

# Mechanizing sugarcane harvesting and retraining sugarcane harvesters in Brazil

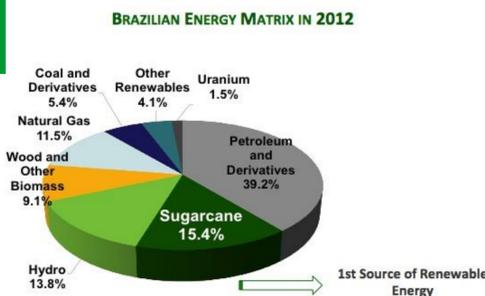
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## Background

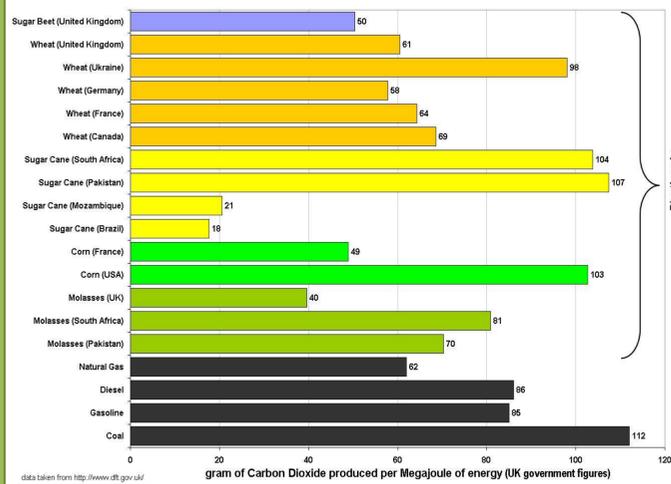
- Sugarcane production in Brazil is becoming increasingly important for the economy
  - Ethanol derived from sugarcane accounts for 18% of the energy used in Brazil
  - The industry employed 1.1 million workers and contributed \$36 billion to Brazil's GDP (1.6%) in 2012
  - The government has implemented policies that further popularise the use of ethanol, especially in cars.
- The increased use of sugarcane ethanol for fuel beneficial to general public health as it reduces emissions by 61%.
- 60% of the sugarcane is produced in the state of Sao Paulo while the rest is spread in a few states across the country.



<http://www.worldatlas.com/webimage/flags/countries/zzzflags/brlarge.gif>

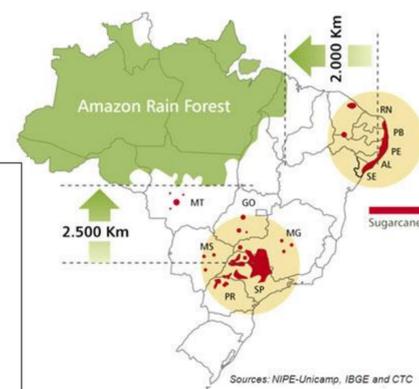


Sources: Balanço Energético Nacional (2013) and International Energy Agency: World Energy Outlook 2012 and Key World Energy Statistics 2012 and Eurostat (2013). Compiled by UNICA.  
<http://sugarcane.org/the-brazilian-experience/brazils-diverse-energy-matrix>



data taken from <http://www.dft.gov.uk/energy/energyemissions/energyemissions.pdf>  
<http://urbantimes.co/2012/03/brazil-energy-policy-ethanol-or-fossil-fuel/>

## Sugarcane producing regions in Brazil



<http://www.brazilintl.com/agsectors/sugarcane/map-sugarcane/map-sugarcane.htm#.U1yvKPlidUz4>

## The Problem

Experiments conducted have shown that harvesting sugarcane after the traditional burning process (which is used to clear the extra green and kill dangerous animals) can lead to serious long-term impacts on the workers' health:

- Respiratory System** – Residual smoke from the burning process causes an 80% decrease in nasal mucociliary clearance which is a “critical innate respiratory defence mechanism.” An impaired system leads will reduce the ability to remove particles and microorganisms, leading to an increased risk of respiratory infection.
- Cardiovascular System** – The intensity of the physical activity leads to muscle lesions and oxidative stress. The impact of the air pollutants is worse as it causes heart rate variability, changes in blood coagulation and high blood pressure.
- Cancer** – The harvesters develop genotoxicity as a result of the pollutants emitted during biomass burning. There is an increase in biomarkers, such as micronucleus, and a higher mean level of buccal cells and lymphocytes in the workers' blood, both of which are associated with diseases such as cancer.

