



Mandating Hunger: The Impacts of Global Biofuels Mandates and Targets

Acronyms

BG	billion gallons
BL	billion liters
CFS	United Nations Committee on World Food Security
EPA	US Environmental Protection Agency
EU	European Union
FAO	United Nations Food and Agriculture Organization
GDAE	Global Development and Environmental Institute at Tufts University
GHG	Greenhouse Gas
G7	The Group of Seven (G7) is an informal bloc of industrialized democracies—France, Germany, Italy, the United Kingdom, Japan, the United States, and Canada—that meets annually to discuss issues of common interest like global economic governance, international security, and energy policy.
G20	The G20 is an informal group of 19 countries and the European Union, with representatives of the International Monetary Fund and the World Bank.
IDB	Inter-American Development Bank
IEA	International Energy Agency
OECD	Organisation for Economic Co-operation and Development
RED	EU's Renewable Energy Directive
RFS	US Renewable Fuel Standard
UNCTAD	United Nations Conference on Trade and Development
UNFCCC	United Nations Framework Convention on Climate Change

ACTIONAID ACTIVISTS PROTESTING AT THE EUROPEAN PARLIAMENT FOR AN END TO THE EU'S BIOFUELS TARGETS

PHOTO: SAIDANE LODE/ACTIONAID

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Executive Summary

Government mandates for the consumption of biofuels produced on agricultural land undermine food security and fuel hunger around the world. By creating an inflexible and growing demand, mandates drive up the cost and increase the volatility of food prices. Demand for biofuels is also associated with land grabs in developing countries, where smallholder farmers growing food for their families are forced off their land to make way for energy crops for export. Policy makers, especially in the United States, must take steps to reform biofuels mandates to prioritize food security.

This study, based on a recent paper by the Global Development and the Environment Institute (GDAE) at Tufts University finds that 64 countries now have biofuels mandates.¹ While these targets represent a wide range of ambition, all encourage the use and, in most cases, the expansion of biofuels in countries' transportation fuel supplies.² The largest global mandates include the US Renewable Fuel Standard (RFS), European Union's (EU) Renewable Energy Directive (RED), and Brazil's mandate for 25% of gasoline to be comprised of ethanol. The US is the largest producer and consumer of ethanol, responsible for 43% of global production.³

This study focuses on first-generation biofuels mandates/targets in 7 major biofuel-producing countries or economic regions: the US, EU, Brazil, Argentina, China, India, and Indonesia. When these mandates are met, global biofuels demand will increase by 51.6 billion liters, or 43%, reaching 170.9 billion liters by 2025. This is a shocking amount of growth considering that in 2000, only 17 billion liters of ethanol was used in transportation fuel.⁴ Even more important for US policy makers, the US will be responsible for 76 billion liters of the total amount, or 44.5% of global demand in 2025. This is a dramatic increase from the 1.6 billion liters the US consumed in 2000.⁵

The projected 43% increase in biofuels use will have considerable consequences for land and water use, as well as food security. Assuming the associated growth in land use will be proportionate to the amount required by US corn ethanol production, it would likely require **13-17 million additional hectares of land devoted to biofuel production, and approximately 145 billion more liters of water.**⁶

In light of the current costs of global biofuels mandates and the anticipated future cost of mandate-driven biofuels growth, ActionAid USA makes the following policy recommendations:

Policy Recommendations

- Governments should cease the implementation, expansion, and creation of food-based biofuels consumption mandates; food security and land rights must take priority over biofuels
- Governments should work toward cooperation on these issues in international policymaking venues
- In the case of the US, RFS mandates spurring the expansion of food-based biofuels such as corn ethanol, soy biodiesel, sugarcane ethanol, and other food-based biofuels must be reformed.

