

Ice cream Made of Brazilian Native Fruits: Sustainable Development to Depressed and Biodiversity Areas

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Abstract—This paper presents a case of food production, especially ice cream producing made of Brazilian native fruits, and the engagement of the poor population and women in the production of healthier products and a more sustainable production. It is about of accessing native fruits in the Brazilian savanna and, therefore, in the base of production, that it is necessary to recognize the role of small and medium producers in the social and environmental transformation of poor or depressed areas. Especially since small and medium producers still have areas of native forests on their land, while large areas of production are generally destined for commodity production. The Frutos do Brasil company is therefore analyzed for its performance in the face of more sustainable forms of production, because it invests in the production of healthier foods, in stimulating small and medium producers of food, in stimulating the maintenance of native vegetation, and inserting more poor and women in the productive process.

Keywords—healthy food, sustainable production, SMEs, environmental development.

I. INTRODUCTION

This paper has the objective of studying the initial formation of a cluster involving the extraction of Brazilian native fruits and the production of low fat and low calories ice cream. The main actor of the study is the company *Frutos do Brasil* that produces ice cream out of native fruits. The firm is in the center of a web of producers, public and private non-profit entities, which includes universities, government and research centers. There is an important participation of the poorer population of Goiás (Map 01) that is a dynamic state especially in high valued agriculture activities but that still has many impoverished areas. Also, should be mentioned another important participation: women from small underdeveloped communities that are perceiving this economic movement to access market, generate jobs and promote social improvement.

Although the world market of ice cream is expanding, especially in emerging countries like China, Brazil and Turkey, the traditional fattening format is losing space for healthier alternatives like frozen yogurts and low fat and calories nutritious ice cream. So, there is a growing marketing niche formed by consumers worried not only about health but also with the sustainability of the planet. This is where native fruits come to play: as much as they are rich in fibers, vitamins, minerals and antioxidants, their cultivation can be done without any harm to the surrounding environment.

Considering this scenario, the company *Frutos do Brasil* envisioned a good business opportunity to be explored: the production and selling of ice cream made of native Brazilian fruits. The firm is at this moment trying to organize its production chain which involves the development of native fruit suppliers, the setup of the assembly line of pulp extraction, the production of ice cream, and all management functions like marketing, distribution, sales and governance.

To carry on the proposed objective, the article is structured in four parts: (a) contextualization of the state of Goiás with the economic potential of a sustainable native fruits exploration; (b) the recent scenario of the ice cream market worldwide and in Brazil, considering the most recent trends towards healthier products; (c) the fruit business with some insights about the native fruits marketing niche; and (d) the challenges of the management of a new company inserted in a web of participants each of them playing an important role in the development of a possible new cluster around native Brazilian fruits and the production of derived healthier products.

II. GOIÁS STATE AND ITS POTENTIALITIES

Located in Central Brazil, Center West region, the state of Goiás is part of a rich biodiversity area with low demographic density; population density is around 19 (inhabitants per square km), very low when compared to the 177 of the richer and more developed state of São

Paulo. Its most important Biome, a woodland savanna, known as the “Cerrado” is the second largest in South America. In the limits of the Cerrado are the springs of the biggest hydrological basin of the Continent, including rivers like the Amazon, San Francisco and Plata. So, the hydrological potential of the area is very high. This Cerrado Biome is home of more than six thousand species of cataloged plants which includes a great diversity of fruit trees. The tropical climate, with temperatures varying from 72° to 79° F along the year is adequate for cultivating fruits according to the Brazilian Agriculture Research Corporation (Embrapa, 2006) (Maps 02, 03, 04 and Figure 01).

In the last decades, Goiás state has experienced an intense economic development. Agriculture has been the motto of this growing since the 1970’s when the state company Embrapa with its applied research transformed the then poor aluminum-based soil of the Cerrado into fertile fields of today where soybean, sugarcane and corn are cultivated with state-of-the-art technology. It also should be mentioned the long-time mining activities (mainly iron, nickel, manganese, calcareous and phosphate) explored in the state by multinational companies like Anglo American and others. Besides agriculture and mining, the state has also developed an important industrial base in sectors like automobile, pharmaceutical, food and beverage. Also, in the 1970’s the regional government started fiscal incentive programs that were successful in attracting global companies from the more developed Southeast part of the country (Gomes, 2005).

Although Goiás holds the ninth grade in the national economic ranking with a GDP of US\$ 50 billion, and despite the fact that the human development index (HDI) has grown from 0,487 in 1990 to 0,735 in 2010 (UNDP, 2010), there are poor and underdeveloped areas in the state. In the public policy “Plano Nacional de Desenvolvimento Regional”, the state is divided into a rich and dynamic area versus stagnant and poor areas. According to Santos (2011), there are many poor municipalities spreading across the state; in some of these small towns there is not even a single formal company. They are dependent upon eventual government support and its population suffers the odds of poor regions lacking access to health, education and jobs (Map 05).

The state and municipal governments articulate public policies to stimulate these poorer areas through fiscal transference programs. Despite that people from these depressed areas also try to create possibilities for their own development. They are natural entrepreneurs with lots of knowledge of the local potentialities.

