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Biofuels: Promises and Implications for Food Security in Brazil

“The fuel of the future is going to come from fruit like that sumac out by the road, or from apples, weeds, sawdust – almost anything. There is fuel in every bit of vegetable matter that can be fermented.” This is what Henry Ford told the *New York Times* in 1925. (Nierenberg 61) Now, in 2007, technology has made biofuels a reality for the modern world. Living in Northwest Iowa near a very large, newly constructed Ethanol plant, I know the benefits for Iowa agriculture, including higher corn prices. I also know some of the negative effects of biofuel production, such as higher grocery prices and higher cash rent for farmers. But I must also question the benefits of biofuels for the world, especially third world countries.

There were several articles I read that gave me a whole different perspective on ethanol production. Instead of looking at it from a fuel standpoint, I had to consider what the manufacture of biofuels does to food production and food prices. Runge, C. Ford, and Senauer, Benjamin’s article, “How Biofuels Could Starve the Poor” in *Foreign Affairs* magazine states that “filling the 25-gallon tank of an SUV with pure ethanol requires over 450 pounds of corn - which contains enough calories to feed one person for a year. Biofuels have tied oil and food prices tighter in ways that could profoundly upset the relationships between food producers, consumers, and nations in the years ahead, with potentially devastating implications for both global poverty and food security.”

In another section of the same article, I read “if the prices of staple foods increase because of demand for biofuels, as the International Food Policy Research Institute projections suggest they will, the number of food-insecure people in the world would rise by over 16 million people for every percentage increase in the real prices of staple foods. That means that 1.2 billion people could be chronically hungry by 2025. If oil prices remain high – which is likely—the people most vulnerable to the price hikes brought on by the biofuel boom will be those in countries that both suffer food deficits and import petroleum” (Runge and Senauer).

The South American Tropical region was the focus of my research, especially the country of Brazil. I was especially interested in Brazil because they are creating biofuels out of sugar cane and other materials, rather than corn. *Foreign Affairs* states “The benefits of biofuels are greater when plants other than corn or oils from sources other than soybeans are used.” Is this plan is better for the world than the way most ethanol is being produced here in the United States? I was also interested in the effects the production of ethanol have had in Brazil.

Brazil produced nearly half of the world’s total production of ethanol in 2005 (von Braun). According to the IFPRI 2005-2006 annual report, Brazil undertook a major ethanol production program based on sugarcane in the mid-1970’s. Almost all sugar mills in Brazil can produce both ethanol and sugar. When sugar prices fall, Brazilian mills are able to shift to ethanol production. Brazil has made significant improvements in sugar cane production and ethanol processing between 1975 and 2000. So, as oil prices have risen, Brazil’s ethanol production costs have fallen. Many of the ethanol plants use bagasse (a residue from the sugar-manufacturing process) to supply most of the energy needs of the biofuel production itself. The government of Brazil has provided crucial support to get the ethanol industry off the ground. There were incentives for ethanol production and use to encourage consumers to make the switch. All of these things have made Brazil a country to watch as the use of biofuels increases around the world.

The success of ethanol production in Brazil does not tell the whole story. According to the Food and Agriculture Organization of the United Nations, 14.4 of Brazil's 176.3 million people are undernourished (8%). Nationally, 22% of Brazilians live in poverty, with over half (51.4%) of those living in rural areas. Brazil is second only to South Africa in the world ranking of income inequality (IFAD). There is a wide disparity between people living in an urban area and ones living in a rural part of the country.

Today in Brazil, the average family would live in an urban area with both parents working. The average income is \$3580 U.S. Dollars. With both parents working, it is not unusual to find domestic help in some homes (Au Pair in America).

Brazilians typically eat a variety of foods. Their diet was influenced by several different cultures, including the Portuguese through colonization, slaves from Africa, and European immigrants (Au Pair in America). A daily meal usually consists of beans, rice, vegetables, and beef or chicken. Breakfast is usually small, consisting of just milk, bread, and coffee (Au Pair in America). American influence is also prominent in Brazil. Franchises like McDonald's and Pizza Hut are located throughout the country. Brazilians, however, are becoming bored with this food and no longer eat it (Au Pair in America).

On weekends, especially Sundays, meals are often shared with the extended family. This can include aunts, uncles, cousins, and grandparents. Often these meals are served by the mother or the domestic help (Au Pair in America).

Brazil's educational structure resembles the one used in the United States. The education system is split into three basic levels (Au Pair in America). The first level includes nursery school, kindergarten, and elementary school. This includes all grades through eighth. Senior high school is the second level. Subjects are usually taught all year long as opposed to semesters. The final level is University (Au Pair in America). In order for students to enter university they have to pass a test called the Vestibular. This test is difficult. It tests all of the information that students have learned from past years.

The school year in Brazil goes from February through December. Often July, January, and parts of December and February are holidays. Students do not eat meals at school. They have their lunch after coming home from school. (Au Pair in America).

Life in the rural areas of Brazil is quite different than in the cities. Almost 80 per cent of rural Brazilians, about 30 million people, live in poverty. In many ways they are more disadvantaged than poor people who live in urban areas. Education and health facilities are more readily available to urban than to rural populations, and water supply and sewage systems are generally inadequate in rural areas (IFAD). Lack of access to formal education and skills training is another major cause of rural poverty (IFAD).

The majority of the 4 million farms in Brazil are very small, and most are dedicated to subsistence production (IFAD). Huge numbers of smallholder farmers and landless people work as day laborers in agriculture. In recent decades, farm mechanization, technological change and diversification in production have contributed to the loss of rural employment and have led to migration (IFAD). Ethanol production has helped to reverse this trend.

