
James Oatway/Panos/ActionAid

FUELING THE FOOD CRISIS:

The Cost to Developing Countries of US Corn Ethanol Expansion

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COVER PHOTO: Jacquilina Manhique on the land she says was taken from her by a biofuels company, Mozambique.

EXECUTIVE SUMMARY

The US Farm Belt is currently experiencing the worst drought it has seen in 50 years, devastating crops and raising corn prices to record levels. The ongoing spillover effect of this price spike is just the latest episode in a devastating, protracted global food crisis that has pushed millions into poverty and hunger around the globe over the past 6 years. It is clear that the promotion of biofuels by the US, the EU and other countries has played a major role in creating the food crisis. Without decisive action on the part of these global actors to eliminate mandates and incentives that encourage the unsustainable production of industrial biofuels, the crisis will continue with no end in sight.

The extended and widespread US drought is straining corn supplies at a time of record demand. Roughly 40% of US corn is now consumed in the production of ethanol, a practice that has been encouraged by a range of US government mandates and incentives. There is no doubt that the diversion of what amounts to 15% of world corn supply into fuel has put significant upward pressure on food prices. The National Academy of Sciences estimates that global biofuels expansion accounted for 20 – 40% of the price increases seen in 2007-8, when prices of many food crops doubled.

In a previous report, "Biofueling Hunger: How US Corn Ethanol Policy Drives Up Food Prices in Mexico," ActionAid expanded on recent research that estimated the additional import costs to Mexico, in the form of higher corn prices due to US ethanol expansion, at $1.5 billion since 2004. In this report, we build on new work by the same Tufts University researchers to estimate the costs to import-dependent developing countries in other parts of the world.

Using conservative estimates of ethanol and corn prices, Tufts researchers estimate that from trade year 2005-6 until 2010-11, US ethanol expansion cost net corn importing countries $11.6 billion in higher corn prices, with more than half that cost, $6.6 billion, borne by developing countries.

Developing countries that import the majority of their food are particularly vulnerable to the food crisis. Many of these countries have only become heavily dependent on outside sources of basic food over the past 25 years. These Net Food Importing Developing Countries (NFIDC) saw ethanol-related costs of $2.1 billion over six years. Central America experienced impacts nearly as dramatic as Mexico's on a per capita basis, with $368 million in higher corn import costs. Guatemala alone absorbed $91 million in ethanol-related costs, in part because its import dependence grew from 9% in the early 1990s to nearly 40% today.

Given the role of rising food prices in fueling social-unrest in North Africa, researchers also examined the ethanol-related import costs to that region. The total cost came to $1.4 billion over the 6-year span, with the strongest impacts falling when unrest became widespread in 2009-10. Scaled to population, each country saw losses comparable to or greater than Mexico, where skyrocketing tortilla prices drove tens of thousands of people into the streets as over half the population suffered food insecurity and 5 million children went hungry.

Africa as a continent spent $1.6 billion more in import costs due to the rise of corn ethanol in the US Countries in Sub-Saharan Africa are often especially hard hit by global food price spikes since most countries in the region are net food importers and cannot afford to protect their populations from the impact of high global prices on local markets. Many countries in Africa produce corn and some, like Uganda, are even small net corn exporters. While

Karina Rivera/ActionAid

Francisco Najera Perez, and family in Las Flores, Guatemala suffered from the food crisis in Guatemal in 2008. They are beneficiaries of ActionAid food assistance.

Andre Telles/ActionAid

Elisabete Maria da Silva in a supermarket in Sao Joao de Meriti, Rio de Janeiro, Brazil. She used to spend R$100 (or US$59) per month to buy food. Today, rising food prices means R$100 is only enough for 15 days.

Uganda saw a net gain in its trade balance as a result of rising corn prices, the majority of its people are still net buyers of corn. Because of this, poor urban consumers were hurt by price spikes in local markets, despite the positive overall impact on Uganda's economy.

This report concludes that biofuels expansion, by diverting food and feed crops into fuel production while placing extra demands on land, is one of the driving forces behind the high food prices that drain resources from developing countries. In the context of the ongoing US drought, the expansion of US corn ethanol has had a particularly strong impact by creating a competing demand for corn as the market experiences a supply shock. Although two of the main policy instruments that helped launch the industry – the blending subsidy and the protective tariff – have been suspended, consumption mandates, through the Renewable Fuel Standard (RFS) and the gasoline blending mandate, remain in force. By leaving these mandates in place, the US government is effectively canceling out the value of US food and agricultural assistance to developing countries and undermining US aid goals.

Livestock producers, food processors, environmental organizations, unions and many others have called on the US Environmental Protection Agency (EPA) to waive the RFS while corn supplies are strained. While ActionAid USA supports these calls for a waiver, we believe that a more comprehensive, longer-term approach is needed to alleviate the food crisis. In order to mitigate the impact of biofuels policies on food prices, calm food price volatility and create a better balance between food and energy policies, the US should:

- Remove volume or blending targets of food-based fuels or fuels that require vast tracts of land for production
- Put plans to expand the amount of ethanol blended into gasoline on hold
- Explore the development of farmer-owned reserves to ensure adequate stock to meet demand

The Group of 20 (G20) member states hold a special responsibility to take coordinated action on issues of food security. ActionAid calls on G20 leaders to:

- Urge member countries to eliminate targets, mandates, and financial incentives that encourage unsustainable industrial biofuels production
- Urge member countries and donors to invest in local small-scale producers to decrease import-dependency and enhance food security
- Support the development of regional, transparently governed, public buffer stocks of corn, procured from local producers to stabilize corn prices in times of volatility

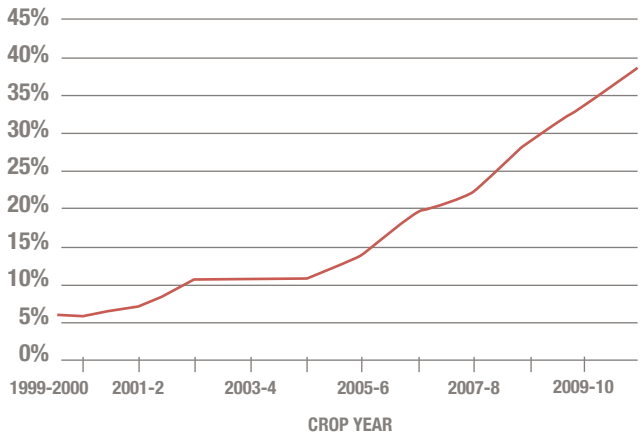
INTRODUCTION: ETHANOL, BIOFUELS & FOOD PRICES

In the wake of the dramatic growth in US ethanol production, stimulated by high oil prices, government subsidies, tariff protection, and a government mandate for biofuel use, nearly 10% of US gasoline sales are now accounted for by ethanol. There is broad consensus that US ethanol expansion, by accelerating the consumption of corn feedstocks and intensifying competition for land, has been an important contributor to global food price increases.

Growth in the amount of US corn used to produce ethanol has accelerated dramatically over the last 12 years. At 13.7 billion gallons, US ethanol production today is nearly nine times what it was in 2000, while the share of US corn going to ethanol has risen from 5% to 40% (see Figure 1).

FIGURE 1

Ethanol Share of US Corn Production



SOURCE: US Department of Agriculture, ERS, Feed Grains.

Ethanol expansion has been encouraged by several government policies: a tax credit, a protective tariff, and a consumption mandate. The US Congress discontinued the tax credit and the tariff in 2011, but the consumption mandate remains a significant driver of ethanol demand, corn demand, and corn prices. The Renewable Fuel Standard (RFS) was established in 2005 and expanded six-fold in 2007. The 2007 RFS requires the consumption of an increasing amount of biofuels each year, culminating in 2022 with a 36 billion gallon mandate, at least 15 billion gallons of which can be produced from cornstarch. The remainder is supposed to be met by so-called "advanced" biofuels, including 16 billion gallons of cellulosic biofuels, but as that industry has been slow to develop, it seems unlikely the United States will be able to fill that part of the mandate by 2022.

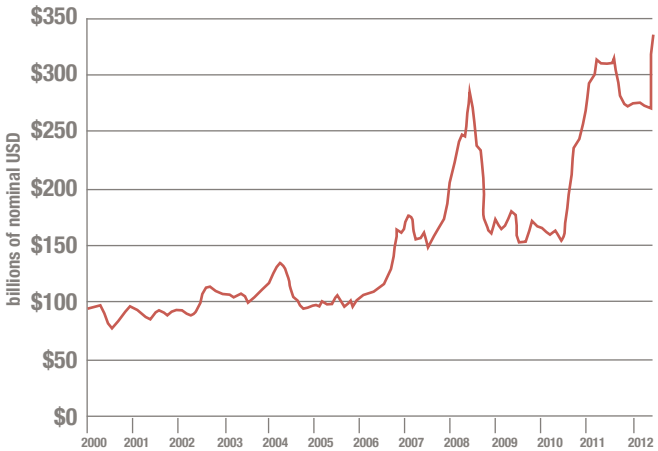
A related consumption mandate is the "blend wall," which determines how much ethanol can legally be blended into a gallon of gasoline. At present, the limit is 10% (known as E-10), but the US Environmental Protection Agency (EPA) has approved a petition to increase it to 15% (E-15). The agency has begun to register producers, making it possible that E-15 could soon be on the market in some areas. Because E-15 is not compatible with all engines, it remains unclear how much this increase will boost ethanol demand.

