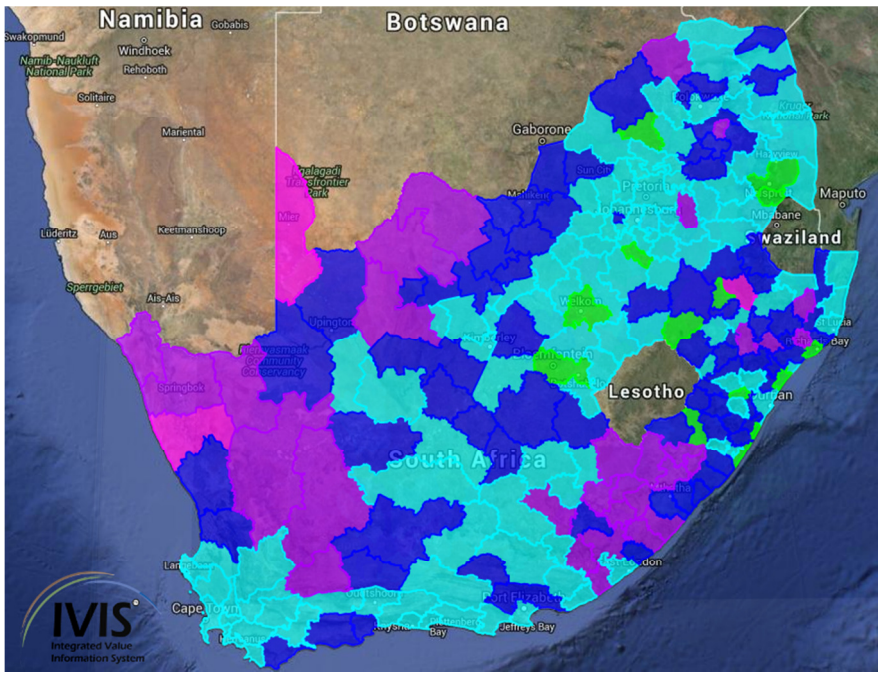


Figure 20 - Summary of Agriculturally Active Households in South Africa
Source: Own compilation: Agri Census (2011), Census (2011), IES (2010/2011)

