

# INSIGHTS

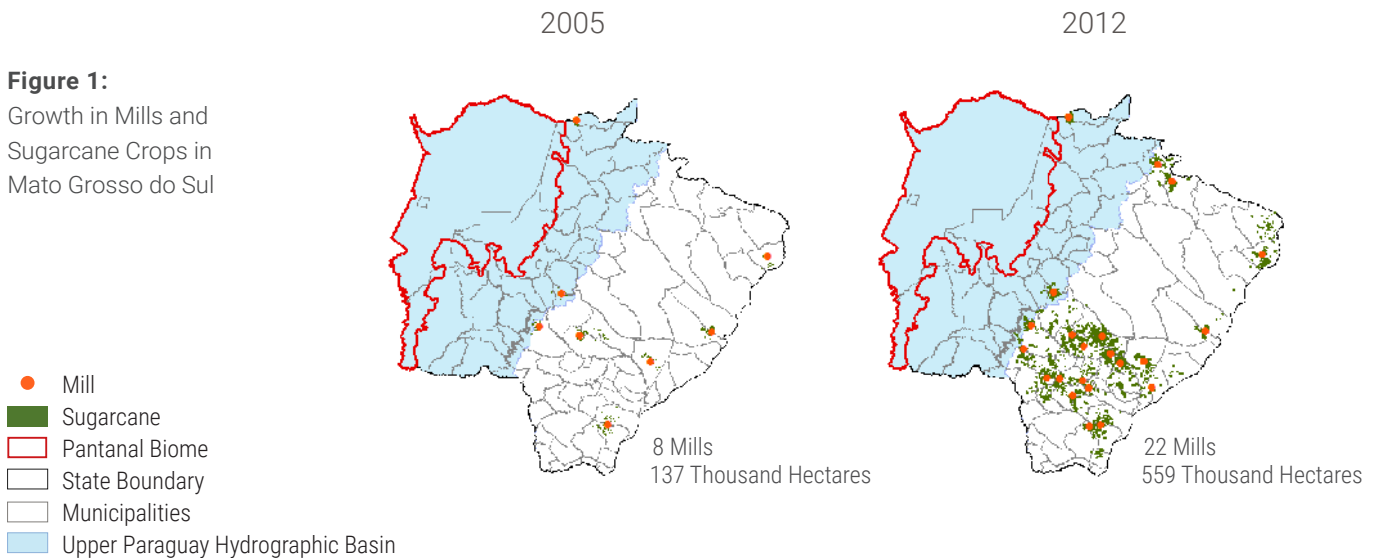
## SUGARCANE'S ROLE IN FUELING THE ECONOMY

As worldwide demand for food and alternative fuels surges, Brazil's local economies prosper and land use improves



As the world seeks to slow carbon emissions by shifting toward renewable energy and more efficient land use, remarkable opportunities arise for Brazil.

Following the introduction of flexible fuel vehicles and the accompanying jump in ethanol demand, the nation's sugarcane industry surged over the past decade. Between 2005 and 2012 sugarcane area increased 70% nationwide and production quadrupled in the Germany-sized State of Mato Grosso do Sul, a booming frontier for sugarcane (Figure 1). Forecasters project this expansion will continue over the next ten years, rising by an additional 37% in the country.<sup>1</sup>



**Note:** Maps constructed using two data sources: 1) Mill locations were obtained from Association of Bioenergy Producers of Mato Grosso do Sul (*Associação dos Produtores de Bioenergia de Mato Grosso do Sul - BioSul*); 2) Sugarcane areas were obtained with satellite images from the CANASat project from the National Institute for Space Research (*Instituto Nacional de Pesquisas Espaciais - INPE*).

<sup>1</sup> OECD-FAO (2015). *Agricultural Outlook 2015-2024*.

Today, Brazil is the world's leading sugarcane producer, its top sugar producer and exporter, and the second leading ethanol producer and exporter. Despite the large investment and expansion in these products, little evidence has been collected about how the sugarcane mills affect the rural communities where they move in. Yet, in order for policymakers and stakeholders to set effective economic, environmental, and energy policies, a richer understanding of the economic impact of the mills is crucial.