The RFS and blending mandate maintain a floor beneath ethanol demand, and in the current environment of drought and short domestic corn supplies many are calling for the EPA to temporarily waive the RFS mandates. There is active debate over the extent of the short-term impact this would have on corn prices. While government policies were critical to the rapid expansion of corn ethanol in the United States, high oil prices have since made ethanol a competitive gasoline oxygenator. Depending on whether the EPA allows additional corn-based fuels to be substituted for yet-to-be-developed advanced biofuels under the RFS mandate, the RFS may well stimulate continued corn ethanol expansion. Additional moves toward a 15% blending wall certainly would.

Partly in response to the expanded 2007 mandate, the growth of corn ethanol has been dramatic over the last six years. This growth coincided with the global food price crisis, which saw agricultural commodity prices at record highs in 2007-8, further spikes in 2010-11, and new records in 2012 (see Figure 2). With the US drought still unfolding, corn price increases are expected to continue into the fall.

FIGURE 2

International Maize Prices (2000-2012)



SOURCE: Global Maize Prices from http://www.indexmundi.com; tick marks are for January of each year, through July 2012.

BIOFUELS' CONTRIBUTION TO RISING PRICES

The debate over the effect of biofuels on food prices has intensified in the context of the food crisis, and the diversion of a large and increasing share of US corn to ethanol production has drawn particular attention. Deservedly so, since corn is one of the key staple food crops in the world and the primary source of calories and nutrients for nearly 1 billion people worldwide. Corn is also one of the most widely used feed crops for animals, so its availability and price have direct impacts on the price of dairy products, eggs, and meat. The United States is at once the world's largest producer and exporter of corn, so changes in US corn supply and use quickly affect prices worldwide.

The upward pressure of biofuels expansion on agricultural commodity prices occurs on a number of related levels:

- The direct impact as food and feed crops are diverted for use as fuel, as with corn for ethanol.
- The scarcities and higher prices that result from the diversion of land from other crops into the higher-priced biofuel crop. For example, when a large amount of land is converted from growing soybeans to corn due to high corn prices,which in turn pushes up soybean prices.
- The increase in prices for food crops that serve as dietary substitutes for high priced biofuel crops. For example, as when demand for wheat increases as corn prices increase, leading to a decline in the use of corn as food or feed and an increase in the use of wheat.
- The rise in the value of agricultural land. Biofuel expansion increases land values, creating both practical and speculative incentives to buy land. The recent wave of "land grabs" in developing countries by resource-poor governments and international financial investors is the most worrisome expression of this trend.
- The decline in inventories of key food staples due to increased demand from biofuels, such that global markets (and prices) are more vulnerable to both sudden drops in supply or increases in demand. For example, weather-related crop failures are on the rise and are expected to increase in frequency and severity with climate change, leading to supply shocks (and concurrent price increases) that will be amplified throughout the markets if inventories remain low.
- The rise in speculative buying and selling in agricultural commodities markets. Large amounts of investment money flowed into commodities markets, after the 2007 financial crisis made other types of investments more risky. Low inventories, partly due to biofuels, make such speculation more profitable for financial investors who gain from short-term price movements. This contributes to price volatility (see Box A for more on the food vs. fuel debate).

While there is widespread agreement that biofuels expansion worldwide is a major contributor to increases in agricultural commodity prices, through the direct diversion of food and feed crops to fuel uses and through competition for land to grow energy-related crops, there is less agreement on what share of food price increases should be attributed to biofuels expansion as opposed to other contributing factors.

Most estimates are in line with those summarized in a recent report from the National Academy of Sciences. Researchers synthesized the conclusions of eleven studies that examined the 2007-8 food price spikes, finding that between 20% and 40% of the increase in commodity prices was attributable to biofuels expansion internationally.[1] This conclusion is consistent with the majority of studies in the field, including studies that incorporate data from the last three years[2] (See Box B).

Complex systems scientists from the New England Complex Systems Institute recently employed a very different methodology to estimate the impacts of both ethanol expansion and financial speculation on corn prices. Drawing on a previously published model that quantifies the contribution of those two factors to overall food price movement in the last six years,[3] researchers scaled the model to corn price movements and the impact on importing countries' costs They estimate that US ethanol expansion raised prices and import costs 27% for the entire period, consistent with the range of estimates in the literature. Financial speculation added another 13%, with the largest share coming in 2007-8 when, according to their modeling, financial speculation alone increased prices and import costs by 80%.[16]

BOX A: Food vs. Fuel — The Basics

Due to a cocktail of incentives, the US currently uses almost 40% of its total corn crop to manufacture ethanol. Each year, farmers plant more corn, striving to keep up with the growing demand for US corn for food, animal feed, and for fuel. However, each year weather shocks in the form of drought, flood, or tornado have depressed some portion of the anticipated yield. The demand for corn has been outpacing corn production, eating away at corn stocks. As the ratio of corn stocks to corn use decreases, the market becomes more vulnerable to bad weather. Mandates for biofuels distort the market – keeping demand for fuel crops high come drought, flood, or tornado.

Around the world, climate change has meant rising temperatures, floods, and harsh storms, making it harder for farmers in developing countries to predict the weather and grow food. In light of the threat climate change poses to food supply, it is essential to equip smallholder farmers in developing nations with the tools and resources they need to shield themselves from disaster. We should energetically pursue and publicly fund innovative climate adaptation and mitigation strategies.

Greater demand for land to feed growing populations, combined with the shrinking availability of arable land, pushes prices up. Increased speculation in the commodities market has exacerbated the problem and made food prices more volatile. What might normally be a price rise turns into a price spike, declining prices suddenly tank. While high prices can benefit some producers, price volatility is hard on farmers everywhere.

A sustainable future depends on our ability to balance the growing demands for energy and fuel with access to food, water, and a healthy environment. When demands for energy and fuel are not in harmony with basic human needs, it presents a serious risk to our global health, economy, security, and livelihoods.

Instead of turning food into fuel, we should feed people, protect the planet, and lower our carbon footprint by getting oil out of our food. Globally, we should invest in small-scale producers, especially women, who are practicing climate resilient sustainable agriculture that requires few, if any, oil-based inputs. Investing in local food systems reduces the need for transportation fuel. Instead of converting land from food to fuel crops we should lower our energy consumption and pursue renewable wind and solar energy.

As climate change impacts where and how we grow our food, shrinking available land for agriculture, the demand for land to meet food, feed and fuel needs is growing. More people are eating meat, increasing the demand for animal feed and for grazing land. A growing global population means greater demand for food and energy.

The process of converting food crops into fuel crops creates competition for land resources. Countries and companies have begun to compete for land and water, leading to a growing number of large-scale land acquisitions. In Africa, over 60% of the land grabs over the last ten years were for biofuels.

Sustainable biofuel production where farmers co-cultivate food and fuel crops can eliminate competition for precious land and water resources. However, turning protected ecosystems or vast tracts of land from food production into industrial fuel production undermines food security and escalates climate change.

Mandates that promote using food for fuel, even when supply is tight will inevitably push up prices. In the immediate term policy makers should remove the mandate for food-based fuel, or at minimum make the mandate more flexible so that it is waived in times of short supply.

Questions & Answers

How can ethanol demand drive up the price of the corn we eat? It is feed corn, not food corn that is used to make biofuels.

The food and fuel debate is less about whether we can eat the feedstock and more about where we grow it. We may not eat feed corn, but it is the foundation of many of the foods we find in our grocery store. Converting animal feed to fuel impacts animal agriculture and contributes to rising meat, dairy, and egg prices. Moreover, it is the conversion of land that could be used to grow food crops into land for fuel crops that ultimately underpins the food and fuel competition.

30% of corn used for ethanol comes back in the form of a high-protein bi-product that can be used in feed. Doesn't that alleviate the impact of ethanol on animal agriculture?

The process of making ethanol produces a bi-product, dried distillers grains with solubles (DDGS), which can be used as a feed source. DDGS help mitigate the competition between feed and fuel, but producers (and their animals) prefer corn. Depending on the animal, there is a limit to the amount of DDGS that can be used without impairing the production process as well as the quality of the end product. In addition, since the process of producing ethanol requires the use of antibiotics, and animal producers also use antibiotics in feed, it is difficult to assess how much additional antibiotics are transferred through DDGS to the final meat product. Because the Food and Drug Administration (FDA) doesn't monitor the use of antibiotics in ethanol production or in DDGS, many farmers are concerned about their inability to assess how much ends up in the feed for their animals.

In the US, commodity prices are only 14% of retail prices. The rest is made up of processing, packaging, transport, and other expenses. Shouldn't the impact of ethanol policy on food prices be fairly minimal?

Commodity prices are a small percentage of the retail price of food in the US because we heavily process our food and transport it over long distances. In developing countries, commodity prices are a bigger percentage of the retail price, in part because people buy whole foods more often than processed foods. Because there are less processing and packaging costs involved, even small increases in commodity prices can have a big impact on local market prices in developing countries.

But aren't the majority of US corn exports to the developing world feed-grade rather than food-grade corn?

