

> ARTICLES  
**MacKensie** AGRIBUSINESS



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## PROJECTS

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- INVITED PROFESSOR ESALQ-USP AND PECEGE – ESALQ –USP.
- AUTHOR OF BOOK: COSTS MANAGEMENT- PRODUCTIVITY, PROFIT, COSTS
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# GLOBAL CRISIS, A MANAGEMENT CRISIS



The global financial crisis that we live nowadays has, in fact, its roots in a management crisis. My thesis is based on a recent survey on executives of large national enterprises conducted by the consulting agency Booz & Company.

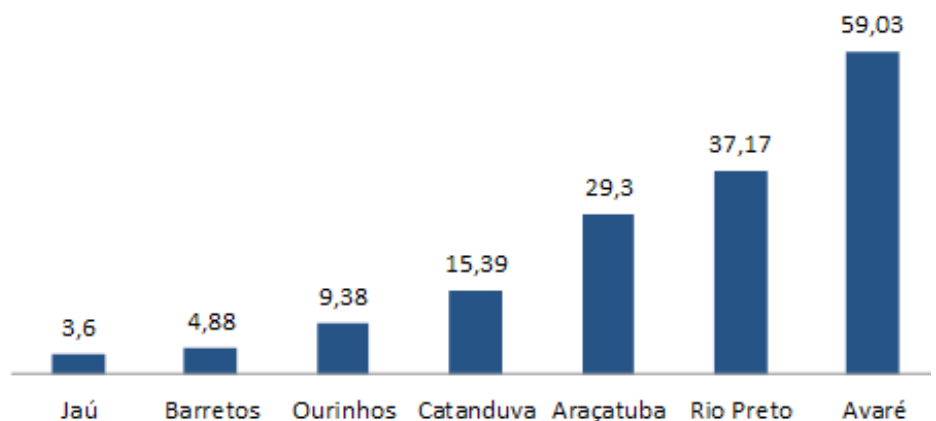
Of the 90 respondents, 73% admitted that their enterprises adopted inadequate actions, which led to losses and burned their reserves. In another survey conducted by the same consulting agency involving 828 executives of enterprise from 65 countries, the respondents questioned their own managerial capacity to find solutions to the crisis and lead their organizations to a safe port. By analyzing the actions and strategies of some large enterprises that play an important role in this crisis, we see clear examples of management mistakes:

- General Motors: one of the reasons for its financial hole is the high cost of the pension plan and health insurance, which guarantees to retirees the same rights of employees in active duty and accounts for 5% of net revenues. In the 1960s, when the plan went into effect, life expectancy of the population was 50 years and health insurance was not onerous. Today, however, as life expectancy has increased to at least 70 years and the increase of spending on health insurance, keeping the benefits to

retirees is extremely costly. In addition, GM made a strategic mistake of resisting making fuel-efficient cars. This mistake cost the enterprise the loss of 77 years of leadership in the American market to Toyota.

- Nortel Networks: the largest manufacturer of telephone equipment in North America, the Canadian enterprise Nortel, faces great risk of bankruptcy. Its crisis stems from a strategic mistake: the sale of the mobile phone unit of high speed for the company to concentrate efforts on a new technology of broadband wireless access, Wimax, which has not yet taken off in the market. Another factor that affected the financial health of the enterprise and investors' confidence was the US\$ 35 million fine imposed by the Securities and Exchange Commission-

**Growth rate % paid for the leasing of lands by region between 2002/2006**



SEC. The reason for the fine was a possible make-up of financial results from 2000 and 2003. The company denies the accusations; however, it had to redo its balance sheet since 1999, because executives would have incorrectly registered billing, inflating its operating results.

- American and European banks: these institutions based and boosted their portfolios of loans with poor assets, the subprime, which refers to real estate loans to customers with high risk of default; however, at high interest rates. This strategy compromised the financial health of banks, leading centenarian institutions, such as Lehman Brothers and Merrill Lynch, to bankruptcy.

- Brazilian enterprises: the Votorantim Group was greatly affected by the crisis. Its bank adopted a strategy of short-term funding, in 24 months, and financed auto vehicles for payment in 72 months. The bank lost liquidity with the global crisis, which caused the termination of credit lines. Another enterprise of the group adopted high-risk financial strategies, betting on derivatives with the expectation of a drop of dollar. The dollar soared and the enterprise faced a huge loss of millions of Reals. The enterprises Sadia and Suzano also bet on operations with derivatives and embittered millionaire losses. The sugar-ethanol sector: the national sugar-alcohol industry also has lessons to be learned from the global financial crisis. Mills sold future crops, capturing resources through short-and mid-term operations, such as ACC – Advance Exchange Contract –, to finance new projects and production expansion. This policy led the mills to consume their working capital, which forced them to postpone payments to suppliers of sugarcane, inputs and salaries. Another strategic mistake of the sector was entering “the ethanol bubble”, without knowing the effective demand for the product and believing that the U.S. Government would open doors to the Brazilian ethanol. In January 2007, the United States Department of Agriculture (USDA) approved US\$ 87 billion in subsidies for corn producers in the country. The subsidization lasted until 2012 and strengthened the competition of American corn ethanol with sugarcane ethanol from Brazil. These are occasional and recent mistakes. However, strictly speaking, the management problems in the sugar-ethanol sector date back long time ago. The problem is that although the mills invest millions of dollars in advanced technology, from planting to final product, many still operate as old sugarcane farms, with management practices that leave a lot to be desired.

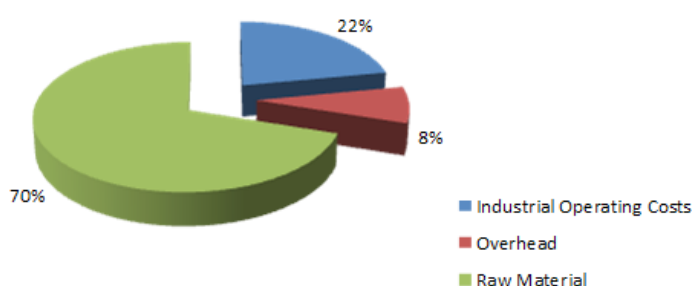
Surprisingly, most mills do not know their costs of agricultural/industrial production, because either their

controls are inefficient or they do not dominate a basic methodology for the calculation of costs, i.e., their management is based on cash flow.

