

Sugar Cane as a Promoter of Development: The Cases of Quirinópolis and Uberaba

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Abstract

The importance of the sugar-energy sector in Brazil is historic, dating from the time of colonization, and later walking side by side with the development of the country. Also, it is one of the mainstays of the Brazilian economy. The sector has a strong impact as a wealth generator for the nation, with a balance of US\$ 28.2 billion in 2008, which was equivalent to approximately 2% of Brazil's GDP. This value is greater than the GDP of some countries such as Afghanistan, Jamaica and Estonia.

Financial transactions and generation of wealth of a sector are fundamental to the economic development of a municipality. Moreover, an economically developed city has better conditions to promote its social development. Based on this, this study aims to make an analysis from economic, social and strategic perspective, enabling to show the economic, social and environmental benefits that the sugar-energy activity brought to regions where they settled, describing how the arrival of new plants has spurred economic, environmental and social activity of a region. This paper studied the case of the municipality of Quirinópolis (GO) and Uberaba (MG), through a qualitative research, using the techniques of documentary analysis and in-depth interviews.

The development of Quirinópolis and Uberaba was evident in recent years and this is due to the arrival of sugar-energy industries in the municipalities and in the region. Generation of jobs, income distribution and the transformation of real “rural slums” with high rates of degraded pastures and insipient income generation, to a role of genuine agricultural enterprises and environmental benefits are undeniable. However, the lack of information access creates distortion of the image of a sector that is still connected to the image of sugar cane lords and burnings, which is also a sector that still has much to offer to the population and that should be encouraged.

Keywords: sugar cane; regional development

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Executive Summary

In 2012, Brazil was the world's largest producer of sugar cane with a share of 37.8%. Regarding sugar production, the country is the largest producer with 22.1% of the total and the largest exporter with a share of 48.7% in total exports. In ethanol production, the country occupied the position of the second largest producer with a total of 27.8%. (FAO, 2013).

The State of Goiás is the second largest producer of sugar cane in the country, with 9.0% of the total produced in Brazil. The municipality of Quirinópolis, on the other hand, is the largest producer in the State of Goiás with a production of 13.5% (UNICA; CONAB 2013). The state of Minas Gerais is the third largest producer of cane sugar in the country with a share of 8.8% in domestic production. The municipality of Uberaba, is the largest producer of sugar cane in the State of Minas Gerais, with a share of 6.5% (UNICA; CANASAT 2013).

Financial transactions and generation of wealth of a sector are fundamental to the economic development of a municipality. Moreover, an economically developed city has better conditions to promote its social development. In this context, taxes collected play an important role as well as workstations that are genuine distributors of income. Once workers are capitalized, they drive the economy of their cities through sales at supermarkets, clothing stores, food shops, leisure and others.

Based on this, this study aims to make an analysis from economic, social and strategic perspective, enabling to show the economic, social and environmental benefits that the sugar-energy activity brought to regions where they settled, describing how the arrival of new plants has spurred economic, environmental and social activity of a region bringing several benefits. The paper studied the case of the municipality of Quirinópolis (GO) and Uberaba (MG), through a qualitative research, using the techniques of documentary analysis, in which documents from plants of municipalities and town halls were analyzed, and in-depth interviews with experts and agents of the chain of these regions such as plants owners and employees, farmers, mayors, commercial and industrial association and market experts.

The development of Quirinópolis and Uberaba was evident in recent years and this is due to the arrival of sugar-energy industries in the municipalities and in the region. Generation of jobs, income distribution and the transformation of real “rural slums” with high rates of degraded pastures and insipient income generation, to a role of genuine agricultural enterprises and environmental benefits are undeniable. However, the lack of information access creates distortion of the image of a sector that is still connected to the image of sugar cane lords and burnings, which is also a sector that still has much to offer to the population and that should be encouraged.

Sugar cane plant generates income that circulates in the city and is widely distributed through wages, taxes and purchase of products and services, moving sectors such as civil construction, restaurants, retail and others, generating a multiplier effect. Just visit these municipalities that previously did not have plants (Quirinópolis and Uberaba) to meet “Chinese Brazil”, which is pure entrepreneurship.

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Introduction

Since the primary and fundamental activity of food production, to the functioning of the most varied and technological economic sectors of a nation, energy is a key element. The global energy matrix consists of renewable and non-renewable fuels, which according to their availability, supply increasing fleets of vehicles and machinery used to move the economy and to enable economic and social development. In this scenario of full development, there are some fundamental issues: How to deal with resource scarcity? How to meet the demand, meeting the present needs without compromising the capacity of future generations?

Part of the answers is in sustainability practices and in the use of renewable energy sources, such as agro energy. According to MAPA (Ministry of Agriculture, Livestock and Supply), energy security is a major challenge of the century. The importance of energy security has focus on the challenge of supplying the development with clean energy, using renewable resources, having economic and environmental importance.

