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## **The Benefits of Sugarcane Chain Development in Africa**

### **Industry Speaks**

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### **Abstract**

As consumers continue to be concerned about the future of sustainable agriculture and the scarcity of natural resources, biofuels can be an important component of the “people” solution through job creation, development and interiorizing economic activities of a country through moving money from cities into rural areas.

The Brazilian sugarcane industry is well developed in terms of corporate social responsibility and can serve as an example for other countries such as Africa. The objective of this article is to show how sugar cane can contribute to the development of Africa by producing renewable fuel for use in booming African cities. A supply of sugar can be developed for use in local markets and exports. Other opportunities exist to produce bioelectricity from the process of burning the bagasse and other new products such as plastic and diesel. In the case of Ethanol, this fuel has proven to be the most efficient in competing with gasoline in the last 40 years, and Africa may gain with a strategic plan on ethanol.

**Keywords:** Agribusiness, Sugar Cane, Strategy, Africa

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## **Introduction**

Sustainability has received a great deal of attention across the world in recent years and has become a central part of the agribusiness agenda. This increased awareness can be attributed to the rise in consumer expectations about the way food is produced and where it comes from; the emergence of a new generation more worried with planet conditions; the scarcity and, in some cases, depletion of natural resources as farmers increase production to feed a growing population; and the effects of climate change. Perhaps more importantly, the advent of the Internet and the viral growth of social networking enable real time dissemination of information about natural disasters, unethical behavior of companies, among others, mobilizing groups and broad societal reaction as never seen before.

The impacts for agrifood system participants are hard to ignore. Farmers and agribusiness companies are now expected to reduce their environmental footprint, to increase transparency and facilitate a better flow of information, to be better governed and promote corporate social responsibility, to be more inclusive, and to be better stewards of the environment and increase the usage of renewable energy sources. The legitimacy of agribusiness firms – and entire agrifood value chains – is not only dependent on economic factors but also on social and environmental sustainability. Simply put, in the 21st Century planet and people matter as much as profits.

The current consensus on sustainability is based on three major pillars: the economic dimension (profit), the environmental dimension (planet) and the social dimension (people). On the economic side, the major factors to be considered are how companies, value chains and networks are dealing with margins, profits, compensation, chain losses, communicating with final consumers, improving credit conditions with benefits to sustainable projects, risk management, information technology and overall strategies to reduce costs and eliminate waste. Without economic sustainability, private firms cannot afford to respond to society's demands – a fact sometimes forgotten by some sustainability advocates.

Doing well economically is not enough. On the social side, society demands companies to comply with labor laws and adopt world-class working conditions not only for employees but also for suppliers and distributors. In addition, society increasingly expects businesses to foster local community development, to incentivize collaboration and cooperation along the value chain, to adopt smallholder-friendly initiatives, to facilitate technology transfer and capacity building for smallholders and to offer broader consumer benefits. Finally, on the environment side, the major factors to be considered are related to the impacts of the company – and integrated suppliers – on the environment. These include transportation issues (food miles), packaging (recycle/reuse/rebuilt and using new materials and fewer materials), waste management, emissions, water management, green buildings and facilities, and carbon footprint, just to name a few.

To some extent, these changes are occurring in developed and some emerging economies. But how about poor countries – particularly in Africa?

## **The Role of Biofuels in Delivering Sustainability**

Some researchers suggest that biofuels could play a big part in the solution for poor countries to diversify business and ensure sustainable development. According to Zarrilli (2007), several countries that implemented biofuels development programs have experienced significant job creation, especially in rural areas but also along the value chain. Poschen (2007), the senior International Labor Organization's specialist on sustainable development, estimates the amount of jobs created in the renewable energy sector will double by 2020 with about 300,000 new jobs. In the

early phase of the bio-ethanol program in the US, around 147,000 jobs were created in different sectors of the economy.

