Impact of policies on biofuel industry dynamics and feed prices

By the Bureau for Food and Agricultural Policy[1]

Large carry-over stocks and resultant low prices of grains have led to exciting new developments in the search for alternative uses of agricultural commodities in order to increase demand, lower stocks and, therefore, support commodity prices.

In recent times, the idea of producing ethanol or alcohol from maize has come to the forefront in South Africa. This development positively coincides with ever-increasing oil prices, provisions of the Kyoto protocol and the global trend towards using renewable energy sources. More recently, the government made some of its intentions clear by releasing a draft of what the potential policies for this infant industry could look like. In the past few years, the Bureau for Food and Agricultural Policy (BFAP) has undertaken extensive research on this topic. This article draws on the results of the recent study that BFAP conducted for the Maize Trust[2].

Factors like the exchange rate, the oil price, demand-and-supply dynamics of the commodities concerned and very importantly, government policies will be the key drivers that will impact mostly on the success of this new initiative. In order for us to take all of these factors into account and to establish their intricate correlations, it is necessary to make use of econometric modelling techniques, as well as a carefully thought through scenario.

The scenario that is presented in this article is called "South Africa's green revolution". The results of the scenario will be compared to a baseline in order to better understand the potential impact of the biofuel industry. This article, therefore, has the purpose of indicating what impact a set of policies could have on the dynamics within the biofuel industry and the resultant impact on feed prices.

ASSUMPTIONS FOR THE BASELINE AND SCENARIO

The baseline

A baseline is a simulation of the sector model under agreed policy and certain assumptions with respect to macroeconomics, the weather and technological change. The baseline does not constitute a forecast, but rather presents a benchmark of what could happen under a particular set of assumptions. Inherent uncertainties, including policy changes, weather and other market disruptions, ensure that the future is highly unlikely to match baseline projections. A baseline can thus be looked upon as a 'reference scenario' and can form part of the validation procedures. In this study, the baseline is used as a benchmark to compare and evaluate the potential impact of the biofuel industry on the agricultural sector. Therefore, the deviations from the baseline, brought about by a biofuel industry, will be analysed.

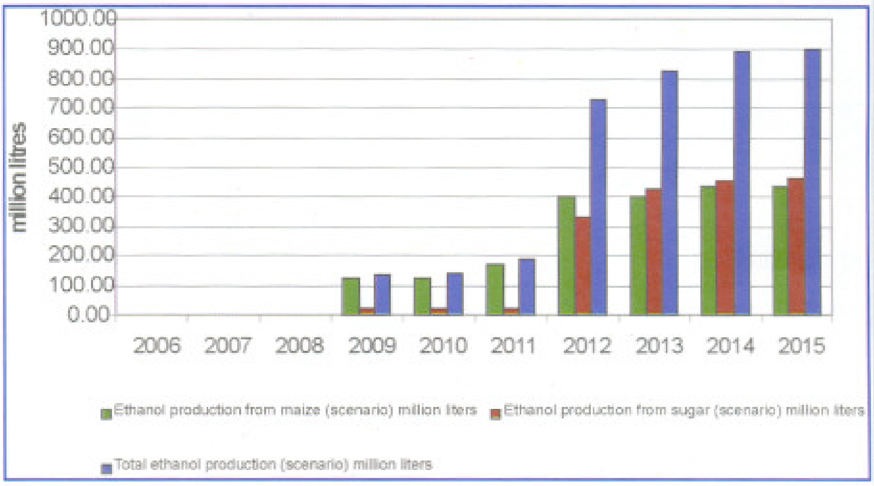

Figure 1: Total ethanol production in South Africa under the scenario
Source: BFAP, *Maize Trust report*, March 2007

Scenario: "South Africa's green revolution"

The scenario represents a world in which the production of biofuel is the answer to South Africa's energy needs. In the government's paper on renewable energy, the government has set standards of achieving 10 000 GWh of renewable energy by 2013. The aim is to have biofuels account for 75% of this quota. The government implements an E10, 10% bioethanol blend, and a B5, 5% biodiesel blend, mandatory blending policy