Terms Used in This Report

- **First-generation biofuels:** These include ethanol and biodiesel produced from crops which are largely also used as food and feed crops, such as corn and sugarcane (for ethanol) and palm oil, soybean oil, rapeseed oil, used cooking oil, and other vegetable oils (for biodiesel). These biofuels have been produced for decades, especially in the case of Brazil with sugarcane ethanol and the US with corn ethanol.
- **Second-generation biofuels:** The second-generation biofuels are ethanol or biodiesel produced from largely non-food feedstocks such as perennial grasses, wood and agricultural residues, algae, etc. Second-generation biofuels have yet to be produced at large commercial scales, so their effects on land use, water supplies, food security, and Greenhouse Gas (GHG) emissions are still unclear.
- **US Renewable Fuel Standard:** The US RFS, enacted in 2005 but expanded in 2007, mandates that the US transportation fuel supply contain 36 billion gallons (BG) (or 138 billion liters, BL) of biofuels from three different categories by 2022. Note that these categories differ from those of first- and second-generation biofuels listed above, meaning that even though this report focuses on first-generation biofuels, the US considers some first-generation biofuels such as sugarcane ethanol to qualify as an “advanced” biofuel. Terms that apply only for the US case include:
 - **Conventional ethanol:** The “renewable fuel/conventional ethanol” category in the RFS requires ethanol to meet a 20% GHG reduction threshold by increasing to 15BG (57BL) by 2015 and continuing through 2022. However, most facilities were grandfathered into this category, meaning they may actually increase GHG emissions. Conventional ethanol includes mostly corn ethanol.⁷
 - **Advanced biofuels:** The advanced biofuel mandate may include biofuels such as sugarcane ethanol, biomass-based diesel (such as biodiesel derived from animal fats, soy, or other vegetable oils), cellulosic ethanol (see below), and other advanced biofuels. These are required to meet a 50% GHG reduction threshold set by the US EPA through an increase to (21BG) 80BL by 2022.
 - **Cellulosic ethanol:** The cellulosic ethanol mandate may include ethanol derived from cellulosic sources such as perennial grasses and wood or agricultural residues. This category is required to meet a 60% GHG reduction threshold, or 16BG (61BL) by 2022. Cellulosic ethanol is not yet produced at a large commercial scale, so it is extremely unlikely that the US will meet its 61BL cellulosic mandate by 2022 or even 2025. It is probable that the gap of 19BL in the advanced biofuels mandate will be filled with fuels such as sugarcane ethanol and soy biodiesel.

Expansion of Global Biofuels Mandates

Biofuels mandates, the primary government support for biofuels in most countries, were largely enacted to achieve the following goals:

- Reduce dependence on fossil fuels,
- Support rural communities,
- Reduce GHG emissions and access a low-carbon transportation fuel,
- Improve nations' trade balance or balance of payments by reducing oil imports, and
- Promote national energy self-sufficiency.

Mandates can take one of two forms. The first is a consumption mandate that requires a certain volume of biofuels to be blended with gasoline and diesel each year. This is the type of mandate that exists in the US.⁸ The second and more common form of mandate requires that a certain percentage of transport fuel consist of ethanol or biodiesel. This form of mandate used in the EU⁹ and most other countries. Most Organisation for Economic Co-Operation and Development (OECD) mandates began in the 2000s, and many developing countries have followed the OECD's lead in instituting biofuels mandates.

These mandates are largely comprised of first-generation biofuels, which are derived from agricultural crops and divert land and food crops to fuel tanks. Dominating the current global biofuels market, this category includes corn ethanol, sugarcane ethanol, and soy and palm biodiesel. Biofuels proponents have long argued that biofuels would develop beyond corn ethanol, and that these new biofuels – sometimes called second-generation biofuels – would be more environmentally friendly and avoid the food versus fuel dynamic. However, biofuels technology has developed more slowly than supporters anticipated and second-generation biofuels are unlikely to reach commercial viability in the next decade. Furthermore, the implications of commercial-scale production of cellulosic and other second-generation biofuels are still unclear.

Food Security, Environmental, and Social Costs

Food Security

Fuel is already displacing food in agriculture, with land that was formerly used to cultivate food crops being diverted to biofuels production. In the United States, 37% of the corn crop is diverted to ethanol production. And while some ethanol byproduct can be used as feed, the feed quality and quantity is not comparable.¹⁰ This trend will



only increase in the future, with implications for food security, land use, land rights, and the environment. According to OECD and Food and Agriculture Organization (FAO) projections, 12% of maize and other coarse grains will go to biofuel production by 2023, while 14% of global vegetable oils will be used to produce biodiesel. For sugar, 28% will go into the production of transportation fuels.¹¹

Expanding demand for biofuels has already been strongly implicated in food price increases and food price volatility, most recently seen in 2008 and 2011-2012.¹² Estimates suggest that biofuels are responsible for 20-40% of the food price increases in 2008.¹³ These impacts were being seen before most mandates, including the RFS in the United States, fully took effect. The additional demand created by biofuels mandates will further impact food security.

An October 2012 ActionAid USA report found that corn importing countries paid \$11.6 billion in higher corn prices, due to US ethanol expansion from 2006 until 2011. \$6.6 billion of this additional cost was borne by developing nations, where much of the population already spends 60-80% of their income on food. When food prices increased in 2011, Guatemala's additional expenditures to import food equaled the amount the US spent on food aid for Guatemala.¹⁴

The impact of biofuels on food security has not gone unnoticed by the international community. In 2011, a report commissioned by G20 agricultural ministers recommended that countries "remove provisions of current national policies that

RAMADHANI ATHUMANI
LWINDE IS A FARMER
FROM KISARAWA
DISTRICT IN TANZANIA.
HE AND HIS FAMILY
LOST 1,600 ACRES
OF LAND TO THE SUN
BIOFUELS PLANTATION.

