National Science and Technology Forum

S.E.T. for socio-economic growth

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Give us our daily bread

South African year-on-year inflation on food and non-alcoholic beverages was reported by the Bureau for Food and Agricultural Policy to be 11.3% in August 2022 – an inflation rate last observed during the period August 2016 to January 2017. Year-on-year inflation on food and non-alcoholic beverages gained significant further momentum in August 2022, with a 1.8% increase from July 2022 (representing the highest month-on-month increase since April 2016). As in previous months, food inflation was mainly driven by price increases in plant oil products, followed by grain-based foods and animal-source foods.

Grain-based foods are the staple of the majority of South Africans. Maize provides the pap/porridge, enjoyed by the local population in various forms, while wheat is transformed into bread or pasta. South Africa produces only about half of its total wheat requirement. As a net importer of wheat, the country is thus affected by developments in the international market. The Russia-Ukraine conflict has added pressure on agricultural inputs and trade in grains and cereals. Prices rose even further worldwide as a result of an expected supply shortage after India - the world's second largest wheat producer - banned the export thereof earlier this year to ensure its own food security.

Prospects for wheat, globally and locally

Together, Ukraine and Russia account for nearly 30% of global wheat exports, as well as approximately 14% of global maize exports, approximately 32% of global barley exports and nearly 60% of global sunflower oil exports. The conflict in Ukraine could lead to the country's wheat production decreasing by as much as one-third, thus keeping prices high.

Local wheat price increases are driven by these developments in international markets, together with a weaker rand-dollar exchange rate. In June the price of wheat jumped to a record high locally, reaching above R8 000 per ton. Farmers rejoiced, while consumers unfortunately now have to pay more for bread. However, there are many danger lights flickering on the horizon and producers will have to brace themselves for rising energy, input, transport and labour costs.

Several international sources that monitor the global outlook for grain stocks and regularly report on them, believe that the outlook for grain stocks is much lower than expected and this leads to price increases. The US Department of Agriculture's May report for the World Agricultural Supply and Demand Estimates shows that global prospects for wheat have declined; they forecast lower stocks and lower consumption in 2022/2023. The global production of wheat is estimated at 774.8 million tons - this is 4.5 million tons lower than in 2021/2022. The United Nations' Food and Agriculture Organization (FAO)'s Global Food Price Index showed record high figures in March and was even higher in April – as much as 30% on a year-on-year basis.

Even though Statistics South Africa's figures showed that the country's consumer food price inflation decreased to 6.3% year-on-year (y/y) in April 2022 from 6.6% y/y in the previous month, South Africa

will also soon experience an increase in agricultural commodity prices. Tiger Brands had already announced towards the end of May 2022 that it would step up efforts to reduce costs and minimise price increases, but significant increases are inevitable.

Agricultural inputs
South Africa is also a net importer of most agricultural inputs. Globally, agricultural input prices have risen sharply in the past two years. South African producers are therefore faced with increased input prices that will hurt profit margins.

Since November 2020, diesel prices have risen by 40 percent y/y. Additional upside risk for the local market is further increases in fuel prices. Almost 90% of all wheat in South Africa is transported by road, which means that wheat producers and logistics companies will feel this cost. Producers may be happy about the higher wheat price, but the impact of runaway fuel prices will affect the planting, harvesting, transportation and even the storage of wheat. Higher fuel prices will therefore have an effect on various aspects of the food value chain, leading to further food inflation. In general, the trends of the oil price over the coming weeks and months remain unknown. However, there is little doubt that local producers, agricultural markets and consumers will be directly affected by fuel prices.

South Africa's capacity for domestic fertiliser production is weak, partly due to the lack of the minerals required as inputs. South Africa imports about 80% of its annual fertiliser needs, which only accounts for about 0.5% of total global consumption. Local fertiliser prices therefore tend to be influenced by developments in countries such as Russia and the other major players.