As mentioned before, Goiás has important economic high valued activities, such as agribusiness, especially

commodities like sugarcane, corn and soybean, mineral exploitation, automobile, harvest equipment and pharmaceutical production – centered in the middle of the state (IMB, 2015). Nevertheless, there are also less economically important activities, such as artisan ice cream production. Although in small scale, it seems an interesting business to be analyzed because it is a growing market with some important elements to consider: the low-fat fruit-based ice cream is gaining international exposure due to the increasing consumer demand for healthier products. Besides that, the cultivation of native fruits, the basic input of artisan ice cream, helps to preserve the more important Biome of Central Brazil and it employs small and medium producers, mostly from the poor local population, uncovering new possibilities of business for a biodiversity area such as the Cerrado.

III. WORLDWIDE CONSUMPTION OF ICE CREAM

The global market of traditional ice cream is still growing: from 2010 to 2015, the worldwide business grew 31%, rising from US\$ 54 to US\$ 71 billion (Forbes, 2016). It is worth mentioning that it is as much a profitable market with margins around 23%, higher than snacks, candy, cereal and sugar. It is not a market dominated by a single brand. Unilever, the most important player accounts for approximately 23% of the world market, followed by Nestlé with share of 10%, General Mills, with 3% and Lotte Group with 2%. Around sixty-two percent remains with small local brands.

The growing of the market in the last years is credited mostly to emerging countries like China and Brazil with expansions of 50% and 100% respectively in the period considered from 2010 to 2015 (Euromonitor, 2015). The explanation for that is based on the up surging in these nations of a lower middle class now able to afford the consumption of indulgences like ice cream, candies, chocolate bars and other amenities. The mentioned growth is centered in products with traditional format, that is, containing high doses of fat in its elaboration which is the original formula of ice cream.

The up surging middle class is not yet as demanding as their peers in the developed world about nutrition facts. In developed countries there has been a decline in the consumption of traditional ice cream due to worries about the intake of sugary and fattening food. In the United States, for instance, in 1989, an average American used to consume ice cream 41,3 times a year; in 2014, this frequency dropped to 28,5 times a year (Fortune, 2014a).

The preference in wealthier markets of the globe is veering towards frozen yogurt (froyo) and fruit-and-vegetables flavors, considered healthier products

opposing to indulgent traditional fattening ice cream. The frozen yogurt market gained room in the 1980's and peaked in sales at the beginning of the 1990's and has born again in the last five years, with revenues increasing by 23%, from 2010 to 2015, according to Guidant Financial data (2015).

IV. ICE CREAM CONSUMPTION IN BRAZIL

The ice cream market in Brazil has been growing steadily since the turn of the twenty-first century and has not stopped despite the current economic crisis the country is facing since 2013. According to the Brazilian Association of Ice Cream Producers (ABIS, 2016), from 2003 to 2014, the volume produced varied from 685 to 1.300 million liters, an increase of 89.7% (Figure 1). The 12% drop from 2014 to 2015 reflected the beforehand mentioned macroeconomic problems. Different sources show different numbers but one way or another the market is growing intensively.

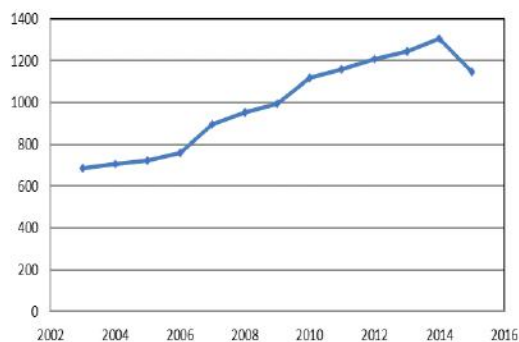


Fig.1 – Evolution of consumption of Ice Cream in Brazil in millions of liters

Source: ABIS (2016)

The most prominent companies in operation are the internationally renowned Unilever and Nestlé, but together the two big giants accounts for only 10% of the internal market (Datamark, 2016). There can be listed some small successful players showing double digit increases in their businesses just in the middle of a strong political and economic turmoil: in 2015, Sorvetes Rochinha, a famous ice cream house in the North shore of the state of São Paulo grew as much as 30%; Bacio di Latte also located in São Paulo in the same year had sales increase of 60% (Datamark, 2016).

As mentioned before, a plausible explanation for the intense growing in the Brazilian ice cream market is the up surging of a lower middle class since the beginning of the years 2000. It is what Marcelo Neri (Neri, 2011) calls “the new middle class”. According to this author, it cannot be compared to the affluence of the North American middle class for instance, but it has

discretionary purchasing power, that is, the new middle class can consume beyond those very basic expenses related to surviving like food and shelter.

From 2001 to 2011 the 10% poorer in Brazil had an income growth of 91.2% while the 10% richer had an increase of only 16.6% (IPEA, 2012). In poorer regions like Northeast the increase in income was 72% against only 46% of the wealthier Southeast. This rising in purchasing power allowed this once excluded strata of population to afford air travels, new car financings, home appliances and electronics in general, including the so popular mobile phone, accessible today for practically the whole Brazilian population. On the rise of income rising, lower middle class is now able to consume outdoor foodstuffs. The consumption of eatables outside home is usually associated with higher standard of living (Kamakura & Mazzon, 2013).