Sugarcane plantations create jobs in rural areas, most of them for unskilled workers. Moreover, around 30 percent of sugarcane production is in the hands of 60,000 independent producers, representing a major activity for small farmers (Moreira). Even with the increase of sugarcane production, food prices in Brazil have never been lower (Contini).

One of the main crops grown in Brazil is sugarcane, which has been used extensively over the past few years in the production of ethanol. Presently the use of ethanol as fuel by Brazilian cars – as pure ethanol and in gasohol- replaces gasoline at the rate of about 40% of the fuel that would be needed to run the fleet on gasoline alone (Wikipedia). Seventy percent of all cars sold in Brazil are “flex fuel, adapted to use gasoline, ethanol or any combination of the two (Contini). In 2007, a 21.9% increase in ethanol production is expected (Wikipedia). Growing sugar cane requires less fertilizer than corn does, which makes it more environmentally friendly.

Sugar/ethanol production does raise concerns about land use. Sugarcane production for ethanol competes with production of food and other export crops. The expansion of sugarcane plantations could indirectly lead to increased deforestation. This could happen if cattle ranches displaced from pastureland by sugarcane production are relocated to forest areas (Moreira). Yet the 5.5 million hectares cultivated with sugarcane represent only 8.6 percent of the total area harvested with essential crops. In addition, farmers are doing more rotating between sugarcane and food crops like tomatoes, soy, peanuts, beans, rice and maize. This approach has helped maintain the balance between energy and food and has improved land profitability (Moreira).

Another way the environment is protected is through government regulation. For example, the government has passed tough legislation and maintains strict norms requiring that 20 percent of agricultural land holdings in the Cerrados in central Brazil be left in natural vegetation (Contini).

”The really strong concept behind agricultural development in the Cerrados,” Contini says, “is continuity. This wasn’t just the pet project of a single administration but involved long-term commitment on the part of government – to facilitate small producers’ access to credit and inputs.” The key, Contini stresses, is to “offer long-term commitment to particular regions without creating dependency, so that local experts own the process.”

One project to promote rural development in the poorest areas of Brazil is the Castor Bean Oil Pilot Project. Castor oil has proved an excellent substance for producing bio-diesel, an alternative source of fuel that reduces air pollution and emission of greenhouse gases. There is huge potential for the development of castor bean production in arid and impoverished areas such as northeast Brazil. There are aspects of castor bean harvesting and processing that need to be perfected (IFAD).

As you can see from this example, there is potential for biofuel production to help small subsistence farms. There is also the danger of environmental damage due to deforestation and soil erosion.

According to Joachim von Braun, Director General of the International Food Policy Research Institute, a strategic framework for Biofuels is needed. The three pillars of pro-poor Biofuels strategy are: 1. Science and technology strategy 2. Markets and trade strategy 3. Insurance and social protection strategy. Von Braun lists the biggest risks for the poor as food price increase and instability and ill-considered policies.

One strategy in the area of science and technology is cellulosic ethanol. *Farm Futures* magazine’s September 2007 edition states that using biomass such as cellulose-producing miscanthus grass, could be the way to produce ethanol in the future. “Miscanthus makes about 1 ½ times more barrels of oil equivalent per acre than a 200-bushel corn crop would.” states Monticello Illinois farmer John Caveny. Although the technology is 7 to 10 years away, the outlook for this type of ethanol is strong. Cellulosic ethanol can be made with many types of feed stocks that are more efficient and more environmentally sound than current practices. This type of crop could be grown in Brazil also.

Another strategy in science and technology is to strengthen Brazil's scientific capacity. Scientists are encouraged to return to Brazil after receiving education abroad, instead of working in other countries. These scientists can work on ways to increase ethanol production in a safe way for the environment (Contini). Scientific research can be shared with other countries to benefit everyone.

A social protection strategy would be for the government to regulate the amount of acres of sugarcane that can be produced. This would ensure that the same amount of acres would be devoted to food production even if the price of sugarcane or ethanol would rise. If farmers are losing money producing food crops for Brazilians, the government could provide subsidies to encourage farmers to keep growing crops for food. More farmers could be encouraged to rotate food crops with sugarcane to put nutrients back into the soil. This would decrease the amount of fertilizer needed and bring sugarcane's cost of production down. This could ultimately lower the cost of ethanol and make it even more competitive in the world market.

Another strategy would be for the subsistence farmers to form cooperative partnerships that combine the lands of many farmers into larger fields. This could increase production by making the farming practices more efficient as farmers work together. Instead of one small food plot and other plots for production items that can be sold, larger plots of food and sugarcane could be grown. The cooperatives could buy seed and other supplies in larger quantities to receive volume discounts. Cooperative marketing would also give the group more options than small farmers trying to do it on their own. The larger volume of crops for sale would increase the farmers' ability to receive the most for their crops. This could also prevent larger farmers or investors from buying out the smaller farmer and creating plantation-like farms with low-paying jobs for the workers.

According to Joachim von Braun, the world food equation is changing. Biofuel expansion will accelerate the globalization of agriculture, increase crop prizes, raise land values, thereby drawing capital into rural areas, and create some jobs. The risks for the poor include food price increases and instability, and policies that could hurt the environment. Brazil is an example of a country that has made great strides in biofuel production. With attention to affects on the environment and its rural poor, the potential for growth in the biofuel industry for Brazil is beyond imagination.

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