

Exceptional yields drive the economics of soya bean production

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Can the exceptional soya bean and maize yields for the 2016/17 cropping season point to a potential step change in trend yields of these two key summer crops in South Africa? That is the question the market is asking in anticipation of the 2017/18 planting season. Within the next few weeks, farmers will be deciding on their crop mix for the new season.

BFAP recently published its Baseline 2017, which presents a ten-year outlook of the agricultural industry. The baseline clearly illustrates (Figure 1) that the gradual switch in area from grains for human consumption (mainly white maize and wheat) to feed grains (yellow maize) and oilseeds (soya beans and canola) is expected to continue over the outlook period.

Despite the sharp recovery in 2017 of the area under white maize production, the area under production is projected to decline again over the long run. Following the setback due to the drought in 2016, the area under soya bean production is expected to

continue to expand consistently over the outlook period to approximately 900 000ha.

Looking at the projected expansion in the area under production only presents one side of the coin. The BFAP sector model generates the outlook for the area, based on the projected returns per hectare for the various commodities. The expected net returns are determined by the projected price (driven by market fundamentals) multiplied by the projected growth in average yields minus the costs of production per hectare.

Growth shares

Figure 2a, b takes the projected growth shares in South Africa for both area and yield into consideration and compares it to the global growth shares projected by the OECD-FAO ten-year outlook. South African growth shares are similar to global growth shares, with the majority of growth in grains coming from the growth in yields over the outlook period with very little expansion in the area under production.

Figure 2a: Global growth shares in area and yields. (Source: OECD-FAO, August 2017)

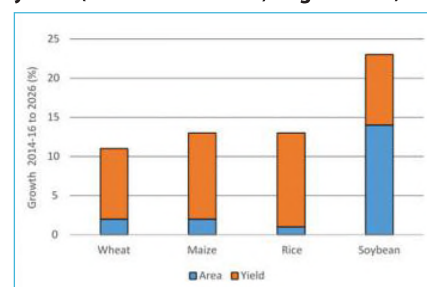


Figure 2b: South African growth shares in area and yields. (Source: OECD-FAO, August 2017)

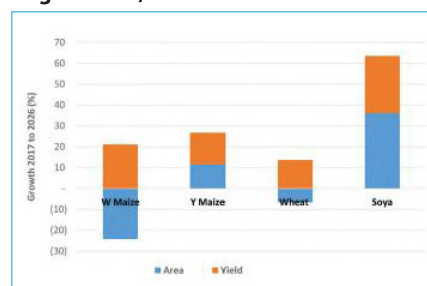
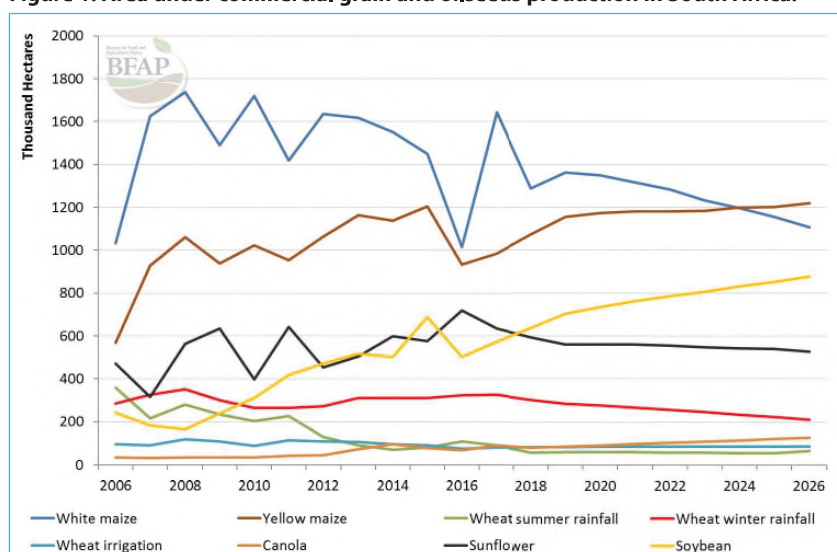


Figure 1: Area under commercial grain and oilseeds production in South Africa.



However, increasing yields and a further expansion in the area under production will drive soya bean production over the outlook period. Global production of soya beans is projected to grow by 25% by 2026 compared to South Africa's expected growth of 63% over the next decade.

Industry competitiveness

Bringing these global and general market trends closer to the realities on the ground, one must take the relative competitiveness at farm-level into consideration. Modern agriculture is faced by increased volatility in macroeconomic drivers, instability in commodity prices, rising input costs and extreme weather fluctuation.

To remain competitive, both locally and in a global environment, producers will have to continue to engage in more

sustainable and efficient cultivation practises, input acquisition and allocation, efficient marketing, and adopting risk mitigation strategies. These approaches are complex and despite better information, decision-making has become more complicated compared to a decade ago.

An appropriate point of departure is to measure the existing status quo of the farm business's competitiveness by using available information on historic performance and how it fits into existing and likely future scenarios.