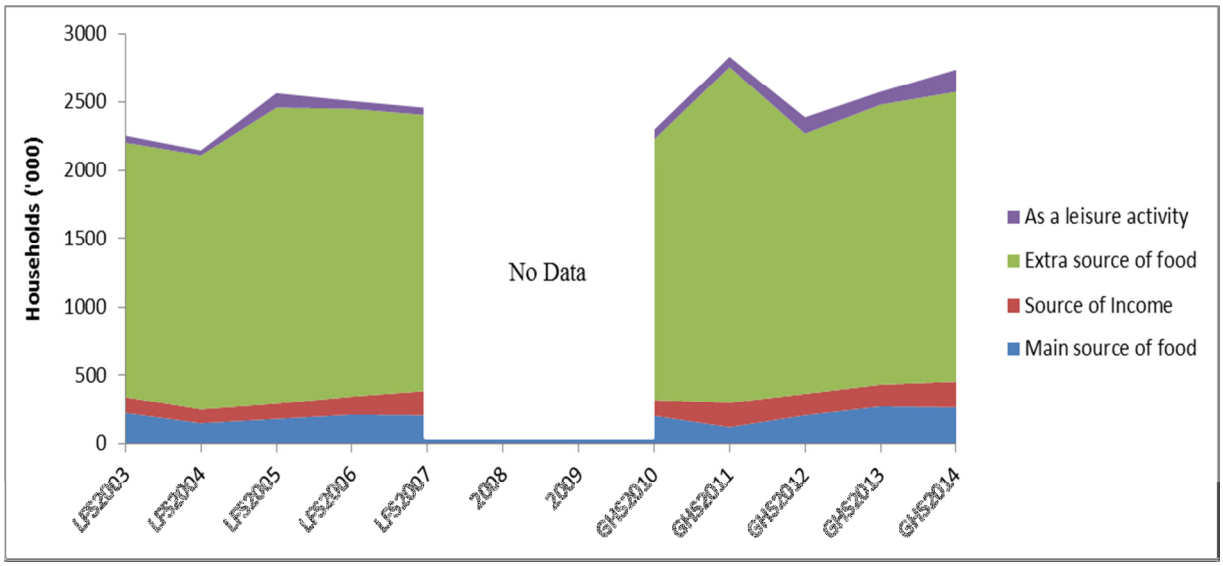


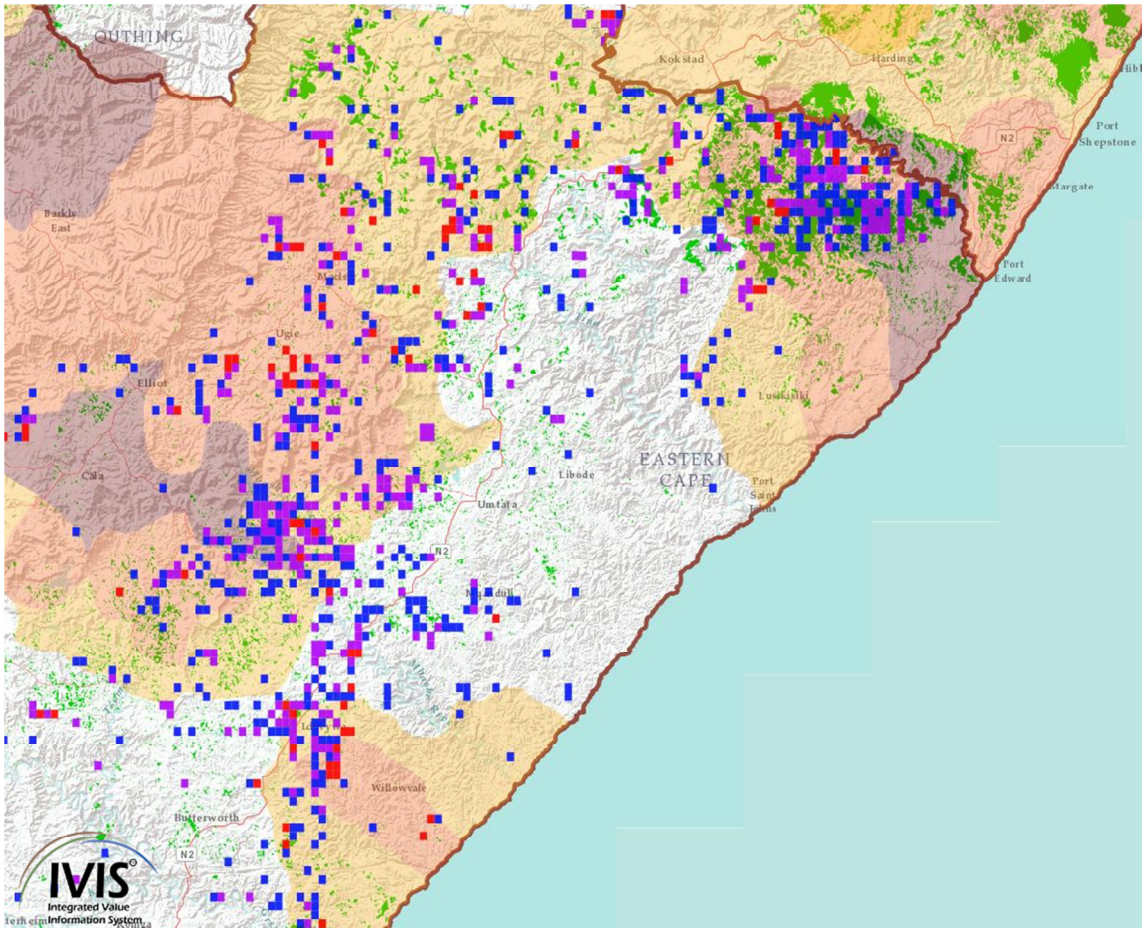
Figure 21 - Agriculturally active households in South Africa
Source: Own calculations from LFS, 2002-2007; GHS; 2009-2013; Census, 2010

