

## Can Westcountry Farmers compete against the Brazilian Biological Ferrari?

Tim Stephens, 19<sup>th</sup> April 2017

Brazil has been described as a 'Biological Ferrari'. This title seems apt given the vast natural resources the country possesses. Everything a plant needs to grow fast can be found in Brazil; warmth, light, water (lots of water, nearly a fifth of all the world's water reserves in fact) and all this spread across 852 million hectares. With the encouragement of their Government since the 1960s, Brazilian farmers have been able to make the most of these abundant natural resources by using modern agricultural management techniques and then multiplying them across vast tracts of often virgin land. Over the past 40 years this has transformed Brazil from being a net food importer into a global agricultural powerhouse as the world's biggest exporter of beef, sugar, coffee, soybeans and chicken. The scale of Brazil's beef industry is highlighted by the fact that it has become the world's biggest beef exporter despite only exporting 15% of the beef it produces. The environmental cost of this growth has been well documented, although deforestation appears to have slowed with the government introducing a range of environmental laws over recent years. The fact remains however that vast habitats of high-value biodiversity have been lost forever, to soybeans and cattle in particular. Interestingly though, only 11% of Brazil's total land area is currently cropped and another 28% is pasture for cattle. This leaves over 60% of the country to other land uses such as reserves for nature and indigenous peoples, a fact that farming leaders and the government are keen to point out.

As part of my Nuffield Scholarship travels, I recently spent 2 weeks in central Brazil, firstly in and around Brasilia, the capital, and then in Mato Grosso. Mato Grosso is a state in the central west of the country which was largely thought to be of low agricultural value until the 1970s. Natural vegetation in these parts is classified as 'cerrado' which translates loosely into 'savannah'. Since the 1970s there has been government encouragement for farmers in the well-

established agricultural heartlands of the south of Brazil to move northwards to areas such as Mato Grosso. The naturally low fertility but sandy loam soils, and mostly flat and open fields have lent themselves to soybean production once they have received lime, gypsum and fertiliser. The insatiable Chinese demand for soybeans, and Brazil's ability to grow more and more of them, has made many fortunes in Brazil. One leading agri-businessman; Blairo Maggi, has recently been made Minister of Agriculture for Brazil.

Farms in these parts range in size from hundreds of hectares right up to hundreds of thousands of hectares, although farm size typically averages one to two thousand hectares. Typical crop rotations include soybeans, corn and cotton with both permanent and temporary pastures for cattle production. One particularly large farmer we visited in Mato Grosso attributed the rapid growth of his family's business since the 70's to four key factors; double cropping, plant breeding advances (including GM), no-till and the introduction of cotton. Double cropping has made a big impact on farm productivity. Soybeans are the number one cash crop and are planted in every field suitable for cropping at the start of the rainy season in October (this part of Brazil has no winter, only a wet season from October to March and then a dry season). Plant breeders have developed varieties of soybeans that reach maturity 100 or so days after planting. This allows the establishment of either maize or cotton in those same fields in January or February, once the soybeans have been harvested. These second crops are then harvested in July and August before the cycle repeats itself. No-till has played a significant role in this system as it helps to conserve soil moisture. A pioneer of no-till farming in Brazil, an English agronomist called John Landers who settled in Brazil in the 1960s, told us that the three most important words in no-till are '*residues, residues, residues*'. He was referring to the way in which residues from the previous crop hold moisture in the soil through the dry periods. The low level of soil disturbance from direct-drilling also helps to retain soil organic matter and moisture.

Sustainable intensification is a term frequently mentioned by industry figures in Brazil, especially in relation to the beef sector. A statistic which was mentioned by several farmers and advisers who we met is that there are approximately 200 million cattle in Brazil grazing about 200 million hectares of pasture. This is a low stocking rate and reflects the generally poor productivity of both the pastures used for cattle production and the main Zebu breed of cattle there. With the global demand for soybeans continuing to increase much of this pasture is being converted to grow crops. With deforestation slowing, and therefore less 'new' land being created, this is pushing up land prices and rents so that beef producers are having to become more productive. The main methods they are using to increase stocking rates are reseeded, liming, use of fertiliser, splitting of fields into smaller paddocks and improvements to water supply for cattle drinking. There are also national breeding programmes for boosting growth rates in the Zebu breed. The relevance of all this to sustainable intensification is that if stocking rates were to double through widespread adoption of all these practices by beef farmers, it would release up to 100 million hectares of pasture for growing crops rather than needing to cut down more forests. In some cases it can also free up land for reforestation and buffer strips beside watercourses, as required in some places by the Government's 'Forest Code'. We met an agronomist who is working for an NGO which is trying to improve the productivity of cattle ranchers in the Amazon region. A common problem in the tropics is that pastures in newly cleared forest grow quickly to start with but then give up, a phenomenon known locally as 'sudden death'. Ranchers then abandon this land and move into newly cleared areas before the process repeats itself. The NGO is trying to improve the ranchers' pasture management so that they can make best use of the land already cleared, rather than have to continually clear more land ahead of themselves.