In this scenario, the Brazilian sugar-energy sector shows its strength, producing different forms of sustainable and renewable agro energy (sugar, ethanol and electricity), which are able to meet this demand without compromising the environment and availability for future generations. To address this issue, some points deserve much attention such as the importance of social and economic development, entrepreneurship, contractual relationships, independent producers and respect for the worker and the environment.

In 2012, Brazil was the world's largest producer of sugar cane with a share of 37.8%. Regarding sugar production, the country is the largest producer with 22.1% of the total and the largest exporter with a share of 48.7% in total exports. In ethanol production, the country occupied the position of the second largest producer with a total of 27.8%. (FAO, 2013).

The importance of the sugar-energy sector in Brazil is historic, dating from the time of colonization, and later walking side by side with the development of the country. Also, it is one of the mainstays of the Brazilian economy. The sector has a strong impact as a generator of wealth for the nation, with a balance of US\$ 28.2 billion in 2008, which was equivalent to approximately 2% of Brazil's GDP. This value is greater than the GDP of some countries such as Afghanistan, Jamaica and Estonia. Considering the total sum of the sales of the various links that make up the sugar cane agribusiness system, it was worth US\$ 86.8 billion. The trend is that these values will continue to increase whereas other products, which today are not the main sources of income, gain more importance in the generation of wealth in sectors such as bioelectricity, yeasts, bioplastics, diesel from sugar cane, biobutanol, cellulosic ethanol and carbon credits (NEVES et al, 2010).

Financial transactions and generation of wealth of a sector are fundamental to the economic development of a municipality. Moreover, an economically developed city has better conditions to promote its social development. In this context, taxes collected

play an important role as well as workstations that are genuine distributors of income. Once workers are capitalized, they drive the economy of their cities through sales at supermarkets, clothing stores, food shops, leisure and others.

Based on the arguments above, this paper aims to answer the following questions: (i) does the arrival of new sugar-energy plants maximize the social, economic and environmental development of a region? (ii) What impacts did sugar cane industry bring to the municipalities of Quirinópolis-GO and Uberaba-MG in recent years?

Theoretical Framework

Sugar-energy chain as a set of contracts

The sugar-energy chain is a set of contracts within the perspective of new institutional economics and contracts, having Oliver Williamson as the main author who won Nobel Prize in Economics in 2010.

Sugar cane business is composed of several links: (i) the production of sugar cane; (ii) the processing of sugar, ethanol and derivatives; (iii) research services, training and technical and credit assistance; (iv) transport; (v) marketing and (vi) export. The interdependent relationship between the plant and cane producers and the horizontal relationships between farmers constituting associations allow the formation of a network which can be contextualized in this paper.

The theoretical model of the company's network seeks to analyze a particular company and its suppliers and distributors, the relationships between them and the relationship with the environment. Essentially, it is an approach of interaction and relationships. Figure 1 shows the network model of contracts of a Sugar and Ethanol Plant.

