ARE BIO FUELS TO BLAME FOR HIGH FOOD PRICES?

BY
DR PHILIP THEUNISSEN
COMPUTUS BESTUURSBURO

World wide food prices have risen significantly over the last number of months. The consumer, who has for a number of years paid low prices for food, is now looking for culprits and one such a culprit are bio fuels, which is increasingly being manufactured from grain.

Naturally the astronomical price increases in fossil fuels of the last number of months makes it very attractive to produce bio fuels and consumer groups, trade unions and politicians focus increasingly on the fact that food, especially grain, is moving from the table to the fuel tank. This causes jitters in the ñ*food versus fuel*ò debate, which divides interest groups into two clear camps.

The processes

The main types of bio fuel are ethanol and bio diesel. Ethanol is mixed in with diesel while bio diesel with the addition of a small quantity of methanol is used on its own it diesel engines. Ethanol can be produced from any plant material that contains sugar but the general tendency is to use maize and sugar cane. The production of ethanol is a two-stage process where the starch is first fermented and then distilled to extract the ethanol.

Bio diesel can be produced from any plant oil. It is a simple process in which the oil is pressed out of the plant material and then filtered. Methanol is only added to increase the combustion of the oil.

Does bio fuels contribute to less food?

The USA is busy erecting ethanol plants at a growing rate and it is estimated that $3 billion per year is made available by the federal government for promotion of ethanol production. Already 4 billion gallons of ethanol is used compared to 140 billion gallons of normal fuel. There are already 110 grain ethanol plants in production which can produce 5 billion gallons of ethanol per year while a further 79 plants are being erected, capable of producing a further 6 billion gallons per year. The market for ethanol in the USA is however not necessarily the result of supply and demand. It is a political product and the federal government is the driver of the rising demand, both through subsidies and the compulsory adding of ethanol to other fuels.

The USA is traditionally a nett exporter of grains to such an extent that it supplies millions of tons of grain to various countries around the world. It follows that the production of grain in the USA has a significant impact on the availability of grain in the world.

In the USA itself the criticism of bio fuels is very heavy. The supporters of bio fuels react to allegations by arguing that:

- Grain farmers can easily cultivate an additional 13% more in hectares;
- Latest biotechnology makes it possible to increase returns per hectare;
- Improved production practices further increased returns.

These arguments definitely have merit. American farmers has for many years been subsidised to withhold land from production in order to prevent large surpluses. Genetically modified cultivars definitely increase production together with new production practices, which protects the nutrients in the ground. Under normal conditions the USA therefore should be able to produce enough grain to provide in the demand for food as well as bio fuel.

It must also be kept in mind that the quantity of grain extracted from the market for production of bio fuels is not entirely lost to the food market. Using maize as an example only between 30% and 40 % of the weight is used for ethanol while the remaining fibre flows back to the animal feed market. The bio diesel process only extracts between 11% and 17% oil from the grain and the oil cake are again available for animal feed.

The increased grain production, either through increased planting or increased efficiency, combined with large quantities of by-products to be used for animal feed, means that the production of bio fuels probably does not contribute significantly to the current high levels of food prices. The Americans further argue that less than 20% of the price that the consumer pay for food goes to the farmer. The rest is made up of transport costs, processing, packaging, distribution and sales costs. A rise in the grain price therefore should only have an impact on 20% of the consumer price.