Because Russia is so integrated into global agriculture through input markets, it presents a major risk for countries like South Africa that depend on imports. Russia is the second largest producer of ammonia, urea and potash and the fifth largest producer of processed phosphates. Russia is the world's leading exporter of fertiliser materials in value terms, followed by China, Canada, USA and Morocco. These fertiliser mixes include a variety of complex minerals and chemicals as well as nitrogen, phosphorus and potassium fertilisers.

Fertiliser prices rose sharply throughout 2021 and have continued to rise since the beginning of 2022 so that South Africa is currently experiencing the highest fertiliser prices in history (internationally and locally). There are many factors behind these sharp increases in input costs, such as the supply constraints in critical fertiliser producing countries, mainly China, India, the US, Russia and Canada.

The Russia-Ukraine conflict will add to upward pressure on these already higher fertiliser prices, especially if Russia's exports suffer as a result of sanctions. The restriction of Russian product in the world market place has a significant impact. Russia plans to continue setting quotas for fertiliser exports during their next winter planting season and during the next spring grain planting season in spring 2023 (April/May). Although South Africa is not a primary market for Russia's fertiliser material, producers will still feel the price pressure of the international market.

Average agrochemical prices (herbicides and pesticides) increased by more than 50 percent from October 2020 to October 2021. In addition, analysts predict that 2022 will generally be characterised by pesticide shortages and further price increases.

One of the most commonly used herbicides, glyphosate showed a year-on-year price increase of 106.7% by April 2022, while other products rose in the region of 70 to 100%. Fortunately, the price of Trifluralin, which is used on wheat for weed control, has fallen by 10%. By April 2022, most insecticides showed a year-on-year increase of between 20 and 50%.

Shipping
Rising shipping costs as well as oil and gas prices are also contributing factors to the price increases, along with stronger global demand as a result of growing agricultural production worldwide. The destruction of economic infrastructure within Ukraine, combined with several shipping lines avoiding the Black Sea region, and the expanded sanctions against Russia will also cause the prices of agricultural inputs to increase significantly. In 2021, for example, Ukraine and Russia together accounted for about 14% of global fertiliser exports.

Inflation

South Africa's agricultural and agribusiness sectors are exposed to rising global inflation, unstable exchange rates and increases in local interest rates. In 2020, when major central banks, including the South African Reserve Bank, cut interest rates to record lows in response to the COVID-19 pandemic's economic damage, producers saw significant reductions in debt service costs. This was a welcome development for a sector that had outstanding debt of R191 billion in 2020. However, the rise in interest rates now comes at an even more difficult time for the farming sector, where input costs are likely to remain at a higher level for some time. The weakening exchange rate also contributes to the rising costs.

On the local level, South Africa has officially introduced a national minimum wage to protect all workers from "unreasonably low wages" and promote a principle of fair wage increases. From 1 March 2020 farm workers were entitled to a minimum wage of R18.68 per hour, but this has already risen sharply to R23.19 with effect from 1 March 2022. The National Minimum Wage Act empowers the National Minimum Wage Commission to assess the wage every year and review. With the upward risks for consumer food price inflation, there will most likely also be sharp pressure on further wage increases.

The rise in agricultural commodity prices, domestically and globally, is therefore good news, but rising production costs will keep producers on their toes. The South African agricultural sector will, in addition to rising input costs, also be faced with loadshedding as Eskom cannot supply power to the entire country at the same time. However, the sector has, over time, improved its efficiency through, among other things, the utilisation of economies of scale, upgraded machinery on the farm, the use of new production technologies, precision farming, and minimum or no tillage.

Our daily bread

The situation also brings woes to the consumers of wheat and wheaten products. During the first nine months of the 2021/2022 wheat marketing season (1 October 2021 to 30 June 2022) 2.52 million tons of wheat products were produced for human consumption. Some 22 970 tons of wheat products were imported and 14 266 tons exported to Southern African countries.

