Sugarcane ethanol: sustainable feedstock for bioplastics
Alfred Szwarc

A number of independent studies conducted in recent years have assessed the production of both sugarcane and sugarcane-based ethanol in Brazil from a sustainability standpoint. When evaluating the main elements that make up the production and supply chain, the results of these studies indicate an extremely favorable and consistent scenario.

Sugarcane has been cultivated in Brazil since colonial times and now covers some nine million hectares, representing about 1.5 percent of the country's arable land. Ethanol production currently consumes 55 percent of the sugarcane crop, while the balance goes to making sugar. Roughly 90 percent of all Brazilian sugarcane is grown in the South-Central region of the country, with 60 percent coming from the State of São Paulo alone.
The second largest cane-growing area is the Northeast.

Together, these two regions account for almost all of Brazil's production. Both lie more than 2,000 km from the edges of the Amazon region, making allegations that sugarcane is devastating the Amazon Rainforest unfounded. Deforestation is a complex problem that involves issues of land titles, politics and economics, and above all is related to disputes over the ownership of the land, illegal logging and cattle breeding.

To avoid the spread of false information about sugarcane planting in environmentally sensitive regions, including the Amazon Rainforest, the Pantanal Wetlands and the Atlantic Rainforest, the federal government enacted a system of agri-ecological zoning in 2009 that bans sugarcane planting in these areas. This initiative follows a similar move by the State of São Paulo in 2008. As a result, most new cane fields occupy areas that were mainly degraded pastures, which helps to restore the land and bring it back into the productive mainstream of farming.

In Brazil, large tracts of land are available for sustainable expansion of sugarcane plantations and ethanol production. This situation offers a unique opportunity to expand the bioplastics industry.

The often alleged competition between sugarcane harvesting and food production is a myth that has its roots in the competition over grains as a source for food or energy, which exists elsewhere. Brazil is a major food producer and exporter and official statistics demonstrate that the expansion of sugarcane planting has not affected the production of corn, soy, rice and beef, amongst other key commodities. Moreover, it is important to understand that almost half of all sugarcane harvested in Brazil is destined to sugar production, which is a food ingredient. It is also worth noting that sugarcane plantations are normally managed under a crop rotation system: sugarcane is a perennial plant that requires replanting after five to six years, at which point it is common to rotate the land to a grain crop like corn, soy or peanut.

It is generally accepted in Brazil that sugarcane is a relatively low impact crop when compared to other traditional crops. For instance, compared to soy or corn cane involves relatively low soil loss. Herbicide and pesticide use in sugarcane cultivation is also lower than in other common crops such as tomatoes and apples, and it can be further reduced through the use of new strains of sugarcane, enhanced biological control and organic farming.

Sugarcane plantations also use relatively small amounts of fertilizers. An important reason for that is the practice of recycling nutrients by treating the soil with vinasse and filter cake, which are industrial residues from sugarcane processing.

Because of favorable rain patterns in the regions where sugarcane is produced and the

application of vinasse, which is essentially water rich in minerals, irrigation is limited to dry areas in the Northeast and to specific situations that require complementary or so-called “salvation” irrigation. Therefore, it can be said that water consumption in sugarcane fields is quite low in Brazil.

Burning sugarcane in the field has been a traditional practice in the majority of countries where the crop is grown. A controlled burn is conducted prior to manual harvesting to facilitate the cane cutters work. While burning is still being used in Brazil, it is being rapidly phased out as manual harvesting is replaced by mechanized harvesting, which can be done without the use of fire. Plans call for the elimination of cane burning in São Paulo State by 2014 in areas where mechanized harvesting is possible with existing technology, and by 2017 in more difficult terrain where steeper slopes make mechanization more difficult. São Paulo, the leading sugarcane producer in Brazil, is leading by example with over 60 percent of its planted area already harvested with machines.

Processing sugarcane into ethanol and sugar has also seen considerable technical progress over the last decade.

Water consumption has been significantly reduced, with drops over 80 percent. Discharge of waste products, which is controlled through environmental regulations, can only be carried out after the effluents have been treated properly. The efficiency of effluent treatment systems is normally greater than 98 percent.

Ethanol and sugar production plants in Brazil are integrated within single industrial units and produce their own energy by burning sugarcane bagasse – the fibrous residue left after cane has been crushed to extract the sucrose-rich juice. The bagasse is used as boiler fuel, offering a significant environmental advantage through the substitution of fossil fuels. These boilers generate thermal energy and electricity (dubbed bio-electricity) needed for the industrial processes and other uses. In addition to providing an appropriate use for the bagasse, this process helps to reduce the emission of carbon dioxide and nitrous oxides, while eliminating emissions of sulfur oxides. The only significant emission is particulate matter, which can be reduced by using standard emission control systems.

Production of sugarcane ethanol in Brazil enjoys an extremely favorable energy balance. For each unit of fossil energy consumed during production, more than nine units of renewable energy are produced. Taking into account the entire life cycle of the product and its inherent characteristics – renewability and low carbon content – sugarcane ethanol can be considered an environmentally sustainable feedstock for bioplastics.

Another point to consider is the significant potential for producing second-generation ethanol from sugarcane bagasse, which could allow for increased outputs combined with enhanced sustainability.

UNICA welcomes and supports sound and well balanced sustainability certification initiatives. Not only do they promote good sustainability practices both in cane fields and industrial plants, but also stimulate innovation and the adoption of higher industry standards.

They also enable traceability of the certified products in the distribution chain. BONSUCRO is a positive example of what can be accomplished in this regard. It is a global multi-stakeholder non-profit initiative that develops environmental, social and economic criteria and indicators covering the entire production process for sugar and ethanol. BONSUCRO aims to establish a standard for certification of responsible practices in the sugarcane industry throughout the world. The

organization was formally recognised by the European Union in July 2011 and has already issued its first sustainability certificate, which turned out to be a Brazilian sugarcane mill.

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Alfred Szwarc is the UNICA´s Emissions and Technology Consultant