Small-scale and subsistence farmer production areas have also been hit hard by the drought. Data on smallholder maize plantings is limited and often based on individual extension officers' reports. Based on some of these reports, maize plantings in the Eastern Cape may be as low as 30% of the usual smallholder maize area, while other extension officers indicate plantings around Mthatha are closer to 50%. Generally, planting indications for Mpumalanga are higher. Though agricultural production mainly focuses on maize production, given that it is the most widely consumed staple food, the purple and blue specs dominating in Figure 22 of the Eastern Cape indicates that maize farming is not intensive in these areas. Typically these farmers would plant vegetables in a back yard vegetable garden and maize in a smallish plot close to the house for their own consumption as fresh maize (green mealies) or as milled grain. Though many farmers are deficit producers on a subsistence scale (they produce less than what is needed till next harvest) they tend to sell grain to neighbours or members of the community partly due to a lack of efficient storage facilities and relatively inflated prices for grain in these rural areas. The backyard gardens and small plots play an important role in the short term food security of the households as the grain would last them 3-6 months and the extra income received from selling the surplus would help purchase other food items to ensure a relatively balanced diet. Because these households spend a large portion of their income on food, these back yard gardens become extremely important in terms of supplementing their income, allowing them to spend their income on other essentials they could otherwise not afford.

Apart from the gardens, many subsistence farmers either own or have access to larger pieces of land. Typically these larger fields are the plots cultivated when rural households are supported through National or Provincial Departments, farmer support programmes or other food security or rural development initiatives. These programmes tend to support farmers through the provision of inputs, contractors and / or advisory services.

Figure 22 overlaps the drought stricken areas in the Eastern Cape with the 2014 maize production indications, illustrating that smallholder maize production has largely been affected by the drought. Even though there are areas where extension officers have reported that planting has commenced as usual and that the maize crop is looking well, most areas have been affected. The main concern for subsistence farmers is not the performance of the larger fields but rather the back yard gardens that play a significant role in ensuring household food security. Though welcome showers have been received in early January, the optimal planting date for maize is long past and numerous households will be reliant on shorter growth period crops like beans and potatoes. For many of these crops however the optimal planting time has passed too.

The rain received in recent weeks might alleviate the pressure on drinking water for livestock to some extent, but it will be months before sufficient grazing will be available. Based on extension officer reports, a large number of cattle did not make it through December and starving cattle were sold or slaughtered. Where livestock was able to be moved or fed, and where good rains were received, proper grazing management would be vital to optimize the regrowth in the next two to three months, but it is quite likely that smallholder livestock farmers, like their large scale counterparts, will be faced with a grazing problem by the middle of the winter. To some extent in the communal areas, cattle are viewed as a type of savings account which households are able to draw on during times of financial hardship. A decrease in the size or total depletion of these 'savings accounts' due to the drought and limited growth potential due to the impact of the drought on next season's calving rates, will impact negatively on rural households' economic and social resilience in the long run.



	Maize Production Density		
	43-95 ha per grid		Moderate Drought
	95-185 ha per grid		Severe Drought
	>185 ha per grid		Extreme Drought
	Small scale subsistence cultivated land		

Figure 22 - Eastern Cape maize production density
Source: DWA (2016), DRDLR (2013), DAFF (2011)

Table 9 matches the drought severity categories and the location of both grain producing households and households that buy maize meal from the market throughout South Africa. In total, 2.5 million people living in 627 000 households across the country are dependent on household grain production (mostly maize). Of these, more than 22% were located in regions classified as experiencing extreme drought conditions, while another 25% experienced severe drought conditions in December 2015 (AgriCensus, 2011). Thus, more than 1.2 million individuals from grain producing households will be affected by the current drought conditions which will inevitably have a significant impact on maize yields and will exacerbate food insecurity.