This short article outlines some potential benefits of biofuel development in Africa. The development of the sugarcane industry in Brazil may serve as a model. The industry output is impressive: 550 million metric tons of sugarcane is used as raw material to produce 31 MMT of sugar (equivalent to 20% of world production), 27 billion liters of ethanol (30% of world production) and bioelectricity. Ethanol production alone creates 465,000 direct jobs, which is six times larger than the oil industry in Brazil. According to industry estimates, the average wage paid by member companies of the Brazilian Sugarcane Industry Association (UNICA) was double that of the current federal minimum wage. Ethanol production is present in 1,042 municipalities across the country, compared to only 176 for oil. This translates into more income distribution and community development in rural areas. As for the environment, the use of sugarcane ethanol has generated a reduction of 600 million tons in CO<sub>2</sub> emission since 1975, an amount equivalent to the carbon sequestered with the planting of 2 billion trees. In economic terms, specialists conclude that for every liter of ethanol use, the country saves US\$ 20 cents in carbon mitigation costs. Air Quality researchers at the University of São Paulo School of Medicine estimate that if every car in the São Paulo metropolitan region were fueled exclusively with gasoline, the city would face annually more than 400 additional deaths, 25,000 hospitalizations and an increase of US\$ 80 million in healthcare expenses.

Chaddad (2010) describes the leadership role of the Brazilian Sugarcane Industry Association (UNICA) in coordinating value chain participants and also in advancing the sustainability agenda. Since 2007 UNICA has been working on several fronts to facilitate industry-wide sustainability efforts, including:

- signing an agreement with the government of São Paulo state – called the Green Protocol – in which the industry voluntarily agreed to speed up the phasing-out of the practice of sugarcane burning;
- leading the Brazilian Climate Alliance with 15 other organizations to propose proactive policies in Brazil and in global climate change negotiations. UNICA has also created an educational program about climate change that will impact more than 2 million students in Brazil;
- signing the National Commitment to Enhance Work Conditions in the Sugarcane Industry together with labor unions and the federal government – the first national agreement to recognize best labor practices. Of the 400 cane mills in operation throughout Brazil, more than 300 have voluntarily signed on to the Commitment;
- launching a “retooling” program for cane workers to lessen the impact of harvest mechanization on job losses. The project will train 7,000 workers per year (mostly sugarcane cutters) to prepare them to take on other jobs in the sugarcane industry or in other sectors;
- hiring a team of professionals to foster the adoption of Corporate Social Responsibility (CSR) practices by sugarcane mills. In addition, since 2008 UNICA has adopted sustainability reports – following the model developed by the Global Reporting Initiative (GRI) – to communicate its social, environmental and economic performance. In 2008, member companies invested over R\$ 160 million in 618 projects within social, environmental,

cultural, education, sport and health areas, benefiting some 480 thousand people in communities with sugarcane production;

- engaging with several multi-stakeholder initiatives (MSIs). It is represented in the board of directors of Bonsucro and helped develop a certification scheme for sustainable sugarcane production. The first sugarcane processors to receive the Bonsucro sustainability certification in 2011 are based in Brazil.

The same economic, social and environmental benefits could also happen in Africa. The sustainability practices outlined above could serve as a benchmark for Africa. Our main message and objective is to show how biofuels – and sugarcane in particular – can contribute to economic and social development in Africa, producing renewable fuel to be used in booming African cities, sugar to supply domestic and export markets, bioelectricity from the process of burning the bagasse, and also to serve as the feedstock to all new bio-based products that are in the pipeline, such as bioplastics, biodiesel and others.

### Africa Learning with the Brazilian Sugarcane Chain

The best way for Governments and researchers in Africa to understand the sugarcane Agribusiness System complexity is to describe the typical mill network. The sugarcane value chain includes many stages: the production of sugarcane on farms; the processing of sugar, ethanol and derivate products in mills; research, technical assistance and financial services; transportation; commercialization; and exports. All of these links build a network around sugarcane mills as shown in the figure below.

