



Sugar cane and land use change in Brazil

Biofuel crops, indirect land use change and emissions

BRIEFING | AUGUST 2010

THIS IS THE FIRST BRIEFING IN A SERIES ON INDIRECT LAND USE CHANGE AND EMISSIONS FROM BIOFUEL CROPS



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Friends of the Earth Europe campaigns for sustainable and just societies and for the protection of the environment, unites more than 30 national organisations with thousands of local groups and is part of the world's largest grassroots environmental network, Friends of the Earth International.



This publication was produced as part of the project "Feeding and Fuelling Europe" with financial support from the European Union and the European Climate Foundation. The contents of this publication are the exclusive responsibility of the Friends of the Earth Europe and Friends of the Earth Hungary and does not reflect the position of the funders mentioned above. The European Union and the European Climate Foundation cannot be held responsible for any use which may be made of the information this document contains.

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Publishing date:
August 2010

Design:
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Printing:
www.beelzepub.com

Cover image:
Sugar cane plantation
worker in Escada,
Pernambuco, Brazil.
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Sugar cane

1. Introduction

European Union (EU) biofuel targets are leading to a rapid increase in demand for feedstock crops such as sugar cane, oil palm and soy. This creates severe pressure for more agricultural land. Where this expansion occurs at the expense of forests, peat land and other carbon rich habitats, it results in substantial increases in greenhouse gas emissions from the soil and the removed vegetation. This expansion at the expense of natural habitats is often indirect, ie. biofuel crops are not planted on forestland, but instead displace other crops or pasture land which move to the forest. This makes it impossible to address this issue through sustainability certification schemes that by definition work at a farm-scale level.

Scientific research has now shown that emissions from indirect land use change (ILUC) have the potential to negate any greenhouse gas emission savings which might be generated from biofuel use. In fact the net-effect of biofuel targets could be an overall increase in emissions.

In this series of briefings – looking at three different displacement chains – Friends of the Earth illustrates the reality of indirect land use change, highlighting how the EU’s biofuel policy could in fact be aggravating climate change. This briefing looks at how increased demand for sugar cane has led to other agriculture being displaced in Brazil, resulting in deforestation and the loss of important stores of carbon dioxide.

2. Sugar cane in Brazil

Originally from India, sugar cane was first introduced to Brazil as a monoculture crop in the 16th century. Sugar cane has retained a prominent place in Brazilian agriculture and Brazil is currently the biggest producer of sugar cane worldwide (around 30 per cent of the global harvest). It is also the world’s biggest exporter of sugar and of ethanol (11 per cent of Brazilian agribusiness exports).

Today demand for ethanol drives growth in this sector. Due to recent oil price increases and the use of flex-fuel cars (run on a mix of petrol and ethanol), domestic consumption and production of ethanol have increased. This has led to a 52 per cent increase in the area planted with sugar cane, from 5.38 million hectares in 2003 to 8.21 million hectares in 2008.¹ This area is predicted to more than double again between 2003 and 2018.²

Ethanol exports have also increased to meet demand for biofuels. Sugar cane ethanol is seen as the most economical fossil fuel alternative. The Brazilian government has seen this as an export opportunity and wants ethanol to be recognised as an international commodity.

One of the most-widely proclaimed advantages of ethanol is that it significantly reduces greenhouse gas emissions. The Brazilian government knows that, to open foreign markets to ethanol, it must demonstrate that ethanol production does not lead to deforestation. In 2009, it introduced zones for sugar cane expansion, excluding two of Brazil’s most biodiverse areas: the Amazon Rainforest and Pantanal.



Sugar cane plantation fields after the harvest, Brazil.



Sugar cane worker in Brazil after burning crop before harvest.



A worker on top of a water truck puts out the fires used to clear the fields for harvesting. Orindiúva, Brazil.

Sugar cane

3. Where is sugar cane grown?

Ninety per cent of Brazilian sugar cane is grown in the southern central region, mainly in the south east. The biggest areas of expansion are currently in the midwest and south, close to the processing plants, the ports and main markets for ethanol. Sixty per cent of sugar cane production is concentrated in the state of São Paulo.