Table 1: Yellow maize balance sheet – absolute change from baseline

		2012	2013	2014	2015
Yellow maize area harvested	1000 ha	101.5	237.4	154.0	211.3
Yellow maize production	1000 tons	378.1	893.8	585.5	811.2
Yellow maize feed consumption	1000 tons	-487.6	-266.3	-396.8	-312.8
Yellow maize human consumption	1000 tons	-17.3	-7.1	-13.8	-9.7
Yellow maize ethanol use	1000 tons	996.1	998.4	1084.6	1086.9
Yellow maize domestic use	1000 tons	491.2	725.0	674.0	764.4
Yellow maize ending stocks	1000 tons	-11.1	174.7	117.4	186.2
Yellow maize exports	1000 tons	-6.8	-2.8	-5.3	-3.6
Yellow maize imports	1000 tons	34.4	13.9	26.5	18.3

Source: BFAP, *Maize Trust report*, March 2007

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[1] A joint initiative of the Universities of Pretoria, Stellenbosch and the Department of Agriculture: Western Cape, www.bfap.co.za

[2] The financial assistance of the Maize Trust is acknowledged for the following report: "Modelling the impacts of macroeconomic variables on the South African biofuels industry", March 2007, Pretoria.

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from 2008 onwards. On top of the mandatory blending policy, there is a fuel levy tax reduction of 40% for both biodiesel and bioethanol and this remains in place for the entire period under review. The third type of policy that was simulated and put in place by 2011 is an import tariff of 30% for both bioethanol and biodiesel.

Modelling results

Given the assumptions above, ethanol production is likely to commence from 2009 onwards, when the first maize and sugar to ethanol plants come into production. No bioethanol is produced until a mandatory blending requirement is introduced because plant profits are negative under baseline conditions where no policies or incentives are introduced. In the long run, more ethanol will be produced from sugar than from maize. The scenario is based on the assumption that biofuel prices are not fixed to the petrol price but prices are discovered by demand and supply in the market place.

It is projected that by 2015, 437 million litres of bioethanol will be produced from maize, which implies that just over 1 million tons of maize will be required for bioethanol production. Approximately 340 000 tons of DDGS will be produced. Table 1 presents the absolute changes from the baseline in a balance sheet format for yellow maize over the period 2012-2015.

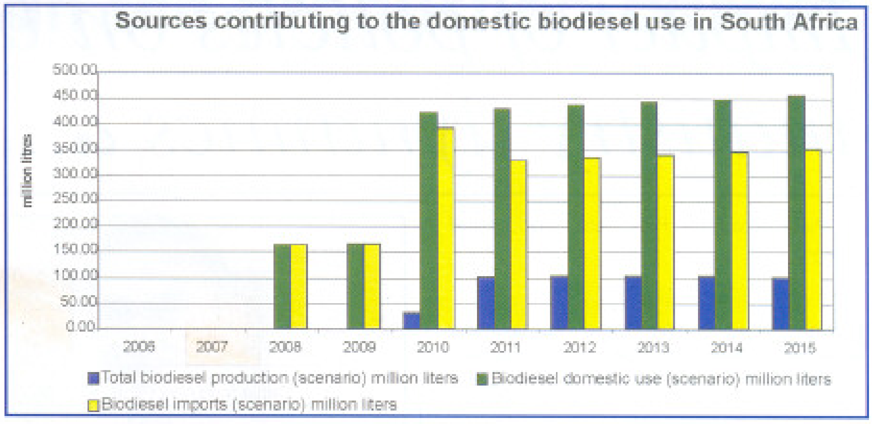

Figure 4: Domestic biodiesel use composition in South Africa
Source: BFAP, *Maize Trust report*, March 2007

