

Environmental sustainability in the production of artisanal sugar cane spirit in Paraná coast- Brazil

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Abstract

The sugar cane spirit is a product commercialized worldwide, and in Brazil it ranks in second position among the most consumed alcoholic beverages. And Paraná Coast has a long tradition in the production of this beverage, which is among the most requested in the country. Traditionally the industries that produce sugar cane products cause environmental changes in the place where they are inserted, but specifically, the sugar cane spirit industry has few studies that measure these impacts. In this context, in order to promote an evaluation of these industries in Paraná coast, a descriptive exploratory research was carried out with six alembic managers between August and September 2016, and the environmental dimension of the CSI (Corporate Sustainability Index) from BM&F BOVESPA (The New Exchange) was used as reference of evaluation. The study revealed that the procedures adopted by the interviewed managers fulfill the prerogatives with regard to the laws and regulations required in the production cycle of artisanal sugar cane spirit in relation to the environmental issue. It was concluded that, although the production processes of artisanal sugar cane spirit in Paraná Coast are developed with alternative practices that result in a sustainable environment, with low emission of pollutants, without contamination of rivers and without provoking deforestation, it also do not provoke any other harmful practices which may compromise the quality of nature in the region, but require adjustments in the issues of procedures formalization developed by the companies in which the CSI environmental dimension is recommended.

Key words: Environmental management, Environment, mills, Alembics, Brandy Sugar Cane, Littoral of Paraná, Distilled drinks.



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INTRODUCTION

The sugar cane spirit is a genuinely Brazilian product, being produced and commercialized since the time when Brazil was still a Portuguese colony (Meira, 2013).

Nowadays, the sugar cane spirit is the most consumed distilled beverage in Brazil, and in Paraná State there are more than 400 producers of this drink, which present many varieties of flavors that appeal to the palate of the most varied types of consumers (Rup, 2011).

Paraná Coast also has a long tradition in the production and trade of this type of beverage. In the northern of Paraná Coast, the artisanal sugar cane spirit industry is a relevant alternative for economic development and income generation (Anacleto et al., 2016).

The market for artisanal sugar cane spirit in Paraná Coast is composed by small scale industries that dedicate the manufacture and trade of artisanal beverages (Rup, 2011), and that in addition to the traditionally distilled beverage, they also produce the versions that are aged for periods up to a year in special conditions called "Premium" and "Extra Premium" (Rup, 2011; Anacleto et al., 2016).

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According to Anacleto et al. (2016) the city of Morretes was identified as the largest producer, concentrating 95% of the regional production of this beverage that generates a volume of approximately 350 thousand liters per year.

In addition, the sugar cane spirit is obtained after the sugar cane cutting, which is milled to become a broth, passing through numerous stages of cleaning, fermentation and distillation (Masson et al., 2007; Anacleto et al., 2013).

The production process is by many authors questioned under the environmental sustainability approach, since it results in high amounts of sugar cane residues, it presents high use of natural resources, such as water, energy source means such as wood and fuel, besides impact and damage to flora and fauna (Ribeiro, Aquino Ficareli, 2010; Rosa and Martins, 2013).

According to Rosa and Martins (2013) the main residues of this type of industrialization are sugar cane bagasse, mineral impurities, smoke, ash, waste water, vinasse besides the gases for combustion.

The alteration in the environmental scenario and the consequences caused by this model of industrialization has made a transformation in the way of thinking, and stimulates collective awareness about the importance of preserving the environment for human life and the need of changing these productive processes in order to cause less impact on the environment where the spirit is produced while preserving the environmental assets (Pereira, 2009).

The need of preservation of environmental assets arose for many decades, still in the period of the industrial revolution, due to the evolutionary changes in the productive process of goods and services, and despite in that time prevail the mentality that nature would serve endlessly and exclusively for human profit, there was already a concern of scholars in the opposite direction, who predicted that natural resources could not be sustained much longer (Donaire, 1999; Coral, 2002).

The discussion on the real need for environmental preservation emerged in the 1980s with the creation of the Brundtland Report, also known as the "Our Common Future" Report, proposed by the United Nations, which warned the world of the need for sustainable development, and so it was guarantee the fulfillment of current needs, without interfering with the support of future generations. Thus, the concept of sustainable development linked social, economic and environmental issues emerged (UN, 1987).

According to Santos (2014), a sustainable organization is characterized by inserting in its business ways of minimizing the negative effects of its activities on nature, being possible to be achieved by the company through strategies that start from the moment of input collection, passing by the production process and ending with the final destination of the product, when it is no longer used by its buyer.

For many decades this concept of sustainability, especially those linked to the environmental issue, has been improved by researchers and today, companies are increasingly interested in incorporating this concept into the organizational culture, being considered a requirement to obtain some forms of certification such as ISO 14000 which certifies that the company has responsibility for the environment. (Donaire, 2009).

The industries that use sugar cane as raw material traditionally generate large amounts of waste and pollutants (Garcia, 2005) and in this context, the ways of mitigating environmental impacts should be considered as priority (Maia et al., 2005).

The business activity of the company is initially pointed as an indicator of the damages that the company can cause to the environment and the expenses that will be indispensable to respect the determinations of the environmental regulation. In this sense, according to Donaire (2009), the companies considered environmentally friendly are not only those that do not cause impacts to the environment, but also those that promote the recovery of the environment, considering the following objectives: pollution close to zero, little or no waste production, no risk to workers, low energy consumption, efficient use of natural resources, and environmental awareness of its managers and workers.

In this way, the managers of the organizations should be concerned with developing environmentally correct products, as a way to obtain commercial advantages, regarding the class of more conscious consumers, as well as to add socio-environmental values to the organizational culture, and attend in a consolidated way the Brazilian legislation and regulation (Donaire, 2009).