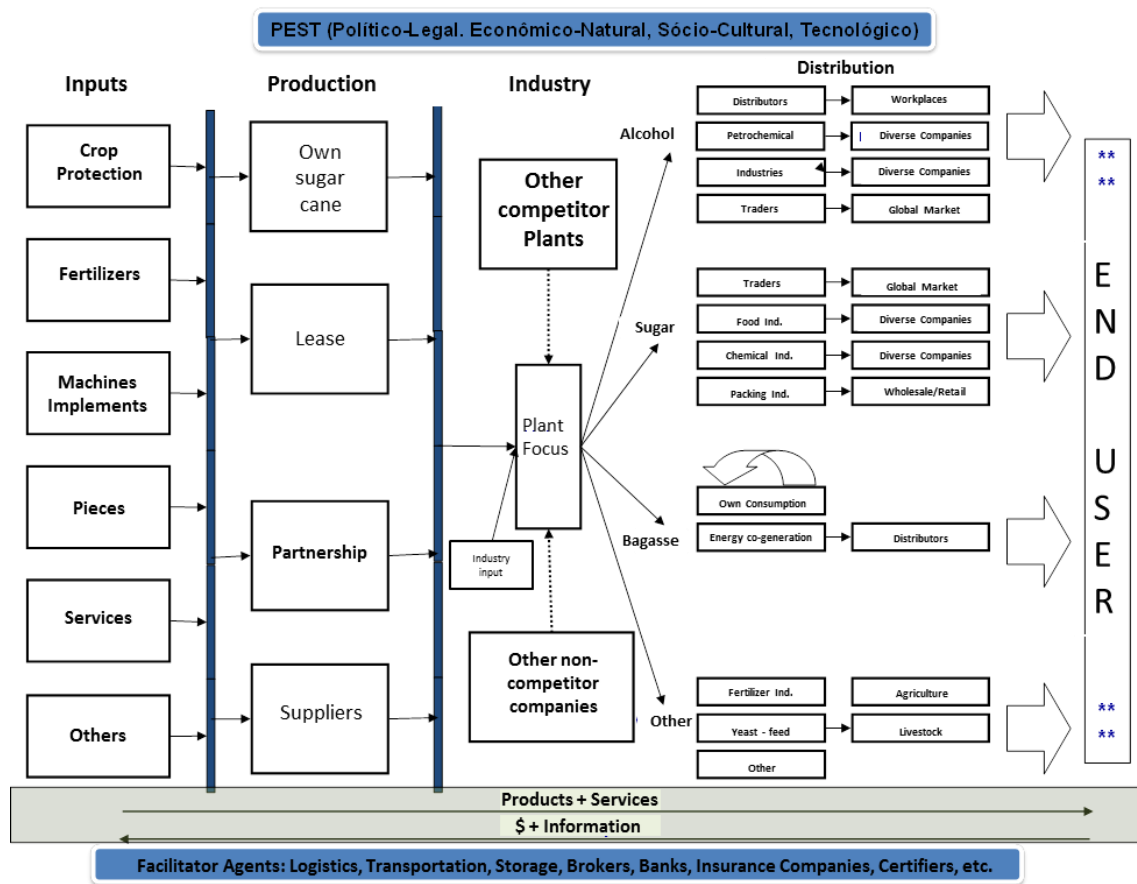


Figure 1 – Network of a typical Sugar-Ethanol Plant
Source: Neves, 2004.

It is important to highlight some relevant theoretical concepts in the understanding of the relationship between cane suppliers and the Plant. Transaction is the transformation of a certain product through technologically separable interfaces. The purchase of cane made by the industry for processing is an example of a transaction. It is not about sugar cane production or processing, but the purchase and sale relationship between these two agents is the transaction. With the contributions of the Nobel Prize in Economics, Ronald Coase (1937, 1960) and several works of Oliver Williamson (1985, 1996), the concept of transaction costs (costs in using the market) became part of economic thought in the second half of the twentieth century.

Ronald Coase, in his work of 1937, addressed that the company is a set of contracts and that the boundary of each company (to where it should go with its activities) results from an analysis of production costs and transaction costs. According to the magnitude of these costs, it is sometimes preferable to acquire an input from market (sugar cane) than producing it internally (plant producing sugar cane itself).

Williamson (1985, p.20) offers a complete definition of transaction costs: "The ex-ante costs of preparing, negotiating and safeguarding an agreement, as well as ex-post costs of adjustments and adaptations resulting when the execution of a contract is affected by failures, errors, omissions and unexpected changes. In short, these are the costs of running the economic system".

According to Douglass North (1994), another Nobel Prize in Economics, institutions (laws) represent incentive structures of a society and as a consequence they determine the performance of the economy. They also result from interactions among individuals that are modeled from a learning process. Once institutions exist, they establish the behavior of society by means of a structure of incentives and punishment.

Oliver Williamson (1993; 1985) states that efficient ways of governance (such as a plant gets sugar cane) develop within the limits imposed by the institutional environment, by behavioral assumptions of individuals and by the characteristics of the transactions. All these factors will interfere in the way of governance (market, hierarchy or hybrid/contracts).

The dimension of asset specificity transaction refers to how the investment (asset) is specific for the activity and how expensive is its relocation to another use (Williamson, 1985), or the asset value loss in the second option (Klein et al., 1978). According to Neves et al. (1998) and Moraes (2000) in sugar cane chain, the specificity becomes important for the analysis, since there are specificities which are already known:

- The *locational specificity* is an input that can not be transported over long distances. Ideally, the radius of sugar cane must not exceed 50 km, due to the transportation costs;
- The *temporal specificity* is due to oversupply in some phases of the year. The sugar cane should be available for processing during eight months of the year. Another factor is the perishability of cane after it is harvested (48 hours);
- The *physical specificity* is large because of the industry (equipment) and since sugar cane is a long-term culture, investments presuppose returns in six years of operation (five harvests).

Thinking about the governance structure, an agribusiness can establish its own agricultural production (vertical integration or vertical production), establish contracts with producers (these contracts can have different ways ranging from more or less complex in terms of time, description of product standards, price mechanisms among others) and simply buy on the spot market. This purchase of agricultural products may come from large producers, purchase of small producers' cooperatives or even isolated small producers. Table 1 summarizes what has been explained.

- Vertical Integration: company owns the assets involved in the production process of raw material and labor relations.
- Contracts:
 - Company becomes entitled on production suppliers, ranging from more to less complex (deadline, details of procedures, prices, etc.).
 - Can be with large producers.
 - Can be with small producers.
 - Can be with cooperatives or associations.
 - Can be a form of integration contract or partnership (almost integration).
- Spot Market: Simple purchase and sale without previous planning.