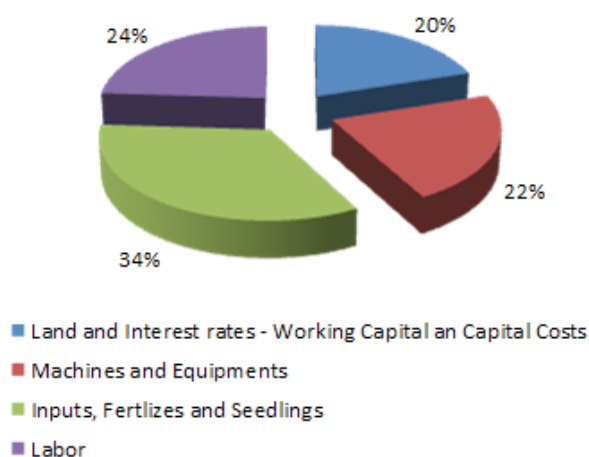
The issue of costs is a taboo in the sugar-ethanol sector, and this is due to its own development model, where until 1997, the Federal Government determined the selling price of the sugar and ethanol and the amounts to be produced. To exemplify how agricultural costs affect significantly on the performance of the sector, I draw attention to the following points:

- The “ethanol bubble” caused, in the last seven years, the increase of up to 90% of the price of the land for sugarcane cultivation. A variation of this magnitude has significant impact on the company’s cash disbursement. A mill that crushes 2 million tons needs, for 25 thousand

**Production Cost - Bags Of Sugar (50kg) Harvest 2008/2009**



**Production Cost: Sugar-Cane Harvest 2008/2009**



hectares, an increase of 4 tons per hectare at a price of R\$ 32, meaning an extra cost of R\$ 3.2 million per year. This was one of the impacts on the working capital of the mills, in addition to the increased costs of agricultural inputs, machinery, agricultural machinery and labor force.

- The price of inputs started an upward trend in January 2000, which accelerated from 2007, significantly

raising the cost of a sugarcane ton. Between January 2007 and June 2008, some inputs increased up to 1,000%, according to the Instituto de Economia Agrícola.

- Another point to be questioned is the composition of costs when the mill processes its own raw material or if third parties supply it. In the first case, we must consider all costs, including the cost of land capital and working capital, while the payment to the supplier is through Consecana; therefore, with an acquisition cost lower than the cost of own production.

In this context, where final prices have not followed the increases in input costs, the best alternative is to focus on cost reduction as a way to not impact negatively on productivity in the coming years.

- In addition to the increases of production factors, we found a significant waste, for example, in the application of pesticides above the recommended dosage or in the use of oversized equipment in agricultural operations with high operating costs, while smaller-sized equipment and lower costs could run agricultural operations with the same efficiency.

These are some of the problems we found in management procedures adopted by enterprises in the sugar-ethanol sector. From an effective turnaround, already used by large sugar-ethanol groups, clearly separating what is management and what is property, the professionalization with planning and cost control, along with the use of new technologies, will place the industry back to a level of prominence on the world stage, enabling Brazil to be one of the major players in the international market of agribusiness through expressive gains in productivity.

Improvements in management procedures of enterprises in general, with more conscious and pondered actions, can help enterprises to face the global crisis. After all, if the root of the crisis is the management mistakes, through correct actions we can turn the current situation around.

It is worth noting that the pillars of the Brazilian economy are solid, with free international capital movement, floating exchange rate with minimal government intervention, active monetary policy, based on inflation targets adopted by the Central Bank and fiscal policy with public debt of around 35% of GDP, way below the recommended maximum of 50%. The bill for the damage caused by the crisis will be paid by society as a whole – governments, businesses and workers. However, the task will be softened if, instead of indiscriminately cutting costs, we search for, above all, operational

efficiency and effectiveness, increased productivity and conquest of new markets.

Brazil can come out strengthened from the current situation, as it has a very large domestic market and an agro-industry with potential for growth able to mitigate the impacts of the global crisis as long as each enterprise does its homework properly.

To conclude, I warn my fellow executives and entrepreneurs. Whenever you think about cutting back workforce, ask yourself whether you are really ready for the job or just taking the simplest decision.

# THE TURNAROUND OF THE SUGAR-ENERGY SECTOR



**B**razil was once the world's largest producer of rubber, coffee, cocoa and orange; however, it has lost its position over the years by misguided Governments and lack of efficiency and effectiveness. Today, we are the world's largest sugarcane producer, but at serious risks of losing this position because of a series of political, economic and technical issues.

In recent decades, the capacity of the sugarcane productive chain has been a huge source of income, employment and taxes, besides generating a technological breakthrough recognized internationally.

In the article "Management crisis is back to its origins", published in the magazine "Agro em Foco" in April 2012, we identified the major bottlenecks of the bioenergy sector.

Synthesizing and updating the conclusion data of this article, we identified three basic issues:

- High indebtedness of enterprises in the sector: according to Unica (Sugarcane Producers Association), in the crop 2013/2014, the debt in the bioenergy sector could rise 7.7% (or R\$ 4 billion) compared to the 2012/2013 season, reaching an es-

timated volume of R\$ 56 billion. The impact on cash flow of enterprises will be devastating, hindering investments in new producing mills and in the renewal of the cane plantations.

- Productivity had a significant reduction from 86.6 tons per hectare in 2006 to 72.7 tons per hectare in 2012. This resulted from the issues mentioned before.

- The management procedures adopted by these enterprises, both national and multinationals, left a lot to be desired, mainly because of the allocation of resources with low rate of return on capital and the inadequate management of operating costs because executives did not, and many still do not, know the sugarcane production costs. Our objective is to present a long-term vision and determine guidelines that allow the productive chain of sugarcane, ethanol, sugar and bioelectricity to become self-sustaining and profitable.

The focus will be primarily technical; however, I will make remarks on the macroeconomic policies for the sector adopted by the Government and their impacts on microeconomics mainly regarding the

agricultural producer.

The exemption of PIS and COFINS (federal taxes in Brazil) on ethanol production, without doubt, will make allow a reduction in costs; however, it will have negative impacts on the National Treasury accounts. To make both ends meet, either the Government, through the National Treasury, will issue currency, causing monetary expansion, possibly leading to inflation increase, or it will issue securities with attractive interest rates, causing market expectation about interest increases in the future.

Petrobras will greatly benefit from the policy of adding anhydrous ethanol to gasoline, because ethanol is priced in Real, and prices are lower than those paid to imported gasoline. There is no a risk resulting from an increase of the dollar exchange rate.

