A Breeding and Technology Levy Collection System for South Africa

By the Bureau for Food and Agricultural Policy (BFAP)

Introduction

South African farmers compete in the international agricultural market where crop prices are determined based on production levels in large agricultural countries, and farmers using the most advanced technologies. In real terms, international grain commodity prices have declined over the long run and are projected to continue on this declining trend at least over the next decade. South African commodity prices have followed a similar pattern with real prices declining over time. In order to ensure economic survival, farmers consistently have to drive on-farm productivity by producing a higher output per unit of input.

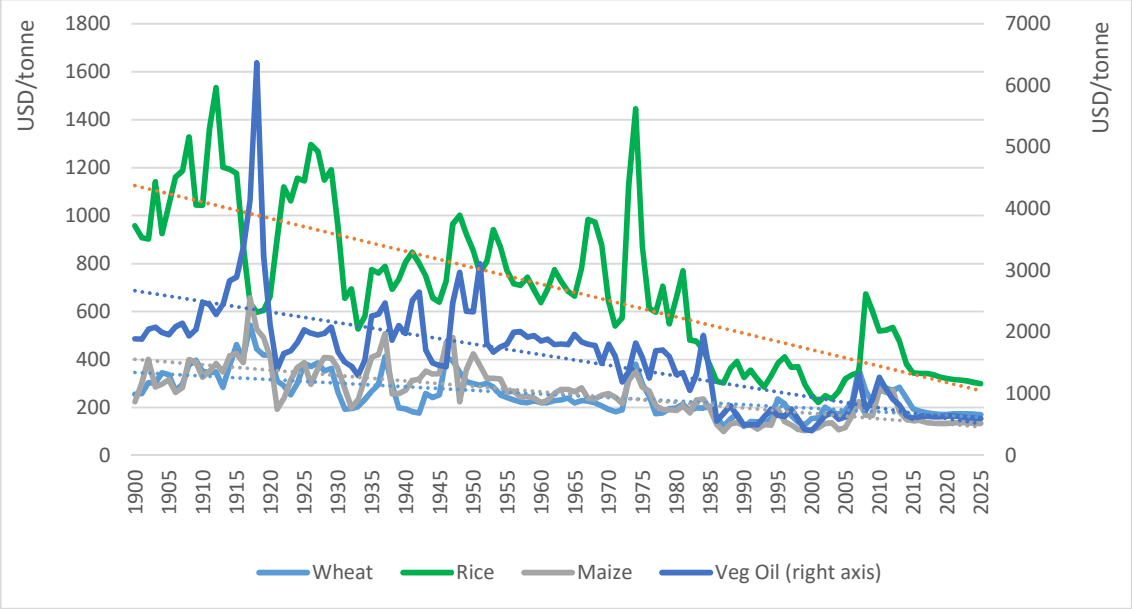

Figure 1: Long-term global commodity prices in real terms
Source: FAPRI, August 2017

Plant Variety Protection legislation in South Africa and many other countries allow for 'Farmer Privilege', i.e. a farmer's right to save and replant the grain he produced on his own holdings as seed. For self-pollinated crops (like soybeans, wheat and barley) where the offspring (seed) is genetically identical to the parent, this means that farmers only have to buy seed once, and can continue planting the same variety in subsequent seasons. The South African seed organisation (SANSOR) estimates farm-saved seed for soybeans as high as 80% and wheat at 70%. Because of the low seed sales volumes (compared to the actual market size) and an effective seed price ceiling (a higher seed price will result in more saved seed), the return on self-pollinated crop seed R&D is limited. As a result, the financial motivation for seed companies to invest in local, long-term, expensive breeding programmes or to import new germplasm or traits, is limited as they are unable to recoup a significant portion of their costs or collect the due return on innovation.

In line with a number of leading agricultural countries that have implemented End Point Royalty (EPR) collection systems, South Africa has recently introduced a Breeding and Technology statutory levy whereby an agreed fee is (will be) paid on every tonne of soybeans, wheat and barley that is delivered. This fee is then transferred to the seed breeding companies and research institutions based on their seed sales market

share. Because this is a statutory levy, 20% of the divisible amount will be contributed to developmental initiatives.

Open-pollinated crops lagging behind in SA

A dynamic hybrid maize seed sector, where cross-pollination necessitates farmer to buy new seed on an annual basis, has contributed to an average annual growth rate of 3.5% for maize between 1998 and 2017. In contrast, soybean yields increased at only 0.43% per year on average and wheat yields (dryland winter rainfall) at 1.91%. In the barley industry, considerable continued investment by the main malting barley buyer has contributed to an annual average yield increase of 4.67%.