**PHOTO: TOM
PIETRASIK/
ACTIONAID**

Case Study: Guatemala

Guatemala's biofuel mandate, at 5% ethanol, was passed into law in 1985 but never implemented. However, Guatemala's experience demonstrates how biofuel policies in OECD and other major economies have a global impact. According to the UN Conference on Trade and Development (UNCTAD), "Guatemala presents the highest potential [for] biofuel production in Central America alongside with Honduras. The country is not only the number one producer of sugarcane in the region, but also one of the most efficient producers of palm oil in the world."¹⁵ Its inclusion in the US-Brazil Biofuels Initiative and the availability of funding from the Inter-American Development Bank (IBD) for renewable energy sources could lead Guatemala to pursue biofuels policies in the future.¹⁶ The government has proposed a 10% ethanol mandate, but no legislative action has ensued.

Even without a biofuels mandate, Guatemala has an ethanol production capacity of 269 million liters (primarily from sugarcane). Most of this ethanol is exported to the EU.¹⁷ The impact of the biofuels market can be seen in its agriculture sector. Three of the most widely grown crops in Guatemala are export crops - coffee, sugarcane, and palm – the latter two being potential feedstocks for biofuels production. The expansion of large monoculture plantations has increased by 40% from 2003 to 2013 (an additional 413,477 hectares) while land used to grow food crops has declined by 525,567 hectares.¹⁸ Some, but not all, of the expansion has occurred on pasture land for livestock. These land use changes have led to more food insecurity, loss of wildlife habitat, destruction of forests, water pollution, and pressure on nature reserves.

Finca San Román, a farm in the town of Sayaxché south of Petén, is an example of this larger land use change and its negative impact on local communities. Thirty-four communities grew food and some subsistence products for markets until they lost half of their land to palm oil producers.¹⁹ The land was transformed from the cultivation of multiple food-crops for local consumption to the cultivation of one crop that will likely be exported and used for fuel instead of food. Monoculture export crops already take up 14% of Guatemala's land; more than smallholders, which use only 12%.²⁰ In a country where half of children under the age of five are malnourished, more land is devoted to export crops than sustenance farming.

THE K'QUINICH COMMUNITY IN THE POLOCHIC VALLEY, GUATEMALA, WERE VIOLENTLY EVICTED FROM THEIR LAND TO MAKE WAY FOR A SUGAR CANE PLANTATION FOR BIOFUELS. HAVING LOST THE LAND THEIR FAMILIES FARMED FOR GENERATIONS, MANY PEOPLE NOW STRUGGLE TO FEED THEIR FAMILIES.

PHOTO: DANIELE VOLPE/ACTIONAID



subsidize (or mandate) biofuels production or consumption,” acknowledging that biofuels production was a significant factor in increased food prices and food price volatility.²¹ In 2013, the UN Committee on World Food Security’s (CFS) High Level Panel of Experts noted that “biofuels and more generally bioenergy compete for land and water with food production.” They recommended the creation of an additional set of guidelines to evaluate the viability of national biofuels policies based on the impact of these policies on both access to land and international food security.²²

Environmental Impacts

The once-promised environmental benefits of biofuels have also been called into question. As one IEA study put it: “It is increasingly understood that first-generation biofuels (produced primarily from food crops such as grains, sugar beet and oil seeds) are limited in their ability to achieve targets for oil-product substitution, climate change mitigation, and economic growth.”²³ Land used to grow biofuels crops is often converted from non-food uses, such as forests, adding to the environmental issues associated with deforestation. When biofuel crops replace current food or feed crops, that food must be grown elsewhere displacing other land uses. In 2011, the National Academies of Science concluded that first-generation biofuels such as corn ethanol are failing to significantly reduce GHG emissions in part due to indirect land use change and that cellulosic ethanol production in the US is unlikely to reach commercial scale due to technological and economic challenges.²⁴

Case Study: United States

The US is the world’s largest biofuels producer and consumer.²⁵ This is driven in large part by a consumption mandate, which requires the use of increasing volumes of ethanol each year until reaching 36 BG in 2022. The US has a history of tax subsidies as well, but the largest of these have expired.

Each year, the Environmental Protection Agency (EPA) releases a federal rule determining what percentage of each type of biofuel must be blended into transportation fuel to meet the mandate. This estimate is based on the amount of fuel the government expects to be consumed.²⁶ However, the EPA failed to implement a rule for 2014 and failed to even propose a 2015 rule before the start of the year.²⁷ While the agency is insisting it will issue rules for both years it missed and get back on schedule for the 2016 rule, it seems highly unlikely that after failing to enact a rule for two years the Agency will be successful in proposing and adopting three rules in 2015.