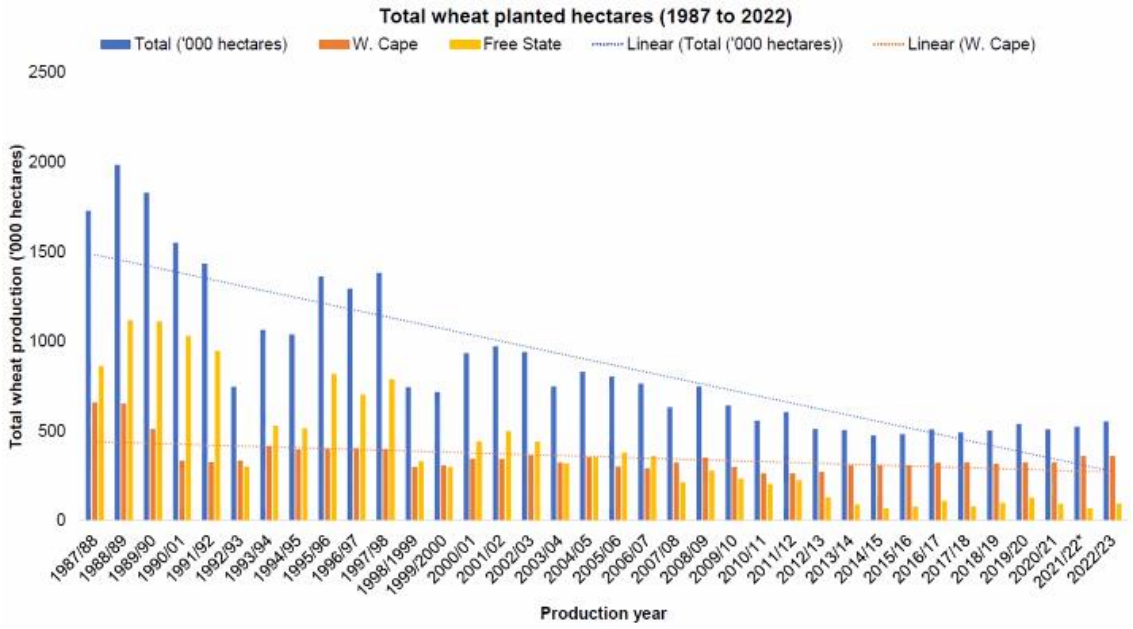
During this period, about 1 800 million pan loaves of bread were baked locally which is 1.64% more than at the same time last year. Recent figures show that white bread is more popular than brown bread for the first time in six years. Some 916 740 641 loaves of white bread were produced, while sales of brown bread dropped to 864 081 338 loaves. Less popular is wholewheat bread, of which only 18 907 900 loaves have been sold in the same period.

According to Statistics SA's information from June 2022, a loaf of white bread of 700 g cost 14.24% more than in June 2021, while a loaf of brown bread of 700 g was 15.89% more expensive than a year ago. Cake flour (2.5 kg) costs 26.47% more than in June last year, while the cost of bread flour (2.5 kg) increased by 15.56% on an annual basis. These figures have undoubtedly escalated since then.

But the last 50 years have been a roller-coaster ride for the wheat industry. In the 1988/1989 marketing year, South Africa produced 3.49 million tons. Progressive wheat deliveries nine months into the 2021/2022 marketing year reached 2.23 million tons. This is close to the final 2.285 million tons that have been estimated by the Crop Estimates Committee. Wheat deliveries for this season are the highest in the last 20 years since the 2002/2003 marketing season when 2.38 million tons were delivered.

In 2014/2015 about 723 million tons of wheat were produced world-wide of which South Africa produced 1.8 million tons (less than 0.5% of the global production). Of this, 64% occurred in the Western Cape, 24% in irrigation areas and 12% under dry land conditions in the Free State.

Overall, the hectares planted with wheat in South Africa have dropped and so has total production. However, the local demand for wheat as a food crop increased significantly during the past two decades. In 1989/1990 local consumption surpassed the production of wheat and in 2014/2015 wheat imports exceeded local production. By importing more than 1.5 million tons of wheat, the country passed the critical limit of importing more wheat than it produces. Although there is an increase in irrigated wheat hectares and consequently yield, the dryland wheat production in South Africa has declined substantially and continues to do so.