So where next for Brazilian agriculture? I travelled home from Brazil feeling that barring any major natural or man-made disasters, it would be a long

time before the world runs out of food, such is the even greater productive potential of countries such as Brazil. Some people describe Brazil as exporting water to China in the form of soybeans. With Brazil's abundance of freshwater yet relatively limited use of irrigation across much of the country, there is scope to boost production further by irrigating on a wider scale. One of the most interesting contrasts in Brazil is the high level of efficiency and management displayed by its agribusiness, compared with the less than efficient way that the country is run as a whole. This is called the 'Custo Brasil', best translated as the 'cost of doing business in Brazil'. Whilst international investors are still piling into Brazilian agriculture, and not too dissuaded by the 'Custo Brasil', local businessmen and women complained that the country continues to suffer from a complex tax system, excessive bureaucracy and under investment in transport infrastructure. Last month's Brazilian meat scandal has resulted in worldwide attention on the meat processing industry. A two-year government investigation has resulted in a number of meat packing plants being raided by officials. Some are alleged to have been bribing meat inspectors and adulterating meat. Despite all of this, Brazilian agriculture is moving ahead quickly and establishing more processing capacity to add value to its food, fibre and energy crops rather than export them in their basic form. We witnessed an example of this in Mato Grosso where a co-operative of cotton farmers has recently invested US\$45m in a factory to produce cotton thread rather than sell it as bales of raw product. Roads will slowly improve, and the country will also make better use of rail and waterways in order to reduce the very high transport costs of getting produce from inland to seaports. Some of this investment may come from the private sector, and possibly China. It also seems likely that Brazil will gradually improve the public image of its agricultural industry and implement greater food safety and traceability whilst also raising animal welfare and environmental standards.

In terms of what future Westcountry farmers have in a post-Brexit world where free trade with

countries like Brazil is a distinct possibility, it is important not to forget the advantages that we already possess. In particular, we have a temperate maritime climate and 60 million relatively wealthy customers on our doorstep who are increasingly interested in where their food comes from. It could be argued however that the farmers who will do best post-Brexit will have pursued the type of 'value-innovation' approach which has been adopted by a New Zealand dairy farmer who we met in Brazil. He is producing a premium UHT milk using Kiwi cows and grassland management methods, but making the most of Brazil's tropical climate to produce low-cost milk by growing grass year-round. As the demand for this branded milk grows, the availability of land in Brazil will allow further cost-efficiencies to be gained through scaling up production. In a nutshell, value-innovation is about cutting production costs at the same time as adding value by giving the customer something different.

In the words of Professor David Hughes, global food trend expert from Imperial College who spoke to us before we left for Brazil; *'the future profit margin of beef will be in the adjective, i.e. Welsh Black, Grass-fed, Free from....etc.'* Professor Hughes also expects the grain market to go in this direction with adjectives such as *'Omega-3 enriched'* and *'GM free'* giving us scope for product differentiation. We in the Westcountry are arguably better placed to be able to add these 'adjectives' to our produce than our Brazilian counterparts are, whatever Brexit may bring.

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Looking at the nitrogen fixing root nodules on a soybean crop. Brazil is the world's biggest exporter of soybeans and fast-maturing varieties like the one pictured allow a second crop of maize or cotton to be grown in the same year.



Zebu cattle waiting to be fed in a semi-feedlot system in the state of Mato Grosso, western Brazil. These cattle currently weigh just under 600kg and are being fattened for slaughter on a diet of grazed grass and dry feed containing maize, soya meal, soya hulls and minerals.



A Zebu stud bull. Breeding programmes are trying to improve growth rates and carcase quality in this hardy but slow growing tropical breed which is widespread throughout Brazil.