

*Edmar Luiz Fagundes de Almeida and Carla M. de Souza e Silva*  
**BRAZIL AS A WORLDWIDE ETHANOL SUPPLIER:  
POTENTIAL AND OBSTACLES**

Edmar Luiz Fagundes de Almeida: Department of Economics – Federal University of Rio de Janeiro,  
edmar@ie.ufrj.br

Carla M. de Souza e Silva: PhD Student – Department of Economics – Federal University of Rio de  
Janeiro, carla@ie.ufrj.br

**Overview**

Brazilian ethanol is considered the most competitive type of biofuel in the world. This competitiveness is motivating an export drive policy by Brazilian government and ethanol players. The objective of this paper is to provide a critical review of the potential for ethanol production and exportation in Brazil. This critical assessment will be focused in three main aspects: the Brazilian potential as a worldwide ethanol supplier; direct and indirect environmental impacts of the expansion of ethanol production in Brazil to supply the international market; and the economic viability and obstacles for ethanol exportation.

**Methods**

The paper is based on a critical review of the Brazilian and international literature on the performance of Brazilian biofuels (including reports from the OECD, IEA, IISD and UN). Concerning the potential for ethanol production and exportation, it will be compared different estimations on the evolution of Brazilian supply and demand, the estimations on the evolution of international (European) supply and demand and aspects concerning technical (normalization issues and sustainability certificates) and fiscal barriers (import duties) to international trade. Regarding the environmental impact, the paper takes into consideration future production to supply the international market. It will be emphasized the potential for ethanol to reduce GHG emissions and impacts of the expansion of ethanol production for deforestation. Finally, concerning economic viability, it will be highlighted the factors responsible for Brazilian competitiveness in relation to its counterpart in US and EU and also in relation to gasoline production cost.

**Results**

Recent studies developed by the Campinas University for the Brazilian Government projected a potential for ethanol production and exports equivalent to 5% of the global demand for gasoline by 2025. In order to achieve this target, it would be necessary to increase ethanol production by a factor of 8.3. This study has pointed out large land areas still available to energy crops in Brazil, excluding all environmentally-sensible land, such as the Amazon region. Given this potential to increase ethanol production in Brazil, it is expected that the country will continue to be the main world exporter, besides the growing domestic market.

Although, biofuels have become a priority of the energy policy worldwide, the development of an international market of ethanol is facing important obstacles: i) most countries that emphasizes ethanol, give priority to domestic production. In Europe and in US, for example, ethanol programs are based on arguments of auto sufficiency and regional development, leaving little or no space for ethanol importation. Discussions about introducing ethanol in the energy matrix of non-producer countries like Japan, are facing important obstacles related to energy security. In order words, these countries require a level of security of supply that Brazil is not yet prepared to provide, given the possible conflict between domestic and international ethanol market.

Concerning the environmental impacts the expected results are that the most harmful impact is the burning before harvest. The emissions of GHG on this phase of production can surpass the economy of GHG emissions on demand side. The solution to this question is the increasing mechanization, which can lead to social problems concerning agricultural employment. The increase in production will be achieved by the expansion of agriculture frontier and this will require a closer monitoring in order to prevent deforestation. The economic competitiveness of Brazilian is expected to be based on two main aspects: i) the gross feedstock cost per liter of ethanol (sugar cane feedstock in Brazil is cheaper than corn (US) and sugar beets (EU) and the difference in costs compensate relative disadvantage in terms of ethanol yields per hectare and ethanol yields per tonne of hectare) and ii) the developments in productivity (which includes the use of cane bagasse in energy cogeneration). Economic competitiveness of ethanol production in Brazil can benefit also from developments in cellulosic technology once the cane bagasse that is used to generate energy could also be used to increase ethanol yield per tonne of feedstock.

### **Conclusions**

The paper shows that Brazil has the potential to become a significant supplier of biofuel the world. However, important challenges should be tackled before an international market for ethanol should develop. The most important are:

- Security of supply in the context of ethanol international trade. In order to guarantee the security of supply exporting and importing countries should coordinate their energy policy in order to avoid possible conflicts between Brazilian domestic and international markets. Increasing the number of ethanol suppliers should contribute to increase security of supply.
- Environmental balance should be positive, in particular considering GHG emissions. It is important to guarantee that the expansion of ethanol production is not made to the detriment of the environmental sustainability. Biofuels contribution for the reduction of GHG emission is a necessary condition for the development of a long-term international market for ethanol.