Table 1 - Alternatives to Govern Sugar Cane Producer and Plant Transaction

Source: Neves and Conejero, 2007.

It is necessary to understand the advantages and disadvantages of each model that was used from the perspective of society. Vertical integration (producing its own sugar cane) generates employment, wages, taxes, exports, and it also generates the transfer of knowledge to its employees, who can become entrepreneurs (induction of technology poles in the vicinity). One disadvantage is instead of a strong supply chain, there is a strong company, which is the Plant.

Buying from large producers also generates benefits as those listed above, and a faster technology transfer which can quickly generate new entrepreneurs in the region. Buying from small producers and cooperatives can be even better in terms of income distribution and development, due to the fact that there are more families involved in the production that will have income and regional consumption, leading to more development.

On the other hand, there are producers selling their products on spot markets without contracts. It may be interesting to the producers by letting them free to negotiate their products, but in terms of temporal specificity and the presence of perishability, it makes the productive sector very exposed to crisis situations due to oversupply.

How to get sugar cane	Advantages according to the point of view of society	Disadvantages according to the Point of view of society
Vertical Integration	<ul style="list-style-type: none"> - Taxes. - Jobs. - Economic Changes (inputs, distribution). 	<ul style="list-style-type: none"> - Gain concentration. - Fewer entrepreneurs. - Risk concentrated in one company.
Contracts with large producers	<ul style="list-style-type: none"> - Taxes. - Jobs. - Technology transfer. - Economic Changes. - Generation of Entrepreneurs and the consequent multiplier effect. 	
Contracts with small producers	<ul style="list-style-type: none"> - Taxes. - Jobs. - Technology transfer. - Economic Changes. - Income Distribution. 	
Purchases from Cooperatives	<ul style="list-style-type: none"> - Coordination of production. - Better use of assets. - Technology transfer. - Economic Changes. - Income Distribution. 	
Spot Market	<ul style="list-style-type: none"> - Total freedom of the parties. 	<ul style="list-style-type: none"> - High risk of crisis, and generalized bankrupts.

Table 2 – Analysis of Contractual Options and Advantages and Disadvantages according to the Point of View of Society

Source: Adapted by the authors of NEVES and CASTRO, 2007.

Agribusiness development through Integrated Projects of Sustainable Businesses

Two aspects that can greatly enrich business plans in Agribusiness Systems (SAGs) are the concept of SAG when explored in the business plan area, and the insertion of a social inclusion vision.

Regarding the first aspect, the models of business plans existing in the literature are known. There are guidelines more focused on financial viability, discussed in issues of corporate budget as Clement (2002) and Bernardi (2002), as well as the broader view of strategic planning (LAMBIN, 2000 CHIAVENATTO; SAPIRO, 2003). Models of farm management and viability plans of crops or agricultural enterprises are also known.

However, when using SAGs (Agribusiness Systems) brought by (Zylbersztajn; Farina, 1999), these plans apart may represent a small part of the overall viability of the investment. Isolated plans often do not consider existing aspects regarding upstream and downstream of a SAG. So, the viability of an apparently positive business from financial perspective can become unwieldy due to the simple operating or even organizational impossibility of dealing with a major supplier or a customer. This point is highly debated in Zylbersztajn (2005) with respect to the failure of pure analysis of classical economic theory to indicate viability or maximum profit in a business venture.

This is even more evident with the comments of Cook and Chaddad (2000) when they highlight the recent changes of agro industrialization referring to the growing importance of inputs, industrialization and distribution in relation to agricultural production and the changes of the farm with non-farm activities. In fact, these non-farm activities should be feasible so the farm activity can have some success.

Inserting in this context of social inclusion issue, a business plan should be concerned to develop a more enclosed model to generate new entrepreneurs and ensure transfer of technology (social viability). This theme, which is much discussed by the issues of social responsibility and corporate governance, gains much importance due to the moment that humanity lives, especially in agriculture and livestock (MACHADO FILHO, 2006). In addition, many public agents consider this dimension the key point for the viability of a project, either by political acceptance or even to obtain resources for its financing (BANCO MUNDIAL, 2004).

A project of this nature, which includes considerations of viability in different dimensions and also have social considerations, is of direct interest to public agents who seek to attract businesses to a specific region, but who are mainly interested in the development that these companies can provide to the region, since benefits can not be limited to taxes and jobs, but also in stimulating a healthy economic relationship with groups of raw materials suppliers and clients, generating long-term benefits for an entire developed network. No doubt it is also the interest of private agents who have a systemic and long-term vision of their business. After all, they need to be successful. The understanding of a broad model facilitates the visualization of potentialities in development and benefits generated (positive externalities of a project), facilitating

communication with public agents when trading installations of their operations in a certain place.