The EPA’s failure to issue a rule demonstrates how broken the RFS is as a policy. Cellulosic biofuels have failed to develop at the expected rate, forcing the EPA to adjust the cellulosic mandate each year since 2010. In recent years, this has meant waiving cellulosic levels down by more than 90%.²⁸ There is no expectation that cellulosic production will reach major production levels before 2022 or be able to meet its mandated consumption levels. This means that the US mandate will continue to rely almost entirely on crop-based biofuels.

Americans are driving less and driving more efficient cars. Since the RFS requires a certain

amount of ethanol to be used, regardless of how much gas is being consumed, ethanol is being blended at a higher rate than originally anticipated. US gasoline supply is already approximately 10% ethanol, primarily corn ethanol. While the EPA provided a waiver for E-15 (gas blended with 15% ethanol) for vehicles newer than 2001, most vehicle manufacturers advise against using E-15 and have indicated they will not honor warranties for cars on E-15.^{29,30}

The EPA has demonstrated an unwillingness to use its own authority to lessen the mandate's negative consequences. The mandate's inflexibility is particularly harmful when food prices spike, since the demand for corn ethanol stays fixed in the face of rising corn prices. While the EPA has the ability to waive the RFS mandates downward based on petitions tying biofuels mandates to "severe economic harm," it has historically failed to do so. Several petitions have been submitted to EPA in recent years by US states negatively affected by high crop and food prices, but EPA rejected these claims citing other demand factors playing a larger role in higher food prices.³¹ While many factors contribute to food prices, the EPA's unwillingness to act on biofuels' negative impact on food prices in a time of crisis is cause for concern.

The RFS also provides a prime example of how domestic mandates interacting with existing trade flows may lead to unexpected outcomes, and ones that frequently undermine political purposes for which domestic biofuels mandates were originally passed. For example, Brazil exports sugarcane ethanol to the US to meet "advanced biofuels" mandates. However, at times Brazil has imported corn from the US to meet its own mandate.³²

Since the RFS has primarily been filled with corn ethanol, a fuel that may actually increase GHG emissions and worsen air quality over traditional gasoline, the RFS has also failed to achieve the environmental goals set out for it.³³ Several pieces of RFS reform legislation are under discussion in Congress, which is an encouraging start. It is time to reform this broken system and stop prioritizing fuel over food.

Certain first-generation biofuels may result in GHG emission reductions, but figures vary primarily due to different calculations of emissions from indirect land use change. For instance, when corn in the US is diverted to biofuel production from the feed supply, additional feed crops must be produced elsewhere which can lead to farmers tearing up native grassland and draining wetlands to create more arable farmland.³⁴ Cropland dedicated to other food and feed crops (such as oats, barley, and alfalfa) has decreased in many countries as demand for corn, sugar, and soybean cropland rose over the past several years.³⁵

Many advocates continue to maintain that second-generation biofuels will reduce GHG emissions and have a more limited impact on land use and food prices. However, as these biofuels are not yet commercially viable and the technology is still evolving, it is not clear if that will actually be the case. It is concerning that some next-generation biofuels proposed in the US, such as corn biobutanol, would still be produced from food-based crops. The International Energy Agency (IEA) estimates that land use even for second-generation biofuels will remain high, raising questions about sustainability.³⁶

Land Rights and Social Costs

Large-scale biofuel projects present a threat to rural communities' livelihoods, food security, and land and human rights in developing countries. ActionAid works with communities around the world who have suffered the effects of large-scale land acquisitions, including significant displacements of people due to foreign investments in land projects. Biofuels are already a driving force behind land grabs.³⁷ Corporations are seizing large amounts of arable land around the world and converting them to crops for biofuel production, typically for export, in order to meet the global mandate supported-demand. These land grabs violate the legitimate land tenure rights of smallholder farmers and producers and have a significant impact on these communities' ability to feed themselves.

Case Study: Tanzania

Tanzania's farmers are feeling the impact of other countries' biofuels mandates. Even though Tanzania itself does not have a mandate in place, the mandates of other countries are fueling a land rush that has resulted in vast tracts of land being sold or leased to commercial interests. Local communities lose land previously used for farming, animal grazing, fishing and gathering, as well as for wood and water collection, often to large multinational biofuels companies or agribusinesses aiming to export what they produce.