This brief is based on a new study by INPUT researchers at Climate Policy Initiative (CPI)/PUC-Rio and provides insights about the widespread reach and impacts of the sugarcane mills' expansion.<sup>2</sup>

The analysts examined the mills' impact on land use, economic growth, demography, labor markets, and financial services in municipalities in Mato Grosso do Sul.

**A richer understanding of the economic impact of the mills is crucial for policymakers and stakeholders when setting economic, environmental, and energy policies**

## KEY FINDINGS

The findings show that the mills dramatically reshape the economic structure of the municipalities where they are located, particularly in rural areas. After the mills arrived, there was a GDP increase of 30% within three years due to widespread gains in agriculture (65%), industry (45%), and services (13%). New mills

**A typical municipality in the study saw a GDP increase of 30% within three years**

also helped drive a 10% population spike and an increase of 31% in tax revenues.

Notably, the research also highlights just how far the economic boom reached. Many positive impacts are documented in sectors well beyond the sugarcane mills and farms: boosts in other crops, decrease in deforestation, growth of labor market, and improved flow of financial resources.

<sup>2</sup> <http://www.inputbrasil.org/publicacoes/combustivel-para-o-desenvolvimento-impactos-da-expansao-da-cana-de-acucar-no-brasil?lang=en>

## BOOSTS IN OTHER CROPS

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The arriving mills set in motion a profound restructuring of the local agricultural sector. For generations, land use in Brazil has been highly inefficient. One fourth of the country is taken up by pasturelands with a single head of cattle using a full hectare of pasture, on average.<sup>3</sup> Yet, in Mato Grosso do Sul, demand for land to grow sugarcane increased due to the ethanol boom. Cattle herds fell by an average of 27,000 heads in the municipalities with new mills and

ranching employment fell, too. This suggests that the mills induced a land use shift, mainly from pastures to sugarcane.

Also notable in the study were the gains in soybean and corn productivity. The researchers attribute part of this increase to an improved supply of agricultural inputs and services to all agricultural producers, including storage and transportation, as the mills drove the growth of support industries (Table 1).

The researchers speculate that this productivity increase may also be driven partly by farmers who raised investments in agriculture after their income jumped. This increase in their income possibly happened due to land rentals, selling their output to the mills, and better access to rural credit.

**The mills arrival induced a land use shift, mainly from pastures to sugarcane**

## DECREASE IN DEFORESTATION

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Three years after the arrival of the sugarcane mills, deforestation was reduced in 6.3 thousand hectares on average. There are a few possible explanations for this. First, the productivity gains might have decreased the demand for area expansion. Second, the arrival of the mills might be followed by improved compliance

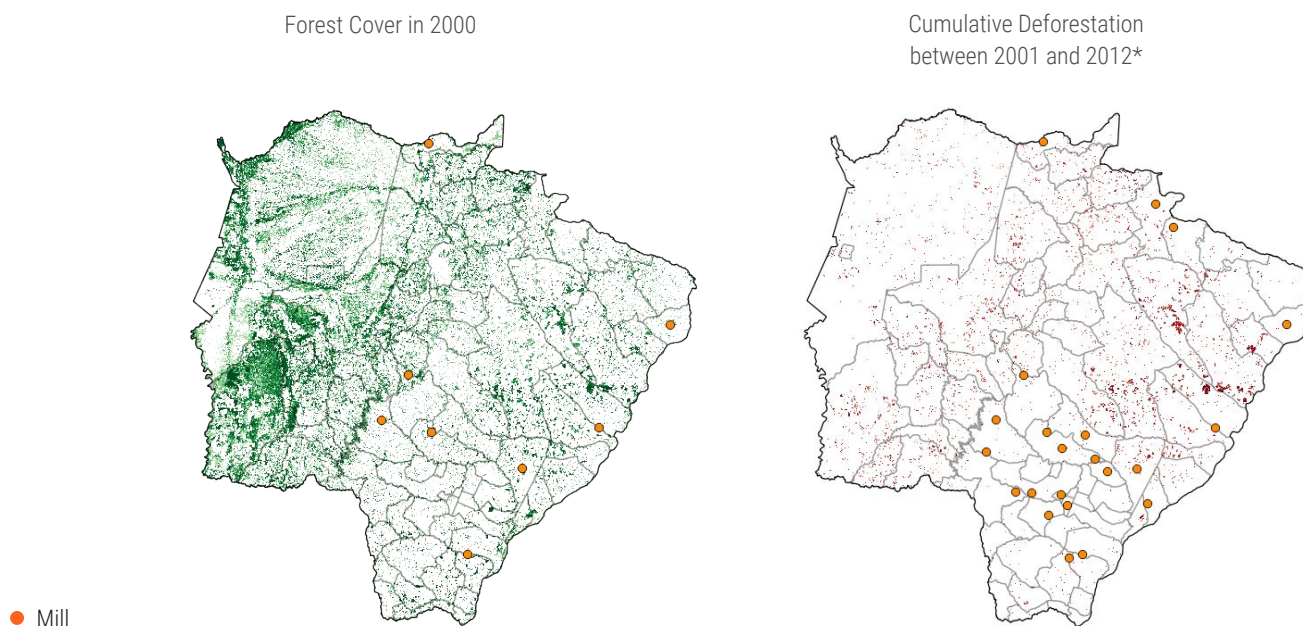
and law enforcement – either because mills belong to big companies, with higher exposure to environmental scrutiny from investors and media or because those municipalities get more economic visibility.

