



## Luís Cortez and Muriel Maymone Cortez

Brazilian Center for Research in Energy and Materials-CNPEM, Brazil

### The Expansion and Potential Impacts of Corn Ethanol, the case of Brazil

Corn ethanol production is expanding fast in Brazil. In 2021 corn ethanol production may reach about 2.7 billion liters and will represent almost 10% of Brazilian overall bioethanol production. Its development is mostly concentrated in the North-Central states of Mato Grosso and Goiás, coincidentally very important states in beef and soyabean production.

The USA is the country where corn ethanol is mostly produced and has a well established integrated model involving the biofuel and the beef industries. Now, with the recent and fast progress of corn ethanol production in Brazil, several questions may raise about how the US model can be adapted. The questions discussed in the present paper are related to the possible benefits and constraints associated with the expansion of corn ethanol production in Brazil.

As far the potential for expansion, the ethanol market in Brazil will grow driven by the “Renovabio”, a federal government program conceived to boost renewable fuels to mitigate GHG. The present production should raise almost 50% reaching about 50 billion liters in 2030. To give an order of magnitude, this is close to the US overall ethanol production today. The corn ethanol produced in North-Central states of Brazil could cope with the ethanol demand in that region where it is traditionally both difficult to supply and also more expensive for consumers than in Southeast Brazil. Ethanol is frequently imported for that purpose.

Concerning the land use, corn is produced in Brazil in two different ways: as main crop and double crop. Double cropping is done with soybean and responds for about 2/3 of all corn produced in Brazil and is becoming more important every year because of clear economic advantages. Today corn production is already above 100 million tons, growing fast, and is the second most important crop in Brazil after soybean.

As far as the expected Carbon Intensity, the corn ethanol production in Brazil most likely will present better figures than in USA because here no fossil fuel is and will be utilized in the processing phase. Eucalyptus, a fast-growing tree, also renewable source of energy, will be planted for that purpose.

Another important benefit of corn ethanol production in Brazil is related to its integration with the local beef industry. The beef cattle in Brazil occupies nearly 20% of total area in the country reaching about 160-200 Mha. This represents approximately three times the present agricultural land in the country, which is about 70 Mha.

The integration of corn ethanol-beef industry could in relatively short time, may be one or two decades, free enough land to allow more sustainable growth of Brazilian agriculture while helping to preserve ecological sanctuaries such as the Amazon forest.

The main doubts concerning the corn ethanol-beef integration are related first with the capacity of Brazilian cattle to adapt to the new feeding model which involves the use of corn ethanol coproducts, such as the DG (distillers grains). Also, this integration will imply in intensifying the present highly extensive production model used by the Brazilian beef industry, particularly in that region.

Another important consideration is related to the climate because corn in Brazil is mostly produced without irrigation and frequently suffering drawbacks due to irregular rain that affect the double cropping.

The introduction and expansion of corn ethanol production in North-Central Brazil may initially appear as a treat to the environment. However, as we intend to demonstrate, more in-depth analysis of all sustainability criteria utilized will show exactly the contrary. Considering all relevant aspects, the corn ethanol production could greatly benefit land use, create sustainable economic prosperity, help to stop unnecessary deforestation and help to preserve rain forest in Brazil.

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### Biography

He completed post graduation in energy. Now he is a professor in Interdisciplinary Center for Energy Planning (NIPE), University of Campinas, Campinas 13083-896, Brazil