As was demonstrated by the 2008 crisis, and again in 2012, when the cost of feed corn imports rises, animal agriculturalists substitute food corn or wheat for feed, pushing up prices for both in local markets. In Mexico it was this practice that caused the tortilla prices to rise 69% from 2005–11.

Don't high corn prices benefit farmers in the Global South?

While some Global South farmers do benefit when grain prices rise, they are usually the bigger, wealthier landholders. It is more difficult for smallholder farmers to access global value chains to get the best prices for their goods. Instead, while Global South smallholders are able to sell grains for a higher price in the local market, their gain is often offset by higher meat, dairy, and egg prices, leaving only a minor benefit. Moreover, price volatility linked to increasing biofuels production has discouraged farmers in the Global South from expanding their production for fear that prices will drop dramatically. On balance, the majority of people in the developing world have been hurt by high and volatile grain prices. In 2010, when the World Bank assessed the impact of high and volatile prices over a period of six months they found that, even accounting for those whose income rose due to high prices, there was a 44 million net increase in the number of people living in extreme poverty.

BOX B: Literature Review

As the 2008 global food crisis unfolded, a plethora of studies identified biofuel and US ethanol policy as a major contributor to food price spikes.

A study by the National Academy of Sciences (NAS) estimated that biofuels expansion accounted for 20 – 40% of the price increases in agricultural commodities since 2007.[4]

Beginning in 2008, a series of studies from researchers at Purdue University pointed to high corn price impacts due to US ethanol policies and the expansion of ethanol production. According to the Purdue studies, US ethanol policy was responsible for roughly 1/4 of the large corn price increases experienced in 2008 and has continued to have a significant impact since.[5] A 2009 discussion paper by the Federal Reserve Board also attributed more than 22 percentage points of the 2006-8 corn price increases to US biofuels expansion.[6]

Bruce Babcock's "backcasting" model examined what agricultural and food prices would have been had ethanol production not expanded from 2005-9. Babcock estimated that US corn prices would have been significantly lower if ethanol production had not expanded, with the price impacts of ethanol expansion growing from 2.5% in 2005-6 to 20.9% by 2009-10.[7]

Finally, a 2008 study by the International Food Policy Research Institute (IFPRI) identified biofuels as one of the major forces contributing to the surge in food commodity prices. Increased biofuel demand in 2000-7 was estimated to have contributed 30% of the overall increase in cereal prices, and IFPRI projected that real prices of maize and oilseeds would be 26% and 18% higher in 2020 compared with a scenario that kept biofuel production at 2007 levels.[8] Three years later, a similar IFPRI study confirmed that the diversion of crops to biofuel production provided a significant amount of upward pressure on food prices.[9]

It is worth pointing out that the Purdue and Federal Reserve Board studies as well as IFPRI and Babcock's estimates are probably on the low end of the NAS's 20-40% range because none of these studies takes full account of the extent to which financial speculation, triggered by declining inventories and reserves, contributed to price spikes.

The Organization for Economic Cooperation and Development (OECD) also examined the impact of biofuels production and policy on the 2008 food crisis. The resulting study estimated that if biofuel production remained at 2007 levels, rather than doubling over the next decade as projected, prices for coarse grains (primarily corn) would be 12% lower in 2017. The OECD encouraged initiatives to reduce energy demand and greenhouse gas (GHG) emissions, the removal of biofuels subsidies, mandates and tariffs, and accelerated development of "second generation" biofuels that do not rely on current commodity feed stocks.[10]

As prices reached record highs once more in 2010-11, a raft of new studies again singled out biofuels as a key source of food price volatility. While continuing to attribute a significant percentage of price increases to biofuels, many of these studies made the case that expanded demands on the corn crop were straining international supply and distorting the market.

In the midst of this second food price spike in four years, G20 leaders commissioned a study of food price volatility from 10 international organizations (FAO, IFAD, IMF, OECD, UNCTAD, WFP, the World Bank, the WTO, IFPRI, and the UN HLTF).[11] The end product found that biofuels mandates are a leading driver of food price volatility because food stock demand induced by biofuels mandates is inelastic with respect to price. Moreover, the study pointed out, the speed with which mandates have been implemented over the past 10 years may have contributed to the depletion of reserves, weakening the resilience of the markets to external shocks. Due to these effects, the study concluded, biofuels mandates should be abolished. Unfortunately, the G20 chose to ignore its own report.[12]

BOX B: Literature Review conrtinued

Shortly thereafter, the OECD-FAO Agricultural Outlook Report devoted considerable attention to biofuels expansion, projecting continued growth in production and demand, with continuing impacts on food prices. The agencies noted that price trends are particularly sensitive to biofuels policies in developed countries.[13]

Finally, complex systems scientists from the New England Complex Systems Institute conducted a study to identify the root causes of the food crisis. After examining a number of possibilities, including adverse weather, currency exchange rates, rising oil prices, and increasing meat consumption, the scientists published a quantitative model demonstrating that the only dominant causes of food price increases from 2004-11 were investor speculation and government support for ethanol production.[14] A year later, they used this model to assess the impact of biofuels on corn price movements and the impact on importing countries' costs, estimating that US ethanol expansion raised prices and import costs 27% for the entire period.[15]

Kavungu Kazua sifts through groundnut shells for remaining seeds in Korania, Ghana.

Jane Hahn/Panos Pictures/ActionAid

ActionAid

Gelajo Jallow, 52, Mali-Kunda, Central River Region, The Gambia.

James Oatway/Panos/ActionAid

Elisa Mongue, a single mother, had her farm land taken by a biofuel company. She survives by making and selling reed mats.

Biofuels are projected to continue expanding globally, so price impacts are likely to persist. In 2008, the Organization for Economic Cooperation and Development (OECD) estimated that if biofuel production remained at 2007 levels, rather than doubling over the next decade as projected, prices for coarse grains (primarily corn) would be 12% lower in 2017.[17] The International Food Policy Research Institute (IFPRI) estimated earlier this year that global biofuels expansion would boost the export price of corn by17.7% in 2020.[18] This year's OECD-FAO Agricultural Outlook Report devotes considerable attention to biofuels expansion, projecting continued growth in production and demand, with continuing impacts on prices. The agencies note that trends are particularly sensitive to oil prices and to biofuels policies in developed countries.[19]

Drought Deepens the Debate

At the writing of this report, the US is in the midst of a devastating drought that has destroyed 28% of corn and 16% of soy crops.[20] The international price of corn broke record highs and soy and wheat prices soared as well, sparking fears of another global food crisis and reviving the "food versus fuel" debate.

The drought provides an excellent illustration of how the rise of US corn ethanol impacts global food prices. The US is historically the world's largest producer and exporter of corn. When the 2012 drought hit, the hot, dry weather withered not only the corn and soy crop but also optimistic projections of the biggest corn crop in US history.

American farmers had planted more corn than ever before, with the expectation that the US would finally be able to meet the demand for food, feed, and fuel both domestically and internationally. Instead, the drought claimed over 1/4 of the US corn crop, bringing the projected yield down to 122.8 bushels per acre, the lowest since 1995, over half of which was rated by the National Agricultural Statistics Service (NASS) as poor or very poor.[21] The diminished 2012 corn crop could have met food and feed needs in the US and on international markets. However, since the US had planned to harvest as much as 5 billion bushels for ethanol as well, a fierce competition for the surviving corn erupted and corn prices spiked,with high US prices translating almost immediately to high global prices.

Corn ethanol is made from feed corn, so the first line of competition is between livestock producers and ethanol. In the face of competition for corn during the drought, livestock producers looked for lower-cost sources of feed. Petitions were filed to use protected lands to graze, some shifted to sorghum, and others fed their cattle virtually anything they could get their hands on at an affordable price, including gummy worms, marshmallows, fruit loops, orange peels, and ice cream sprinkles.[22] Internationally, importers of US corn for feed switched to importing wheat, pushing wheat prices up and broadening the impact of the drought internationally. Producers who couldn't afford

Chris Coxon, ActionAid

Gertrude Kadzo, a 37 year-old farmer, was told jatropha trees for biofuels would be more profitable than the pineapples that she had been growing. She has failed to sell any of the jatropha that she has grown because there is no local market.

Atul Loke/Panos Pictures/ActionAid

Some of the land at a tea estate where Sabha Topno, 40, works was dug up four or five years ago and replaced with jatropha for biofuels as an experiment—now she is worried about losing her job.

corn or alternate feed for their animals began to slaughter their stock.

As global prices spiked, the threat of a food crisis loomed, alongside concern over the transmission of high global prices of corn, soy and wheat to local markets. In the US, our diets are riddled with corn. Not only is corn the foundation of our meat, dairy and eggs, but high-fructose corn syrup is found in most of our processed foods. Food price increases in the US are expected to range from 3-4%, a slight increase above average annual food price inflation.[23] While modest, the cumulative impact of this price increase will surely affect people living in poverty, those on fixed incomes, and the unemployed, as well as the one in six Americans who are already going hungry.

While the price impact of high commodity prices on US consumers is mitigated by the fact that processing and transport make up the majority of our food costs, this is not the case in developing countries. Where the average US consumer spends 10% of their income on food, in developing countries food accounts for between 50-80% of the average budget. Moreover, unprocessed food makes up a far greater part of developing country food budgets, resulting in a greater transference from global commodity markets to generalized food price inflation.