Although evidences are supporting that there is, on one hand, a rising lower middle class now able to consume what in the recent past was out of reach, on the other hand, there is an upper middle class in Brazil with consumption standards very close to developing countries wealthier social strata. In the case of ice cream consumption, just like in the developing world, the upper middle class prefers low fat and healthier choices like frozen yogurt and natural fruits options (ABIS, 2016).

This situation uncovers a complex market reality showing social classes composed of quite different family structures, with some of them on the top of the social pyramid, demanding sophisticated products while others, on the base of this pyramid, celebrating the very fact that they now can afford to buy indulgences like a tasteful (and incidentally fattening) ice cream.

The potential for growth is reflected in the numbers: per capita consumption of ice cream in Brazil is only 6,4 liters/year, way behind the United States with 20 liters/year; and lagging as much South American neighbors like Argentina and Chile both with 9 liters/year (Datamark, 2016).

V. THE MARKET OF NATIVE FRUITS

Fruits are the second most popular consumed item by Americans, taking over the spot once occupied by soft drinks. Growth conscience is partly responsible for the fruit ascent. Grocery stores are dedicating more shelf space to produce (fruits and vegetables). The most consumed fruits are berries, apples, bananas, grapes and citrus (Fortune, 2014b). The fruit industry is in the mature stage of life cycle. The market shows strong signs of competition, minimal technological change, industry product category well defined and demand increasing with the rising of middle classes (IBIS, 2016).

Due to consumer health consciousness fresh fruits and vegetables are expected to replace industrial formats. In many parts of the world, the growing demand for fresh fruits is expected. This growth is positively associated with urbanization and with the rising of middle classes (IBIS, 2016).

The fruit market in Brazil, according to the Ministry of Agriculture, Livestock and Food Supply (MAPA, 2014) exported as much as US\$ 878 million in 2013. The consumption of fruits in the country occurs during the whole year long due to good weather conditions.

When interviewed in 2012, the president of the Brazilian Association of Ice Cream Producers expressed: "let's stop exporting mangoes and start exporting ice cream" (Marques, 2016). It is worth to mention that the fruits export values (US\$) are very close to the fruits import values. Therefore, to aggregate value to native fruits products could improve the exportation figures and enhance the trade balance (Graphic 01).

The fruits are consumed in many different forms like juices, jellies, sweets, ice creams and popsicles. Fruits and vegetables grew as much as 52% from 2010 to 2013. The sector represents 10% of Brazilian GDP and the country is one of the largest players in the world. There are 32,000 companies involved in the production of fruits and vegetables – the sector employs 19% of the working population and is highly concentrated: 1% of the companies accounts for 50% of the production gross value (EMIS, 2014).

The consumption of food is concentrated on three main species: corn, wheat and rice; together they account for 60% of all food consumed. Thirty species accounts for 95% from a universe of 12,650 species, evidencing that in practice native species are not demanded or consumed (Hortibrasil, 2016).

Native fruits could be classified in the "specialty" categories, that in the definition of the Specialty Food Resource (Roberts, 2016) are those differentiated items not available in the mass market. Specialty fruits remained representing only 2% of the sales but the increase was 38% from 2009 to 2013 (Fortune, 2014b).

There are alleged benefits in the consumption of native fruits. They are said to be rich in fibers, vitamins, minerals and antioxidants. They are also believed to prevent diseases like cancer, cardiovascular problems, rheumatism and amaurosis. Native fruits in Brazil are used for consumption in natura or to produce jellies, juices, liquor, sweets and others. They are adapted to the soil and do not need any chemical treatment. Also, the fruit trees are used successfully to recover degraded and eroded areas (Embrapa, 2006), that is, the cultivation of native fruits can contribute significantly to the sustainability of the Biome where they are inserted in.

It is a fact that the Cerrado is having environmental problems. The same agricultural treatment that transformed the once poor soil into fertile lands brought troubles in reason of the use of chemical corrections, causing pollution to the soil, subsoil, rivers and streams. Besides that, innovation in agriculture also introduced invasive species that compete with native ones, fragmenting the habitats. Adding to that the greenhouse effect caused by industries and the natural fires, the flora and fauna of the Cerrado is under constant threat (Fernandez, 2011).

The Center West region has 71 kinds of native fruits. The ones with high potential in the short run are pequi, mangaba, cagaita, baru, araticum, maracuja, caju, buriti and gabioba; pequi and mangaba are the two most studied species (Embrapa, 2006).

Weersma and Batista (2007) present a group of critical factors required to have success in exports of fruits in general: quality of products, quick delivery, good regularity and punctuality, adequate packaging and the correct use of irrigation. Embrapa (2006) developed a criterion to assess the native fruits business and it involves knowledge available, social importance, environmental importance, conservatism, use and handling, potential for planting (seeding) and marketing and commercialization. Additionally, Dorr and Grote (2009) argue that certificates and quality requirement – involving safety and traceability of the products are increasingly a prerequisite to producers interested in exportation.