In this scenario the concept of PINS (Integrated Projects of Sustainable Business) can be applied. This model has been used in Vale do São Francisco in a joint work between the Agribusiness Program of USP (PENSA) and CODEVASF (Development Company of Vale do São Francisco and Parnaíba) to attract food industry and fiber companies, with strong insertion in domestic and international markets so producers of public irrigated perimeters can have one of their sources of supply, whether in fruit production, bioenergy, goat and sheep farming, citrus, poultry, dried and dehydrated fruit, vegetables minimally processed, cotton and other sectors.

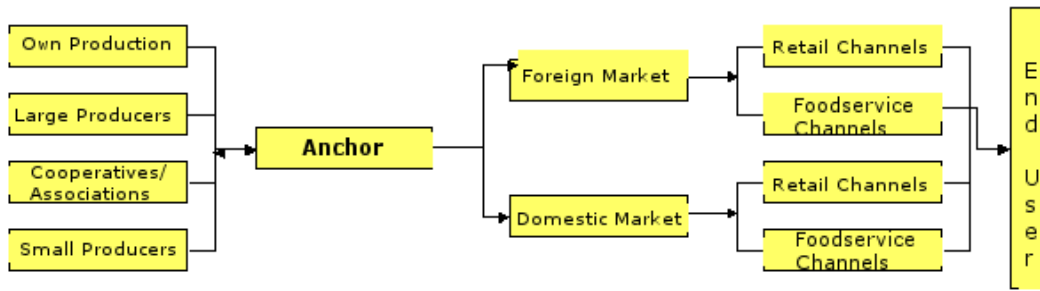
Agribusiness is defined as "the total sum of production operations and distribution of farm supplies, production operations on the farms, storage, processing and distribution of agricultural products and items produced." John Davis and Ray Goldberg addressed this topic in 1957.

The PINS model can be described in the following way: In Integration, private mechanisms of contracts and relationships between agribusinesses and producers are suggested; in Project, technical analyzes and economic and financial viability are developed for applicant businesses; in Sustainable, the appeal on the social, environmental and economic sustainability is characterized by the opportunity to link these projects to seals of fair trade, organic, low use of agrochemicals, appropriate working conditions and economic sustainability. And finally the Business, interesting rates of return to base agro-industries are calculated as well as an interesting income to the family farmers

The PINS model aims the examination and is based on an anchor company that is capable of operation in the market. This is a concept driven by demand, where production is already sold or ordered even before the production decision. But it is necessary to ask which these anchors companies in particular SAG are.

What defines an anchor company is how the company, which is in a particular SAG, controls demand and pulls the business, since without it SAG would have difficulty to exist. In fact, this is a company that has an important advantage from the point of view of the consumer in terms of product (a brand, for example) or superior services. According Sauveé (2001), these companies constitute the so-called strategic center. Its role is to create value for its partners, set rules, and build skills while establishing and organizing a strategy of network. These roles help to identify which one is the strategic center in a network, or Anchor. A Sugar and Ethanol Plant can be considered an agribusiness anchor and it will make with oil business or tradings of sugar and alcohol and it will also dictate the pace of production.

The following figure outlines the PINS.



INTEGRATED	PROJECT	SUSTAINABLE	BUSINESS
<ul style="list-style-type: none"> • Inter-organizations • Vision of chains • Technology transfer and specificities • Cooperatives • Associations • Government • System • Public banks 	<ul style="list-style-type: none"> • Rigor in technical analysis • Rigor in marketing analysis • Organization (implementation schedules) 	<ul style="list-style-type: none"> • Environment • Fair trade • Organic • Employment • Social development • Local development • Working conditions 	<ul style="list-style-type: none"> • Aims profits • Cost Control • Innovations • Permanent search for competitiveness • Quality

Figure 2 – PINS Model

Source: Elaborated by NEVES and CASTRO (2007).

Unlike other sectors of the Brazilian economy, the sugar-energy sector presents no characteristics of centralization, where few companies dominate the entire production chain. Due to this feature, the sector absorbs large amount of small and medium entrepreneurs who greatly contribute to the development of it.

The sugar-energy chain, despite being a large scale, fits into the concept of PINS. After all, there are plants playing the role of anchor companies in the micro-regions, coordinating the entire chain since their own production, coordinating the production of suppliers and transferring technology. The chain still has the Council of Sugar cane, Sugar and Alcohol Producers in the State of São Paulo (Consecana) that governs the main transaction relations between the chain links.

Method

This study aims to make an analysis from economic, social and strategic perspective, enabling to show the economic, social and environmental benefits that the sugar-energy activity brought to regions where they settled, describing how the arrival of new plants has spurred economic, environmental and social activity of a region bringing several benefits.