The 2012 drought is an extreme illustration of the impact of corn ethanol expansion on food prices, but the food versus fuel dynamic has been playing out on a less dramatic scale for the past several years. Each year, farmers planted more corn, striving to keep up with growing demand for US corn for food, animal feed, and fuel. Each year, weather shocks in the form of drought, flood or tornado have depressed some portion of the anticipated yield. Each year, the demand for corn has outpaced corn production, eating away at corn stocks. As ratio of corn stocks to corn use shrinks, the market becomes more vulnerable to bad weather. It is this erosion of corn stocks that made food prices so vulnerable to the impact of the 2012 drought.

The drought has spurred policy makers to re-assess biofuels policies that promote competition for limited land resources between food and fuel. The EU Commission has drafted a proposal to cap biofuels made from food crops to 5% by 2020 in order to limit the impact of biofuels on food prices. In the US, petitions to waive the Renewable Fuel Standard have sprung up from various sectors. (The challenges and implications of a waiver are detailed in Box C).

BOX C: Growing Pressure to Wave the Renewable Fuels Standard

In the midst of the worst US drought in 50 years and a 28% reduction in the US corn crop, widespread pressure began to build on the Environmental Protection Agency to waive the Renewable Fuels Standard. As one of the hardest hit sectors, livestock producers were the first to formally request that the Environmental Protection Agency waive the mandate. Numerous US politicians joined the call, including 25 Senators and 156 Representatives, all of whom filed formal letters with the EPA requesting a waiver. Governors of six states also filed petitions, claiming that the Renewable Fuels Standard (RFS) was causing extreme economic harm in their state.

As of the writing of this report, the EPA has not ruled on these petitions. The fact that a quarter of the Senate and nearly a third of the House of Representatives are petitioning for the EPA to waive the ethanol mandate demonstrates the breadth of concern about burning US corn for fuel instead of freeing it up for food or feed. If the EPA denies the waiver request it could spur Congress to take action to change or repeal the Renewable Fuels Standard in 2013.

This isn't the first time that the EPA has been asked to waive biofuels consumption mandates. During the commodity price spikes of 2008, Texas Governor Rick Perry petitioned the EPA to cut the mandate in half. The EPA refused, making it clear that future petitions would have to prove that the **RFS itself** was causing **"severe economic harm"** and **not just contributing** to any such condition. The EPA was slow to come to this decision and even pushed back its own decision deadline, meaning that by the time they released their final conclusion the crisis had passed.

This 2008 decision sets a high bar for the 2012 petitions to meet. Given that the drought is the primary reason for this year's tight corn stocks, it will be easy for the EPA to argue (correctly) that the RFS is just a contributing factor to the economic harm caused by the drought. Of course, this justification obscures the extent to which the RFS is exacerbating tight food stocks by continuing to mandate the production of corn ethanol, using up to 40% of the US corn crop.

Ethanol proponents and some agricultural economists have argued that even if the EPA or Congress were to waive some or all of the RFS corn ethanol mandates, it would only result in a small reduction in the price of corn this year due to a variety of factors. For many of the reasons described below, economist Bruce Babcock estimates that, in the short term, waiving the RFS entirely would only result in a 4.6% (roughly $0.28/bushel) reduction in today's corn prices:[24]

- In 2011 the US was a net exporter of corn ethanol. The excess production of corn ethanol (beyond mandated levels) meant that refiners and blenders were able to accrue excess credit for buying more ethanol. There are an estimated 2.4 billion gallons of available ethanol, which reduces the additional amount required by the mandate this year to 11.2 billion gallons.
- There is supposed to be a Renewable Identification Number (RIN) for every gallon of renewable fuel produced, but the RINs are then "stripped" from the actual fuel and can be bought, sold, and traded on the open market. A RIN scandal, in which companies were found to be selling RINs that were never attached to an actual gallon of fuel, has put a great deal of uncertainty in RIN calculations. Refiners, blending companies, and other "obligated parties" can get credit for meeting the RFS by using up RINs even if they are not using the actual fuel. Companies are also allowed to carry over a 10% deficit of RINs. This translates to 1.32 billion gallons of ethanol, reducing the effective mandate for this year to just under 10 billion gallons.
- In past years, the US has produced surplus ethanol for export. High oil prices made ethanol competitive, even without US mandates. In this context, obligated parties

used the actual ethanol fuel and stockpiled the RINs. Because RINs have expiration dates, companies cashed out RINs that were close to expiration and hoarded those that were not close to expiration to be used at a time when the actual ethanol fuel is more expensive.

- Refiners and blenders have become accustomed to using corn ethanol to oxygenate gasoline, and it is unclear how flexible they are about using an alternate product for oxygenation. The more flexible companies are about using ethanol alternatives as oxygenators, the more impact the waiver would have.

Other analysts argue that a waiver could still significantly impact corn prices in the short-term. Using a different model than Babcock, an August 2012 study by the Farm Foundation and a group of economists from Purdue University found that, assuming at least some short-term flexibility on the part of refiners and blenders to utilize ethanol alternatives,[25] a waiver could reduce corn prices by between $0.47 - $1.30/ bushel below current prices.[26] The degree to which a waiver could impact prices depends on a variety of factors including: the ultimate percentage of the corn crop destroyed, the price of oil, the degree of flexibility on the part of refiners and blenders, the size of the waiver, and the amount of available excess ethanol and/or RINs. When you consider the net corn imports of developing countries, the savings add up. Assuming that these countries will continue to import roughly 50 million metric tons of corn per year, this would mean a savings of between $900 million and $2.6 billion dollars annually.

Looking forward, even if companies minimize the impact of ethanol production on corn prices this year by depleting their stores of excess ethanol, "cashing in" their excess RINS, and utilizing their allowable 10% RIN deficit, they will have completely exhausted their ability to respond to any future supply shocks. In the immediate future with reserves of both corn and ethanol likely to be low, greater flexibility in the RFS will be very important, particularly if a changing climate brings another weather event that depresses yield. In light of this, it will be critical to move beyond a case-by-case waiver system to a more systemic solution to the biofuels challenge. We can't control the weather but we can control the priorities we use in meeting competing demands for our corn crop. Good policy needs to be set now to ensure that we can waive the RFS mandate when necessary to ensure that food comes before fuel and people come before cars.

Flexible Mandates

Proponents of the RFS argue that the RIN system and the ability of the EPA to waive the mandate make the RFS sufficiently flexible. Opponents of the RFS argue that the EPA's decisions are politically influenced, that the waiver process is too lengthy to respond to a crisis, and that the RIN system is vulnerable to abuse and corruption. A possible solution to these problems is an automatic waiver of the RFS that would be triggered in times of tight stocks-to-use ratios.

One version of a stocks-to-use flexible mandate scheme is laid out in the Renewable Fuel Flexibility Act currently under consideration by Congress. The waiver would be automatically triggered based on the World Agricultural Supply and Demand Estimates (WASDE), making it quickly responsive to world supply and less easily influenced by politics. Some have estimated that had this legislation been in place this year, even accounting for the excess RINs, it would have dropped corn prices by a dollar. This proposed fix to the RFS system has been upheld by a range of independent studies. For example, the InterAgency report on reducing food price volatility that was presented to the G20 in France in 2011 suggested flexible mandates as a minimum next step on biofuels and recommended that they have an automatic trigger.[27]

GLOBAL FINDINGS: THE COST OF US CORN ETHANOL EXPANSION

The Rising Cost of Import Dependence

Recent price spikes exacerbate an already precarious situation for many developing countries. Over the last fifty years, and particularly since the 1980s, the world's least developed countries have gone from being small net exporters of agricultural goods to huge net importers (see Figure 3). The shift came when structural reforms in the 1980s, usually mandated by the International Monetary Fund and the World Bank, forced indebted developing country governments to open their economies to agricultural imports while reducing their support for domestic farmers. The result: a flood of cheap and often subsidized imports from rich countries forcing local farmers out of business and off the land.

As the graph shows, these policies have resulted in a costly dependence on imported foods. When agricultural commodity prices were relatively cheap in the 1990s and the early 2000s, the financial cost was relatively low. More recently, with commodity prices rising dramatically, the cost has been enormous. In the price-spike of 2008, the world's least developed countries imported $26.6 billion in agricultural goods and exported only $9.1 billion, leaving an agricultural trade deficit for these overwhelmingly agricultural countries of $17.5 billion, more than three times the deficit recorded in 2000 ($4.9 billion). This squeezes government budgets, strains limited foreign exchange reserves, and leaves the poor more exposed to food price increases.