The production of native fruits in Brazil is explored by small farmers with labor force from local communities. Usually they are underpaid, and the business is poorly rewarded financially (Embrapa, 2006).

Braga (2014) conducted a research assessing the acceptance of consumers when tasting the nectar of exotic Brazilian fruits in the format of lactose free diet ice cream. The results showed that respondents perceived positively the taste of some native fruits, especially graviola and taperobá. It was also detected an important positive influence of the previous information about healthy components of the fruits and its alleged potential to prevent diseases. To a suggested extent, taste and health should be combined. This point is quite interesting because it exposes the problem the frozen yogurt (substitute of ice cream) has had since the beginning of its launch in the 1980's; there has been a lot of complain about weak flavor; according to Hillard (2015), there is a stigma among consumers that the taste of frozen yogurt is not good.

Native fruits are becoming target of producers due to the business potential they represent. According to the researcher of Embrapa interviewed, the commercial

possibilities of cultivating native fruits are considerable (Globo Rural, 2013). Native fruits are the main raw material used in the production of artisan ice cream. The forecasts about the market of specialty fruits and artisan ice cream indicate a good potential to be explored (Marketing Indicator Report, 2014, Fortune, 2014b).

An interesting possibility is to offer the native fruit ice cream not only to middle class consumers but also to low income population due to its nutritious characteristics. An inspiring example of that was articulated by Muhammad Yunus (1999) between the Grameen Bank and the French company Danone producing low cost yogurt. This partnership provided a nutritional enrichment of the food for poorer population in Bangladesh, and it was especially good for the children. The renowned economist emphasized that the production of low-cost nutritious food is an important step to help people for poor areas once it has the potential of improving the quality of life and health of the population.

VI FRUTOS DO BRASIL – THE MANAGEMENT OF THE COMPANY

In the 1990’s two companies owned by the same family were launched: Frutos do Brasil e Frutos do Cerrado. The first located in Goiania (GO) and the former

in Uberlandia (MG). Both companies are specialized in ice creams and popsicle made of native Brazilian fruits, produced with low fat and sugar (Photo 01).

The main company, named “Frutos do Brasil” employs 32 people, produces 27.000 posicle a day, equivalent to 1,500 kg a day of ice cream. They offer 76 different flavors of products between ice cream and popsicles. In 2015 this company made about US\$ 3,5 million of dollars in revenues. They have stores in nine states of Brazil, adopt a franchise model and have 16 franchisees and 22 dealers. In 2016 the company started to export to USA, especially to Florida, and they intend to export to The Netherlands in a few years.

As depicted in figure 2, Frutos do Brasil interacts with research centers, universities, and government institutions. The research centers are helping the mentioned company with logistics, strategies and marketing. The company is sending them the waste (biomass) from the producing process of the fruits transformed into pulps – to provide for instance research about antioxidants.

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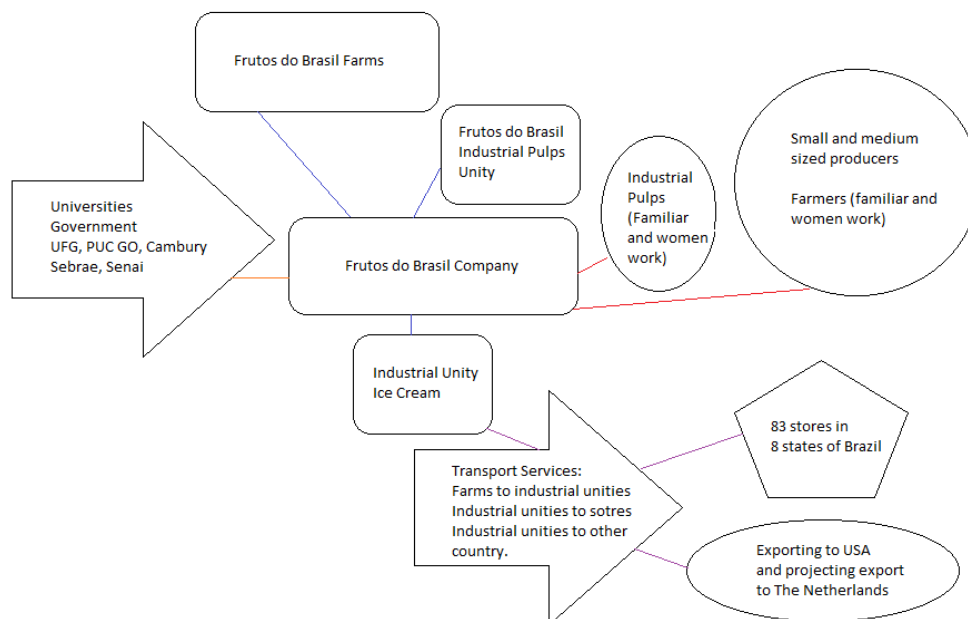


Fig.2 – Frutos do Brasil and the Web of Activities

Source: The authors.