Increasing land values – and the lack of available suitable land – have driven expansion into other states, with production in Goiás increasing by 55 per cent in 2008/09 and in South Mato Grosso 30 per cent.³

This rapid expansion is expected to continue, with ethanol production projected to increase by 60 per cent by 2019 (based on 2008 levels). Most of this expansion is expected to be in the midwest, home to the Cerrado – a vast tropical savanna that supports an enormous range of plant and animal biodiversity, making it biologically the richest savanna in the world. The area covered by sugar cane in the Cerrado is predicted to increase by 365 per cent by 2035.⁴

4. Land use change

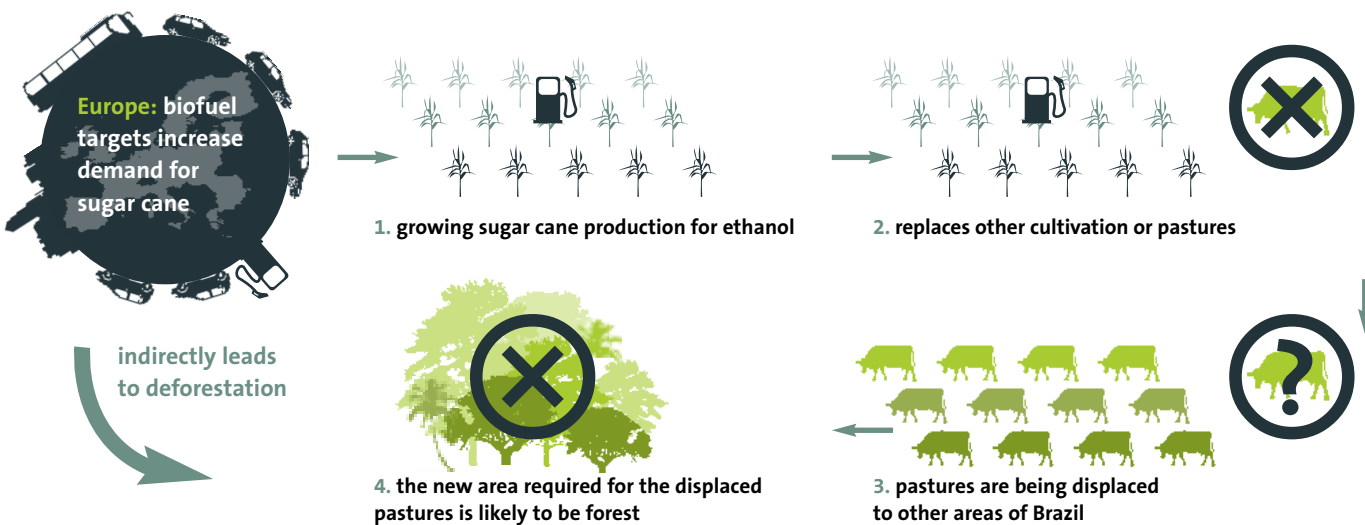
This expansion has resulted in other agriculture in the south and midwest being displaced, particularly cattle pasture. In the southern central region, 60 per cent of the expansion was on land previously used for grazing cattle.⁵

Map 1. States of Brazil



Source: Wikipedia.

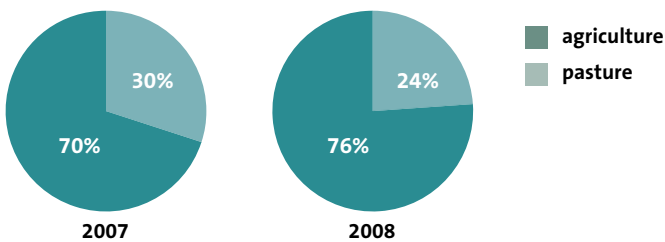
Figure 1. Europe: biofuel targets increase demand for certified sugar cane



Studies show that sugar cane is also expanding into previously uncultivated areas,⁶ particularly in the Cerrado and Pantanal. In Mato Grosso, which has areas of Amazon forest and Cerrado, as well as Brazil's largest cattle herd, eight per cent of the sugar cane expansion has been on former forest land. This means an increase in net greenhouse gases emissions.

Sugar cane is replacing soybean in some parts of Goiás where some 20 new sugar cane and ethanol plants have opened, increasing production by up to 54 per cent since 2008/09. Three quarters of the expansion was at the expense of other crops in 2008. Soybean cultivation is also expanding rapidly, according to official data.⁷

Figure 2. Types of land used for new sugar cane plantations in 2007 and 2008, by percentage



Source: Zuurbier and Vooren, 2008.

5. Agriculture and cattle in São Paulo

In São Paulo and in Parana, sugar cane expansion is displacing pasture and other crops. Between 2005 and 2008, the area cultivated with sugar cane in São Paulo expanded by 1.8 million ha. Half of this land was previously pasture (960,000 ha) and 44 per cent other crops. Some 5,500 ha of sugar cane was planted on either forested or re-forested land.⁸

São Paulo is an important source of food for the south east region, but figures for 2007 show that maize, soy, wheat and bean cultivation in São Paulo decreased.⁹ At the same time, milk and dairy prices increased.

Ranchers, displaced by the expansion of sugar cane, are moving to areas where land is cheaper. The Araçatuba region of São Paulo was once known as “the national capital of live cattle”. Former beef farmer and president of the local farmers union Alfredo Neves Filho, describes sugar cane as his “salvation”.