Annual average maize yield increase between 1998 and 2017

Country	Percentage
Brazil	3.74%
South Africa	**3.52%**
USA	1.23%
China	1.21%
Argentina	1.18%

Annual average soybean yield increase between 1998 and 2017

Country	Percentage
USA	1.46%
Brazil	1.33%
Argentina	0.64%
South Africa	**0.43%**

Annual average wheat yield increase between 1998 and 2017

Country	Percentage
Russia	2.69%
SA WC dryland	**1.91%**
Argentina	1.62%
USA	0.85%
Australia	0.38%

Annual average barley yield increase between 1998 and 2017

Country	Percentage
SA WC dryland	**4.67%**
Argentina	2.64%
USA	1.40%
Canada	1.38%
Australia	0.97%

Soybeans

The SA soybean area has increased considerably over the last 50 years, from less than 10 thousand hectares to 787 thousand hectares in 2017/18. With increased crushing capacity ensuring local demand for soybeans, the active promotion of the benefits of including soybeans into a rotational cropping pattern with other crops, and management ease brought by genetically modified herbicide-tolerant soybean varieties (released in 2001), more and more farmers choose to plant soybeans in rotation with maize. In 2017, soybeans surpassed sunflower seed as SA's second biggest summer crop, in area.

One important fact to take into consideration when interpreting the lower yield for soybeans, is that the area under soybean production has increased rapidly and western production regions that have traditionally been regarded as climatically more marginal areas for soybean production, are gradually coming into production.

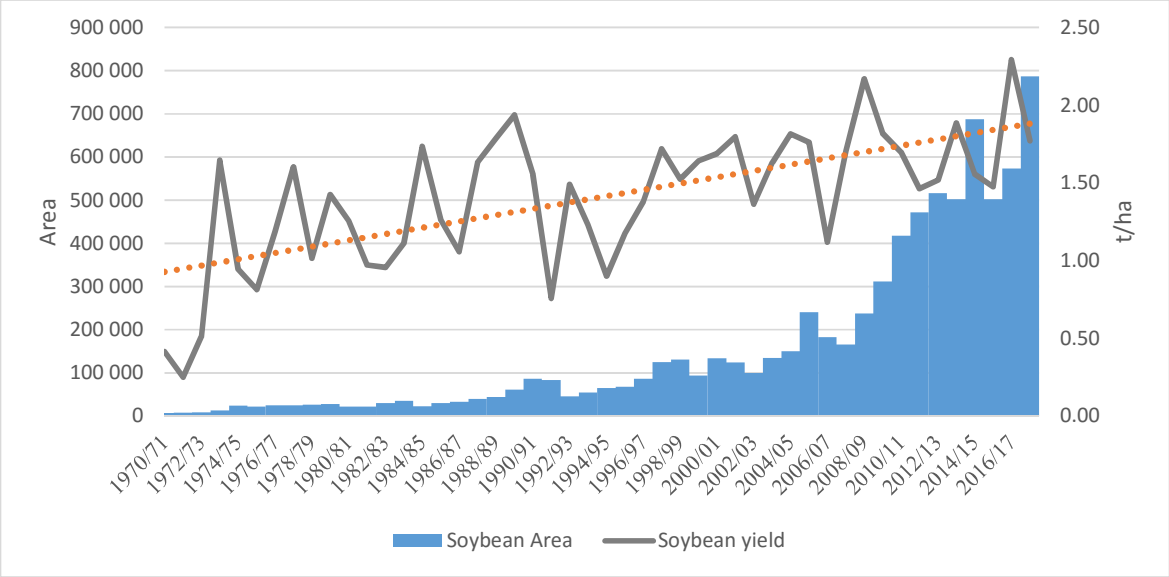

Figure 2: SA soybean area and average yield since 1970
Source: SAGIS

Although seed companies have reacted to the rapid soybean area expansion by offering a larger number of soybean varieties, current market information indicates that companies are not willing to introduce the latest seed technology in SA without a guarantee that they will be able to earn a return on their investments. This could have a significant impact on the competitiveness of SA soybean farmers, who are facing very stiff competition from the major international soybean producers, not only from a yield perspective but also from the ability to produce a consistent quality bean.

From 1998 to 2017, the average annual yield increase for soybeans in the US was 1.46%, while yields increased by 1.33% in Brazil and 0.64% in Argentina. Over this same period, soybean yields increased at only 0.43% in SA. In addition, over the 20 year period, SA's average soybean yield was 40% lower than the average obtained in the three leading soybean countries. Although the recent droughts have played a role in the SA average yield trends, it is clear from Figure 3 that yields over the long-run have increased at a higher pace in major soybean exporting countries like the US and Brazil than in SA.