THE SUN BIOFUELS
PLANTATION IN
KISARAWA, TANZANIA
**TOM PIETRASIK/
ACTIONAID**



In 2006, 11 villages in Tanzania's Kisarawe District lost land to a UK company, Sun Biofuels.³⁸ The company planned to plant jatropha for the European biofuel export market. Five years later, the company abandoned the 8000 hectares, having never fully compensated local villagers. This failed venture continues to undermine the communities' access to water, ancestral burial grounds, food security, and forest products. The production of cassava, the area's main food crop, declined. While the land has since been transferred to a new investor to raise cattle, ActionAid continues to work with villagers to support their rights and work to put them on a more-level playing field with foreign investors and governments in future land transactions.³⁹

Another potential Tanzanian land grab case fell apart after 2010, due to changing economic conditions and widespread public criticism. US based AgriSol Energy aimed to operate a commercial farm for biofuels, crop, and livestock production on land "occupied by 160,000 Burundian refugees who [had] been living there for 40 years."⁴⁰ Without public engagement pushing back against this land grab, the refugees would have been displaced. Continued vigilance is needed since this community could be vulnerable yet again; the company's website still maintains an interest in approximately 13,000 hectares of land in the area.⁴¹

Corporate land grabs are still a threat for Tanzanian farmers. The New Alliance (a joint initiative between the private sector and G8 and African governments) supports the Tanzanian Government's Big Results Now initiative. This initiative has plans for 25 large-scale farms, 16 of which would grow sugar for export and potentially biofuels production. The land for the first of these farms though is still occupied and the company has plans to implement involuntary resettlement of local farmers. In addition to the sugar cane farm, the company has plans to build an ethanol plant.⁴² By promoting large-scale cultivation of crops such as sugarcane, which can be used for fuel instead of food, the New Alliance will displace families, when it should be supporting the investments of small-scale farmers who grow the large majority of food actually consumed in developing countries.

Case Study: Thailand/Cambodia

Thailand and Cambodia's biofuels industries are closely linked, but have developed on alternate paths. While Cambodia has no biofuels target on the books, Thailand intends to increase its annual biodiesel and ethanol consumption to 2.2BL and 3.3BL, respectively, as part of its larger 10-year Alternative Energy Development Plan.⁴³ In 2013, Thailand consumed approximately 1BL of biodiesel and 1BL ethanol, for blend rates of 5% and 10%, respectively.⁴⁴

Thailand's ethanol industry is supported by government price supports and marketing and production subsidies for gasoline stations and vehicle manufacturers.⁴⁵ In addition, recent terminations of 91-octane regular gasoline sales have led to more ethanol use: consumption nearly doubled from 2012 to 2013.⁴⁶ Current ethanol feedstocks include sugarcane, 'spoiled rice,' and increasingly cassava, a crop with a domestic price floor.⁴⁷

Thailand's biodiesel industry is supported by import restrictions and the government's

A photograph of a man harvesting sugar cane in a field. The man is wearing a purple long-sleeved shirt, dark pants, and a red and white checkered headscarf. He is bent over, working with a large pile of harvested sugar cane stalks. The background shows more of the field with rows of cane stalks.

A MAN HARVESTING SUGAR CANE IN KAMPONG SPEU PROVINCE, CAMBODIA. COMMUNITIES IN THIS AREA WERE FORCED OFF THEIR LAND TO MAKE WAY FOR A SUGAR PLANTATION.

PHOTO: PEUPLES SOLIDAIRES/ ACTIONAID FRANCE

promotion of expanded palm acres aimed at protecting domestic palm growers.⁴⁸ While palm oil is Thailand's primary biodiesel feedstock, the government has also supported research and development into new algae and jatropha feedstocks.⁴⁹ Jatropha was once promised as an example of how small-scale agricultural production for biofuels could spur rural development. Instead, recent land grabs in countries such as Cambodia, including the violent displacement of families, have vividly demonstrated that large-scale monoculture plantations of biofuels crops have become the norm.⁵⁰

The largest sugar and ethanol producer in Thailand - Mitr Phol Sugar Corporation - has been linked to forcible evictions of at least 250 Cambodian families via its subsidiary Angkor Sugar. Angkor and two other Mitr Phol companies were able to acquire land through 70-year Economic Land Concessions they received from the Cambodian government in 2008.⁵¹ Families facing evictions have "faced multiple instances of intimidation and physical violence... Some have been shot at, wounded and jailed."⁵² A recent ActionAid report, "The Great Land Heist," profiled a rural woman from Oddar Meanchey province in Cambodia who said, "Angkor Sugar Company took our land to plant sugar cane. Provincial officers came to ask us whether we approved of exchanging our land or not. We did not agree, so they destroyed and burnt our house."⁵³ Villager Hoy Mai was five months pregnant when she lost her 20 hectares of land to the sugar companies. She said, "The soldiers arrived in trucks to take our lands. I refused. I walked for three days to get to Siem Reap, then to Phnom Penh, to protest near to the Prime Minister." Hoy Mai was arrested and imprisoned for eight months without judgment. "I did not leave prison until the day I gave birth, and then I was put back in prison with my baby." Hoy Mai's husband has since died, leaving her struggling to raise her children without any land of her own. "Now I don't protest anymore," she said, "but I want to get my land back."⁵⁴