In South Africa there are approximately 5.3 million households that buy maize meal from the market at an average value of R134 per month (IES, 2011). Many of these households produce their own maize and will be forced to buy maize from the market at higher prices. The total spending on maize meal for households in areas classified as experiencing extreme and severe drought conditions was more than R346 million in 2010. These 2.8 million households spend between R114 and R130 per month on maize meal on average. The impact of the drought on maize and other staple food affordability at retail level is investigated in more detail in the following section.

Table 9: Household grain production and consumption affected by the drought

Drought Severity: December 2015	Production		Consumption		
	Total Grain Producing Households	Dependency: Grain Producing Households	Maize meal Buying Households	Average Monthly Expenditure on Maize Meal (R)	Total Expenditure on Maize Meal (R)
None	139 816	579 601	1 019 440	162	164 856 405
Moderate	189 591	778 845	1 467 304	131	192 603 121
Severe	157 789	629 013	1 583 564	130	206 006 569
Extreme	139 746	526 725	1 235 298	114	140 559 507
Total	**626 942**	**2 514 184**	**5 305 606**	**134**	**704 025 602**

Source: Own calculations from Agri Census, 2011; IES, 2011

Consumer Price Impact

Over the past 18 months inflation on food has almost consistently been higher than total CPI (Figure 23). This, along with the fact that food and non-alcoholic beverages account for 14.2% of total consumer expenditure shows that food is a key driver of current inflationary pressures experienced in South Africa. This section serves to explore to what extent the prevailing drought is responsible for these pressures.