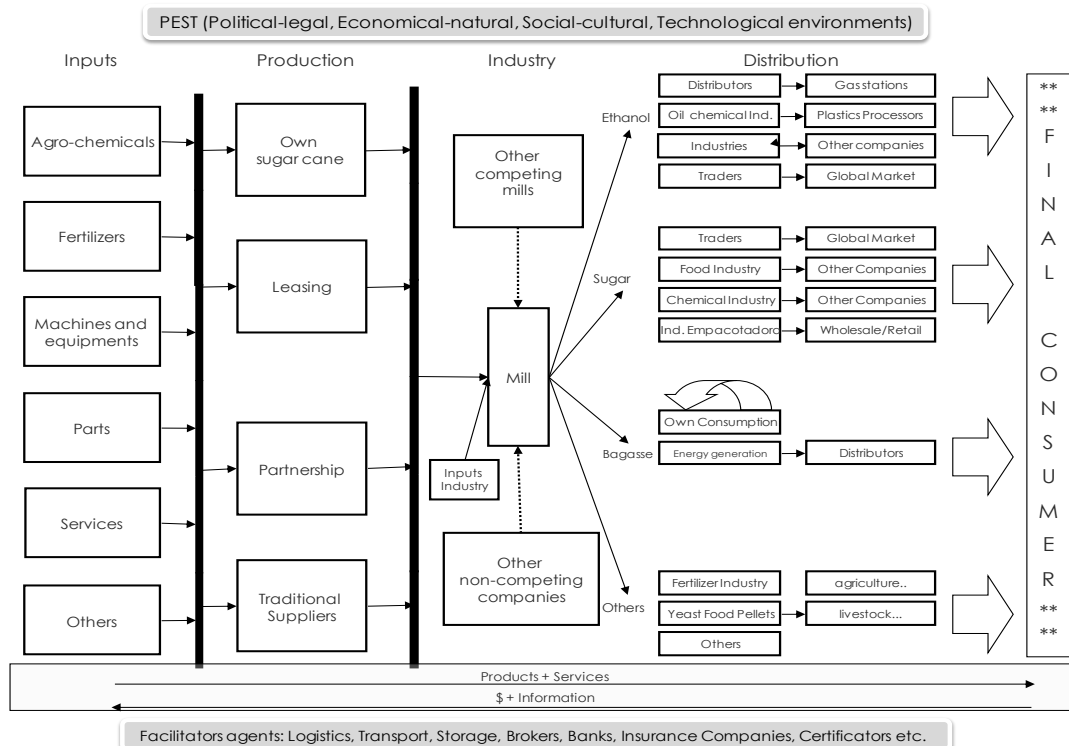


Figure 1. The Network of a Sugarcane Mill in Brazil

The output of a mill depends on the supply of sugarcane and capital goods. The main products (ethanol, sugar, and energy) are sold to fuel distributors, the food industry, wholesalers, retailers, exporters and electric energy distributors. Byproducts are destined to other industries, wholesalers and retailers of other sectors such as orange juice and animal feed. In addition, sugarcane mills use residues, such as vinasse and cake filter, as biofertilizers.

There are different institutional arrangements governing the transaction between sugarcane producers and the mills, from spot market to vertical integration. The supply of sugarcane accounts for almost 70% of a mill's production cost and the sugarcane transaction with the mills is complex due to the need of relationship-specific investments, the perishability of the product and uncertainties related to the effects of Mother Nature. Vertical integration is observed when sugarcane is grown in farmland owned by the mill. Farmland leasing for sugarcane production using the mill's farm equipment and labor is the next governance option. Less integrated options include partnerships, long-term supply contracts and spot market relationships with independent producers.

Vertical integration has historically been the dominant governance mechanism in the industry. But there is a trend towards less vertical integration and increasing use of contracts with suppliers. Leal (2006) estimates that 65% of the area cultivated with sugarcane is either owned or leased by mills while 35% belongs to independent producers – mostly under some form of contract.