According to figure 3, the annual production and sales had a steady growing period from 2002 until 2011, from 43 thousand liters to 864 thousand, when the effects of the economic crises came to the ice cream business. Because of the new unfavorable situation, from 2011 to 2015, there was a 25% fall in volume and value received

for every liter sold. In figure 4 one can see the evolution of the employed personnel in the operation. Since the start of the business in 1996 until 2002, there was a very small body of 3 workers. Then this number grew yearly until 25 in 2014 and 32 in 2015. This shows a certain loss of

productivity per worker due to an excess of production capacity brought by the mentioned drop in sales.

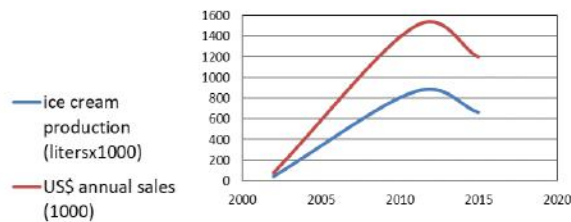


Fig.3 – Evolution of production and sales

Source: data from Frutos do Brasil

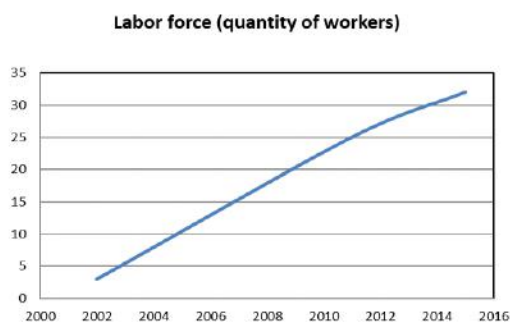


Fig.4 – Labor force employed

Source: data from Frutos do Brasil

VII. COMPETITION

As much as Frutos do Brasil and Frutos do Cerrado, other incumbents have also entered in this specialized business of native fruits ice cream market: Delícias do Cerrado (Paraúna-GO), Frutos de Goiás (Goiânia -GO), Fruta Pura (Anápolis-GO). These companies are not formally connected but are geographically concentrated, especially in Goiás and Minas Gerais. The products are similar in tastes and consumption format (cones and popsicles), the sales areas are also alike but they do not exchange information or share equipment, structures or suppliers. They are just a group of companies formed by medium and small entrepreneurs without organization among them (see teaching note 03).

From the point of view of Frutos do Brasil the competition is considered high in the following aspects: price, mix of products, access to suppliers. An important challenge is the concentration of suppliers and the improvement in the logistics strategy.

VIII. PRODUCTION OF FRUITS

There are two ways to get to the fruits. One way is through an area of 35 hectare where the company Frutos

do Brasil cultivate 100 different species of fruit trees from the biomes Caatinga (another Biome from the Center West region). Another way is through independent small producers who sell their fruits production to the company (social data from Goiás: Map 05, Graphics 02 and 03).

To pave the way to the important supply of fruits the company stimulates the producers offering them seedlings without costs. These seedlings are germinated beforehand at Embrapa and Emater-GO and then are sent to the producers and research institutes interested in the matter.

The suppliers also have an important role supporting the product development, once they are informally acquainted with their raw materials. They also support the handling and transformation of fruits, recipes and combinations.

To transform the raw material, Frutos do Brasil has a production unit (plant) to extract the fruit pulp localized in Abadia de Goiás (GO), 50 kilometers West of the state capital Goiania. This unit has a processing and storage capacity of 120,000 kilos of fruit pulp per year. It has two fixed employees and up to 30 in the high harvest season. These workers, women in majority, made the peeling of the fruits manually. After preparing the pulps, they are stored in cold chambers to be sent to the unit in Goiania to transform them in ice cream and its diverse formats – cones, popsicle, sorbets.

IX. PACKAGING

The production is concentrated in the city of Goiania. Suppliers deliver their raw material at the unit of transformation in Abadia de Goiás, and after processing of the raw material, the pulps are transported to Goiânia where they become input in the production of the ice cream and popsicles.

The number of personnel involved from the harvest of the fruit crop until the selling of an ice cream in the retail is approximately 500. In the unit of Goiania, 12 employees work in the production line under the supervision of two food engineers that respond for the quality of the products. There are also 3 more employees in charge of the administrative support.

In the second semester of 2016 the ice cream industry operates using only 60% of its full installed capacity (Company Data collected in interview). The ice cream produced contain from 60 to 80% of fruit pulp in its composition, with low sodium, fat and sugar.

X. DISTRIBUTION

The distribution of products happens all over the Brazilian territory and the exportation begun in June of 2016. The first country selected for testing exportation was United States, in the state of Florida.

After produced the ice creams are stored in a cold chamber of 104 square meters with temperature of 0° F. Once frozen they are packed, put into boxes and transported in appropriate trucks to the franchisee shops.

The truck fleet is proprietary; once there were situations when Frutos do Brasil needed aid from competitors to refrigerated trucks, but the partnership was denied.

The export usually happens through appropriate trucks (refrigerated); the production is sent to the port of Santos (Southeast Brazil) from where it goes abroad in refrigerated containers, United States in the case of this first external sale.

It should be mentioned that there is a dry port (exporting point through airport) very close to the company facilities in Goiania, only 60 kilometers away. But the costs to send the load of fruit by plane are prohibitively higher than the ordinary way using refrigerated truck and container.