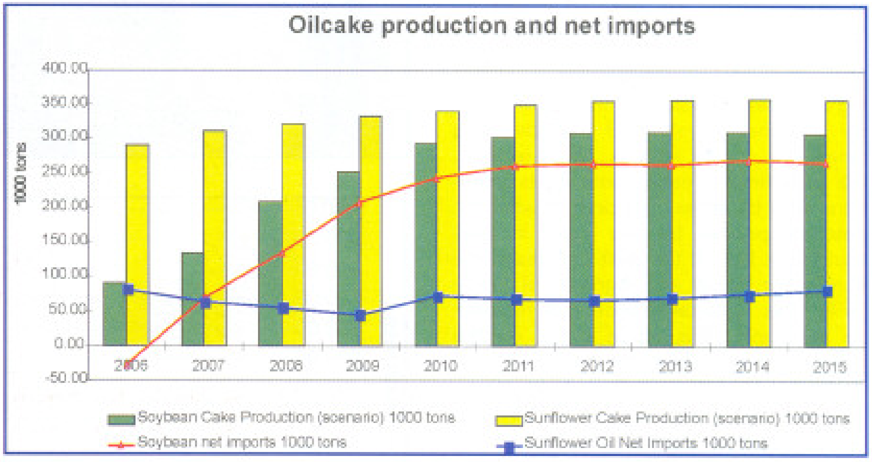

Figure 5: Oilcake production and net imports
Source: BFAP, *Maize Trust report*, March 2007

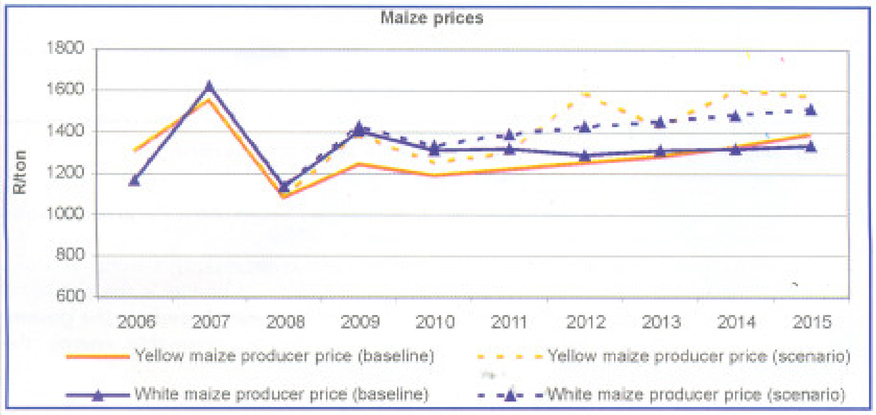

Figure 2: White and yellow maize SAFEX prices
Source: BFAP, *Maize Trust report*, March 2007

The interaction between industries is taken into account in the partial equilibrium framework. For example, white maize prices increase because the area planted under white maize will decrease as the area under yellow maize expands due to higher yellow maize prices. Figure 2 represents the deviations the maize prices, both yellow and white, will experience due to the biofuel industry. Although the increase in white and yellow maize prices is projected to be moderate (12% and 18% respectively), it has to be mentioned that these projections are simulated under normal weather conditions.

The model projects a net increase in the total consumption of maize of approximately 650 000 tons per annum. Under normal weather conditions, South Africa can easily produce a surplus of 650 000 tons and only a moderate increase in prices can be expected. However, under drought conditions, it can be expected that the local maize industry will move to an import parity scenario much faster if maize is used for the production of ethanol (Maize Trust, 2007).

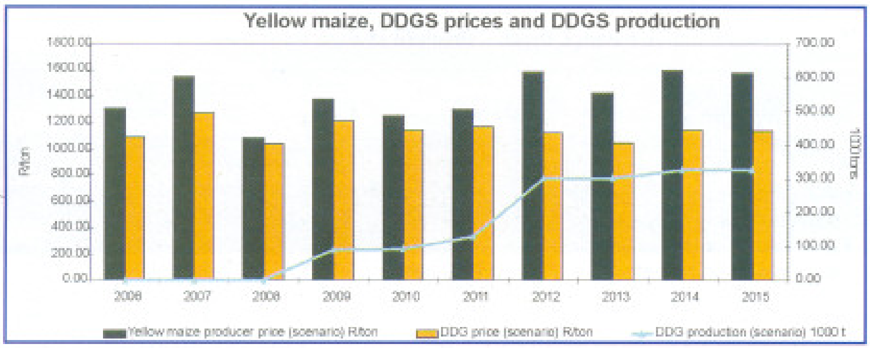

Figure 3: Scenario: DDGs production, yellow maize and DDGs prices
Source: BFAP, *Maize Trust report*, March 2007

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The graph below represents that prices at which yellow maize and DDGs are expected to trade given the assumption in the scenario.