Figure 3 illustrates the concept of competitiveness in a global environment given input cost and the associated yield for soya bean production in the Eastern Free State. The prototype farm is compared against key global players such as Argentina, Brazil and the United States (US). The graph represents (for 2013 and 2014) the cost to produce a ton of soya beans, calculated by dividing establishment cost by yield. The implication of the dry season is clearly observable in 2013 where a yield of only 1,2 tons per hectare realised on the Eastern Free State prototype farm.

The graph further indicates that at the yields of 2,4 tons per hectare that were achieved in 2014, the competitiveness of the Eastern Free State farm improved significantly, yet the costs of production were still higher than the international sample space average of \$121 per ton soya beans produced. The challenge is not necessarily at farm-level, but across the entire value chain.

Benchmark studies suggest that South Africa is ranked among the most expensive countries with regard to the cost of fertilisers. Among 22 countries, South African producers paid on average 38% more for nitrogen, 44% more for phosphorus and roughly 50% more for potassium. In terms of nitrogen costs, the

Figure 3: Soya bean international competitiveness.
(Source: BFAP and agri-benchmark, 2016)

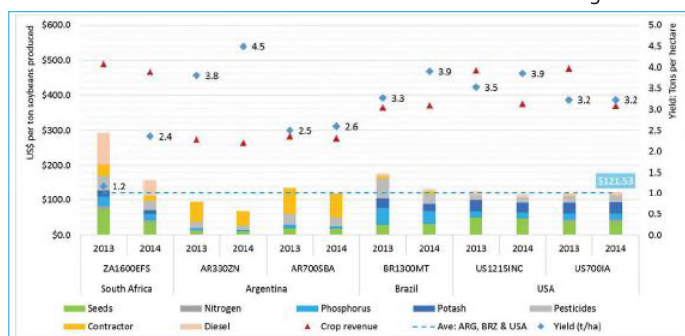
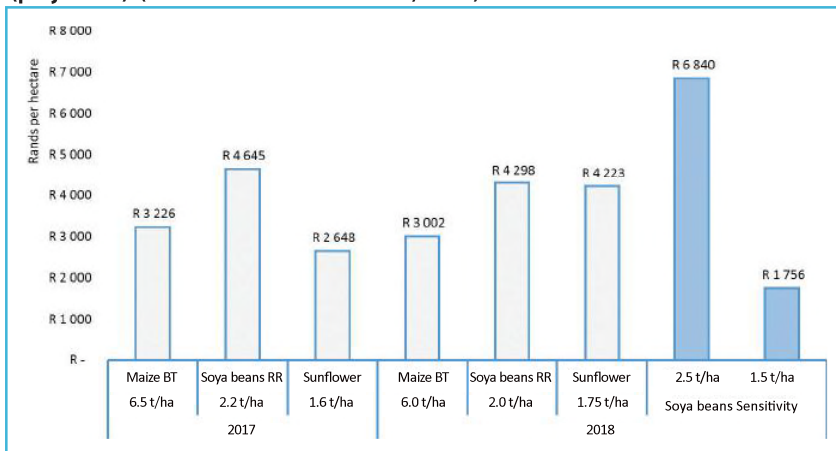


Figure 4: Eastern Free State – crop gross margins: 2017 (estimate) and 2018 (projection).
(Source: BFAP and Grain SA, 2017)



inclusion of soya beans in a rotational cropping system will drive down the cost of nitrogen, but the higher costs for phosphorus and potassium will remain.

Furthermore, diesel expenses also seem to be significantly higher on the South African farm compared to the other countries. Argentinian farmers make extensive use of contractors and diesel expenses are hidden in this cost item, but for the Brazilian and US farmers, the diesel costs appear to be lower.

Economics of soya beans

Figure 4 takes the economics of soya bean production one level deeper into the micro-environment of the producer in the Eastern Free State by considering the competition between crops. The competitiveness of soya beans among alternative crops is based on gross margins for the 2017 and 2018 seasons.

Given the current market prices and the estimated average yield of 2,2 tons per hectare for the Free State (Crop Estimates Committee 6th production forecast), soya beans are most likely outperforming maize and sunflower margins in the Eastern Free

State in the current season.

Under the assumption that yields will return to trend levels under normal rainfall conditions in 2018, the

margin for soya beans is still projected to be higher compared to maize and sunflower if BFAPs projected prices for 2018 materialise.

However, selecting the crop mix does not only depend on expected returns but also the risk associated with the expected return. This is where the variability in yields for soya beans has been a source of concern for farmers. The soya bean sensitivity analysis (Figure 4) illustrates the importance of yields, which could either result in margins well above competing crops or well below.

A high yield scenario of 2,5 tons per hectare will increase a farmer's soya bean margin by almost 160% from the baseline. This can push the gross margin to almost R7 000 per hectare. Yet the opposite is also true given a low yield scenario of 1,5 tons per hectare, which could reduce the margin by more than R2 500 per hectare.

In conclusion, there is significant potential for the expansion in soya bean production based on the growing demand for feed, and the potential financial returns and rotational benefits for subsequent crops at farm-level. However, the consistency of yields under adverse weather conditions will remain a key driver in the rate of growth of the industry. Therefore, continuous investment in the development of improved seed varieties, efficient production practises, continuous research and technology adoption will pay off in the long run. 🌱

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