The efficiency of flex-fuel engines used in cars produced in Brazil has remained the same for years: the yield of ethanol in flex cars is, on average, 32% lower than in cars that run on gasoline, whether in the city or on the road. Therefore, it is feasible to use ethanol only if the price is up to 68% of the price of gasoline. This ratio has remained constant since the launch of the Pro-alcohol program back in 1974.

What has the automobile industry done for the development of the engines for an effective increase in the operational performance of flex-fuel cars?

From my perspective, we operate in a capitalist market, thus, business owners and executives should conduct their business without relying on a national policy for the sector. Our objective is the profit of the business; therefore, we should produce the product that best remunerates the capital. Consequently, we must establish the best strategy for the growth of the enterprise and the industry.

The turnaround of sustainable growth should follow two paths: doing things right and doing the right things.

The basis for the recovery of the sector primarily comprises a top-of-the-line management team and knowledge of the sector. Today, we find decision makers who do not fully understand the agricultural and industrial processes of sugarcane. An example was the non-renewal of cane plantations and cultural practices in the 2008/2009 and 2009/2010 crops. Now they are paying a high price for this misguided decision.

The planning for the short and long-term essen-

tial for the production of high-quality cane with high productivity based on new technologies and significant changes in agricultural practices, by using a varietal model with varieties compatible with their respective environments and adapted to mechanized planting and harvesting.

Crop rotation is also relevant for the optimization of production factors, especially for land cost. The rotation of crops with soybean allows a cost reduction of sugarcane by 15.3% on the conveyor belt.

With the significant drop in productivity in the past two crops (69 t/ha and 72 t/ha), according to market data, we will only achieve 84t/ha after two full cycles, adopting a renewal rate of 20% of the sugarcane plantations and applying a policy directed to increase productivity, such as heat-treated seedling nurseries, (90% of the mills do not use this practice demonstrably effective), a high-productivity varietal model adapted to their respective environments, the mechanized planting and harvesting. With a productivity of 84 t/ha, production cost is R\$ 71.00 t/ha; with an average productivity of 70 t/ha, the cost will rise 20%.

Following this line of thought, only after two cycles, i.e., 10 years, we will recover the level of 84t/ha. With price increases of the 2012/2013 crop to the 2013/2014 crop, production factors, such as, labor force (+8%), fertilizer (9.63%), herbicide (12.62%), the breakeven point of sugarcane production is near 99 t/ha. In this scenario, we will need two more cycles. Thus, the turnaround of the sector will take 20 years. As Keynes said, "in the long run, we will be all dead".

The above scenario shows that the management change of the bioenergy sector will occur only when there is an awareness of our managers from the 21st century, who lead enterprises rooted in past-century procedures, i.e., in the ancient processes of sugar mills.

The current business managers hold the responsibility to break the Government's bonds and manage their businesses with a capitalist vision, producing products that effectively generate higher profits, remunerating the invested capital and ensuring the survival of the company.



# FROM ECONOMIC STABILIZATION TO ECONOMIC RECOVERY



Operational and economic factors have dragged sugarcane mills to the deepest crisis in the sector. Now it is the moment to define alternatives for a stabilization process and recover growth.

During the International Seminar on Food & Agribusiness Management – IFAMA –, held in June 2010, in Boston, the USA, Ray Goldberg, a professor from the Harvard Business School, emphasized that, in the last 50 years, the term “agribusiness” was understood by almost all stakeholders of this chain; however, the initial link, i.e., the agricultural producer, still lacks a professional management system focused on results and sustainable development.

Externalities, such as the ethanol price, logistic infrastructure, among others, exist, but the major issues to be tackled are internal, whether in agricultural management or in the industry.

Primarily, effective management of an agro-industrial process requires a knowledgeable manager and an excellent planning and control of the process. There is great need for capital and profit margins are reduced. Moreover, it is essential to adopt new technologies that ensure a significant increase of productivity in the sector and profitability of assets.

Fundamentals of the crisis – the macroeconomic factor: for decades, Brazil has lived through an inflationary process that reached levels of hyperinflation, which was one of the main factors to increase fuel prices, challenging the rational expectations of economic agents. Therefore, any significant and sustained change in fuel prices could lead to the resumption of the inflationary process. Since ethanol has the value of gasoline as price limiting, the Government avoids any gasoline price rise at all costs. At mills, the origin of the crisis was a

mistaken strategic diagnosis in 2007, in that Brazil would become the world’s largest producer of renewable energy. Five years after, we imported ethanol and, even more amazing, for the first time in 50 years, we imported sugar.

The mills have invested in “greenfield” projects using short-term financial resources for projects of long-term financial economic maturation. The financial constraints in 2008 due to the global crisis drove enterprises to reduce significantly their operational investments, mainly in the renewal of the sugarcane plantations and cultural practices, leading to a drastic reduction in productivity. One of the main factors for the crisis was indebtedness of the sugar-ethanol sector that reached R\$ 40.5 billion in the 2010/2011 crop and ended the 2011/2012 crop with an increase of 3.7%, reaching R\$ 42 billion, according to Itaú BBA Bank. This increase of indebtedness resul-

ted from the increased production costs. According to data from Unica, the graphic below shows the upward trend in indebtedness of sugarcane mills.

Another factor was the loss of agricultural productivity. In recent crops, we achieved a productivity similar to that from the 1980s, i.e., 73 tons per hectare. This low productivity is a result of lack of investment in the renewal of the plantation and in improvement of cultural practices. The use of low-quality seedlings, mainly during the planting of the “ethanol bubble”, was one of the factors that led to a drop in agricultural productivity.

The mechanized harvesting also contributed to the emergence of pests and diseases in sugarcane crops. The constant need for fungicides led to a higher cost of production. In addition, the varieties of sugarcane planted were not prepared for the mechanized system. The low efficiency of the harvesters significantly pushed up operational costs in the last seasons. The cost of the CCT reached up to 55% of the total operational costs, causing a considerable loss to crops.

Another factor to make matters worse was the lack of specialized labor force. As the sector grew, there was a need for a greater number of workers, who, in most cases, lacked the required experience for this type of work. Employee turnover has relevant impacts on business management.

Many sugarcane producers are not aware of the actual production costs and cost reduction programs. Therefore, they adopt an inappropriate methodology for calculating costs, i.e., they do not take into account depreciation, capital cost and opportunity cost of capital, for instance. They conduct their management procedures based on cash flow. Cost reduction programs require the establishment of operational procedures in their respective production environments to define management parameters.