XI. SALES AND MARKETING

Frutos do Brasil operates in seven states and in the Federal District where the federal capital Brasilia is located. There are 80 shops distributed all along the country. In the last years, the company decided to offer the franchise model to launch new shops. In 2016 the franchisees are 16 and there are 22 dealers. To be a franchisee one has to apply in a selection process, to pay fees and in case of approval the new franchisee receives a team of marketing professionals and architects to plan the building of the new shop. The marketing team is hold responsible for the promotion of the products specially in events and fairs.

In the last three years the investments made by Frutos do Brasil were proportionally distributed as follows: 60% to productive capacity, 25% to product development and 15% in marketing. The entrepreneurs are planning to change that in the next five years to: 40% in productive capacity, 30% in product development and 30% in marketing. They believe that at this point the business is in need of organizing professionally the communicating and promoting functions. The top management is confident that their products are better than the competition, attributing this superiority to a high-quality production process.

XII. GOVERNANCE AND SUPPORT INSTITUTIONS

The studied company established research and development relationship with Sebrae and Senai. Sebrae is a non-profit private entity created to promote and develop small business; they have branches in every Brazilian state directed to support the management of

small companies and startups. Senai, the National Service of Industrial Learning is an education entity which mission is to form professionals in 28 areas of the industry; they operate in the 27 Brazilian states and territories. These entities, Sebrae and Senai are used by Frutos do Brasil as an important source of professional education.

There are also direct partnerships with universities and research institutes. The Federal Universities of Goias and Minas Gerais conduct studies about antioxidants with the waste (biomass) originated in the extraction of fruit pulps. The company donates the biomass to these research entities and in exchange they use it for relevant scientific investigations. The formalization of these partnerships was only documented in 2016, twenty years after the foundation of Frutos do Brasil.

Another interesting partnership was made with the Information Technology Center of the Federal University of Goias directed to support projects in logistic chain in which Frutos do Brasil is involved. Marketing specialists from the University also assist the visual planning of the company.

The company Frutos do Brasil estimates that the development of a new product consumes approximately US\$ 6,000 due to the lack of interaction and governance among partners. There is a lack of programs with support to processed native fruits; this specific sector is not recognized as separate area to be considered and studied.

Due to excessive paperwork, formalities and complex procedures, the company does not participate in the fiscal incentive programs like Fomentar and Produzir, the two most famous tax exemption programs of Goias state.

To establish the new unit that processes fruit pulp in Abadia de Goias the company Frutos do Brasil could rely on public resources from the city: the mayor donated the ground on which the producing plant was constructed.

XIII. ACCESS TO CAPITAL AND FUNDING

There are some ways to access financial resources available to Brazilian industries. In the Center West region there is a popular fund denominated Constitutional Fund for Financing the Center West or just FCO (Fundo Constitucional do Centro Oeste). It aims at contributing to social and economic development of the region through the financing the productive sectors like agriculture, mining, industries in general, commerce and services. A company can obtain up to US\$ 6 million to initiate, expand or modernize its business.

Frutos do Brasil does not use waivers of tax exemption nor does get credit at FCO. But they have access to an also popular source of public foment funded by the National Bank of Economic and Social Development, the BNDES. They call it the "BNDES

card”, the way it is implemented and arrives in the hands of the borrower. This kind of resource is operated through ordinary public and private banks because BNDES has no operating branch; it provides the fund, but the risk analysis is conducted by the commercial banks. Entrepreneurs complain about this inter mediation because sometimes banks demand the acquisition of services to offset the odds of operating the BNDES card. This is considered unfair, but it is practiced by the Brazilian financial system.

XIV. CONCLUDING REMARKS

The production of fruits and its derivatives is an important activity due to the professionalization of the supply chain involving people from poorer local communities in the provision of healthy food. It also stimulates the valuation and awareness of the Brazilian Biomes like Caatinga and Cerrado, the ones approached in this paper. These activities are not supported specifically by public or private financing.

The producers are not articulated or organized; they only compete and have not access to international market in reason of an expensive logistic cost, among other factors. The collaboration among fruit producers should be more articulated and organized in order to build the basis to the formation and enhancing a cluster.

It might be too early to affirm that the web around the company Frutos do

Brasil can become a cluster soon. The organization of players is still in an initial stage of maturity. Although there are important signs of participation like the involvement of universities, research centers and experienced non-profit entities supporting the activities, the interaction among players has not grown strong enough.

The good news is that the demand for healthy products based on native fruits are increasing worldwide. Also to be considered is: the environmental sustainability that permeates the exploration of native fruits suggesting good possibilities of obtaining foment funding by international entities focused on the preservation of nature; the stimulus to the preservation and cultivation of native species, contributing to the conservation of the Biome, its fauna, flora; the preservation of hydrological basin and springs of the region; the support to poorer communities to solve problems like unemployment and low labor qualification; the possibility of widening the employment for women especially those from low income families. This kind of organization can be a reference for countries with economic depressed areas looking for sustainable solutions.

