



Moema sugar mill in Orindiúva helps supply one of 25,000 biofuel filling stations across the country.

PERSPECTIVE

Lessons from Brazil

Thirty five years of experience has taught one of the world's leading biofuels producers several essential lessons, which other countries should heed, says **Marcia Moraes**.

There was nothing inevitable about the path Brazil took to where it is today — a country with a vibrant biofuel industry that annually turns half of its sugarcane harvest into 24 billion litres of ethanol to power 12.5 million vehicles. In 2009, nearly 1.2 million jobs in Brazil stemmed from the sugarcane, sugar and ethanol sectors. About half were held by poorly educated workers on sugarcane plantations. Sugarcane workers are among the best-paid in Brazilian agriculture, and their children have better socioeconomic outcomes than the children of other agricultural workers. Here are some of the lessons that Brazil has learnt as it has built its biofuels industry:

LESSON 1: PROVIDE STABLE GOVERNMENT OVERSIGHT

In 1975, there was no market for sugarcane ethanol. The Brazilian government had to intervene to create this market, and for decades tightly controlled it. Clear and stable rules allowed companies to make the long-term investments needed to achieve their goals.

The late 1990s saw a sharp reduction of state interference in the biofuel industry. Production quotas were abolished, as was the ethanol subsidy. Sugar and ethanol prices were left to the market. Sugarcane producers are now remunerated by processors based on sugar and ethanol prices; and ethanol

producers and distributors are free to negotiate prices and quantities. The free market brought considerable efficiency gains. But planning to meet the market demand is tricky. Unlike corn and soy, sugarcane is a perennial crop, going through a six-year cycle (planting in the first year and harvesting in the next five years). Planning the supply of sugarcane means considering the estimated demand for the next five years, for both ethanol and sugar. A market economy is not always up to this task.

LESSON 2: PLAN FOR MAXIMUM FLEXIBILITY

From the outset, Brazil chose to produce two types of ethanol: anhydrous ethanol, which is blended with petrol (gasoline), and hydrated ethanol, used in vehicles that run only on ethanol and also in dual-fuel (flexible fuel) cars. State intervention was essential for the creation of the necessary infrastructure for both hydrated and anhydrous ethanol, including the installation of hydrated ethanol pumps at more than 25,000 filling stations. Today, government intervention is basically limited to determining the proportion of the anhydrous ethanol blend, setting the tax rate on sugar exports and enforcing the existing environmental and labour rules. The focus on anhydrous ethanol certainly reduces the necessary investments, aids the planning of the supply and allows the co-existence of

fossil and renewable fuel — simply blending anhydrous ethanol with petrol (gasoline) in different proportions yields whatever grade fuel is desired.

LESSON 3: ESTABLISH CLEAR RULES ABOUT ETHANOL STOCKS

Ethanol is produced from an agricultural product, subject to weather conditions and the length of the growing season. So although sugarcane harvesting and ethanol production last for 6–8 months every year, ethanol is sold year round. There must be a policy for buffering stocks to avoid shortages or sharp price oscillations throughout the year.

LESSON 4: GET THE SCALE RIGHT

When Brazil launched its biofuel initiative in 1975, the Programa Nacional do Álcool encouraged the establishment of small-scale distilleries. These distilleries lacked economies of scale and most closed through economic inefficiency.

LESSON 5: PROTECT THE ENVIRONMENT

Minimizing environmental impact is imperative. Brazil regulates issues such as where sugarcane may be grown¹ — for example prohibiting production in the sensitive biomes of Amazonia and Pantanal. The government regulates use of water, use of the by-product vinasse as a fertilizer, preservation of forests and burning of sugarcane stalks as a method of straw removal. Even without mandates, biofuel producers have seen the virtue of minimizing waste. Biorefineries burn the fibrous sugarcane bagasse to generate electricity for the ethanol plant and for sale.

LESSON 6: WELCOME PRIVATE INVESTMENT

Brazil has greatly expanded its sugar and ethanol production in recent years, relying on both domestic and foreign private investment. External capital has enabled the industry to introduce new technologies and management standards. Investment from other countries in particular has helped give Brazilian biofuel producers access to foreign markets that may be shielded by protectionist policies.

No two countries will face exactly the same circumstances. But the strategies that have guided this nation of almost 200 million people should show the rest of the world that the future of energy need not depend on oil. ■

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1. Leopold, A. & Aguilar, S. *Case Studies on Bioenergy Policy and Law: Options for Sustainability* (eds Morgera, E., Kulovesi, K. & Gobena, A.) FAO Legislative Study, 102 (FAO, 2009).