Data from Pecege (Esalq-USP) show that the effective total costs in traditional sugarcane producing regions were R\$ 43.71 in the 2007/2008 crop and R\$ 70.08 in the 2011/2012 crop. Production factors such as labor force, land and agricultural inputs have kept the upward trend. In terms of revenue, the attractive prices of sugar have enabled significant gains, unlike ethanol. However, for the next few years, our competitors in the international market will increase their sugar output, which will cause price drops, shrinking the revenue for the enterprises in the sugarcane sector.

The turnaround in management in the sugar-alcohol sector was started in 1999, when the Government stopped regulating the price of sugar, ethanol and sugarcane; however, enterprises, entrepreneurs and executives have not been able to define strategies for their companies, which operate in the market of commodities. This paradigm must be broken if the enterprises are to survive in a business environment of rapid change.

These facts lead to the diagnosis of a real blackout in management. Without doubt, it is more convenient to present crop failure due to the adverse weather conditions or lack of support policy from the Government as justifications to shareholders, but those who really know the sector know that the problems are in the sugarcane mills. Enterprises that operate in the market of commodities must know their production costs and stop cultivating varieties unsuited to their respective production environments, generating lower productivity.

The mills must review the fundamentals of their operations; otherwise, they will be driven out of the market. Successful enterprises were those that evaluated strategically their cost structures and made large-scale changes to align the organization to a new business model.

Initially, the enterprises must prepare for a highly volatile business environment, in which the main pro-

duct is a commodity. Competition with world producers for new markets is increasingly fierce. The stabilization and resumption undergo the adoption of three basic policies:

1. Qualified and competent professionals in strategic positions;
2. Operational, judicious and optimized planning of their activities;
3. Use of effective methods of performance control.

Upon completion of these steps, all forces should be directed to:

a. Renegotiation of debts: changing the debt profile, transforming short-term to long-term debts, in addition to the renegotiation of interest rates. This will provide greater liquidity, enabling investment in renewal of the sugarcane plantations.

b. Renewal of the sugarcane plantation: this action is paramount for the turnaround of the sector. Only with significant increase in productivity, the mills will make it through this crisis. The adoption of strategies such as the deployment of “healthy seedling nurseries” for the supply of commercial plantations, the use of varieties suitable to their respective production environments and good management practices will allow achieving, in the mid-term, the expected productivity to reach their operational and economic breakeven point.

c. Focus on cost management: cost management is for the commodities market as price management is for products. However, it is not perceived as such. The adoption of a standard cost methodology in which the cost of each process or activity is determined, as well as the correct determination of the amount of use of production factors, allows the adoption of a cost planning focused on process and on techniques of production, contributing to offer a competitive product to the market.

There is no more time for experimentation. We are in a battlefield that will define our survival. The name of the game is increased productivity and cost management.

# PRODUCTIVITY INDEXES IN THE SUGARCANE SECTOR

The evolution of agribusiness in the international scenario, its growing participation in the Brazilian economy, powered by population growth and consequent increase in world demand for food, have placed Brazil as a major player in the energy market and agricultural products in the world.

Commodities are homogeneous products of low-value added inserted in a perfect competition market in which profit tends to zero. In this scenario, an agricultural enterprise can have differentiation or increase in profits for commodities by reducing production costs of its activities. A reduction in production costs can be attained, among other ways, with the use of advanced and efficient technologies, increasing production and productivity of the sugarcane mills. Moreover, the adoption of an integrated management model that considers an agricultural production system allowing to reach the productive potential in terms of technology and working capacity of each property or agribusiness ensures continuous improvement and optimization of processes.

Therefore, we stress the concept and maximization of productivity in these agro-industrial systems as the major objective to be achieved and established, allowing identifying the critical production factors involved and attending the competitive strategy of each segment in the agro-industry sector. In this context, determining and using productivity indexes are critical and important tools

for budgets preparation and production control through the analysis of variables and planned features, effectively used in activities considered and measured by these indexes.

However, what are these productivity indexes? How are they determined? How can they be applied to agro-industrial systems, more specifically the sugar ethanol sector?

To answer these questions, first, we must define a general production system, which considers two parts. Number one, the physical system of production and two, the economic production system (Muscat, 1967). Both are interconnected and the physical system (Figure 1) shows the technology used in each operation based on three main production factors: labor force, materials (all inputs used in the activity) and equipment, generating the final product. The economic production system (Figure 2) considers the market in which these three factors are inserted, measured monetarily, resulting in the total revenue obtained from the product.

The definition of the production system allows the construction of the index system of productivity. The index starts from a broader and initial concept named global productivity index composed of physical and economic attributes of the production system that is broken down into more specific and detailed indexes referred to as partial indexes of productivity and costs.

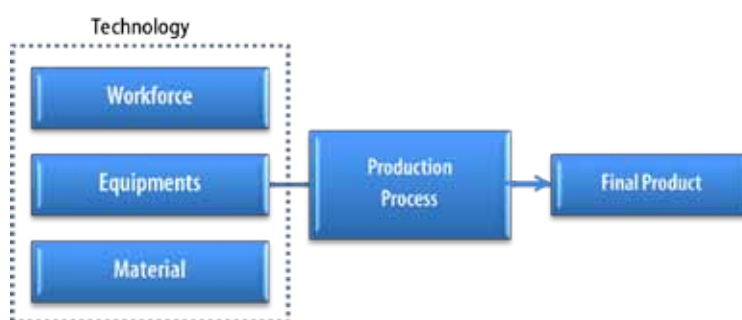


Figure 1. Physical Production System. Adapted from Muscat (1967).

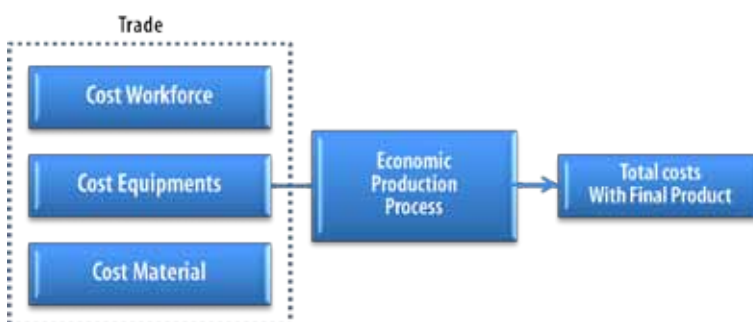


Figure 2. Economic Production System. Adapted from Muscat (1967).