Estimating the Impact of US Ethanol Expansion

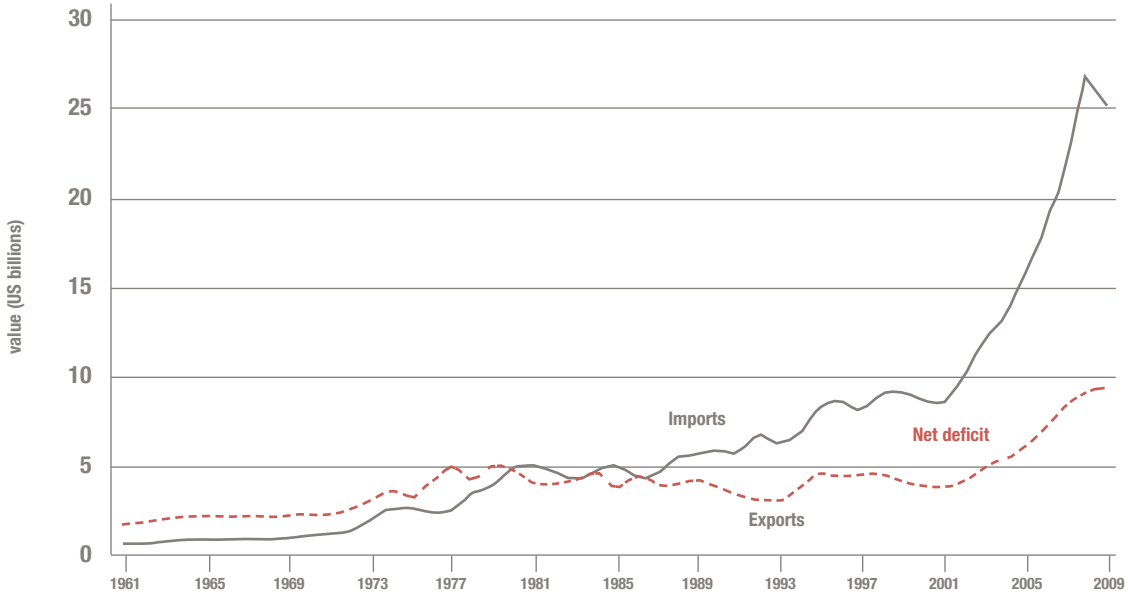
To estimate the impact of US ethanol on corn prices, and the subsequent impacts on developing countries' corn import bills, Tufts researchers utilized Bruce Babcock's "backcasting" study, which models what corn prices would have been if corn use for ethanol had not expanded past its 2004 levels.[28]

As Table 1 shows, Babcock estimates that US corn prices would have been significantly lower if ethanol had not expanded, with the price impacts growing from 2.5% in 2005-6 to 20.9% by 2009-10. The two biggest jumps were in 2006-7 and 2008-9. These price impacts are generally consistent with the rising share of US corn going to ethanol. Researchers used Babcock's estimates to extrapolate an additional year based on the assumption that the price impact varies in proportion to the share of corn going to ethanol.[29]

Researchers calculated how much lower the average price would have been for each crop year had

FIGURE 3

Agricultural Trade Balance of Least Developed Countries, 1961-2009



SOURCE: FAO (2011) TradeSTAT

TABLE 1

Costs of US Ethanol Expansion to Net Corn-Importing Developing Countries, 2005-2010

	2005-6	2006-7	2007-8	2008-9	2009-10	2010-11	Total
	(1)	(2)	(3)	(4)	(5)	(6)	
Average price ($/bushel)	2.00	3.04	4.20	4.06	3.60	5.18	
Price w/o ethanol expansion ($/bushel)	1.95	2.64	3.76	3.30	2.84	4.10	
Difference (percent)	-2.5%	-13.3%	-10.6%	-18.7%	-20.9%	-20.9%	
Difference ($/bushel)	0.05	0.40	0.44	0.76	0.76	1.08	
Difference ($/metric ton)	2.0	15.7	17.3	29.9	29.9	42.6	
Net Corn Imports (1000 mt)	40,322	46,179	47,015	44,805	51,694	50,229	280,244
Cost of US ethanol expansion ($ millions)	81	725	813	1,340	1,546	2,140	6,644

Sources: Prices for crop years (Sept-Aug) from Babcock, "The Impact of US Biofuels Policies on Agricultural Price Levels and Volatility," ICTSD, 2011 (column 6 extrapolated from Babcock); NCIC net imports: USDA PSD, for Trade Years (Oct-Sept) in current US dollars.

ethanol production stayed at 2004 levels. They then calculated a six-year estimate of the added corn import costs for all net corn importing countries attributable to US ethanol expansion beyond 2004 levels.[30]

In Table 1, we present the results for net corn importing developing countries. We present the results for all net corn importing countries in Appendix 1, along with selected categories of countries. Altogether, the ethanol-related losses totaled $11.6 billion for all net corn importing countries. Among developed countries, Japan ($2.2 billion) and Korea ($1.1 billion) absorbed a large share of the losses. But developing countries incurred more than half the costs.

Developing countries as a group had net imports of 280 million tons of corn, and saw a 20% increase in import volume over the six-year period. The estimated cost of US ethanol expansion to this group was $6.6 billion. Among the top developing country importers were Mexico ($1.1 billion in losses), Egypt ($727 million), and Colombia ($466 million) (see Table 2).

Developing countries that import the majority of their food are particularly vulnerable to the impact of US ethanol expansion. These Net Food Importing Developing Countries (NFIDCs) saw ethanol-related costs of $2.1 billion over six years, led by Egypt ($727 million), Morocco ($238 million), and Peru ($230 million). Aggregate totals, of course, can be misleading as the large totals correspond to large countries. Scaled to population, it becomes clear that the impacts of US ethanol policy are felt across a broad range of countries. In fact, thirteen developing countries had per capita costs higher than Mexico's. They come from every region and include larger countries such as Malaysia and smaller countries such as Botswana and Swaziland.[31] Costs were particularly high in North Africa, Central America, and the Caribbean.

It is worth pointing out that these estimates are likely to understate the cost for a variety of reasons. First, Babcock's price impact estimates are on the low end of the 20-40% range suggested in the literature. His estimates rise to the level of 21% only in 2009-10.

TABLE 2

Ethanol-Related Import Costs, 2005-10

Top Ten Net Importing Developing Countries

	Net imports (1000 mt)	Ethanol Cost current US $
Mexico	48,180	1,117,859,200
Egypt	29,984	726,853,500
Colombia	20,018	466,004,300
Iran	19,900	491,890,000
Malaysia	16,350	381,717,100
Algeria	13,845	328,271,500
Saudi Arabia	10,292	244,109,100
Syria	10,088	242,177,700
Morocco	10,138	236,290,500
Peru	9,569	229,895,000
Indonesia	7,123	195,742,300
All Developing Countries	279,612	6,628,510,400
All Corn-Importing Countries	501,880	11,577,923,300
NFIDC Total*	86,129	2,093,742,600

Source USDA, author's calculations

*Excludes Pakistan

Charles Eckert/ActionAid

On the December 12, 2008, a peasants' rally saw 3,000 people from all corners of Haiti, calling for an end to hunger by boosting local agriculture rather than diverting land towards fuel production for cars.

Leo Liberman/ActionAid

Women took action during the HungerFREE Women Campaign in 2008 advocating for women's access to land and the right to food.

Second, these estimates do not take full account of the extent to which US ethanol expansion contributed to price spikes, including from financial speculation, made possible by declining inventories. Corn inventories, in particular, have been hard hit by the rapid rise in corn use for ethanol. Third, McPhail and Babcock have estimated elsewhere that US biofuels policies make corn markets more susceptible to price volatility by reducing the price elasticity of demand for corn and gasoline.[32] Thus, ethanol expansion has an additional indirect effect on prices not captured in our estimates, making corn prices more volatile in the presence of other supply or demand shocks.

Our estimates also understate the costs because they exclude related increases in other food crops. Soybeans are often grown in rotation with corn; in the United States, both have been heavily hit by the drought. But high corn demand and prices take land out of soybeans, increasing its price. Additionally, in the current drought we have seen significant increases in wheat prices because wheat can substitute for corn in livestock feed mixtures. Even though wheat production has not been significantly impacted by the drought in the US, prices have increased in the current crisis.

Finally, these estimates incorporate only the impacts through September 2011 (Trade Year 2010). Prices were high for most of the current trade year, so the ethanol-related impacts are expected to be high as well. Preliminary trade estimates from the USDA suggest that ethanol-related costs for the trade year ending September 30, 2012 will be $2.7 billion for net corn importing developing countries, and $4.3 billion for all corn-importing countries. These are up significantly from the previous year's estimates of $2.1 billion for developing countries and $3.6 billion for all corn importing countries.