To achieve the objective of this paper, the study was conducted in three phases:

Phase 1. Secondary Data Survey:

This stage consisted of gathering information from secondary sources of the sector. Two techniques for gathering information, which are the desk research and documental analysis, were used at this stage:

Desk Research: a secondary data survey was performed through data sources from government, industry agents, research papers, journals and other data sources. These data include both the Brazilian industry and the municipalities of Quirinópolis and Uberaba.

Documental analysis: an existing documentary survey was conducted in the region, highlighting documents of Associations, Unions, SJC Plants, Uberaba, Vale do Tijuco, Grupo Delta, documents of the City of Quirinópolis and Uberaba and the Government of the States of Goiás and Minas Gerais, the Rural Syndicate, written materials about the region, and other documents which the researchers had access.

Phase 2. Primary Data Survey:

This stage consisted of gathering information from primary sources in the industry. The in-depth interview technique was used in this phase.

In-depth interviews: In the city of Quirinópolis interviews were conducted in October 2012 with mayors, bank managers, independent sugar cane producers, associations of producers, plants, and other agents. In Uberaba, in-depth interviews occurred in September 2013, covering various economic agents in the region such as employees of Delta plants, Vale do Tijuco and Uberaba, the president of the Rural Syndicate, the Environment Secretary, the Agriculture Secretary, independent sugar cane producers, SENAR, SENAI, SEBRAE, Commercial and Industrial Association of Uberaba, plants, among others.

Phase 3. Consolidation of Results:

With the information from primary and secondary sources, data consolidations and the analysis of the main information found were carried out aiming to show the impacts of the sugar-energy sector in the municipalities of Quirinópolis and Uberaba.

Results and discussions

Initially it is necessary to describe the location of the cities studied. Quirinópolis is located in the state of Goiás, in the central-west region of Brazil, 900 km from the city of São Paulo, while Uberaba is located in the state of Minas Gerais, in the southeast of the country, about 485 km from the city of São Paulo.



Figure 1 - Location of the municipality and dimension of the study.

Source: Elaborated by the authors.

The State of Goiás is the second largest producer of sugar cane in the country, with 9.0% of the total produced in Brazil. The municipality of Quirinópolis, on the other hand, is the largest producer in the State of Goiás with a production of 13.5% (UNICA; CONAB 2013). The state of Minas Gerais is the third largest producer of cane sugar in the country with a share of 8.8% in domestic production. The city of Uberaba has a sugar cane production of 5.26 million tons in a planted area of 80,000 hectares, being the largest producer of sugar cane in the State of Minas Gerais, with a share of 6.5% and a grinding representing 10.7% of total grinding of State (UNICA; CANASAT 2013).

The benefits of the sugar-energy sector in these regions range from direct benefits such as generating jobs and taxes to indirect benefits such as the development of the local economy. The following will highlight some of these goals.

Social Development

Within the social contributions, some advances provided by the arrival of cane sugar in these regions must be highlighted such as jobs created, qualification of manpower, improvement in wages (highlighted in Table 1) and income distribution. These points respond to a concern that people had: the fear that the arrival of the cane in the region would dump people with temporary jobs in the city, which would have to absorb them throughout year. In contrast, currently there is a dispute by qualified professionals in the city. Thus, because of sugar cane industry in Quirinópolis Uberaba and can absorb a large contingent of manpower with respectable levels of remuneration.

The Grupo SJC Bioenergia Ltd. located in Quirinópolis (GO) is responsible for generating 3,000 direct jobs and 10,000 indirect jobs, which will drive the regional economy (Table 1). In addition to generating jobs, another important contribution of the

group for the development of the region is seen in the collection of taxes. About \$ 50 million annually in local, state and federal taxes are reinvested in investments and development in the catchment area of the plants of this group.

QUIRINÓPOLIS								
	2005	2007	2009	2011	2012	2013	2020	2025
No. Staff	-	1,411	2,063	2,016	2,150	3,000	-	-
UBERABA								
	2005	2007	2009	2011	2012	2013	2020	2025
No. Staff	5,990	7,269	6,838	9,016	9,283	8,220	9,379	9,379
Wages (Million R\$)	77,4	109,3	137,8	253,7	305,6	333,7	388,8	388,8
Average of Salary (R\$ / year)	12.921	15.036	20.152	28.138	32.920	40.596	41.374	41.374
Taxes Generated (Million R\$)	-	-	89,4	145,9	83,1	136,6	251,6	242,8

Table 1 – Employees, wages and taxes generated by the sugar-energy sector

Source: Elaborated by the authors from data of Vale do Tijuco Plant, Uberaba, Grupo Delta and Grupo SJC.

In Uberaba, the sector generated in the region more than 2,000 jobs in 8 years (Table 1). The annual wage average ranged from R\$ 13.000 per employee in 2005 to R\$ 40.596 in 2013, which was an increase of 217% - more than the triple. The sector also generates approximately R\$ 137 million in taxes for the city, aiming to achieve the double by 2020.