Defining and determining these indexes are an important management tool that allows comparisons with operating results from previous years, identifying the points to improve, simulating scenarios and elaborating strategies for the short and long term.

The application of these concepts in the sugarcane sector, more specifically, in mechanized operations involved in sugarcane production is relevant and essential for the reduction of production costs of the activity and the quality improvement of raw material used in the mills, maximizing revenue and overall profit. As the product of the sugarcane sector is classified as a commodity, competitive strategy adopted by mills aims at cost reduction, thereby determining the productivity indexes generates scaled values in costs per unit of area used, i.e., R\$ per ha-1

The structuring of productivity indexes for mechanized operations in sugarcane has as global indicator the sum of costs per unit area of the five macro-processes carried out and considered, namely soil preparation, planting, sugarcane plant treatment, harvesting (cutting/shipment/transport) and cultural practices of tussocks.

For each of these processes, we obtain partial indexes of productivity for each activity and production factor/class of resources (materials, equipment and labor force) from the determination of the partial indexes of physical productivity and costs of resources used and considered in each activity of the macro-process.

The schematic structure of the index network for the mechanized planting in sugarcane and the results for this macro-process are shown in Figures 3 and 4, respectively. Figure 3 shows the structuring network of partial productivity indicators for the macro-process of mechanized planting in sugarcane. The macro-process of the mechanized planting was composed of a network of indexes that considered five activities: transport of fertilizers, pesticides, cut seedling, harvesting of cut seedlings and the mechanized planting (Figure 3). The partial productivity index for this operation recorded the use of approximately R\$4,330.00/ha, in which the mechanized planting and harvesting of seedlings were the activities with greater participation (Figure 4).

Figure 4. Mechanized planting: partial indexes of productivity for activities (R\$.ha-1)

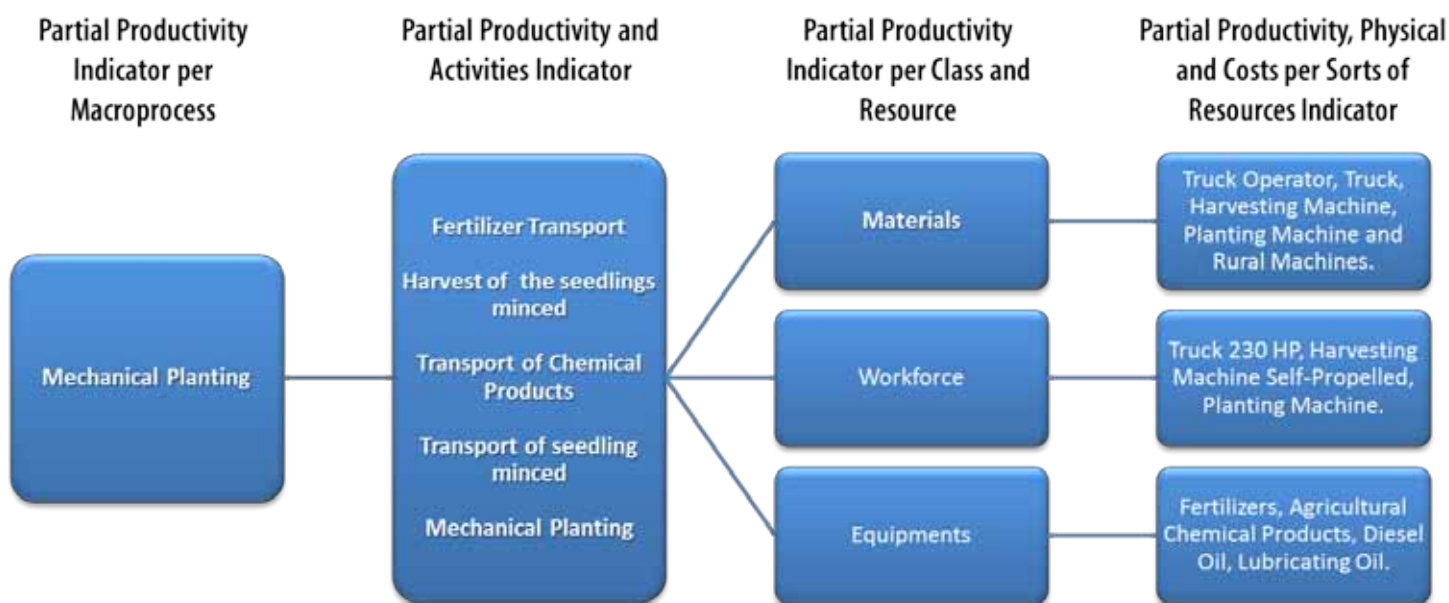


Figure 3. Structure of Partial Productivity indicators for the Macroprocess of Sugar Cane Mechanized Planting.

The significant participation of these activities in the total cost of the macro-process is explained, among other factors, by the high quantity of materials (fertilizers, seedlings, pesticides, diesel fuel, lubricating oil, etc.) demanded from the mechanized planting activity, the high cost of the equipment and the size of investments

made in mechanized harvesting of relatively small areas to meet the demand in the area for planting seedlings. In this context, Figure 5 outlines the costs (R\$. ha-1) for each resource class used, reassuring the greater participation of materials and equipment in the total cost of the macro-process of the mechanized planting of sugarcane.

