Biofuels, International Food Prices, and the Poor

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On the relationship between the United States' renewable fuels policy and food prices

Introduction

World agriculture is at a turning point: economic growth, energy needs, and climate change redefine the equations of agricultural supply and demand and contribute to accelerate food prices. Biofuels have been particularly high on the global agenda largely due to rising concerns about national energy security, high energy prices, and global climate change, as well as the income expectations of farmers and other investors (von Braun and Pachauri 2006).

The International Grain Council reports an overall growth in the use of cereals by 32% in 2007/8 and an estimated 31% in the coming year, and by 41% and 32% in the USA respectively (see table 1). The USA has a share of about 80% in the total quantity. The total quantity used globally this year (95 Mill. Tons) is large, relative to total world trade of corn (100 Mill. Tons) and relative to total world corn production (777 Mill. Tons).

The rapid expansion of ethanol and biodiesel has increased dependency on natural vegetation and crops grown specifically for energy. Biofuel production has also introduced new food-security risks and new challenges for the poor, particularly when resource constraints have lead to trade-offs between food and biofuel production and rising food prices. For the further development and use of biofuels, it is necessary to carefully assess the impact of different technologies, products (ethanol, bio-diesel, bio-gas), and feed stocks (e.g. sugar cane, corn, oilseeds, palm oil, agricultural waste and biomass).

Table 1: Utilization of Cereals for Ethanol production (2004/05 - 2008/09)

	2004/05	2005/06	2006/07	2007/08[1)]	2008/09[2)]	2007/08:06/07 change in %	2008/09:07/08 change in %
	in Million Tons						
USA All	34,1	41,3	54,5	76,8	101,7	+ 40,9	+ 32,4
Corn	33,6	40,7	53,8	76,2	100,4	+ 41,6	+ 31,8
Sorghum	0,5	0,6	0,7	0,6	1,3	- 14,3	+ 116,7
EU-27	1,1	3,2	3,4	2,9	5,2	- 14,7	+ 79,3
Canada	0,5	0,7	1,5	1,8	2,5	+ 20,0	+ 38,9
China	6,5	9,5	11,0	11,5	12,0	+ 4,5	+ 4,3
Other countries	0,8	1,1	1,4	1,9	2,4	+ 35,7	+ 26,3
Total	43,0	55,8	71,8	94,9	123,8	+ 32,2	+ 30,5

1) estimate, 2) projection

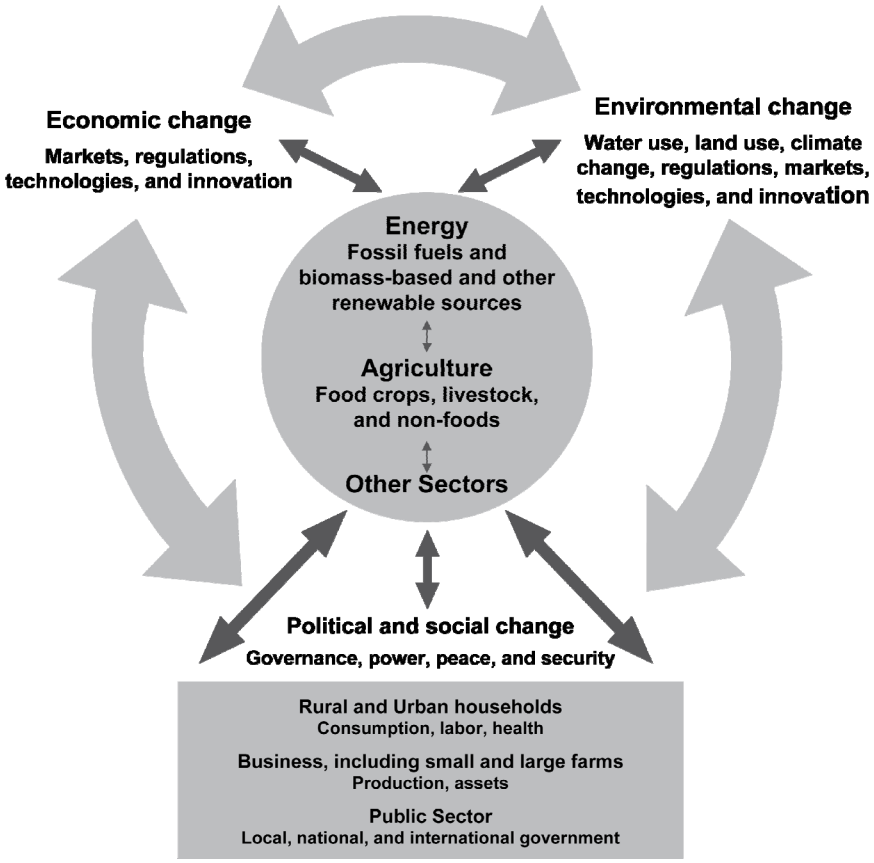
Source: International Grain Council, June 2008

Energy and agriculture in a broader conceptual framework

A comprehensive policy framework will be fundamental to developing biofuels in such a way that they contribute to energy security, climate change mitigation, and environmental sustainability, and at the same time they do not negatively affect food prices and the food security of the poor. The three main domains upon which biofuels have an impact—namely the political/social, the economic, and the environmental—interact when agriculture and energy become more closely linked through the production of biofuels (Figure 1). This interaction will lead to changes in the dynamics of agriculture as well as changes in the impact on households, businesses, and the private sector.