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ANNEXES

Teaching notes (for use in teaching cases):

1. Sustainability and innovation are themes and issues of studies and discussions about possibilities of the renovations and permanence of the capitalist productions. Sustainability were represented as a concept in Brundtland report as a possible action for the human beings that shouldn't result in damages to the future generations. Arbix (2010) argues that innovation is essential for continuity of capitalist competitive activities. Analyze relations between sustainability and innovation will be a challenge because to maintain capitalism and agents as productive its necessary innovation, but to maintain this process in long term it will be necessary sustainable actions in those innovations, and only then the concept of innovation can really mean something complete. So in this case we want try to discuss the concepts: Innovation, Sustainability, Competition and Cooperation.
2. According to the Case Dutch Flower it is important to separate elements that are relevant to promote Competition and elements to support and stimulate Cooperation. That case was very important to build this one, because both are about dedicated products and process. In The Netherlands things were and are still much more organized, but it is important to think about these innovative actions as an important idea for clusters.
3. Is there a cluster of producers? In what they compete? Do they cooperate? How to stimulate the group of producers? How can they become a cluster? Students should be incentivized to define which items would be interesting to establish cooperation; which items should be stimulated to competitiveness?
Competition: production time, price, product, size, quality, quantity, reputation and variety.

Collaboration: technologies, information, suppliers, education, qualification, campaigns to preserve potential areas of supply, transportation, infrastructure, technical challenges, plagues combat, financial control, negotiation, exportation, fund raising, teamwork, marketing of products, consumer of healthy food, the participation of small farmers and local communities in the business, the preservation of native forests.

4. To know the actions that involve innovation and sustainability becomes an exercise in this study. To know the productive and sustainable activities of “Frutos do Brasil” company becomes an important theme to this analysis. It is a company created in the middle of the Brazilian territory, and their activities has to deal with small and medium farmers, that need to preserve at least part of the natural environment. All the raw material of this company comes from preserved environment. This business is about ice cream made of (most of all) endemic fruits.

5. This is an important case because it can become an interesting model of cluster to depressed areas all over the world; it might help public decision makers to deal with the challenges of poorer regions, and additionally bring reflexions about protected areas with biodiversity.

Map 01: Localization of Goiás State.



Source: Atlas do Desenvolvimento Humano. Available in: http://www.atlasbrasil.org.br/2013/pt/perfil_uf/goias.

Map 02. Vegetation cover of the Cerrado in Brazil.



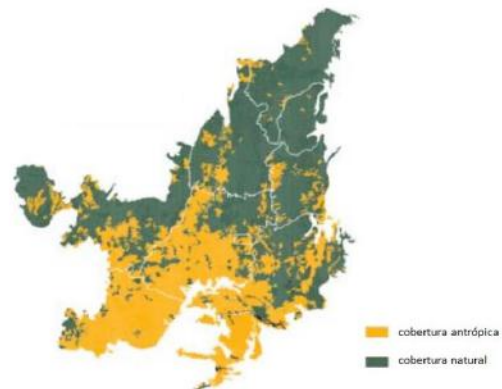
Source: Mapeamento de Cobertura Vegetal do Bioma Cerrado: estratégias e resultados. Available in: <https://www.infoteca.cnptia.embrapa.br/bitstream/doc/570887/1/doc190.pdf>. Access: July, 2018.

Map 03. Mapping vegetation of the Cerrado and states with “Frutos do Brasil” stores.



Source: Cobertura Vegetal e sítio empresa Frutos do Brasil. Organization: Godoi, C.N. Available in: http://bbeletronica.cpac.embrapa.br/2007/doc/doc_190.pdf and <http://frutosdobrasil.com.br/pt/lojas>. Access: August, 2016.

Map 04: Antropic action in the Cerrado. (Yellow – antropic action, green – Natural Cerrado.)



Source: Mapeamento de Cobertura Vegetal do Bioma Cerrado:estratégias e resultados .Available in:

http://bbeletronica.cpac.embrapa.br/2007/doc/doc_190.pdf f. Access: August, 2016.

Estado	Porcentagem do bioma no estado (%)	Cobertura vegetal natural (ha)	Cobertura vegetal antrópica (ha)	Formação florestal (ha)	Formação savânica (%)	Formação campestre	Cobertura vegetal natural
SP	33	1.078.716	6.934.203	833.387	210.441	34.888	13
PR	2	118.692	255.565	20.558	14.048	84.085	32
MS	61	6.935.404	14.722.762	2.867.267	3.599.826	468.311	32
DF	100	213.527	362.138	44.645	162.718	6.164	37
GO	97	14.706.696	18.180.482	2.929.033	11.090.161	687.502	44
MG	57	17.794.873	15.418.690	3.279.762	11.322.147	3.192.964	53
MT	40	23.740.333	12.148.095	7.717.102	15.868.080	155.151	66
BA	27	11.209.896	3.963.095	3.333.902	7.357.605	518.389	74
TO	92	20.251.786	4.838.460	4.639.932	13.362.688	2.249.165	79
MA	65	18.753.706	2.318.028	12.337.965	6.032.951	382.790	89
PI	37	8.590.582	758.423	2.319.035	6.210.085	61.462	91

Fig.1: Antropicocupation in the Cerrado,in Brazil:State / Bioma in State/ Vegetation cover/ Antropic Cover/ Florestal formation / Savannas formation/ Grassland/ Natural Cover

Source: Mapeamento de Cobertura Vegetal do Bioma Cerrado:estratégias e resultados .Available in: http://bbeletronica.cpac.embrapa.br/2007/doc/doc_190.pdf. Access: August, 2016.