As Hoy Mai's situation demonstrates, even though Cambodia does not have a biofuels mandate, global demand driven by other mandates still results in violations of land rights among vulnerable people there. According to a report supported by Oxfam Australia, "About one million hectares of land in Cambodia... have been rented and planned to be rented to foreign and private companies for biofuel crops plantations."⁵⁵ Meanwhile, in 2010, 29% of Cambodian children under age 5 were malnourished.⁵⁶

Analysis

This study looks at the seven major biofuel producers and consumers to calculate the approximate growth in biofuel demand for each country if they meet the current mandates for 2025. As the summary table of selected biofuels consumption mandates (Table 1) makes clear, full implementation of major biofuel-consuming countries' existing mandates and targets would represent a 43% expansion of first-generation biofuels demand over current levels.

Table 1 shows current consumption levels, mandates, and anticipated growth in demand. When looking at the data, it is important to note that this study:

- Assumes the US will meet mandates for first-generation biofuels but not for cellulosic ethanol. Therefore by 2025, the US will use 20 BG (76BL) of first-generation biofuels such as corn ethanol, soy biodiesel, and sugarcane ethanol, short of the 36BG (137BL) required by 2022.
- Treats the EU's 10% mandate as effectively 8.6%, to reflect the double-counting included in the mandate.
- Anticipates that India meets its 5% ethanol mandate, but will fail to meet its 20% biodiesel and 20% ethanol targets, which are unlikely in the short-run.
- Expects China, which has both a 10% mandate and a 15% target in nine provinces, to meet its 15% target because past targets have systematically been met.
- Uses higher targets for Indonesia, which currently has a 5% mandate for biofuels, but also has more aggressive targets of 15% ethanol and 20% biodiesel by 2025.

If countries exceed these predictions in meeting their mandates, demand could increase at a greater rate than anticipated here.

Table 1: Selected Biofuel-Consuming Country Mandates through 2025
(in billions of liters)

COUNTRY	MANDATE/TARGET			CURRENT CONSUMPTION		MANDATED INCREASE	TRANSPORT FUEL DEMAND GROWTH THROUGH 2025	ADDED VOLUME, FULL MANDATE+ DEMAND GROWTH	PROJECTED DEMAND 2025	
	Timeframe	Ethanol	Diesel	vol	% fuel supply	%	%	vol	vol	% increase
United States	2022	72 BL	3.8 BL	62.9		21%	N/A	31.1	76.0	21%
European Union	2020	10%		18.7	5.0%	72%	-8%	12.1	30.8	64%
Brazil	2014	25.0%	7%	29.0	27.5%	0%	36%	12.2	41.2	36%
Argentina	2014	5%	10%	2.0	7.6%	25%	57%	1.3	3.2	64%
China*	2020	15%	-	3.6	8-12%	50%	59%	3.9	7.5	109%
India	2014	5%	-	2.3	2.1%	42%	47%	2.0	4.3	89%
Indonesia	2025	15%	20%	0.8	3.0%	795%	65%	7.1	8.0	860%
Total Selected				119.2				51.6	170.9	43%

Sources:

All current volumes are taken from the most recent US Department of Agriculture (USDA) GAIN reports unless otherwise noted. Transport fuel demand growth rates are calculated from IEA's New Policies Scenario except for Indonesia and Argentina. Ethanol and diesel demand estimates for Argentina, for 2015-2024, are taken from USDA's GAIN Report for Argentina, 2014. Ethanol and diesel demand estimates for Indonesia, for 2015-2024, are taken from USDA's GAIN Report for Indonesia, 2014. Diesel consumption for India is derived from USDA's GAIN Report for India, 2013.

Current volumes for the US are the Environmental Protection Agency's (EPA) 2013 mandated biofuels volumes.

*China's mandate is for nine provinces only, representing just 1.1% of current fuel use and a projected 1.3% in 2025.

Full Implementation of Existing Mandates

As the table above shows, most large biofuel consuming countries with mandates or targets have only partially implemented them, with the notable exception of Brazil. Demand increases due to biofuel mandates are expected to comprise the majority of increased growth in biofuel production from now until 2025. Specifically, the mandates of the developed countries that comprise the OECD will continue to be the real drivers of biofuel demand, with the US leading the way and the EU also playing a major role. The US is close to fulfilling its mandate for first-generation ethanol; it is only 13BL away from its 76BL mandate of first-generation biofuels. The EU is about 12BL away from its overall 10% mandate, though there is wide variation among member countries in their progress.