Participants in the biofuel discussion come from many sectors and include farmer representatives, the energy industry, global environmental movements, large capital funds, and science and technology lobbies. The extent to which biofuels remain on the agenda will depend on political pressures and security concerns. High levels of rent seeking as well as political lobbying are part of the picture, and their impact can be seen in the current subsidy and trade policies adopted by some countries. The implemented biofuel subsidies are regressive and anti-poor because low-income households lose much on the food consumption side if food prices rise, and gain little on the energy side if energy prices decline.

Figure 1. Energy-agriculture linkages within a broader conceptual framework



Source: Devised by author.

The quantities of biofuels required to meet energy needs vary between countries and depend on the choice of feedstock. For example, if 20 percent of the maize crop in the United States were to be used for ethanol production, it would meet only one-third of the country's 10-percent ethanol blending target. On the other hand, if 20 percent of the sorghum crop in India were to be replaced with sweet sorghum, it would be sufficient to meet India's entire 10-percent ethanol blending target (Winslow 2008). Less-known crops such as *Jatropha curcas* and sweet sorghum also represent an area of opportunity for using marginalized lands and reducing greenhouse gases.

Whether biofuel production is a viable and sustainable source of energy depends not only on the choice of feedstock, but also on cultivation practices, technologies employed, or the security, trade, and environmental policies that are adopted. Many countries have already established ambitious biofuel expansion plans and blending targets, and yet biofuel production remains

uncompetitive in many places of the world. Since second-generation biofuel technologies, which may lessen the food–fuel competition and the negative effects on the poor, are still a long way away, it makes sense for many countries to wait for the emergence of these technologies and "leapfrog" onto them later.

However, it is also important to recognize that technology may not necessarily overcome the food–fuel competition. The trade-offs between food and fuel may actually be accelerated when biofuels become more competitive relative to food with a further increased demand as a consequence. Therefore, it is not a question of either or: It is essential to simultaneously invest in energy **and** other agricultural technologies to soften the trade-offs. The Consultative Group on International Agricultural Research (CGIAR) can play a vital role in this process.

Biofuels and rising food prices

Feedstock makes up the principal share of total biofuel production costs. It accounts for 50–70 percent and 70–80 percent of overall costs for ethanol and biodiesel, respectively (IEA 2004). Net production costs, which refer to all costs related to production (including investments), differ widely across countries. For instance, Brazil produces ethanol at about half the cost of Australia and one-third the cost of Germany. However, feedstock costs have increased by 50 percent and more during the past few years, impinging on comparative advantage and competitiveness. While the biofuel sector will contribute to price changes, it will also be a victim of changes in feedstock prices.

The high price of energy is a key factor behind rising food prices. Energy and agricultural prices have become increasingly intertwined. With oil prices at an all-time high and the U.S. government subsidizing farmers to grow crops for energy, U.S. farmers have massively shifted their cultivation toward biofuel feedstocks, especially corn (see Table 1), often at the expense of soybean and wheat cultivation.

An IFPRI study by Mark Rosegrant (2008) did a comparison between a simulation of actual demand for food crops as biofuel feedstock through 2007 and a scenario simulating biofuel growth at the rate of 1990-2000 before the rapid takeoff in demand for bioethanol. This

approximates the contribution of biofuel demand to increases in grain prices from 2000 to 2007. The percentage contribution of biofuel demand to price increases during that period is the difference between 2007 prices in the two scenarios, divided by the increase in prices in the baseline from 2000 to 2007. The increased biofuel demand during the period, compared with previous historical rates of growth, is estimated to have accounted for 30 percent of the increase in weighted average grain prices. The biggest impact was on maize prices, for which increased biofuel demand is estimated to account for 39 percent of the increase in real prices. Increased biofuel demand is estimated to account for 21 percent of the increase in rice prices and 22 percent of the rise in wheat prices (Rosegrant 2008).

Scenario analyses undertaken with IFPRI's International Model for Policy Analysis of Agricultural Commodities and Trade (IMPACT have examined the effects of biofuels on food prices as they may occur in the future. The developed scenarios include:

Scenario 1 — based on the actual biofuel plans of countries and biofuel expansion for identified high-potential countries. Under this scenario prices increase ceteris paribus by 18 percent for oilseeds and 26 percent for corn by 2020.