FOOD PRICE IMPLICATIONS IN CENTRAL AMERICA

Scaled to population, the impact of US ethanol production throughout Central America is nearly as great as in Mexico, with $368 million in total ethanol-related costs (see Table 3). This finding is particularly striking since, like Mexico, Central American countries are traditional corn-producers. In Guatemala, for example, additional import costs over the past 6 years due to US corn ethanol policy totaled $91 million, $28 million of which accrued in trade year 2010-11 alone. The $28 million lost in 2010-11 represents six times the level of US agricultural aid or an amount nearly equivalent to US food aid to Guatemala over the same period.[33] From the perspective of the Guatemalan national budget, it represents a loss equivalent to over 10% of the government's annual expenditure on agriculture.[34]

Chris Coxon, ActionAid

Jatropha trees

Atul Loke/Panos Pictures/ActionAid

Jatropha plant seed pods

TABLE 3

Ethanol-Related Import Costs: 2005-10

Latin American-US Free Trade Agreement Partners

	Central America Net imports (1000 mt)	Ethanol Cost current US $
Guatemala	4,069	90,919,600
Costa Rica	3,907	88,051,500
El Salvador	3,134	70,281,700
Honduras	2,213	52,218,200
Panama	2,135	49,390,700
Nicaragua	726	16,966,000
Subtotal of Central America	**16,184**	**367,827,700**
Other Latin American FTA Partners		
Chile	6,362	113,763,600
Colombia	20,018	466,004,300
Dominican Republic	6,381	142,981,000
Mexico	48,180	1,117,859,200
Peru	9,569	229,895,000
Other Latin Am FTA Partners	**90,510**	**2,070,503,100**
Total Latin Am FTA Partners	**106,694**	**2,438,330,800**

Source USDA trade years 2005/6-2010/11, author's calculations

As in Mexico, the ethanol-related import costs accrued by Central American countries reflect stagnating national production and an increasing dependence on imports. Central America's overall corn import dependence climbed from 18% in the early 1990s to nearly 50% in recent years. Guatemala's rose from 9% in the early 1990s to around 40% today (see Figure 4).

Relying on imports for a significant share of national consumption was an attractive option when prices were low, during the 1990s and the early 2000s. But now that prices have risen dramatically, it is an expensive policy to maintain.

It is also a difficult policy to justify. As Figure 5 shows, demand for corn in Guatemala and Central America as a whole has been growing. This is not unexpected, as food and feed demand grows with the population. However corn production in the region has stagnated since the early 1990s. Under current economic policies, the gap is filled by imports. Rather than use the rise in demand for a product that can be produced locally as a stimulus to invest and increase productivity in the local corn economy, increased demand in Guatemala mainly benefits US exporters. And thanks to US ethanol expansion, those imports have now become quite expensive. This is no small thing in a country where roughly half the population falls below the poverty line and 49% of children under the age of 5 suffer from chronic malnutrition.[35]

Interestingly, ethanol-related import costs are particularly high for Latin American countries that have formal trade agreements with the United States (see Table 3). Taken as a group, the countries under the Central American Free Trade Agreement (CAFTA) plus the Dominican Republic and Panama show $511 million in ethanol-related costs, a level comparable to Mexico on a per capita basis. Add to those the other

Greg Funnell/ActionAid

Rosa Xol Pa, overlooks fields of biofuel crops close to her house in Limon, Guatemala. Rosa is taking a stand against biofuels companies by refusing to sell her land. She was made aware of the dangers of doing so by ActionAid.

Ana Lucia Mijangos/ActionAid

Children who were ActionAid benefiaries during the food crisis in San Carlos Alzatate in Guatemala in 2009.

US Free Trade partners in the region – Mexico, Colombia, Peru, and Chile – and the total is $2.4 billion over six years. This is not to say that these trade agreements are necessarily the cause of high costs or the rising import dependence that underlies them. But these countries, through their trade agreements with the United States, are increasingly locked into treaties that open the door to US exports and severely constrain governments' policy options to increase their own domestic production. Such policies will have significantly higher costs as corn prices rise due to US ethanol expansion.

FIGURE 4

Rising Corn Import Dependence
Central America and Guatemala, 1990-2011

SOURCE: Production, Supply and Distribution Online (PSD), USDA FAS, http://www.fas.usda.gov/psdonline/, accessed August 2012

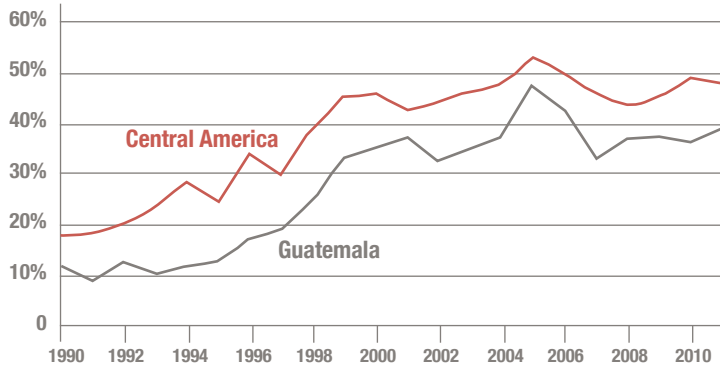
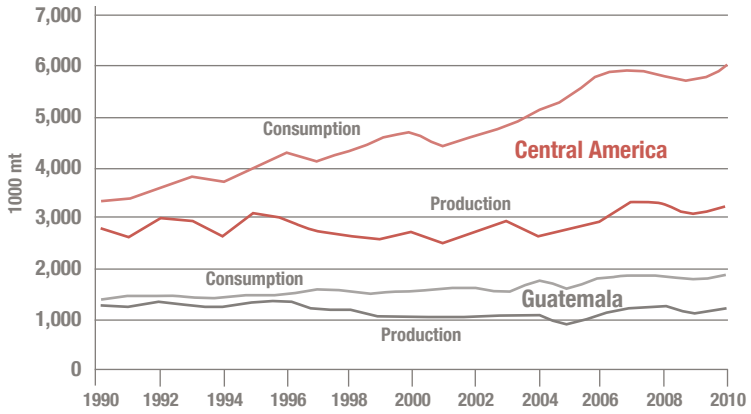


FIGURE 5

Corn: Rising Demand, Stagnating Production
Central America and Guatemala, 1990-2010

SOURCE: Production, Supply and Distribution Online (PSD), USDA FAS, http://www.fas.usda.gov/psdonline/, accessed August 2012



Enrique Pérez Suárez /ANEC

BOX D: Impacts of Biofuel Production on Guatemalan Food Security

In addition to the negative impacts of US ethanol production, Guatemala is also severely impacted by increased ethanol and biodiesel demand created by mandates and targets in the US and the EU. Guatemala has one of the most unequal land distribution patterns in the world, with 92% of subsistence and infra-subsistence farmers utilizing only 22% of cultivatable land.[36] Land-related commitments in the Guatemalan peace accords of 1996 meant to address this situation have failed to materialize. Instead large-scale re-concentration of land has taken place, opening a path for huge sugarcane and palm oil plantations that feed the global appetite for biofuels while further jeopardizing local food security.

Biofuels production in Guatemala has also been linked to forcible displacement of entire communities, among other severe human rights abuses, as large tracts of land are seized for sugar production in response to increased international demand for sugar ethanol.

In the Polochic Valley, the Chabil Utzaj S.A. sugar refinery has evicted 11 communities from land they occupied and farmed for decades. Communities were evicted through the joint efforts of Guatemalan government forces, the refinery's owners, and private security agents hired by the refinery. During the evictions, broadcast on Guatemalan television, refinery owners were seen to destroy houses and crops in order to prevent communities from returning.[37] Serious human rights violations were documented in the course of the evictions and a number of fatalities have been associated with the conflict.[38]

Enrique Pérez Suárez / ANEC

The 'La Ayuda' community in Coatepeque, Guatemala, has 72 families that are affected by the growth of palm oil plantations in the region. Some have lost their land, food production is decreasing, and the community's water has been diverted to palm oil irrigation, leaving them with no water during the dry season. Marta Olinda López Juárez has six children and lives on a small plot of land in the La Ayuda community where she and her family grow fruit and raise livestock. They cannot produce enough food to feed themselves, and are struggling due to high food prices.

FOOD PRICE IMPLICATIONS IN AFRICA

TABLE 4

Ethanol-Related Import Costs: 2005-10
Net Importing North African Countries*

	Net imports (1000 mt)	Ethanol Cost current US $
Egypt	29,984	678,894,400
Algeria	13,845	328,271,500
Morocco	10,138	236,290,500
Tunisia	4,250	99,290,200
Libya	3,044	67,504,900
North Africa	**61,261**	**1,410,251,500**

Source USDA, author's calculations
*Based on UN definition of North Africa

The North African impacts of ethanol-related import costs are particularly important to examine, given the widely observed contribution of rising food prices to social unrest in the region. Ethanol-related import costs totaled $1.4 billion over the six-year period, spiking in 2009-10 when unrest became widespread. Scaled to population, all of the countries studied saw losses comparable to or greater than Mexico's, including Syria ($242 million), Iran ($492 million), and Yemen ($58 million). This highlights the importance of food price stability to political stability, and the potential contribution of ethanol-related price increases to political instability.[39] Costs for African countries as a whole were about $1.6 billion.

The Impact of Corn Ethanol on the Poor in Exporting Countries: the Case of Uganda

It is not only net corn importing countries that are affected by the rise in corn prices due to ethanol. Whether countries are net importers or not, corn price increases can have a devastating impact on the poor. Uganda, for example, is a small net corn exporter, yet the majority of the country's consumers are still net buyers of corn. High prices transmit, in varying degrees, to local markets. So ethanol-related price increases may affect poor urban consumers in Uganda even as the country sees a small net gain in its trade balance.