Photo 01: Report about the company in Brazilian magazine.

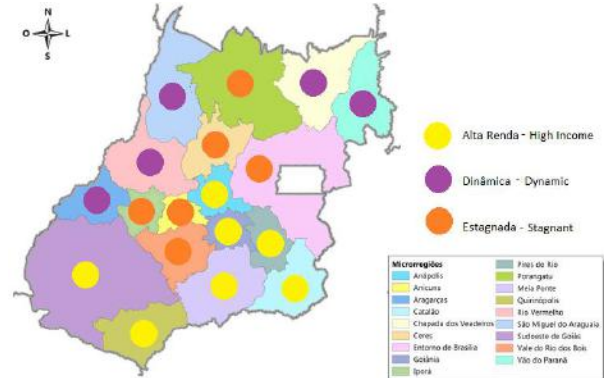


Source: Revista GOL 02.2012.Available in: <http://frutosdobrasil.com.br/pt/momento-natural/clipping/revista-gol>

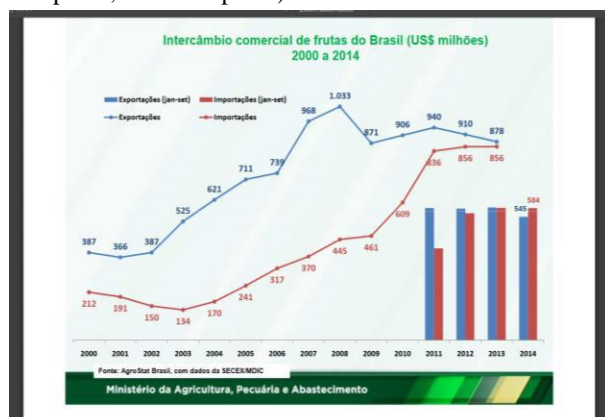
Source: Ministério da Agricultura, Pecuária e Abastecimento.Available in:

http://www.agricultura.gov.br/arq_editor/file/camaras_setoriais/Fruticultura/41RO/App_Oportunidades_41RO_Frut as.pdf.Page 04.Access: July, 2016.

Map 05: Economic dynamic regions in Goiás.

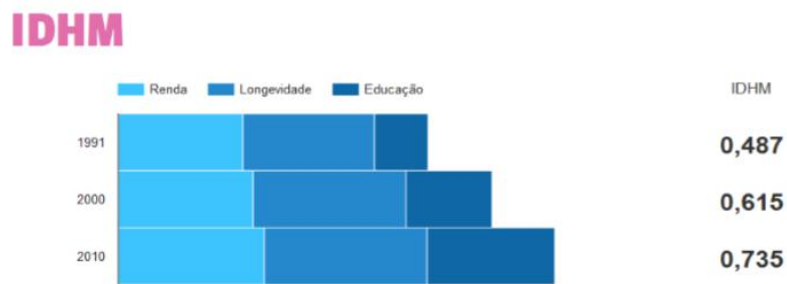


Graphic 01: Commercial exchange of fruit in Brazil (Blue – Exports; Red – Imports)



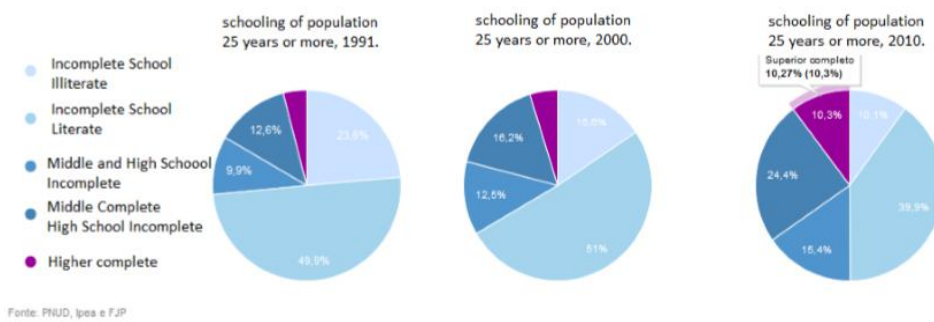
Source: Política Nacional de Desenvolvimento Regional e Instituto Mauro Borges.Org.: Godoi, C. N.Available in: http://www.mi.gov.br/microregioes_pndr and <http://www.imb.gov.br/viewmapa.asp?mapa=Mapas%20das%20Microrregi%F5es%20de%20Goi%E1s%20-%20IBGE>.

Graphic 02: Evolution of the IDMH in Goiás State:



Source: PNUD, Ipea e FJP. Available in: http://www.atlasbrasil.org.br/2013/pt/perfil_uf/goias.

Graphic 03: Population, Age, and Qualification in Goiás



Source: PNUD, Ipea e FJP. Available in: http://www.atlasbrasil.org.br/2013/pt/perfil_uf/goias.