According to the literature, in the sugar-energy sector the generation of indirect jobs has a multiplier effect of 2.39 on the direct jobs (MONTAGNHANI; FAGUNDES; SILVA, 2009). In other words, for each direct job the sector generates 2.39 indirect job workplaces. Those jobs that can be allocated in various sectors such as: services, trade, health and others. Considering the jobs generated by the groups of the plants analyzed and a multiplying factor of 2.39, it can be observed that 26,816 indirect jobs were generated in both regions in 2013.

Also in relation to jobs, it can be said that beyond the end of burnings, the mechanization of the sugar-energy sector has brought with it an increase in the technical level of harvest workers and greater formality in the sector, since temporary work has decreased. Operating a machine requires knowledge beyond the simple mechanical task of cutting sugar cane. To respond to developments in the sector, an operator must have systematization and productivity knowledge of the technologies that he is dealing besides developing new interpersonal skills.

Another important social factor that must be considered is the independent sugar cane producer. Just like plants, these independent producers also generate jobs in their properties. These partners and suppliers also share the value created in the chain, increasing the profitability and value of their land and starting to have greater power to invest and develop their businesses. In some areas of the region, the lands have risen by four times since the installation of the plants. The regions of Quirinópolis and Uberaba

are prioritizing development model based on independent sugar cane producers with the intention that these producers represent most of the sugar cane grinded by industries.

By these facts, it can be stated that the entrepreneur and the worker of sugar cane sector play an important role in the development in the sector, in the regions in which they are located and in Brazilian agribusiness. It is clearly observed that the sugar cane activity contributes to the absorption of a large contingent of manpower, which was excluded from the labor market, acting as a real agent of social inclusion.

Environmental Development

Currently, the plants installed in Quirinópolis and Uberaba practice mechanized harvesting without burning straw in most of owned and leased areas. Only a minority of suppliers perform burning before the harvest (this practice will be abolished in 2014, as prescribed by law).

The arrival of the plants in these cities has brought many environmental benefits. Many of these benefits are due to cane sugar culture, which were proved by scientific studies published in the *Nature*. These benefits are responsible for reduction in temperature compared to pasture on 1.5 degree *Celsius*. Other benefit was large environmental monitoring which plants are subjected and programs and that these plants do.

With mechanized harvesting, for each ton of sugar cane there is an average of 140 kg of straw produced but this amount can vary (CTC, 2011; VITTI, et al., 2007; KUVA, et al., 2007). The straw that is left on the soil contributes to its conservation. Another part of the straw is taken to plants to serve as a source for energy cogeneration.

The straw left on the ground exerts a protective function of the soil against erosion because it structures, waterproofs and compacts the ground, which is less exposed and its functionality is preserved (UNICA, 2010). The straw assists in the formation of microbial fauna of soil and increases the carbon content (LUCA et al., 2008). It may also play an important supply of nutrients and availability of these nutrients for the plants, thereby increasing the fertility of the soil. It also helps to reduce the use of herbicides since it hampers the growth of weeds (RONQUIM, 2010). In addition to contributions to soil, the straw left on the field also collaborates with CO² emission reduction compared to a bare soil, thus resulting in a decrease of greenhouse gases release (FIGUEIREDO E LA SCALA, 2011).

The plants coexist with a much stronger and stiffer environmental enforcement than the farms. This fact naturally brings a benefit to the environment of the region. Once a farmer becomes a cane sugar supplier, he starts to live with the same inspections of the plant and it assumes responsibility for assisting its partner to adopt good environmental practices. Besides encouraging and supervising the independent sugar cane producers regarding environmental regulations, the plants have recovered and adapted the areas of partnerships, bringing benefit to the land owner and also for the environment.

There are many environmental contributions performed by local plants and by analyzing them, it is evident for the city of Quirinópolis and Uberaba that is generally superior to activities such as livestock and grain cultivation.

Economic Development

The development of Quirinópolis is evident between 2005 and 2011 with the installation of the plants São Francisco and Boa Vista (Grupo São Martinho is an investment with strong participation of Petrobras). The city of Quirinópolis, which once occupied the 39th position in the ranking of cities with the best quality of life in Goiás, occupied the 6th position in 2012. It was not only the sugar-energy sector that felt the benefits of this development, but the contribution of investment in the region increased the number of jobs and therefore the income of population, also driving other sectors such as civil construction and hotel sector. So, the number of companies established in the town was of about 700 in 2004 to over 3,300 in 2011. Along with the opening of new companies, the number of formal jobs in the region increased by over 100% in the period analyzed. This increase in jobs, accompanied by increased revenues of the municipality and small population increase resulted in a larger and better distribution of local income. It can be observed that the per capita income of the municipality increased from R\$ 7.5 billion in 2004 to R\$ 15 billion in 2010. A trend was also accompanied by the value of the average wage of workers, which nearly tripled in the past few years.