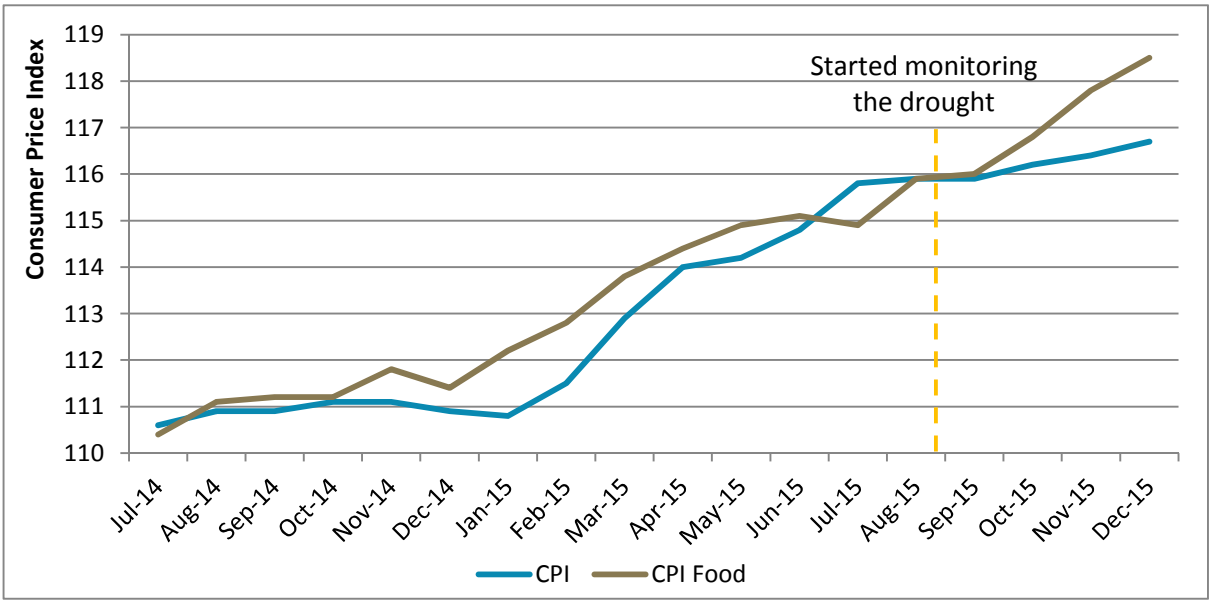


Figure 23: CPI and CPI food (July 2014 - December 2015)
Source: StatsSA

A staple food basket approach is used to determine the impact of the drought on staple food affordability in the short and medium term. A typical food basket is used, based on expenditure data from the Income and Expenditure Survey (IES) 2010/2011. Expenditure patterns are averaged out for expenditure decile (ED) 1 through 5 to show the effect of price increases on the poorest 50% of the population. In order to understand the short term impact of high commodity prices, average commodity prices recorded in January 2016 are used to determine the effect on final retail prices for the first quarter of 2016. To determine the medium term impact on the typical staple food basket, the average annual commodity price increase between 2015 (actual) and 2016 (projected[1]) will be considered. Transmission elasticities quantifying the responsiveness of retail prices to changes in underlying commodity prices are used in the final link where retail prices have to be specified.

[1] The BFAP sector model was used to project average annual commodity prices for 2016, based on the latest CEC crop estimates.

Staple Food Basket Analysis

To serve as a benchmark for year on year comparisons, Table 10 shows how the staple basket cost for 2015 was calculated. Annual average expenditure was calculated from the IES (2010/2011) data, then 2010 retail prices for the respective staple products, as collected and reported by StatsSA, were used to estimate average quantities purchased per annum. These quantities were then used as the basis for calculating the cost of the staple basket for different price levels at different times.

Table 10: Cost of annual staple food consumption basket (2015)

	Exp R/hh/year			
	Avg ED 1 to ED 5 (i.e. poorest 50%)	**Est. Quantity purchased(kg)**	**Prices 2015/01 (R/kg)**	**Cost of Annual Consumption**
Maize meal	772	198	6.43	1270.17
Brown bread	561	50	14.7	738.10
White bread	252	21	16.31	334.47
Total Bread	813	71	15.51	1096.54
Rice	362	30	15.47	461.13
Potatoes	220	24	10.33	251.31
Wheat flour (cake & bread)	215	27	11.54	315.72
		Total Annual Cost of Basket		**3394.87**
		Average Monthly Cost of Basket		282.91

In terms of determining the short term effect, preliminary retail prices for January 2016 were obtained for all the products in the staple basket. The results with the associated costs are presented in Table 11. Based on these preliminary prices, the cost of the staple basket increased by approximately 19% from January 2015 to the corresponding month in 2016.

Table 11: Cost of annual staple food consumption basket (2016/01 - preliminary prices)

	Exp R/hh/year			
	Avg ED 1 to ED 5 (i.e. poorest 50%)	**Est Quant purchased**	**Preliminary Prices 2016/01(R/kg)**	**Cost of Annual Consumption**
Maize meal	772	198	8.80	1737.55
Brown bread	561	50	16.70	838.52
White bread	252	21	18.99	389.23
Total Bread	813	71	17.84	1261.71
Rice	362	30	14.99	446.82
Potatoes	220	24	11.99	291.69
Wheat flour (cake & bread)	215	27	10.99	300.67
		Total Annual Cost of Basket		4038.44
		Average Monthly Cost of Basket		336.54

In order to establish an outlook for staple basket affordability, a short and medium term impact of increased commodity prices is calculated. Here the short term view looks specifically at the effect of the extremely high commodity prices experienced during January 2016 and how this will affect retail prices for the first quarter of 2016. Calculations based on the percentage change in producer prices between December 2015 and January 2016 show that the staple basket cost will increase by approximately 10% in quarter 1 of 2016 (this is additional to the 19% year on year increase that was discussed in Table 11 above).

Table 12: Short term projected cost of staple food basket

	Exp R/hh/year				
	Avg ED 1 to ED 5 (i.e. poorest 50%)	**Est Quant purchased**	**Month on month increase in commodity prices (%)**	**Average Projected Prices Q1/2016 R/kg)**	**Cost of Annual Consumption**
Maize meal	772	198	40.00	10.63	2098.96
Brown bread	561	50	-	-	-
White bread	252	21	-	-	-
Total Bread	813	71	5.00	18.22	1288.29
Rice	362	30	6.00	15.35	457.54
Potatoes	220	24	10.00	12.55	305.40
Wheat flour (cake & bread)	215	27	5.00	11.22	307.00
			Total Annual Cost of Basket		**4457.20**
			Average Monthly Cost of Basket		**371.43**