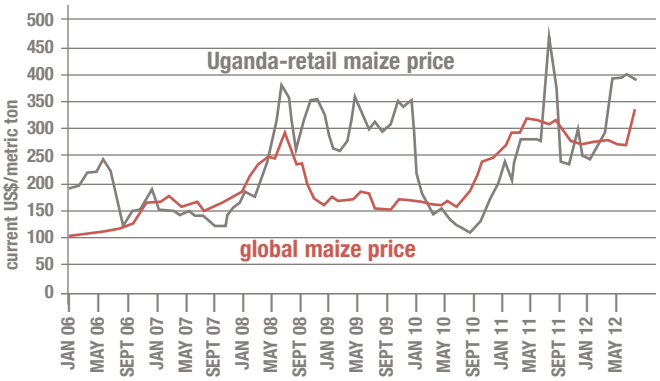
Though a 2008 study suggested that global maize prices transmitted weakly to Ugandan markets, subsequent data suggests a strong correlation between rising international prices and retail maize prices in Uganda (see Figure 6). It is worth noting that Ugandan prices stayed high even as international prices fell in late 2008, then spiked even higher than international prices in subsequent years.

An unprecedented upturn in Ugandan food and commodity prices in 2011 led to social and political instability in the country. The country continued to experience transient food shortages and high food prices up to the summer of 2012 when major harvests for beans and other cereals helped to alleviate food insecurity.

Price transmission comes principally in the form of higher demand for Ugandan maize from neighboring Kenya, as Kenyan importers seek alternatives to high-priced international markets. 65% of Ugandans' cash income is used for the purchase of food, and the urban poor are dependent on maize purchased in local markets for 20% of their daily caloric intake.[40, 41]

FIGURE 6

Maize Prices: Uganda vs. International Prices, 2006-2012



SOURCES: GIEWS for Uganda (Kampala); World Bank for global price.

Millions of Ugandans are classified as food insecure, although the exact number varies widely from one source to another. According to the National Development Plan, 17.7 million Ugandans (approximately 52% of the country's population) were categorized as food insecure as of 2007, an increase from 12 million in 2002 attributed largely to population growth.[42] The World Food Program estimates that 37% of households were not able to provide food for their households at some point in 2008.[43]

Although most parts of the country were believed to have enough food to carry the population through to the next harvest, the food security situation report produced by the office of the Prime Minister (OPM) in August 2011 indicated that 15 out of 120 districts in

James Oatway/Panos/ActionAid

Julio Ngoene, farmer. 'Our livelihood was dependent on the farms and [the biofuels company] has taken our farms.'

Chris Coxon/ActionAid

Henzanani Merakini (26, mother of two) is a smallholder farmer. Her house is located on land earmarked for a biofuels plantation. Henzanani's family has occupied this land for over a hundred years. She has not been offered any alternative land or compensation.

Uganda were experiencing acute food insecurity. A survey by ActionAid Uganda carried out in the second half of 2011 in rural areas of Eastern, Northern, and Central Uganda showed that 37% of Ugandan households frequently worried about food with 96% indicating a worsening situation. 43% had spent at least a night without food in the month just before the survey was done. The majority of respondents attributed worsening food security to dwindling food production mainly due to drought and unpredictability of rains (61.5%) while 38.5% attributed it to rising food prices.

Evidence shows that poor households that already spend a significant proportion of their income on food in Uganda are responding to soaring food prices by reducing food consumption and buying less nutritious food.[44] Indeed, data collected by ActionAid on food prices in Eastern, Northern, and Central Uganda shows that 68.4% of Ugandans were narrowing their dietary diversity due to production-related constraints, particularly seasonal variability and drought risks (52.2% of the responses) and rising food prices (44.9% of the responses). Numerous studies link chronic malnutrition to diminished physical and cognitive capacity, which in turn reduce work productivity and act as a constraint on economic development, from the household to the national level. Uganda loses $310 million in productivity as well as 4.1% of gross domestic product per year due to high levels of malnutrition.[45]

Farmers in Uganda who sell their surplus could potentially benefit from rising food prices under certain conditions: if production costs (for example, the costs of fertilizer, fuel, and seed) do not increase more than food prices and if farmers have easy access to cash credit to buy agricultural inputs they need to grow their crops. The majority of smallholder farmers in Uganda have not benefited from rising food prices because most manufactured products and non-food commodities, whether domestic or imported, have been affected by price inflation to an equivalent degree. For instance, there has been a rise in the producer price of maize from Shillings 350 per Kg in 2008 to Shillings 400 per Kg in 2011. This has been overshadowed by the rise in the price of kerosene and sugar which are essential goods in rural areas. The cost of production for maize has also increased from Shs. 128 - 170 per Kg in 2007-08[46] to Shs. 300 per Kg. The rise of maize price does not benefit farmers when they in effect must sell more maize to buy less sugar or kerosene.

To the extent international prices transmit to Ugandan markets, US ethanol expansion is contributing quite directly to food insecurity among the urban poor, even in a net corn exporting country. By our estimates, US corn ethanol expansion since 2004 has boosted maize prices in recent years by about 20%, a premium Uganda's urban poor are ill equipped to absorb. With poverty rates at 65% and extreme poverty at 38%,[47] there is little question that US ethanol expansion endangers food insecurity in this net corn exporting country, albeit in ways that are difficult to quantify because of the difficulties associated with estimating price transmission accurately. As is the case in Guatemala, local production of biofuel crops (primarily jatropha) also contributes to food insecurity (see Box E).

Atul Loke/Panos Pictures/ActionAid

65 year old Nantume Enfrance of Bigando Bigando, Uganda, a grandmother looking after 11 grandchildren, bemoans the droughts that hit in 2011. She lost most of what she planted that year, including sweet potatoes, cassava, and maize, either to the sun or ranging bush fires. Seen here with her burnt garden, Natume says "We have resorted to one meal a day. One cannot easily get green vegetables unless one has land next to the swamp. We are not sure when the rains will come and even if they come whatever is in the ground will rot or be already rotten." When asked the extent of the problem she said "People have kept to themselves so one can't tell how many have been affected," but later in the discussion she named four to five homes in her community where she was sure people were living on one meal a day.

BOX E: Impacts of Biofuel Production on Ugandan Food Security

Fuel crops with no commercial value have long been planted in Uganda to demarcate the plots of small holder farmers, especially among people in Buganda (central Uganda). But the global quest for clean energy has changed this. Not only have mandates for increased production and use of biofuels in the US and Europe increased demand for fuel crop imports from developing countries, but some countries, like Uganda, sought to expand domestic biofuel production for internal use.

The government of Uganda unveiled a plan for large scale biofuels production in 2006, in hopes that the use of biofuels would reduce greenhouse gas emissions, provide a renewable and sustainable energy source, and serve as a rural development driver to increase incomes for the rural poor.

Since then, there has been a steady move towards massive biodiesel production in the country. The Ugandan government has developed various incentives to woo foreign investors into the Ugandan biofuels sector. Companies like African Power Initiatives LTD (API) and Nexus Biodiesel LTD have planted thousands of hectares of jatropha in different areas of the country. Jatropha is not the only biofuel crop in production. Corn, soybeans, sugarcane, castor (nsogasoga) and candlenut (kabakanjagala) seeds are also being cultivated as fuel crops.

Biofuels now compete for the small land plots that were once used to grow food. To power a car in Uganda for one year requires 430 liters of fuel. A jatropha tree, the most popular biofuel crop in Uganda, can produce five kilograms of seed a year, generating a single liter of diesel. To power a single car therefore, requires converting an acre of land to grow the 430 trees necessary to produce 430 liters of fuel. According to Uganda's ministry of works and transport, Uganda has over 600,000 vehicles. To produce fuel for even a fraction of these means hundreds of thousands of hectares of fertile land must be used to produce jatropha rather than food.[48]

Rainforests in some parts of Masindi near Murchison Falls National Park have been cut down to make room for jatropha plantations. This has disastrous environmental impacts and contributes to climate change. Ugandans are already experiencing the impact of climate change on agriculture as crops fail due to prolonged droughts. Given that industrial monocropping of jatropha requires excessive use of fertilizers and pesticides, environmentalists are also concerned for soil fertility, biodiversity and increased greenhouse gas emissions. When the full lifecycle of the resulting biofuels is assessed, it is not at all clear that there is a net benefit for the environment.

The use of corn for fuel in Uganda is a more recent development, and has yet to be assessed in terms of the percentage of land converted, the amount of food production displaced and the impact of converting corn from food to fuel on domestic corn prices. As ActionAid Uganda points out, the top priority in all of this must be the Ugandan people and their ability to feed their families. Ensuring that expanded biofuels production does not increase food insecurity requires not only analysis of the impact of biofuels production on food systems but also new policy protections for people with insecure land tenure to ensure that they can continue to grow food crops on their land. ActionAid Uganda calls on the Ugandan government to prioritize food security over biofuels and encourages farmers not to abandon food crops completely in favor of biofuel crops.

CONCLUSION

Biofuels expansion, with its direct diversion of food and feed crops and its indirect impact through competition for land and other food-producing resources, has contributed significantly to the rise in food prices over the last six years. The expansion of US corn ethanol has had particularly strong effects, contributing to food insecurity in import-dependent developing countries. In an earlier report, we estimated the six-and-a-half year cost to Mexico of US ethanol expansion at $1.5 billion, a heavy cost for a country in which corn is a staple food crop and tortilla prices have risen 69% since 2005.

Here that methodology is extended to all net corn importing countries, estimating the costs of US ethanol expansion to developing countries at $6.6 billion over six years. The particularly vulnerable group of NFIDCs suffered ethanol-related costs of $2.1 billion. For all net corn-importing countries, the costs were $11.6 billion.

