

BIOFUELS IN MEXICO

Diversifying energy supply and increasing the use of renewable energies is convenient for Mexico due to strategic, economic and environmental reasons.

Biofuels may play a prominent role in this effort, but it's imperative that their use and production adhere to strict sustainability criteria.

By making appropriate use of biofuels Mexico can contribute to solving global problems and play a leadership role while demonstrating the responsible use of its resources.

In this country, it's necessary to ensure the following in order for biofuels to be beneficial for society and the environment:

- **Contribute to the national and regional economic well-being**
- **To not wrongfully impact the quality of air, water and soil**
- **To genuinely reduce net emission of greenhouse gases**

According to the International Energy Agency (IEA), the benefits regarding reduction of greenhouse gases are significant only to ethanol (extracted from sugar cane) and for second generation biofuels made from lignocellulosic material.

Without adequate planning for the cultivation of raw materials for second generation biofuels, the mitigation of greenhouse gases could be negatively affected, which currently ranges between 60% and up to a 120% compared to fossil fuels.

- **No requirement of substantial subsidies**

The United States of America is an example of the problems that high subsidies can generate on biofuels. According to a statement from the Global Subsidies Initiative (GSI), subsidies in the USA have reached a record high and are a very expensive way to reach public policy objectives with potential impacts on the environment and economy. They recommend examining the supposed benefits that come from the subsidies to biofuels and compare them with the costs of reaching the same goals through different means.

- **They should not compete with food production or negatively affect the food market**

There is a wide consensus amongst diverse scientific studies that biofuels also contribute to the price increases on food. One of these meta-analyses concludes that the three largest factors that made food prices go up in 2008 were: the worldwide change in production and consumption of basic food products, the dollar depreciation, and the production growth of biofuels.

Other studies reviewed by the World Bank indicate that most models predict that the future development of biofuels would result in price elevation of foods, the decrease of cereal exports from the United States and the European Union, decrease in agricultural aid programs, increase of rural jobs and an ambiguous effect in the livestock sector.

- **Do not affect biodiversity nor contribute to deforestation**

The generation of raw materials for biofuels may affect grazing lands or forest's carbon balance. A recent study made in Southeast Asia estimated that it will take between 75 to 93 years for the carbon emissions saved from the use of palm oil fuel to compensate the loss of carbon from the forests being converted.

Biomass extraction from the wetlands and other water bodies can improve the quality of ecosystems and their biodiversity, but the extraction of forest residues can negatively affect the local nutrient balance and increase erosion risk. Fighting deforestation may be a better mitigation strategy for climate change rather than the forests being converted for biofuel production, and it can also help nations fulfill their international commitments reducing the loss of biodiversity.

- **Do not entail to excessive use of fertilizers and pesticides that harm ecosystems**

The nitrogenous fertilization in the production of biofuels can provoke high nitrous oxide emissions (N₂O, a very powerful greenhouse gas) making the global warming problem worse.

The most convenient cultivation over a nitrogen base and use of land is the sugar cane, contrary to the soy and rapeseed which are less effective.

- **Do not diminish or exhaust essential natural resources like water and fertile soils**

In the life cycle analysis of biofuels, where the direct and indirect impacts of changing land use is taken into account, the environmental benefits can be minimal or even negative. When these impacts are not taken into account, emissions and energy savings for sugar cane can be between 49-85% with regards to fossil fuels.

For the use of residues (2nd generation biofuels), the impacts are small or positive, but negative impacts may occur if the retreat is excessive, thus affecting the quality of the soil and its biodiversity.

Water consumption and the use of agrochemicals in biofuel production can negatively affect the availability and quality of the water. Water consumption is high for biofuel production and it can reach 20,000 liters (5283.4 Gallons) of liquid per liter of biofuel.

Second generation biofuels appear to offer better benefits because they allow the use of residues, non-food cultivation, less amount of soil per unit of ethanol and the use of lands not apt for food cultivation. In many ways biofuel success is linked to the biotechnology success.

A smart and responsible policy to promote biofuels in Mexico must take into account all of these factors as well as to harness international experiences and data, very abundant now, in order to find our way towards sustainable energy development.

Some of the production systems for biofuels that have been suggested or adapted in other countries don't comply with the sustainability criteria mentioned before; and they have been justified on economic and energy-related circumstances, very different than the ones that prevail in Mexico. Thus, we need to be careful and not adopt strategies that are working in other countries and whose contexts are different than ours (from the biofuel perspective, Brazil and United States are very different than Mexico).

One of the most employed arguments to promote the use of biofuels is their contribution to solving the global warming problem resulting from the emission of greenhouse gases. This aspect has been the cause of many analyses and great controversy, but what is clear today is that not all biofuels contribute to the reduction of greenhouse gases in the atmosphere. For example, the integral studies on the life cycle of biofuels indicate that ethanol produced from corn doesn't help to solve the problem, and the one obtained from sugar cane only has a positive effect if it's obtained through an efficient manner and all of the derived products are entirely used.

In general, if fertilizers and fossil fuels are used for producing and transporting biofuels, the emissions associated to carbon dioxide and nitrous oxide (a very powerful greenhouse gas) will compensate in a great way the benefits of using renewable fuels.

In fact, it's clear that in many cases the net effect is negative and instead of fighting climate change it promotes it.

To ensure that biofuels genuinely contribute to solving global warming, it's necessary to carry out a comprehensive life-cycle analysis in each case that quantifies all the emissions associated with these products. For such reason, regulations being developed in California and Europe contemplate regulating the way that biofuels are produced, in order to guarantee that their climate impact be positive. With the same purpose, an international certification system is being developed for the production of sustainable biofuels.

For these reasons, making the use of fuels from renewable sources mandatory without the proper regulations would imply high economic and environmental costs and could result counterproductive.

In Mexico, any legislation established to promote the use of any of these products must include certification and monitoring mechanisms so they truly guarantee that the expected benefits are achieved.