In terms of a medium term outlook, the year-on-year percentage change in average commodity prices between 2015 and 2016 is considered. The projected average white maize producer price (as well as all the other commodity prices) from the CEC baseline was used in the calculation. This resulted in an average annual white maize price of R4751 per ton which is lower than the high commodity prices experienced in January 2016 and reflected in the calculations of Table 12 above. Table 13 shows medium term projections for the staple food basket. The staple food basket cost for the medium outlook is 16% higher than the basket in Table 10. If one however compares it to the basket in Table 12, the escalation in cost is slightly less (13%). This shows that if the 2016 crop approximates that of the CEC estimate, one can expect to see some alleviation, in terms of cost pressures on the staple food basket, at least over the medium term.

Table 13: Medium term projected cost of staple food basket

	Exp R/hh/year				
	Avg ED 1 to ED 5 (i.e. poorest 50%)	**Est Quant purchased**	**Year on Year Commodity price increases (%)**	**Average Projected Prices 2016 (R/kg)**	**Cost of Annual Consumption**
Maize meal	772	198	49.00	9.43	1952.24
Brown bread	561	50	-	-	-
White bread	252	21	-	-	-
Total Bread	813	71	27.00	12.04	851.50
Rice	362	30	32.00[2]	17.01	507.04
Potatoes	220	24	29.00	11.07	269.25
Wheat flour (cake & bread)	215	27	27.00	13.20	361.14
			Total Annual Cost of Basket		**3941.17**
			Average Monthly Cost of Basket		**328.43**

According to IES (2010/2011) bread and cereals make up approximately 24% of average total household food expenditure (Figure 24) and based on the nature of the supply response to prices, grains, cereals and field crops like potatoes, are expected to show the quickest reaction to a supply shock such as the current drought. Therefore, even though the staple food basket represents only a quarter of total food expenditure, it captures the products/commodities that are likely to react the fastest to the drought and for which the inflationary effects on final retail prices is already observed.

Beef prices have declined somewhat in January in line with a typical seasonal trend. Slaughter numbers have also increased throughout the drought period; hence the process of herd rebuilding after the drought is likely to cause inflationary pressure for beef prices in the medium to long term, beyond the current drought period. Over the short run beef prices will be supported by the depreciation of the exchange rate causing export parity prices for beef as well as import parity prices for alternative meats (chicken and pork) to rise. If one simply regards the staple basket, it seems very likely that double digit food inflation will be the order of the day. The current situation in the meat industry, along with lower world prices of key commodities, may however serve as a mitigating factor which dampens inflationary pressures on food. Due to the significance of meat as an expenditure group and the longer supply response associated with it, one could however expect to see food inflation pressures for a significant period after the drought.

[2] For rice, price increases are exclusively driven by average exchange rate depreciation between 2015 and 2016, in correspondence with the BFAP outlook.