### **Potential Benefits for Africa from Ethanol Industry Development**

The Brazilian experience with the sugarcane industry – and, in particular, the recent growth fostered by ethanol mandates in Brazil and other countries – suggest ethanol may generate the following benefits for the African people and society at large.

- A first potential benefit is that ethanol reduces dependency on foreign oil – particularly as the oil industry generates increasing negative externalities and is fraught with geopolitical risks.
- A second benefit is the amount of jobs generated in all stages of the ethanol chain, from equipment suppliers to ethanol distribution systems, but also including allied industries such as research, trade and services.
- One of the most important potential benefits for the African people is the immediate reduction in pollution at large cities. As compared to gasoline and diesel, emissions from engines run on ethanol are increasingly smaller with considerable improvements in air quality and thus quality of life.
- Another benefit for African society is to, via an ethanol strategy, increase economic relationships and trade with important emerging partners among African nations and also with other emerging economies such as Brazil, China and India.
- From a business perspective, ethanol can generate opportunities for foreign direct investment for African people and companies, selling products and making profits outside Africa and repatriating these resources to help the development and income distribution in the continent.
- These investments will also allow Africa to have access to world-class technology that is currently dominated by ethanol producing countries.

- Finally, Africa can provide a strong contribution towards mitigation of climate change in the 21<sup>st</sup> century.

## **An Outline of Strategies for Sugarcane Industry Development in Africa**

This article had the objective to show how Brazil has benefitted from adopting an ethanol development policy for the last 40 years that resulted in the development of a booming sugarcane industry with several economic, social and environmental benefits to society. Just to summarize, in 2010 the Brazilian sugarcane industry supplied 100% of the domestic sugar market and produced enough of a surplus to export 53% of the international sugar market. In addition, the industry produced enough ethanol to supply 52% of the domestic market use of light-vehicle fuels (compared to 48% for gasoline). In 2015, this share is expected to reach 80% versus only 20% for gasoline. This was accomplished with the use of 9 million hectares of sugarcane from the estimated 350 million hectares available farmland in the country.

Africa can follow several strategies to foster the development of the sugarcane chain, including emulating the Brazilian experience. In what follows, we offer some possible contributions to this debate.

- A Strategic Plan should be developed as, to our knowledge, it is not existent yet. This article and Chaddad (2010) provide several pieces of relevant information about the Brazilian industry, how it is organized, the relevant policies and the leading role of UNICA. A next step would be to adapt the Brazilian model to the specific environment and conditions of countries in Africa.
- A suggestion for Africa to get started in building up supply chains in preparation for an ethanol or renewable fuel mandate (such as in Brazil, the U.S. and the European Union, to name a few). The initial mandate could start as an E10 policy (10% of anhydrous ethanol blended to gasoline), with a perspective of moving to an E25 policy when production capabilities are in place.
- In order to be able to increase ethanol production, Africa may initially invest in agricultural research and technical assistance to produce sugarcane, sugar and ethanol in some regions with existing technologies, and subsequently develop second generation biofuels from cellulosic sources, perhaps adapting Brazilian technologies that have been developed since the 1970s.
- An integrated model based on a network of small farmers may be a useful approach to foster sugarcane production and rural development.
- Another important possibility for Africa is to invest in ethanol production in some selected African countries with favorable conditions, which could supply other African nations. This would serve as the basis for an oil import substitution policy aimed at substituting oil imports with ethanol produced in the continent. This strategy will reduce dependency from oil producing countries and enhance the economic ties among African nations.

There are several alternative strategies that can be part of Africa's future positioning on sugarcane and biofuels. The international sugar market is growing and, except for Brazil, the most relevant sugar exporters face considerable challenges. In the case of ethanol, it has proven to be the most efficient biofuel in competing with gasoline in the last 40 years, and Africa may gain with a

strategic plan on ethanol. Africa has a long avenue of opportunities to follow. Increased collaboration with Brazil in this field is a future development agenda for Governments, NGOs and the private sector. The University of Sao Paulo is open for this collaboration and to help Africa in this strategic plan.

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