Scenario 2 — based on a more drastic expansion of biofuels, assuming a doubling of the production expansion rate over Scenario 1 levels. Under this drastic biofuel expansion scenario (Scenario 2), the price of corn rises by 72 percent and of oilseeds by 44 percent.

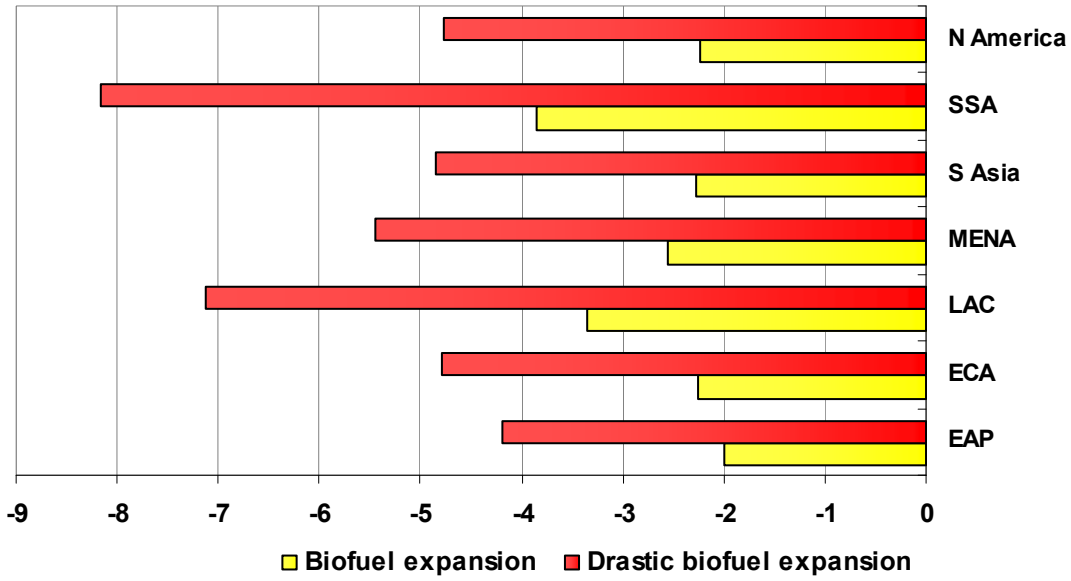
Would the poor go even hungrier with more biofuel production?

Poor people are impacted by biofuels as consumers in food and energy markets, producers of agricultural commodities in small businesses, and workers in labor markets. The increase in agricultural demand and the resulting increase in agricultural prices will affect poor people in different ways. Some poor farmers could gain from this price increase. However, net buyers of food, which represent the majority of poor people, would respond to high food prices with reduced consumption and changed patterns of demand, leading to calorie and nutrition deficiencies.

Under the two IMPACT scenarios, the increase in crop prices resulting from expanded biofuel production is also accompanied by a net decrease in availability and access to food. Calorie

consumption is estimated to decrease across regions under all scenarios compared to baseline levels (Figure 2). Food-calorie consumption will fall the most in Sub-Saharan Africa, where calorie consumption is projected to decrease by more than 8 percent if biofuels expand drastically.

Figure 2. Calorie availability changes in 2020 compared to baseline (%)



Source: IFPRI IMPACT Model projections.

As a result of rising food prices, cuts will likely be made to food expenditures, exacerbating diet quality and micronutrient malnutrition. A study of the effects in an East Asian setting suggests that a 50-percent increase in the price of food, holding income constant, will lead to the decline of iron intake by 30 percent. As a result, the prevalence of micronutrient deficiency among women and children will increase by 25 percent (Bouis 2008). Studies also show that current malnutrition of mothers and children has long lasting effects (Lancet 2008) and will show in deteriorated health and income decades later.

Implications for policy

A comprehensive policy framework will be fundamental to developing biofuels in such a way that they contribute to energy security, are environmentally sustainable and that complementary policies protect the pro-poor as long as grain based biofuels contribute to high food prices. Such a framework requires a strategic approach with three pillars:

1. *Science and technology policy* , which calls for accelerated agricultural productivity to maintain and improve food security, accompanied by an expanded focus on agricultural and biofuel technologies and close coordination with biofuel users—for example, the automobile industry.

2. *Markets and trade policy* , which calls for building a global system for biofuel markets and trade that is undistorted and operates with low transaction costs. Transparent standards are needed, including sustainability and performance-based standards rather than technology-based standards that will quickly become outdated.

3. *An insurance and social-protection policy for the food-insecure poor,* which is a necessity given existing large-scale food and nutrition insecurity and the growing number of changes in the food system which are partly driven by the expansion of biofuels. Such protection could include employment programs, school feeding and food for schooling programs, conditional and unconditional cash transfer programs, and social security systems for the poorest.

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