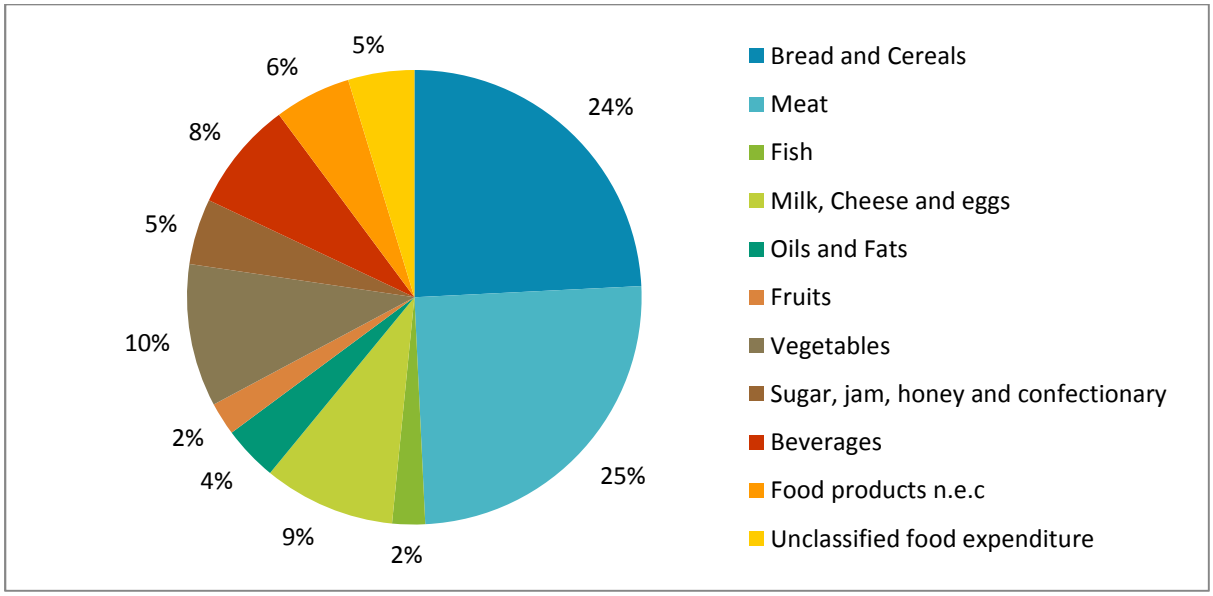


Figure 24 - Percentage of annual household food expenditure
Source: Calculated from IES 2010/2011 data

Policy Recommendations

It is clear that strategic planning and collaboration between private and public decision makers is needed to ensure food security (availability and affordability) for South Africa in 2016. Some recommendations for the sector include:

- **Rapid decision making is needed on regulatory and legislative level regarding the possible need for white maize imports from the US as a supplementary resource to white maize from Mexico**: this is an immediate recommendation, but includes the overall recommendation of clear, evidence based policy development.

- **Efficient planning and coordination of logistic**, **infrastructural and transport resources to ensure the availability of maize and maize meal:** Collaborative, integrated planning is needed to make informed policy decisions as well as to execute and apply the set policies and regulations efficiently. In this regard a working group by government and private sector has already been formed that is led by the South African Cereals and Oilseed Trade Association (SACOTA) to establish a Grain Logistics Coordinating Committee.

For years to come, the best way to combat food inflation is surplus domestic production of food which implies that farmers need to continue farming. A discussion of farm-level policy considerations follows below:

- **Proactive future disaster management and support – Crop insurance programs:** Crop insurance can act as a safeguard for producers in the future which may cover some of the losses incurred by extreme events such as droughts. In the United States (US), the government subsidises crop insurance premiums to some extent. The government also takes on some of the risk that insurance companies normally would have encountered. Several policies exist, where the most common are yield protection / insurance where payments will be made to producers once the yield falls below a certain threshold (typically between 50-85% of a recent average). Another policy is to compensate a producer if the harvest revenue falls below a certain trigger point (a percentage of a farm's average yield multiplied by planting-period future prices). Government subsidises roughly 62% of the premium for the respective insurance policy. The notion of risk sharing is critical to farmer support for the program. An unsubsidised program could result in costly premiums in areas where associated risk is too high, ultimately affecting the producers' ability to afford the insurance policy. However, subsidised programs are also costly to government.

- **Continuous investment in research and development in agriculture – Achieving the aspirations of the 2014 Malabo Commitments as part of the Comprehensive Africa Agricultural Development (CAADP) program:** As stated by the goals of CAADP, continuous commitment by governments and leaders across Africa is crucial in order to enhance the transformation in African agriculture, ultimately preventing hunger, enhancing trade, enhancing resilience of livelihoods and production systems promoting best farm practise and ensuring that agriculture contributes significantly to poverty reduction (CAADP, 2015). Increasing growth, reducing food insecurity and accelerating poverty reduction, particularly in rural areas requires an increase in agricultural productivity, higher added value and improved producer price incentives (ASDP, 2001). In order to meet these goals, African leaders should continue to invest in research and development pertaining to agriculture (such as drought resistant technologies) and revise whether commitments in this regard have been met. Greater focus is required on improved institutional functioning, service delivery, technology adoption, infrastructure development and commercialisation, especially in smallholder agriculture (ASDP, 2001).