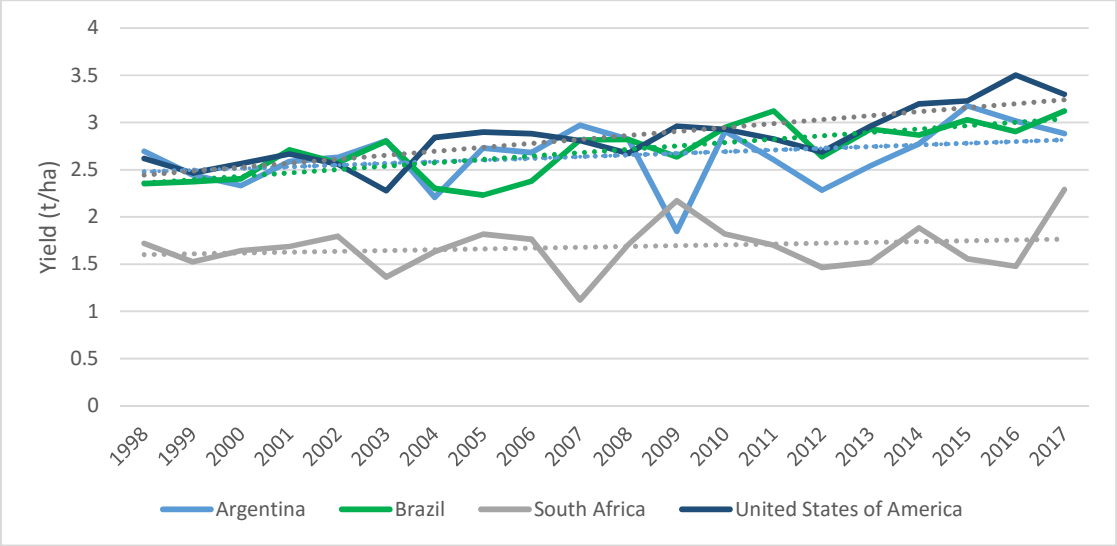

Figure 3: International soybean average yield trend comparison
Source: SAGIS and FAOSTAT

Wheat

According to industry role-players as well as BFAP's *agri benchmark* farms, wheat's comparatively high average yield increase should be attributed more to a number of good rainfall seasons in especially the southern Cape region as well as production intensification (higher input use) and improved production practices, rather than better wheat varieties. The reason for this is that wheat seed breeding over the last 20 years has focussed on producing varieties resistant in terms of specific agronomic characteristics (e.g. pest and disease resistance) and on good-quality varieties, as opposed to high-yielding varieties. Figure 4 compares Western Cape dryland wheat and barley yields for the last 20 years and it is clear that barley's yield has increased at a faster rate than that of wheat.

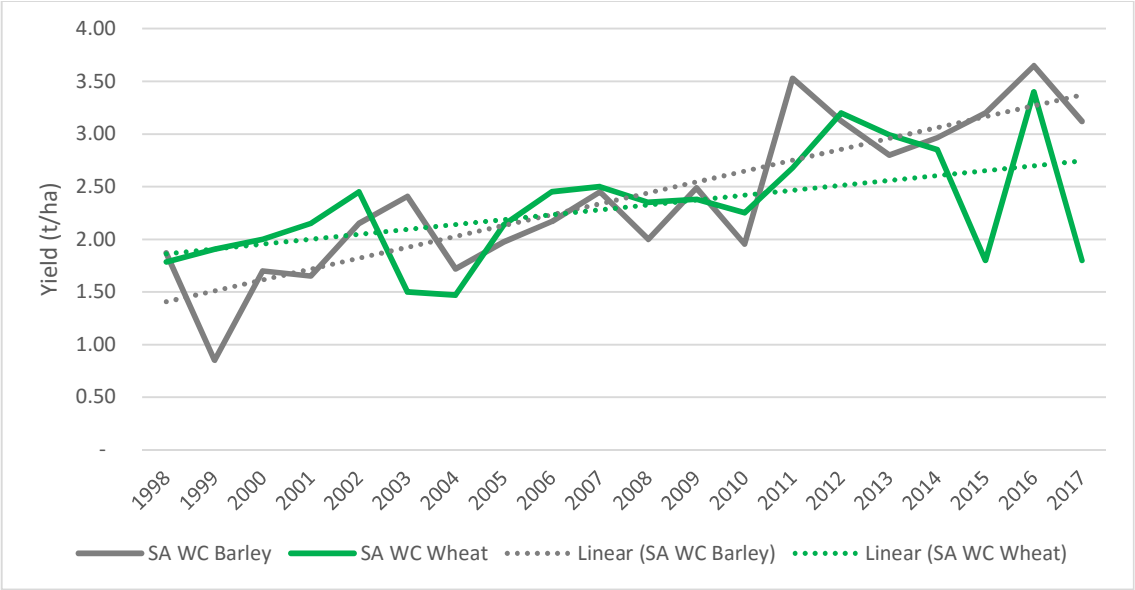

Figure 4: SA wheat and barley yield trend comparison
Source: SAGIS

Need for investment

Although improved farming practices also play a decisive role in the drive for higher yields, these growth rates illustrate the need for investment in improved seed varieties and technologies in the soybean and wheat industries and additional support of the existing barley research initiatives. It is important to note that comparing absolute yield growth only presents part of the full picture since the grain or oilseed quality that is produced also plays a crucial role in determining the price and ultimately the overall output that is produced per unit of input.

Continued investment in seed research, breeding and technology transfer, is vital for a competitive and sustainable agricultural sector. It is estimated that with continued investment in seed and seed technology research and development, made possible through a Breeding and Technology statutory levy, yield growth in soybeans, wheat and barley can be sustained, resulting in an additional annual revenue of up to R1.5 billion per annum, for the three crops, for the next ten years.