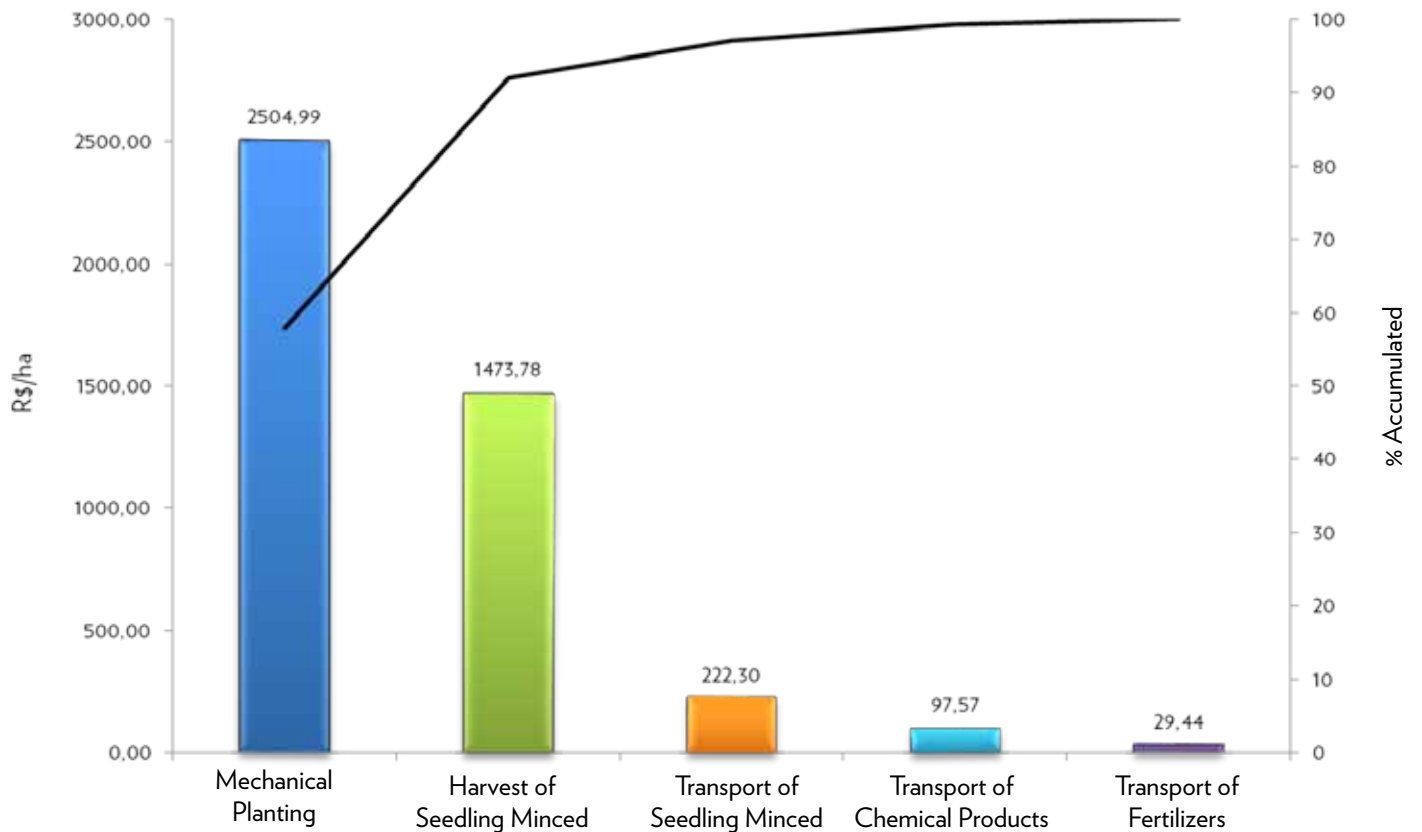


Figure 4. Mechanized planting: partial indexes of productivity for activities (R\$.ha-1)

### Final remarks

The adoption of management models in agro-industrial sectors is critical to improve efficiency and effectiveness of production systems by increasing productivity/production to reduce costs. Tools, such as the productivity indexes, should be part of everyday operational and administrative procedures of enterprises

in the agricultural sector to assist in the analysis of the economic/operational performance of production factors, providing subsidies for strategic and financial planning, supporting the decision-making process for the most suitable combination of resources and services for a maximized and sustainable use of productive potential of enterprises.

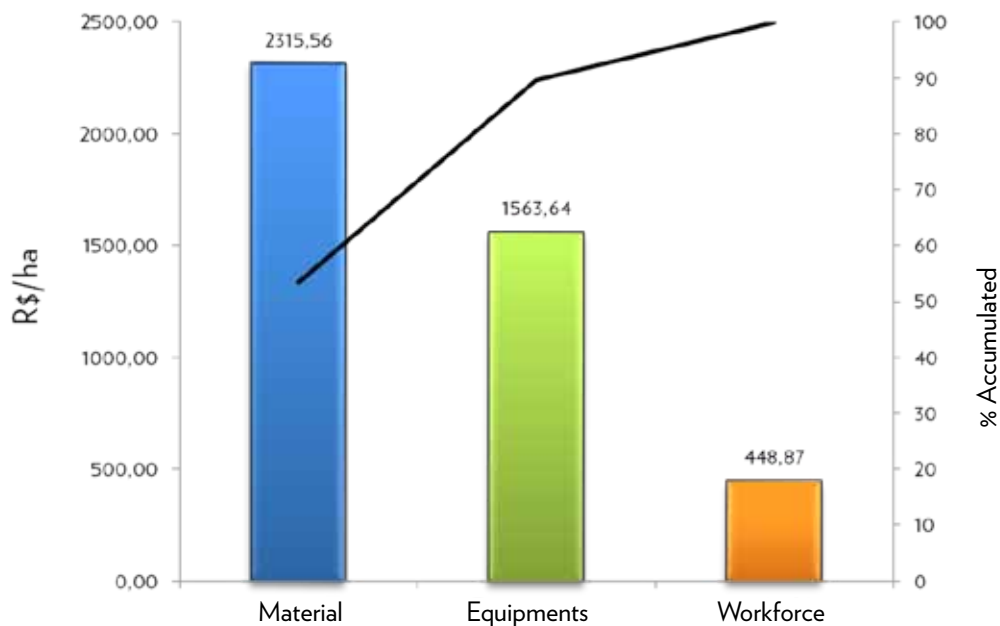


Figure 5. Mechanized planting: partial indexes of productivity per resource class (R\$.ha-1).



# MANAGEMENT CRISIS IS BACK TO ITS ORIGINS

## THE IMPACTS OF MANAGEMENT CRISIS ON AGRIBUSINESS

*The current crisis, not only in agribusiness, but also in the generalized scope is attributed to a management crisis that began mainly due to strategic and operational mistakes. Therefore, our proposal is to invest in a model of management excellence, focused on the origin of management essence: planning and control of operations.*

In the last decade, enterprises such as HP, Xerox, GM and Lehman Brothers among others, went through or succumbed to a deep crisis primarily due to management mistakes, whether in their strategic planning, in the case of HP or Xerox, or in basic operationalization of the basic finance law, in the case of Lehman Brothers, by putting all the eggs in the same basket such as the “subprime” (mortgage securities with high credit risk and return rates above the market average).

The former President of Spain, José Luís Rodrigues Shoemaker, acknowledged management mistakes to explain the electoral defeat and criticized the European Union (EU) for “not being able to find a solution to the debts of countries members of the European Community”.

Directing our focus to agribusiness, we also found

mistakes that have generated negative results in the bottom line of balance sheet as in the case of bioenergy sector.