The EU's biofuels mandate will drive a significant increase in biofuels production. The mandate requires 10% of the EU's transportation fuel to be ethanol, however the mandate allows for some double counting, so this study calculates their effective mandate as 8.6%. However, the European Parliament is currently considering proposals to cap use of ethanol from food-based crops at 7%. If accepted, the cap dramatically changes the EU's projected biofuels growth, to a demand increase of 6.1 BL instead of 12 BL. This would decrease global projected demand growth to 38%, an important and positive step.

If the EU takes action to limit biofuels from food-based crops, the US will have the most alarming level of biofuels consumption. Its reliance on corn ethanol in particular undermines any environmental benefits its biofuels policy might have had. The US will be by far the largest biofuels consumer in the world, with consumption nearly double that of Brazil, the next largest consumer. The US will also be responsible for the largest projected volume growth in demand between now and 2025. That means that the United States could have a major impact on reducing the growth of global biofuels demand by reforming its own mandate. A first step towards RFS reform would be for the EPA to finalize 2014 biofuels volumes in line with the levels proposed in late 2013, and to maintain these lower mandates. By doing so, the US would contribute 4.6BL less to global first-generation biofuels demand, leading to a 14% demand increase instead of a 21% increase by 2022. Beyond this initial step, Congress and the Administration should work to permanently reform the RFS.

For countries with mandates/targets that require a percentage of fuel to be biofuels, added transportation demand is one fifth of the overall increase in demand. Brazil, for example, is already meeting its biofuel consumption mandates. The projected 36% increase in its consumption by 2025 comes solely from fast-growing demand for transportation fuels, a high percentage of which are biofuels. In other words, while biofuels' share of the transportation fuel supply is expected to stay relatively flat, increased demand for fuel will drive an increased demand for biofuels. Argentina is a much smaller consumer with lower mandates, but increased transportation demand as well as growth to meet its mandates, are expected to lead to a 64% increase in consumption by 2025.

China and India's mandates are two of the most fluid. China currently has a 10% mandate in just nine provinces, which it has reached, with a target of increasing to 15% which would require a 50% growth in demand. However, given anticipated high growth rates in demand for transportation fuels, the projected growth rate of China's



biofuels use is 109% through 2025. Precedent suggests that future Chinese biofuels policies will continue to be mindful of domestic food vs. fuel concerns and demand for agricultural commodities, a cautious approach which began after food price spikes in 2008. This caution could ultimately lead to a change in China's mandate.

India is only halfway to meeting its 5% ethanol mandate, recently scaled back from 20%. Its 20% biodiesel target has not been reduced, but it is not included by GDAE, as it is not a binding mandate and is likely to be reduced. Still, even without added biodiesel, India's biofuel production is expected to increase by 89% to 4.3BL by 2025.

Indonesia presents the largest planned growth on a percentage basis (860%) as it moves from its current 5% biofuel mandates to aggressive 15% and 20% targets for ethanol and biodiesel, respectively. With high transportation fuel demand growth anticipated, such targets would make Indonesia one of the most significant sources of new demand for biofuels between now and 2025 – 8 BL – with the bulk of the feedstock expected to be palm oil.

This study's projected 43% increase in first-generation biofuels production over current levels is consistent with projections offered by the OECD/FAO. Roughly 3-5% of global fuel supply would be comprised of first-generation biofuels. However, growth rates could increase further if second-generation biofuel mandates are met and if countries such as India actually meet their lofty biofuel targets. In fact, based

MEMBERS OF THE K'QUINICH COMMUNITY IN GUATEMALA LOOKING OUT OVER THE LAND THEY WERE FORCIBLY EVICTED FROM TO MAKE WAY FOR A SUGAR CANE PLANTATION FOR BIOFUELS. HAVING LOST THE LAND THEIR FAMILIES FARMED FOR GENERATIONS, MANY PEOPLE NOW STRUGGLE TO FEED THEIR FAMILIES.

PHOTO: DANIELE VOLPE/ACTIONAID

on those types of expansive assumptions, the IEA estimates that up to 8% of world fuel supply will be comprised of biofuels in 2035.

Conclusion

Biofuel mandates were often created with the best of intentions. Governments set reasonable and understandable goals of energy independence, reducing fossil fuels use and promoting rural development. However, biofuels mandates are currently met using first generation biofuels that are unlikely to deliver the environmental benefits once anticipated. Even more alarming is the impact of first generation biofuels on food security and land rights. Biofuels demand contributes to higher and more volatile food costs and to land grabs in developing countries. Also concerning, and worthy of further study, is the impact biofuel production growth will have on water and land usage. However noble the original goals, the cost of biofuel mandates is simply too high.

Significantly, it is clear that growth in biofuels demand over the next decade will be driven primarily by biofuels consumption mandates. This study's prediction of a 43% growth demand is relatively conservative and far lower than some estimates, but still has frightening implications for food security and land and water use. Government policy makers have an opportunity to reform these mandates to prevent these consequences. Fuel for cars should not be prioritized over food security. It is time for policy makers to take action to reform biofuels mandates to ensure the right to food is protected.