Maurício Lima Verde, Chairman of the Rural Union of Bauru, said farmers in the state had chosen to lease their fields to sugar-ethanol plants or to plant sugar cane, as this was three times more profitable. According to Paulo Cavasin, a local agronomist,

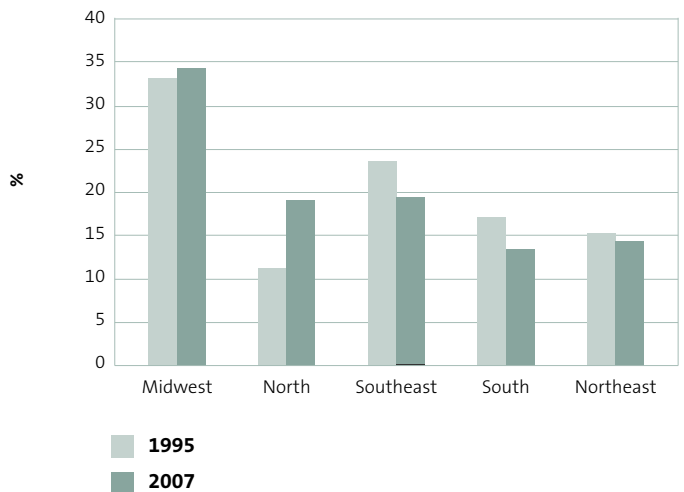
“Where there used to be cows, today there is a sea of cane and that will happen also with other sorts of farming. The state has lost a lot of dairy production to make way for sugar cane. Ranchers have left São Paulo and gone to other states. Consumers are the losers.”¹⁰

The highest rates of expansion for cattle ranching are in the north and midwest, home to the Amazon rainforest and the Cerrado. The current expansion in ranching is considered the main factor in the destruction of the Amazon rainforest, responsible for an estimated 80 per cent of total deforestation.¹¹

Recent data show the number of cattle in the Amazon increased by 78 per cent between 1997-2007. By 2007, there were 69,575 million cattle in the region, 35 per cent of the national total.¹²

As land values increase near urban areas, less profitable agricultural activities are pushed into forested areas. Cattle farming in the Amazon-dominated North increased by 81 per cent compared to 1996¹³ In Pará and Rondônia, the size of the herd almost doubled. While the cost of land was a major factor in the displacement during this period, this is now being reinforced by the expansion of sugar cane.

Figure 3. Brazil: changes in the distribution of cattle by geographical region – Share of total (%) by region between 1995 and 2007



Marcelo de Carvalho Dias, the owner of an animal feed company and a cattle rancher in São Paulo explained that because of the rising cost of land in São Paulo:

“The cattle rancher tends to lease land for cane here in São Paulo, take the money and raise cattle in the Amazon. There are regions in the Amazon as good as Ribeirão Preto [São Paulo]: good soil, good rainfall, large areas, and these areas will be opened.”¹⁴

Sugar cane

6. Ethanol's real carbon footprint

There is much controversy about the level of greenhouse gas emissions from ethanol, even when only direct land use changes are taken into account. The emissions caused by pesticide use, cane straw burning, and by soil degradation, for example, mean that emissions can increase.

When farmers move to the Amazon, trees and other vegetation are burned or cleared to make way for pasture, reducing the capacity to store and sequester carbon. As land is cleared, soil starts oxidizing, releasing massive amounts of stored carbon. While precise calculations are difficult, emissions from indirect land use change are significant.



Clearing a sugar cane field in Brazil.

New research has found that emissions from indirect land-use change could indeed be greater than the carbon savings from biofuels in Brazil, “creating a carbon debt that would take about 250 years to be repaid using these biofuels instead of fossil fuels”.¹⁵

Expansion into the Amazon also has wider impacts, with increased cattle farming likely to lead to an increased likelihood of logging, soybean planting and new illegal roads which in turn open up new areas of forest.¹⁶

Given that ILUC causes significant greenhouse gas emissions, EU policy must take a precautionary approach.

7. Conclusion

The use of ethanol instead of petrol is clearly leading to economic, social and environmental problems, which seriously undermine the supposed benefits of sugar cane. Indirect land use change as a result of expanding sugar cane plantations is leading to a substantial increase in greenhouse gas emissions, perhaps causing even more emissions than fossil fuels.

Friends of the Earth is calling for:

- Strong ILUC factors, based on the precautionary principle, to be used to calculate the impact of ILUC emissions in the life cycle analysis of biofuel emissions.
- An urgent review of EU biofuel targets in the light of findings that ILUC emissions increase disproportionately with the size of the overall target.



Sugar cane plantations in Brazil.

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