### CAUSES FOR THE CROP FAILURE OF 2010/2011

The crop failure in 2011 was attributed fundamentally to strategic and operational mistakes due to the ethanol bubble in 2007, when everyone expected that Brazil would provide renewable energy – ethanol – to the entire world.

We highlight some relevant points and mistakes:

1) Strategically, entrepreneurs of the sugar-ethanol sector do not seem to realize that the ethanol price is attached the gasoline price. Gasoline is one of the items of greatest impact on expectation inflation; therefore, the

Government will not change gas price due to increased ethanol costs. This point is critical for the economic policy of the country to keep the inflation rate within the established target.

2) In 2007/08, many sugarcane mills used capital resources in new investments, mainly ethanol producing mills, with long-term return on investment. With the financial crisis of 2008, the domestic and international financial market cut back credit lines previously abundant, promoting a credit crisis between the plants and their partners and suppliers.

This fact led mills to cut down on investments in their operation, i.e., in the renewal of sugarcane crops and improvement of field practices. In addition, prices of agricultural inputs increased significantly.

3) Another relevant point was the growth of mechanized sugarcane harvest that favors the occurrence of diseases in the roots and shoots of sugarcane. Researchers say that the sugarcane varieties used were not prepared for this type of management. Another reason for the reduction in productivity was the use of low-quality seedlings in previous crops. Few mills concern about the quality of sugarcane seedlings they use today. Therefore, the vast majority of mills have neglected to use the heat treatment.

Many new and old diseases are attacking the sugarcane fields these days. In a very near future, we will start using fungicides in sugarcane crops increasing, thus, production costs.

4) One of the major impacting factors in the composition of the total sugarcane production costs was the mechanized harvesting, due to low productivity of sugarcane harvesters. On average, a harvester needs to cut 600 tons/day to reach the breakeven for productivity and costs and if this number increases significantly, machinery maintenance costs will rise exponentially.

5) The low productivity resulted in a significant reduction for sugarcane crushed, leading the mills to wrap up the harvesting operations in advance and therefore increasing the off-season period pushing up significantly production fixed costs.

6) With the growth of the sector, mainly in light of the large number of mergers and acquisitions, there is a significant shortage of skilled labor force. The major groups hired excellent executives from other industries; however, there is an adaptation and learning time in the sector, because the sugarcane energy sector has always adopted a family management mode, with knowledgeable and experienced people in the

production of sugarcane. This experience was acquired over the years and mainly with the technical support of Centro de Tecnologia da Copersucar, currently Centro de Tecnologia Canavieira (Sugarcane Technology Center). For 40 years, this world-recognized technology center has developed and implemented techniques adopted today, in which hundreds of technicians have been trained in the production of sugarcane, sugar and ethanol and electric power. The question is: Do the executives in our bioenergy sector today know that, in order to plant sugarcane, the seedlings need to be treated? Do they know the production cycle? Are they aware that the investment in sugarcane cropping today will be the profit tomorrow?

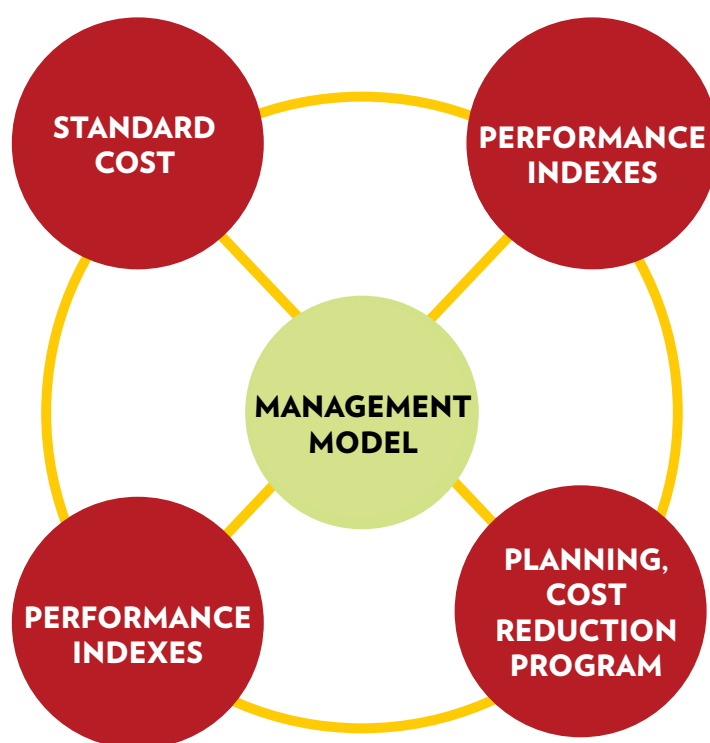


Figura 1 - PROPOSAL: PATHS FOR MAKING A PROFIT

Business management is the backbone of a healthy enterprise. Investors assess not only the company's assets, market-share and EBITDA; but also most of its management team.

Therefore, it is necessary to establish a management plan focused primarily on the decision-making process. It is equally important to implement tools for effective management, namely planning, execution and control of operations. In the agricultural sector, most products are commodities, i.e., products marketed on a large scale, homogeneous, with low value added inserted into a perfectly competitive market; therefore, profits tend to zero.

The profit is obtained from cost reduction and increased productivity. The focus of the management should be directed as shown in Figure 1.

The management mode is understood as a set of management principles and targets under which the enterprise must be managed, ensuring that the targets are achieved and the risks minimized in view of its effectiveness (doing the right job) and efficiency (doing the job right).

From the management model, the direction is:

Agricultural and industrial planning: the planning of agricultural production aims to ensure the supply of good-quality raw materials and viable costs for the production of sugar, ethanol and electric power.

The industrial planning aims to maximize the use of raw materials, establishing a steady production flow and the search for high productivity. Managing each stage of the process is critical (syrup extraction, fermentation, distillation, etc.), mainly in search for high productivity indexes in the process.

#### Management Model

Performance indexes: they are productivity indexes aiming at the maximization of production factors: land, capital, technology, labor force, machinery, equipment and supplies.

In the bioenergy sector, the pursuit of continuous development and significant increase of agricultural and industrial productivity is a matter of survival.

Standard cost: determining the production cost has special importance for the decision-making process as it determines the results for the venture. The standard cost is a predetermined cost calculated from standardized processes and should focus on the production environment of the agricultural operation. It is also a technique used for the control and analysis of performance.