Policy Recommendations

Implementation of biofuel mandates is driving increased demand for biofuels produced on agricultural land. Biofuels already have serious consequences for food security, land rights and the environment, and this projected growth has alarming implications.

ActionAid USA is making the following policy recommendations:

- Governments should cease the implementation, expansion, and creation of food-based biofuels consumption mandates, and international and domestic policies should do more to ensure that food security and land rights are not undermined by global biofuels mandates.
- Governments should work toward international cooperation on these issues in international policymaking venues such as the G7, G20, UN Framework Convention on Climate Change (UNFCCC), UN World Committee on Food Security, and the post-2015 development agenda.
- In the case of the US, RFS mandates spurring the expansion of food-based biofuels such as corn ethanol, soy biodiesel, sugarcane ethanol, and other food-based biofuels must be reformed.
- At a minimum, countries should enforce strict sustainability criteria, bring mandates more in line with current biofuel production, and ensure that so-called "advanced" or "next-generation" biofuel mandates are not feeding further first-generation production or continued production of food-based and land-intensive biofuels that undermine food security.

Appendix I

Below is a list of some of the major countries and regions with current biofuels mandates or targets.

Country/Region	Mandate/Target	Level of Implementation	Anticipated Growth to Reach Mandate (%)	Primary Feedstock
CANADA	5% national bioethanol mandate; 2% national biodiesel mandate; up to 8.5% bioethanol mandates in four provinces.	Fully implemented.	None.	Corn, wheat, canola oil. ⁵⁷
EU	10% of transportation fuels from renewables by 2020 but proposal for only 7% from food-based feedstocks. Projected volumes for full implementation would be around 30,000ktoe. ⁵⁸	In 2012, most countries were on track to meet the 2020 targets. Projections show the EU will fall short of its 2020 goal by approximately 1/3 using around 20,000ktoe in 2020. ⁵⁹	92% increase required to meet 10% mandate, which accounts for a drop in transportation demand.	Varies from country to country.
FRANCE	Current target of 7%. ⁶⁰	5.78% from bioethanol and 7.07% from biodiesel. ⁶¹	4.28% from EU 2020 target.	Corn and sugar beets. ⁶²
GERMANY		7-8% of transportation fuel from bioethanol in 2009. ⁶³ 2.6 billion tonnes of biodiesel in 2010; insolvency in companies is leading to lower numbers in recent years ⁶⁴	2-3% from EU 2020 target.	Vegetable oil. ⁶⁵
ITALY		4% of transport fuel from bioethanol in 2009. ⁶⁶	6% from EU 2020 target.	Rapeseed, soy, palm, cereal and wine byproducts. ⁶⁷
SPAIN	Revised targets down to 4.1% for all bioenergy and 3/9% for bioethanol in 2013. ⁶⁸	Biodiesel blending has not been enforced since 2010. Revised targets were met in 2013.	6.1% from EU 2020 target. ⁶⁹	Domestic oil seeds, imported palm, and animal fat. ⁷⁰
SWEDEN		Reached target of 10% biofuels in transport fuels. ⁷¹	Met EU 2020 target.	Rapeseed and wood pellets. ⁷²
UK		3.45% of transport fuel from bioethanol. ⁷³	6.55% from EU 2020 target.	Wheat, rapeseed, and sugar beets. ⁷⁴
ARGENTINA	10% biodiesel mandate, 5% ethanol mandate. ⁷⁵	Implemented, average national ethanol blend of 7.6% in 2013 (600 million liters). ⁷⁶	64% increase to meet current mandates in 2025, which includes increased transport demand.	Soy, sugarcane. ⁷⁷
BRAZIL	25% ethanol blend mandate, 7% biodiesel mandate. ⁷⁸	Fully implemented.	36% increase required to maintain current blend level with increased transport demand by 2025.	Sugarcane and soy
US	36BG (137BL) of biofuels by 2022 divided into requirements for first generation, advanced and cellulosic fuels. ⁷⁹	Meeting mandates for first-generation biofuels such as corn ethanol but not cellulosic ethanol derived from non-food crops.	21% growth to meet non-cellulosic mandate by 2022. Current production of 15BG (58BL) of ethanol (corn and sugar) and 1.3BG (5BL) of biodiesel.	Corn, soy, animal fat, sugar cane (imported).

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FRONT COVER:

A WOMAN AND HER SON HARVESTING SUGAR CANE IN ODDAR MEANCHHEY, CAMBODIA

PHOTO:

PEUPLES SOLIDAIRES/
ACTIONAID FRANCE

BACK COVER:

ILLUSTRATION:

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