Nett energy value

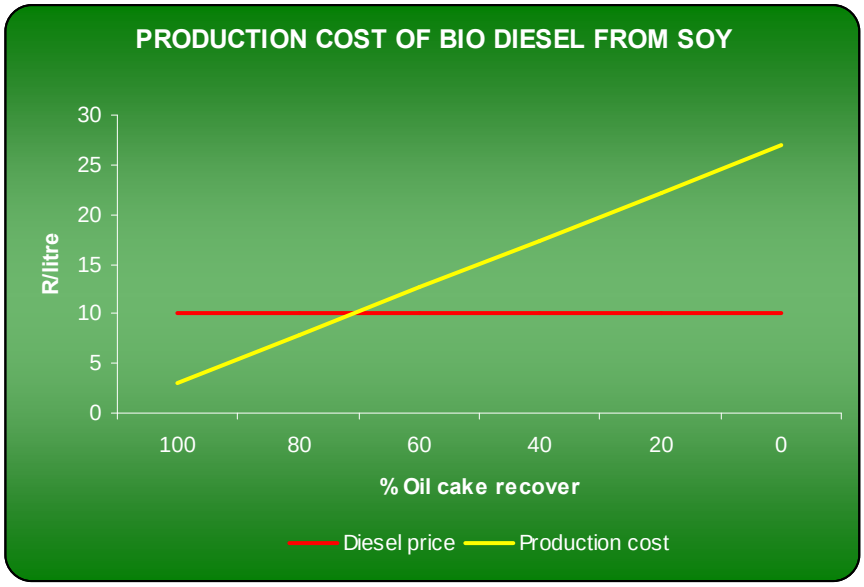
Energy analysts report that adding ethanol to crude oil definitely results in a saving but there are conflicting views on the nett energy gain. It takes 55 litres of diesel fuel to produce one hectare of soy, which in turn can produce 195 litres of bio diesel. This does not include the fuel for transport of input costs and the transport cost of the product to the silos and the market. Another component that should be kept in mind is the energy consumption in the production of input requirements, especially fertilisers.
Adding the electricity consumed by the bio fuel plant in the production process there is the view that more energy is expended in the production of bio fuels than what is actually made available. An authoritative study however came to the conclusion that a nett energy gain of 34% is achieved; with the assumption that the by-product is used for animal feed.

Is it economically viable to produce bio fuel?

All inclusively it costs $1.74 per gallon to produce ethanol while it only costs 95 cents to produce petrol. The irony is therefore that fossil fuels are used on the farms and the bio fuel plants for the production of bio fuel, in order to make it economically viable. Without the subsidies in the USA, bio fuels would not be economically viable. Fuel is a very strategic product for the Americans as is demonstrated by their military

involvement in the Middle East. The USA want to be less dependent on the oil from the Middle East despite the costs involved and their answer is ethanol production.

The production cost of bio diesel from soy is shown in the figure below:



In South Africa it will cost about R3,00 per litre to produce bio diesel from soy, but then all the by product of the production process, the oil cake, must be sold at market value. If 20% of the oil cake cannot be sold the production cost rises to R7,80. For every 10% of the oil cake not sold, the production cost rises by R2,40 per litre and if only 50% is sold the production cost will stand at R15,00. It is therefore imperative that the oil cake be sold in order to justify the production of bio diesel from soy.

A plant that can produce 1 million liter per annum would need about 7 700 tons of soy and would then be able to supply in the fuel demand of 20 mid sized farmers. At the same time about 6700 tons of oil cake would remain which is sufficient to feed about 1800 cattle for one year.

In addition the profitability of a bio fuel plant would depend on the relative price relationship between fuel and grain. The lower the grain price compared to the fuel price, the more attractive the bio diesel option. Currently both prices are equally high which negatively influences the calculation.

Economic realities

Although there was a worldwide grain surplus for a number of years, this situation reversed in a short period of time to such an extent that there are currently shortages. There are two reasons: Firstly adverse climatic conditions caused smaller harvests from all mayor grain-producing regions. Secondly, the international demand for food increased due to continued economic growth especially in China and India.

China has a population of 1.3 billion and its economy has been growing for a number of years at a rate of more than 10%. India has a population of 1.1 billion, also with a fast growing economy. South Africa is currently expecting a maize crop of 12 million tons. If every Chinese increases his consumption of maize by 9 kg per year, the whole of South Africaôs crop would be consumed just by this increase. In Indiaôs case an increased consumption of 10 kg per person per year would make our total crop disappear.
Even though these people prefer rice to maize, it gives a good indication of how quickly grain reserves can be consumed in the light of 10% annual growth in such economies. The shortages of food therefore rather seem to be a result of an increase in demand rather than the production of bio fuels only.

Conclusion

Bio fuelôs contribution to high food prices is miniscule. Currently it is not worthwhile to produce bio fuels from grain because it does not produce a material nett gain in energy and it is not economically viable. It can only be justified by the Americans, due to continued subsidising by their government, and this can only continue up to a certain point. Although bio fuels is a renewable energy source, it is not effective yet and the economic realities will ultimately prevent all the grain from moving from the table to the fuel tank.

Bethlehem
June 2009