Cost-reduction program: a cost-reduction project aimed at increasing the profitability of the enterprise. In the sugar-ethanol sector, very few enterprises hold detailed monitoring of their operating costs. For an efficient management of costs and an effective reduction of costs, it is necessary to be fully aware of cost structure, processes and agricultural activities that use sugarcane to obtain products and services.

#### FINAL REMARKS

The management crisis can be reversed through the composition of a management team with new people bringing in new management models, integrating new knowledge with the experienced staff. By searching for new technologies and training applied to the model proposed above, the enterprises in the sugar-ethanol sector could,

in the mid-term, reduce costs and increase productivity. The growing market requirements of pressures within the sugar-energy chain will require decision-making with greater reliability, increased managerial efficiency and real sync between planning and control.





## SMALL TECHNOLOGICAL STEPS – A GIANT LEAP FOR THE SUGAR-ENERGY SECTOR

How the use of new technologies and processes can provide a more profitable horizon for sugar mills.

**H**ow the use of new technologies and processes can provide a more profitable horizon for sugar mills.

New technologies or processes can derail a product. Shale gas has a lower price and may replace ethanol fuel. The growing exploration of this gas in the United States revolutionized the American energy matrix, allowing a significant change in the American economic framework. However, besides affecting the environment, shale gas economically hinders ethanol production, which is a clean energy, despite the higher production cost.

New technologies adopted by sugarcane growers and the sugar-ethanol industry, such as new tractors, harvesters, increasingly advanced agricultural inputs, must be used only for specific processes and operations. For instance, a 180-HP tractor used for herbicide application costs R\$ 138.00 per hour/hectare, while a 120-HP tractor performs the same operation for R\$ 83.00 per hour/hectare.

In plain sugarcane peak season (2013/2014), sugar prices in the international market are US\$ 17.00 per pound and production costs reach US\$ \$16.88. In addition to the high sugar

supply from India, as the market does not have reliable information about ending stocks for the next season, farmers and mills are apprehensive regarding the planning of future seasons. This scenario, along with the Government's indecision about the policy of ethanol prices and the relevant level of indebtedness of the sector, leads the market to a very fragile condition.

There is no alternative to a significant reduction in production costs in the short term; therefore, profit margins tend to remain negative or low, leading national enterprises to halt production and discouraging multinationals from investing in the production of sugar and ethanol in Brazil.

The production chain of the sector has invested in new technologies and efficient production processes; however, these investments are not consistent and significant enough to change the current scenario. The R&D model adopted in the 1980s enabled Brazil to achieve international standards. The necessary technological model considers a sugarcane production of 120 ton/hectare, an average of 140 60-kg sugar bags per ton, more than 100 liters of ethanol per ton of cane, which will not happen in the next twenty years.

Agro-industrial processes and technologies available on the market aim at boosting productivity, reducing costs and increasing profitability.

The expectation for the industry is to integrate the production of second generation ethanol (2G) that uses cane bagasse and straw for ethanol production. It is called “second generation” because it is produced from raw material that has a cellulosic basis. It has a higher production cost and requires sizeable investments at a moment of money constraint and excessive indebtedness of mills. Sugar and ethanol prices do not even cover the sugarcane production costs. The 2G ethanol, however, is estimated to increase the current productivity of 7,000 liters of ethanol per hectare to a total of 10,000 liters per hectare.

#### New Technologies and Agricultural Processes

In the very short term, to reduce costs or limit operational losses, the ultimate mission of managers will be the proper use of planning, adopting the following processes and technologies:

- Seedling nurseries – each mill must have its own seedling nursery for its own environment of production, with healthy and resistant seedlings, reducing significantly the use of herbicides, insecticides and increasing productivity with varietal model suitable to the environment of production.

- New sugarcane varieties – research centers and universities are marketing, annually, sugarcane varieties with good productivity. A prominent technological advance is the reduction of time for sugarcane diffusion. The former breeding program generated new varieties in 15 years. Now, with an advanced methodology, it is possible to make new varieties available in eight years. The new varieties can minimize losses caused by mechanized harvesting, because they are adapted to their respective environments.

- The systematization of the land use for sugarcane planting and the adoption of planting systems (single or combined) offer several benefits for mechanized harvesting, namely lower costs, increased durability of harvesters and other equipment supporting the CCT, In addition to promoting an upgrade in the production of sugarcane in sequential crops.

- The harvesting of the straw can also be a source of income. In addition to selling it other producers, the straw can provide raw material for boilers.

- The use of large and flat fields can streamline operations of the CCT, avoiding unnecessary machine movements, rationalizing the use of mechanized operations. This process allows a reduction in the number of harvesters, lower fuel consumption per ton of cane harvested and less equipment deterioration.

The use of information technology also reduces opera-

tion costs using analytical planning systems to increase the performance of the entire process of agricultural and industrial production, as well as logistics by using transportation models from the mill to the harbor. The smart management adopted by some mills is based on the use of graphic rules that allow coordinating the operations carried out and controlled in real time. The great difference is that the rules share information from different sources, transforming them into knowledge for strategic decision making in real time.

Direct benefits of this integration: control of production costs at each stage of the process, best performance indices, transparency and reliability of information, reduction of calculation time of costs, minimization of risks and losses, maximization of the productive capacity and confidence in the decision-making process.

#### New Industrial Technologies:

Technologies currently used in industrial processes provide relevant results to increase operational efficiency, reduce costs and provide positive indices of economic viability.

Projects are being conducted for the treatment of vinasse, which is a fertilizer produced with waste from the alcohol agro-industry (concentrated vinasse, filter cake, boiler ash and soot from chimneys) replacing the mineral fertilization of cane plantations. Studies on feasibility estimate that the granulated and dried organic-mineral bio-fertilizer reduces up to 98% use of potassium chloride, 21% of phosphorus and 35% of nitrogen, affecting production costs.

Another technology developed and applied in sugarcane mills aims at using yeast capable of withstanding a fermentation process with high alcohol content. The process operates through the mash that is concentrated before fermentation, eliminating part of the water by evaporation and/or by the addition of honey. This allows the mash to retain a greater concentration of sucrose, ensuring high levels of alcoholic concentration during the fermentation process, changing from 8% to 16% of alcohol content.

#### Conclusion

Brazil aims to be the world’s “supermarket” offering food and energy due to its climate and production factors (land, capital and efficient labor force, if properly trained). However, it is imperative that the Government establish policy for agriculture and R&D to the country and direct relevant investments to these purposes.

Agribusiness, particularly the sugar-energy sector, has resources and competence to make Brazil a better country for all Brazilians.





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