The blue line represents the production of DDGs. Initially, DDGS prices are projected to trade close to yellow maize prices however, with the sharp increase in DDGS production in 2012, the DDGS prices are projected to trade below the yellow maize prices.

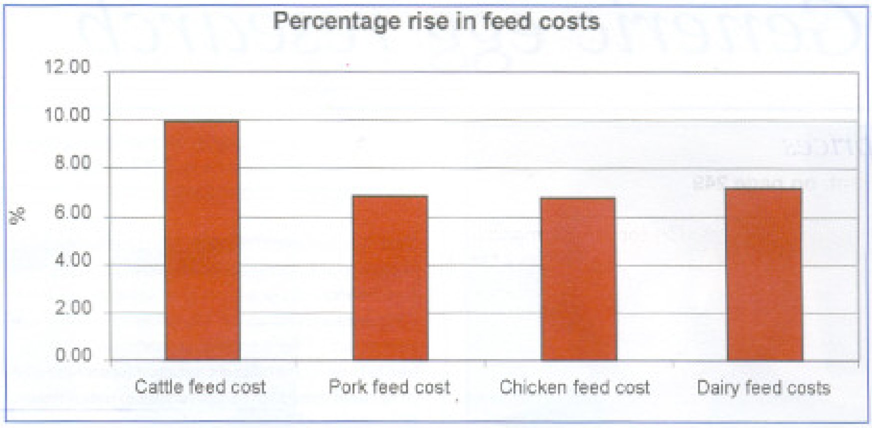


Figure 6: Percentage rise in feed costs
Source: BFAP, *Maize Trust report*, March 2007

Feed manufacturers reckon that due to the livestock composition in South Africa, the uptake of DDGS will occur at competitive prices until a certain threshold is reached. Once this threshold is reached, DDGS will have to trade below yellow maize to ensure a complete uptake in the livestock market.

On the biodiesel, side the picture looks different. Even under the set of policies proposed in the scenario, biodiesel production from soybeans and sunflowers is not economically sustainable on a large scale and it is projected that most of the biodiesel produced locally will be from on-farm production for own use. With the bulk of vegetable oil already being imported for human consumption and trading far above the price that vegetable oil can obtain in the biodiesel market, very large incentives are required to divert any vegetable oil away from the human market to be sold into the fuel market. Figure 4 illustrates that only 25% of the 450 million litres required for a B5 blend will be produced locally.

Sunflower oil is trading at a premium above soybean oil; therefore, it is more likely that soybean oil will be used for biodiesel. Soybean cake is also a higher valued product than sunflower cake, which makes the production of biodiesel from soybeans more profitable.

Domestic soybean cake production is projected to reach just over 300 000 tons by 2011. Although the model currently projects that soybean imports will rise as local demand is increasing, a shift in technology and production practises could imply that local production will meet local consumption.

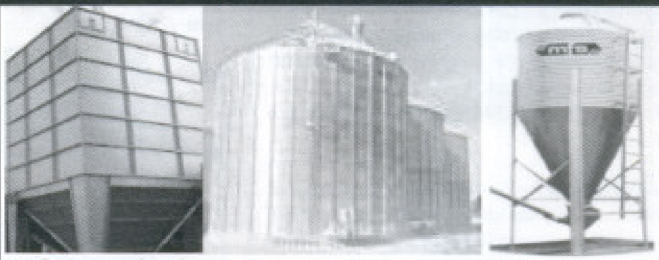
The net effect of the potential biofuel industry on feed prices is presented in figure 6.

CONCLUSION

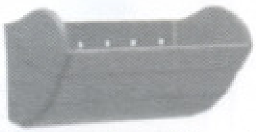
The introduction of certain favourable policies will be crucial to get the infant biofuel's industry up and running. Failure to do so will result in an unprofitable industry and a blending mandate, which is mostly served by imports.

An increased demand for feedstock, required for the production of biofuels, will put upward pressure on prices, therefore, increasing feed prices. Feed costs are expected to increase between 6% and 10% given the assumptions within the scenario.

ABC Africa



Silos & feed bins, large & small



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