The 'wheat revival' - history

Numerous reasons for the decline are mooted, but the reality is that a structural change occurred in the wheat market when producers realised that soybean and maize crops (which have been genetically modified for both herbicide and pesticide resistance that streamline production practises) give better returns. In addition to this, the doubling of soybean crushing capacity in South Africa from 600 000 to 2 102 000 tons between 2012 and 2014 has spurred local plantings and opened up a market gap for additional soybean hectares. This is especially true in the Free State where rainfall is lacking at critical times of the wheat growth stage due to a seasonal shift in rainfall, due to climate change. It is an indication that wheat, in the future, may only be grown in the Western Cape and under irrigation. By 2014, irrigated wheat already covered about 21% of the total wheat area, and produced 41% of the total crop.

It was thus not surprising when, in 2014, the industry collectively decided on action plans to revive wheat production to its former position of prominence. Role players in the grain industry realised that, although the whole industry was in dire straits, the starting point where change is most needed, is with the producers. If producers cannot produce wheat sustainably, the entire wheat industry remains under pressure.

Industry role players dearly wanted to see an increase in wheat production – the solutions they sought should have a direct positive impact on the producer and wheat production in South Africa. A free-market system was of primary interest while other important principles were a profit driven approach, as well as returns on capital.

1. Wheat grading regulations and advanced technologies

Historically, South Africa's strict quality parameters had guided breeding and selection of new varieties to such an extent that local wheat was by far superior in both milling and baking quality to wheat that was imported to satisfy the local demand. Although superior in quality, the selection process had not taken into consideration the yields of these new cultivars. The proposals to revive the wheat industry thus also included changes to numerous aspects of the wheat grading regulations such as protein content, hectolitre mass, falling number, presence of field fungi and the percentage screenings – all quality parameters which affect the pricing of wheat.

Given the current market structure, this proposal would clearly lead to financial benefits for local grain producers and was therefore in line with the purpose of the "wheat revival" exercise. The Wheat Forum and Wheat Forum Steering Committee made the decision to focus on the sustainable funding of seed breeding. Global approaches were investigated to find a sustainable and effective research funding model for South Africa, specifically focused on advanced breeding and technology. The

proposals that were ultimately adopted go hand-in-hand and are i) to relax the cultivar release criteria, and ii) implement a levy system.

2. Relaxing cultivar release criteria
When the release of new wheat cultivars is considered each year, there should be a relaxation of certain criteria required in breeding, which had earlier entailed only parameters exclusively for wheat quality required in milling and baking. It was widely acknowledged that widening of the quality criteria alone would not address producers' needs without an increase in yield.

The new terms of reference for wheat breeding were that there should be a healthy balance between yield and quality, driven by the free market, dictated by demand. The decision was made to also include yield as a parameter in all future cultivar trials so that farmers could obtain higher yielding cultivars without losing their competitive edge as far as quality is concerned. However, it is well known that the protein content of wheat is a critical quality factor that has an impact on all other quality characteristics. There was consensus among all the role players that if the minimum and maximum values of the criteria used to classify bread wheat lines are widened to accommodate higher yielding varieties, then the yield of such varieties must be significant - all such varieties must yield at least 5% more than current commercial bread wheat varieties.

3. Implementing a levy system
Stagnation of the local wheat industry and increasing reliance on wheat imports were pointing to a risk in the long-term, threatening our food security. South African producers, researchers and seed breeders were adamant that intervention was necessary to stimulate local wheat production because a competitive seed sector is key to ensuring timely availability of appropriate, high-quality seeds at affordable prices to South African farmers.

A more effective cultivar development and seed breeding system would be the answer, as South Africa's farmers are price takers, and compete with countries where wheat producers have access to the latest developments and the practice of retaining seed is not the order of the day. But there was a problem.