While one might assume that Mexico, a large corn importer, would suffer high losses, when scaled to population the impacts were on the same order of magnitude or greater in 13 additional countries. Impacts were strong in Central America, and among those Latin American countries that have trade agreements with the United States. A number of the Arab and North African countries that have experienced social unrest in recent years – Egypt, Syria, Tunisia, Libya – also experienced high ethanol-related costs, perhaps an indicator of the contribution of rising food prices to political instability.

Some corn-importing countries also grow corn, and to the extent high prices transmitted to local markets for domestic corn their farmers saw some benefits from higher corn prices. However, for some countries, like Uganda, where consumers are net-buyers of corn, the majority of the population still feels the impact of high prices, even as the country shows a small increase in its trade balance. For import-dependent countries that no longer grow much of their own food, biofuel-induced price increases are simply a large net loss to society, straining government trade balances, using scarce hard currency, raising food prices for consumers, and driving up the cost of government safety net programs.

Global corn prices have reached record levels due to the drought in the United States. In the context of the drought, the competing demand for corn from the ethanol industry has caused much higher price increases than would have been experienced otherwise. Though two of the main policy instruments that helped launch the industry – the blending subsidy and the protective tariff – have been suspended, the consumption mandates, through the Renewable Fuel Standard and the gasoline blending mandate, remain in force.

Livestock producers, food processors, and many others have called on the US Environmental Protection Agency to waive the RFS while corn supplies (and inventories) are strained. This paper documents the high costs of US ethanol expansion not just to industries relying on US corn as a raw material but to import-dependent developing countries. If the US ethanol mandate is effectively taking back the value of US food and agricultural assistance to developing countries, then US biofuels policies are potentially undermining our international aid as well.

RECOMMENDATIONS

In order to mitigate the impact of biofuels policies on food prices, ActionAid USA recommends the following policy changes:

To the Government of the United States:

In order to calm food price volatility, and build a better balance between food and energy policies, the United States should:

- ✓ **Reform the Renewable Fuels Standard to ensure that it does not continue to drive the expansion of corn ethanol or any other food-based, or land-intensive fuel.**
  - — Ultimately, policy makers should remove volume or blending targets of food-based fuels, or fuels that require vast tracks of land for production, to ensure that biofuels policies do not continue to promote food and fuel competition for land and other resources.
  - — At minimum, policy makers should support legislation that increases the flexibility of the biofuels mandate, lowering the artificial demand for food based fuels in times of tight supply.
- ✓ **Put any efforts to expand the amount of ethanol blended in gasoline from E10 to E15 on hold until an assessment is made on the impact of a new artificial demand for a food-based fuel on global and local food prices, land use and the environment.**
- ✓ **Explore the development of farmer-owned reserves that can help cool price volatility and ensure adequate stock to meet the growing demand for corn for food, feed and fuel.**

Mhaga village committee chairman Athumani Mkambala, 46, beside a campaign slogan displayed during a meeting to discuss action against Sun Biofuels' land grab in Kisarawe. Many in Mhaga have lost land to Sun Biofuels' jatropha plantation.

Tom Pietrasik/ActionAid

To the G20:

G20 member states hold a special responsibility to take coordinated action on issues of food security: they possess the majority of global food reserves and resources, they host the largest commodity exchanges in the world and their agricultural policies play a dominant role in food price formation. ActionAid calls on the G20 leaders to:

- **Urge member countries to eliminate targets, mandates and financial incentives that encourage the expansion of unsustainable industrial biofuels production. This recommendation is consistent with the conclusions of the report of ten international organizations commissioned by the G20 in 2011.**
  - Member countries should ensure that all biofuels, whether domestically produced or imported, meet strict social and environmental sustainability criteria that ensures that their production and consumption does not compromise food, land and worker rights and that they result in lower net greenhouse gas emissions than fossil fuels when considering the full life-cycle of the biofuel production process.
- **Urge member countries and donor nations to invest in small-scale producers as a means to decrease import-dependency and enhance food security.**
  - At the global level, this investment should be through public sector windows like the Global Agriculture and Food Security Program (GAFSP).
  - At the national level, these investments should prioritize small-scale producers, especially women, and agro-ecological models of production in order to help farmers both adapt to and mitigate the impact of climate change.
- **Support the development of local and regional, transparently governed, public strategic buffer stocks of staple grains, procured from local producers in order to stabilize prices in times of volatility.**
  - Announce support for enhanced food reserves in developing countries, both through material and technical assistance.
  - Urge that reserves be consolidated, or at least coordinated, on a regional basis and offer assistance to regional bodies such as the South Asian Association for Regional Cooperation and the Economic Community of West African States, which are already working on such approaches.

To Developing Country Governments:

- Invest in domestic smallholder food production to decrease import-dependence, seeking international support where available.
- Demand policy space to impose appropriate protections for domestic producers from global imports.
- Strengthen national land tenure laws in order to resist foreign land grabs, which often occur amidst efforts to increase biofuel production for international markets.
- Develop national and regional food reserves to cushion the impacts of excessive price volatility caused in part by foreign biofuels policies.

ActionAid

Ocola Apio Polly is a smallholder farmer in Odom Village, Katakwi District in Uganda. She uses her land to feed her family and make a living. Polly is spearheading a cooperative for women farmers that pools community resources to build up local food stocks.

Appendix 1: Ethanol Costs, Net Corn Importing Countries, 2005-2010

	Net imports (1000 mt)	Ethanol Cost current US $
Japan	98,096	2,221,720,500
Korea, Rep.	50,281	1,128,386,300
Mexico	48,180	1,117,859,200
EU-27	30,861	678,894,400
Egypt, Arab Rep.	29,984	726,853,500
Taiwan	26,579	603,506,700
Colombia	20,018	466,004,300
Iran, Islamic Rep.	19,900	491,890,000
Malaysia	16,350	381,717,100
Algeria	13,845	328,271,500
Saudi Arabia	10,292	244,109,100
Morocco	10,138	236,290,500
Syrian Arab Republic	10,088	242,177,700
Peru	9,569	229,895,000
Canada	8,372	139,160,400
Indonesia	7,123	195,742,300
Israel	6,656	144,300,900
Venezuela	6,574	186,728,900
Dominican Republic	6,381	142,981,000
Chile	6,362	113,763,600
Vietnam	5,663	150,861,400
Tunisia	4,250	99,290,200
Cuba	4,214	102,941,300
Guatemala	4,069	90,919,600
Costa Rica	3,907	88,051,500
El Salvador	3,134	70,281,700
Libya	3,044	67,504,900
Turkey	3,023	74,537,100
Kenya	2,880	85,574,900
Zimbabwe	2,721	52,417,000
Ecuador	2,660	63,310,400
Yemen	2,453	57,786,000
Honduras	2,213	52,218,200
Panama	2,135	49,390,700
Jordan	2,044	44,132,100
Lebanon	1,823	45,500,900
Jamaica	1,529	34,411,500
Philippines	1,144	22,713,500
Botswana	1,105	25,661,500
Bosnia and Herzegovina	1,057	22,614,500
Belarus	900	15,130,000
Kuwait	828	19,976,200
Korea, Dem. Rep.	790	17,351,500
Nicaragua	726	16,966,000
Mozambique	670	12,554,500
Switzerland	632	15,578,900
Trinidad and Tobago	611	13,248,100
Lesotho	605	15,038,000
Namibia	565	13,956,000
Senegal	491	11,031,300
Swaziland	450	10,980,500
Azerbaijan	354	8,829,300
Iraq	350	9,670,000
Macedonia	332	7,539,200
Albania	321	7,453,500
Hong Kong	284	4,764,700
Norway	270	7,047,300
Nepal	247	6,752,800
Singapore	237	6,052,800
Georgia	223	4,617,700
Guyana	169	4,424,500
Angola	160	3,871,000
Somalia	153	4,165,000
Chad	125	3,385,000
Cameroon	115	1,968,000
Cape Verde	107	1,932,100
Ghana	91	1,875,900
Congo, Rep.	50	1,475,500
Congo, Dem. Rep.	50	1,354,000
Mauritania	50	1,369,000
Uzbekistan	45	1,346,000
Cote d'Ivoire	42	1,060,500
Central African Republic	25	747,500
Togo	23	709,100
Tajikistan	20	661,500
Burundi	16	32,000
Guinea	15	322,500
Madagascar	9	446,400
Mali	5	10,000
Turkmenistan	5	149,500
Eritrea	4	62,800
Afghanistan	2	19,300
Haiti	1	17,300
Bolivia	-5	1,608,800

Selected Country Group Subtotals

All Net Corn-Importing Countries	501,880	11,577,923,300
Developing Countries	279,612	6,628,510,400
NFIDCs	109,358	2,080,666,800
Central America	16,184	367,827,700
Other Latin America FTA Countries	90,510	2,070,503,100
All Latin America FTA Countries	106,694	2,438,330,800
All African Countries	68,744	1,642,705,700

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ActionAid works with people living in poverty and citizens acting in solidarity to end poverty and injustice. We fight hunger, seek justice and education for women, hold companies and governments accountable and cope with emergencies in over 40 countries around the world.

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