<sup>3</sup> According to Brazil's latest Agriculture Census in 2006.

**Table 1:** Growth by Key Sectors after the Arrival of the Mills between 2005 and 2012

Many sectors were significantly impacted by the arriving mills and grew by the following percentages:	% of growth
<b>Agriculture, livestock and forestry</b>	<b>42</b>
Growing of sugarcane	400
Agricultural service activities	149
<b>Wholesale and retail trade and maintenance</b>	<b>60</b>
Repair and maintenance of motor vehicles	147
Wholesale of agricultural raw materials	94
Wholesale of agricultural machinery and equipment	157
Wholesale of fertilizers and agrochemical products	192
<b>Transport, storage and communications</b>	<b>154</b>
Freight transport by road	316
<b>Financial intermediation</b>	<b>43</b>
<b>Education</b>	<b>103</b>
<b>Others</b>	
Mining of chemical and fertilizer minerals	67
Manufacture of fertilizers and nitrogen compounds	179
Manufacture of other chemical products	165
Repair and maintenance of tractors and agricultural machinery	2.563
Repair and maintenance of electrical equipment	New sector
Production and distribution of electricity	46
Renting of agricultural machinery and equipment	1.770

**Figure 2:** Changes in Forest Cover



\* The map on cumulative deforestation shows areas deforested between 2001 and 2012 that had forest cover greater than 50% in 2000.

**Note:** Maps constructed using data from Global Forest Change Dataset version 1.1 (Hansen et al., 2013).

## GROWTH OF LABOR MARKET

The labor market thrived throughout the region after the mills arrived. Overall, employment jumped by 40% and aggregate wages grew 49%. The mills spurred the

opening of an average of 186 more businesses per municipality, representing an 82% increase. Lastly, the educational level of the labor force rose.

## IMPROVED FLOW OF FINANCIAL RESOURCES

The study shows a deepening of the financial services available throughout the municipalities where the mills expanded. Total private deposits increased by R\$4.8 million (103%) and rural credit for investments, expenses, and commercialization rose by R\$18.5 million (77%).

**Many positive impacts were documented in agricultural production, deforestation, the labor market, and the flow of financial resources**

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## CONCLUSION

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Brazil's economy has much to gain from the increasing world demand for sugarcane-based products. The economic benefits driven by private investment are transformative for communities impacted by this growth.

Furthermore, with careful stewardship by policymakers, Brazil is in a strong position to promote local economic growth while increasing land use efficiency.

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## SOURCE

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“Fueling Development: Sugarcane Expansion Impacts in Brazil” Working Paper (2016).

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The **Land Use Initiative (INPUT - Iniciativa para o Uso da Terra)** is a dedicated team of specialists who work at the forefront of how to increase environmental protection and food production. INPUT engages stakeholders in Brazil's public and private sectors and maps the challenges for a better management of its natural resources. Research conducted under INPUT is generously supported by the Children's Investment Fund Foundation (CIFF) through a grant to the Climate Policy Initiative. [www.inputbrasil.org](http://www.inputbrasil.org). The New Climate Economy project also supported this analysis.