- **Create an attractive investment & policy environment for small- and commercial producers:** It is essential to create and maintain a favourable, positive and attractive investment environment in agriculture that will ensure investment in enhanced productivity not only on primary level, but also across the value chain. Agricultural investments are expensive and span over a long term. Creating a certain and secure investment environment will encourage long term investments from small- and commercial producers and private (domestic and international) firms.

  Investment in soil and soil nutrients is crucial, ultimately resulting in long term sustainable agriculture with improved productivity. The importance in the prevention and management of soil degradation cannot be over emphasised. Nutrient replenishment through the application of appropriate and sufficient quantities of agricultural fertilizers and lime is crucial in order to ensure long term sustainability and productivity. From a producer perspective, in an environment where real agricultural prices tend sideways and costs continue to increase (cost-price squeeze, it is key to increase productivity in order to remain competitive in a global context.

  Investment in irrigation, including irrigation infrastructure with specific reference to increased efficiency in water channels, dams and water reservation is important. Strategies pertaining to water and in particular, the National Water Resource Strategy framework should be aligned with the goals and vision stated by the National Development Plan by the National Planning Commission. Agriculture was identified as a key driver of ensuring food security, job creation and social upliftment of rural communities where many of the potential winning industries

are dependent on water. Also refer to the study conducted by BFAP: Implications of the National Water Resources Strategy 2 on irrigation agriculture, its economic contribution and long run sustainability.

Investment at primary level in technologies pertaining to conservation agriculture remains important and the correct policy environment and support should be in place in order to stimulate and encourage private investment.

- **Competitiveness of producers remains vital in the long run:** In order for domestic smallholder and commercial producers to remain competitive in a global environment associated with declining real crop prices and increasing costs, productivity and competitiveness will become even more important in the future (even though the current drought has induced a temporary price increase, prices are expected to revert back to global trends in the medium term). It is increasingly important to strive to reduce costs and boost productivity by investments in more efficient production systems and technologies. It is also important to revise business and investment opportunities in domestic manufacturing capacity. Supporting small-scale producers by linking them to output markets and creating an integrated approach will improve sustainability. This can further be linked to the role of government in Agri Parks and the revitalisation of the small-scale environment.

One of the central objectives of any central bank is price stability. How should monetary policy respond to food price inflation driven by the drought? A drought can be considered as a supply shock, and if it only affects one season the shock can be considered temporary and not structural/persistent. However, supply shocks also serve to influence perceptions related to inflation which ultimately drive demands related to wages. Perceptions related to inflation in South Africa might already be negative due to looming increases in administered prices such as electricity. The Bureau for Economic Research reports that business professionals and trade unions expect inflation to be around 6.2% and households expect it to be around 7.1% in 2016. Increases in food prices might therefore just serve as the final nail in the coffin to spark labour unrests. It therefore seems that the current drought serves to support interest rate increases, at least just to keep the effect of inflation perception at bay. A key issue to consider will be the effect of the drought on the livestock industry. Keeping in mind that meat plays a significant role in the food expenditure basket of consumers, a structural price shift, as a result of depleted herds, could significantly contribute to persistent pressures in food inflation which could in turn further support increases in local interest rates.

- **The most efficient way of combating maize meal price increases, is to ensure increased white maize production for the 2017 season**.
- **Commodity prices are not the only factor increasing food prices, the weaker exchange rate will likely have a big impact in the supply chain component of food products.** Therefore ensure clear policy and transparent regulation with efficient

monitoring of the exchange rate. (MPC actions and considerations as discussed in the preceding paragraph).

- In order to anticipate the full impact of a drought or any commodity price increase on consumers**, improved or more disaggregated data regarding household food expenditure and composition of income**, i.e. livestock and farming portions of income throughout South Africa is needed.