The lack of investment into new technology is largely caused by the retention of farm-saved seed, which results in less seed being sold. Worldwide, the levels of Plant Variety Protection (PVP) legislation and protection for self-pollinated crops are insufficient to guarantee a return on investment on intellectual property for the holders of such plant breeders' rights. This is due to PVP exceptions such as the "Farmer's Privilege" and the fact that the offspring/grain produced from self-pollinated crops has the same genetic content as the parent. This means that seed can be harvested and replanted. It creates a situation where growers could, for example only purchase one season's seed, then lawfully save seed of his harvest for the next, and subsequent planting seasons.

Commercial seed sales of self-pollinated/open pollinated crops were jeopardised by low volumes (since it is cheaper to retain grain for seed) and low prices (since any increase in prices triggers an increase in the use of farm saved seed). New seed companies and new cultivars did not enter the South African market because of the lack of returns on investment and local farmers were thus denied new seed technology available to our international competitors.

In the case of wheat, where a high percentage of annual plantings take place with retained seed, it meant that the investment in the development of new cultivars was only covered by a small portion of the market. The research and development costs were shared only by those farmers who buy seed. Seed companies therefore lost interest in the crop, as continued investment in its development was not worth their while. The seed company will simply direct its resources towards crops that deliver a return on investment.

According to plant breeder's rights, a form of Intellectual Property Right providing for the acquisition of legal rights in terms of the Plant Breeders' Rights Act, 1976 (Act No 15 of 1976), seed breeding companies may obtain royalties as remuneration for efforts made during the breeding of new varieties.

Without the latest technology, it is impossible for South African producers to compete against their international counterparts, who use the best seeds and latest technology available. Plant breeding

changes or enhances the traits of plants to produce desired characteristics. These include plants with higher yields, improved quality (milling and baking quality, such as for extractions, hardness, and water absorption), disease and pest resistance, maturity duration, agronomic characteristics, moisture and heat stress, and wider adaptability. For producers, it was important to obtain new and improved plant varieties as there is a constant demand for better quality, higher yields, better processing properties and increased disease resistance.

But breeding and development of a new variety are expensive and time consuming; such royalties thus give owners of a variety the opportunity to obtain a financial reward for their efforts. It takes more or less 12 years and costs more than R16 million to bring a new wheat cultivar to market. The solution to this problem was to collect royalties by initiating a statutory levy for breeding and technology.

The wheat industry decided that this approach was imperative to develop the confidence of international seed companies to invest in South Africa by bringing in technology and varieties that already exist in other countries that compete with South African products on the global market.

A new body, the South African Cultivar Technology Agency (SACTA), was established in 2016 to collect and administer the levies. Since then, the levy system for wheat has attracted numerous new international role players to the country and improved the investment of seed breeders into new technology. It allows high performing breeding companies to be compensated according to actual performance as it is based on their market share achievement, which is calculated every year.

The wheat levy has been collected for six seasons and currently R32.00 is raised from every ton of wheat sold. The system is supported by growers as the new cultivars offer a healthy balance between yield and quality and ensure that all parties in the value chain benefit. Since the introduction of the levy on wheat in 2017, 23 new wheat cultivars have already been released. Thanks to the new cultivars, wheat yields have risen from 0.5 tons per hectare to between 4.0 and 4.5 tons per hectare.

The situation remains daunting

Industry is confident that local wheat production is back on track, but the past two years have been remarkable for most winter crops, as high prices have coincided with favourable weather and strong yield performance. In its most recent long-term outlook, the Bureau for Food and Agricultural Policy, however, expects wheat production to grow at only 10% over the next 10 years. Wheat production is not keeping pace with consumption, suggesting that a larger share of domestic consumption will be imported by 2031. It is expected that about 50% of household use will need to be imported by 2031, compared to 48% on average over the 2019-2021 base period. This is still far below the imports of 60% observed after a poor local wheat harvest in 2019.

The opinions expressed above are those of Ms Mariana Purnell, and do not necessarily reflect the views of the Executive Committee or members of the NSTF.