The problem is currently being tackled through Project RenovAção in the state of Sao Paulo, but the other states have not yet taken any action.

## Current Solution – Project RenovAção

- A collaboration between Unica (Union of the Sugarcane Industry), the Federation of Rural Workers in São Paulo (Feraesp), the Solidaridad Foundation, supply-chain companies like John Deere, Syngenta and Case IH, and the Inter-American Development Bank (IDB).
- These organisations, along with the state government that passed the law to eliminate pre-harvest sugarcane burning by 2021, are aiming to mechanise the harvesting process.
- The program makes provisions for the consequent unemployment by providing the rural workers with new professional opportunities through retraining programs that prepare them for new jobs at the sugarcane mills or for jobs in other sectors of the economy.

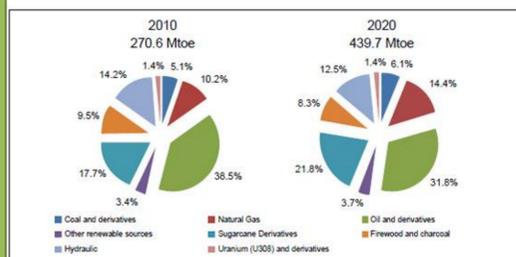


Figure1–Evolution of the total primary energy supply  
[http://www.scielo.br/scielo.php?pid=S0103-40142012000100017&script=sci\\_arttext&tlng=en](http://www.scielo.br/scielo.php?pid=S0103-40142012000100017&script=sci_arttext&tlng=en)

## Analysis

**Scaling Up** - The nationalising of Project RenovAção will require scaling up in three major areas. The political scaling up will require a law similar to that in São Paulo being passed on the national level. Since the program has the support of the unions and helps increase sugarcane production, which has long been a goal of the Brazilian government, it is unlikely that this should be an obstacle. The quantitative scaling requires the program to be expanded to more areas, which are clearly defined as the sugarcane producing regions in this scenario. The financial scaling up can be accomplished with the support of the government, as it will have to find and collaborate with local NGOs, educational institutions and supply-chain companies.

**Funding** - The responsibility for the entire mechanisation process should be the responsibility of the *Sistema Nacional de Credito Rural* and should be implemented on a loan basis, where the farmers pay back the cost of the machines in instalments over a period of time. The cost of mechanisation will be offset by extra earnings through the increased production and productivity as well as by the money saved in the form of wages of manual labourers.

**Partnerships** - Supply-chain firms should still be involved in the program as they can tie up with the government to sell their machinery to the farmers in return for hiring retrained workers. Such partnerships will entice companies to be involved and can help boost the economy.

**Accountability** - The state governments can work with NGOs to ensure the workers are being retrained for jobs in demand in the state and are being accounted for in order to improve employment, create efficiency within the system, and help the state economy. It will also lead to accountability between the NGOs and the government and employers.

**Greater Reach** - By successfully linking up with NGOs, the government can make the most of their local networks to find jobs and ensure that the workers have a guaranteed source of income and alleviate the uncertainty associated with the future of the harvesters.

## Conclusion

As it stands, more than 400,000 sugarcane cutters in Brazil continue to be exposed to the residual smoke from the pre-harvest fire in the fields. The Brazilian government needs to implement a program similar to Project RenovAção in the rest of Brazil. This will include mechanising the harvesting process and retraining the workers with skills to earn an income through other jobs in the sugarcane mills, or jobs in other sectors. In order to ensure the success of such a program, the government should provide funding through the *Sistema Nacional de Credito Rural* to allow the farmers to buy the machines, and should work with local NGOs to set up retraining facilities. Accountability can be ensured through involving different levels of government, the unions and NGOs. Swift action will prevent labourers from facing long-term damage to their health, and will allow a healthy expansion of the sugarcane ethanol industry as a domestic fuel source and as an important export.