QUIRINÓPOLIS								
	2001	2003	2005	2007	2009	2011	2012	03-12%
Estimated Population (thousand)	-	37.2	37.9	38.1	39.8	-	-	
Municipality Revenue (Million R\$)	-	28,2	31,6	50,4	60,6	-	-	
Per Capita Revenue (R\$)	-	-	7.572	9.678	-	-	-	
ICMS tax (Million R\$)	-	10,2	8,1	13,5	22,2	24,3	-	
ISS tax (Million R\$)	-	-	914	4.728	4.339	9.040	--	
UBERABA								
	2001	2003	2005	2007	2009	2011	2012	01-12%
Estimated Population (thousand)	252.1	265.8	280.1	287.8	296.3	299.4	302.6	20.0%
Municipality Revenue (Million R\$)	152,1	204,4	277,8	356,4	344,8	497,7	566,4	272.4%
Per Capita Revenue (R\$)	603,3	769,0	991,8	1238,4	1163,7	1.662,3	1871,8	210.3%
ICMS tax (Million R\$)	167,3	198,4	258,9	337,7	380,8	483,8	567,1	238.9%
ISS tax (Million R\$)	5,9	10,3	16,3	18,9	24,7	46,3	45,8	676.3%

Table 2 - Population, municipality revenue and taxes collected between 2001 and 2012

Source: Compiled by authors from data of Quirinópolis (GO) and Uberaba (MG).

By analyzing from the perspective of the development of the municipality, it was not possible to attribute its development only to the sugar-energy sector since it is the result of the sum of the sectors that comprise the city, and in the case of Uberaba other sectors also had strong growth. Thus, in the period 2001-2012, it was found that the municipality had an increase in its revenue in 270%. With higher income, the investments of the municipality in education, health, hotels, restaurants, security and others were also higher (Table 2). The ICMS tax increased 240%, and the ISS tax, which is paid directly to the municipality, which is an immediate liquidity in the revenue, has increased 676%. The per capita income of Uberaba increased from R\$ 603 in 2001 to R\$ 1.871 in 2012, which was an increase of about 210%. This economic growth is clearly reflected in the development of the economy and local businesses, increasing sales in supermarkets, retail stores, appliances, restaurants, bars and others. In the end, the sugar-energy chain in the region of Uberaba has a turnover of approximately R\$ 3,3 billion in the local economy just in the last harvest accounted. This money is passed to the population, market, neighboring municipalities, which is invested once again in health, education, the market itself, etc. In short, it is a highly beneficial financial move for the county and the micro-region.

By analyzing the data from these two regions it is clear that the sugar-energy sector directly contributed to the economic development of the regions. Direct contributions are seen by payment of taxes, increased income of the city and increased income of the population. But still there are the indirect economic contributions such as new industries and trades that appear to meet the sector, better income distribution that contributes to the development of the local market and consequently a higher raise of tax for the municipalities. In other words, economic contributions of the sugar-energy sector are tangible.

Conclusions

Studies such as this portray the true importance of the sugar-energy sector for the development of a region. This development often is unnoticed by people, or whose credits are not properly deposited for the sugar-energy sector.

It is clearly noticed that the model adopted by the region is prioritizing the development by multiple gains, valuing farmers. This model is beneficial because it brings income to sugar cane supplier, to the agricultural partner and it also allows plants to have better planning and to gain efficiency in operations, that is, these three agents gain benefit in this context. This model also allows new suppliers or partners to benefit from the sector by integrating their activities with those of the plants. According to respondents, these small towns around Uberaba are positively affected with the benefits from plants and the sector, promoting improvement in the quality of life of the population.

The development of Quirinópolis and Uberaba was evident in recent years and this is due to the arrival of sugar-energy industries in the municipalities and in the region. Generation of jobs, income distribution and the transformation of real “rural slums” with high rates of degraded pastures and insipient income generation, to a role of genuine agricultural

enterprises and environmental benefits are undeniable. However, the lack of access to information creates distortion of the image of a sector that is still connected to the image of sugar cane lords and burnings, which is also a sector that still has much to offer to the population and that should be encouraged.

Sugar cane plant generates income that circulates in the city and is widely distributed through wages, taxes and purchase of products and services, moving sectors such as civil construction, restaurants, retail and others, generating a multiplier effect. Just visit these municipalities that previously did not have plants (Quirinópolis and Uberaba) to meet “Chinese Brazil”, which is pure entrepreneurship.

After the analysis of Brazil's competitiveness in various sectors under an international focus, the question remains: what other quick development alternative would these municipalities have in the interior region of Brazil? By imagining the impact of 80 new plants planned in 80 cities in the interior generating wealth. Other than that, having energy security is what all countries seek and unfortunately part of Brazil seems to want to walk in the opposite direction.

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