Specifically, related to this segment of production, despite its relevance for regional development, few studies have been found on the subject, as well as on the implications and impacts that the segment may be provoking in its environment. Thus, in this context, the present study was carried out in order to evaluate the levels of environmental sustainability of these industries of sugar cane spirit in Paraná Coast..

MATERIAL AND METHODS

Exploratory and descriptive research was carried out through qualitative approach, as proposed by Gil (1991).

The content of the questionnaire was elaborated in order to identify if the practice of environmental sustainability was inserted in the daily production process of the sugar cane spirit, what level of knowledge that the producers had on this subject, and if there were actions that were intended to mitigate the damages that harmed and directly and indirectly affected the nature around these industries, as well as to verify the consonance of these producers with the current legislation.

Initially in order to obtain information on the sugar cane spirit producers, visits were made to Empresa Paranaense de Assistência Técnica e Extensão Rural - Emater Paraná (State Company of Technical Assistance and Rural Extension), and to an agronomist recognized in the community for being a consolidated leader in the sector.

A total of 19 alembics from Paraná Coast were visited, with the majority (n=17) located in Morretes, but only six managers collaborated with the research.

Face-to-face interviews were conducted between August and September 2016, and the environmental dimension of the CSI (Corporate Sustainability Index) from BM&F Bovespa (The New Exchange), which deals of general issues on the nature of the product, corporate governance and economic, financial, environmental and social aspects of Brazilian companies which are seeking for self certification, as described by Nunes et al. (2010).

Additionally, as proposed by Del Corso et al. (2014), the participant observation technique was used to verify if the practices reported in the interview really were corresponded to the actions performed in the production units.

After this step, the interpretative and descriptive analysis was performed using the data triangulation technique, as proposed by Freitas et al. (2012), considering the similarity among the practices adopted in several companies visited. The results of the participant observations and the analyzed documents, according to Anacleto et al. (2014), were evaluated with a grouping of similar responses issued by the interviewees according to the environmental dimension of CSI.

RESULTS AND DISCUSSION

The totality of the companies visited can be classified as small enterprises, managed in the majority (n = 65%) by men, and all the interviewees had a high school education.

The average age of the managers of the companies was 41 years old, with an average of 12 years dedicated to the management of their establishments. Maintaining a direct dependence of the family, either for labor, because they are family businesses or to encourage the continuity of the enterprise, and it was observed that significant part of the enterprises (n = 50%) maintains production on a small scale.

The study showed in relation to the first indicator CSI, that in spite of being legalized companies, the organization commitments to the environment are not formalized in the most of cases (n = 65%). In all the companies visited it was possible to verify that there is the commitment of all the managers with a preventive approach regarding the environmental aspects of their units of spirits production. However, the internal evaluation is carried out without a planned periodicity and does not have a specific instrument for this purpose, being carried out in an empirical way based on the experience of the managers.

It was observed in all the cases analyzed that the main manager of the companies was also the direct responsible for the environmental issues of the companies to the community, environmental agencies and other stakeholders, and it was also evidenced that the managers promoted, although in an empirical way,

the evaluation of the risks and opportunities derived from the relation of its operations to the environment, especially since this practice is a legal requirement of the regulations that authorize the producers of sugar cane spirit to perform such procedures.

Still related to this indicator, it was observed that in the companies visited the corporate policy that contemplates aspects of health and safety of the worker are those provided and required by the legislation, as well as the periodicity that it is also executed and defined by the law, and this try meet the minimum elements required in this matter.

The search for the efficient use of resources for an ecological production was a recurring practice among the companies visited (n = 100%). This issue can be observed even in relation to the production cycle, when it was verified that the type of raw material used was shown to be, in particular, sugar cane harvested without burning (n = 100%), from organic origin, without the use of agrochemicals, as well as chemical fertilizers. Other agronomic practices classified as ecologically correct were also observed, such as crop rotation, used as a form of soil protection, and the use of allelopathy to control weeds.

After being harvested, the sugar cane was ground in order to use the broth. The leftover, also called bagasse, was used as fertilizer in sugar cane plantations and also in other crops in all the companies visited.

The sugar cane bagasse was also used as the main material for heating the furnace during the distillation process, thus providing a suitable final destination for the waste.

Although in all cases the correct adoption of the cleaner production technology was recorded, it was also observed, in the majority of visited alembics (n = 65%), that there are other types of waste without adequate destination, as in the case of water reuse, recycling of waste, correct disposal of the ash and other furnace waste and glass recycling.

The correction of these situations, in disagreement with the cleaner production system, it is possible to be applied in the companies visited, since it was observed among the interviewees that one of the artisanal production units developed an environmental program based on reverse logistic execution, which provided a proper reuse of the packaging, as well as the practice of recycling, or correct waste separation for correct destination, without having made high investments, only with the commitment of all organization employees.

When thinking about the responsibility of a company that produces a consumable product, it is assumed that they know all the standards of quality and hygiene provided by law, as well as their practical application. However, in the research conducted in the sugar cane spirits alembics from Paraná Coast, this situation was not observed in the interviews with the managers.

According to the interviewed managers information (n = 100%), the distillation of fermented sugar cane results in three different products. The "head" of the spirit, which is not commercialized because it contains a high level of alcohol, the "heart" of the spirit that is the commercialized part and the "tail", which contains a very low level of alcohol and which, if mixed, deprive the flavor of the product. Thus, it was observed in all the companies visited, the part of the drink that is inappropriate for human consumption due to the high alcohol level is reused as alcohol for cleaning the place or even as fuel to light the distillation furnace.

The mills are mostly established in rural areas, with large area of natural vegetation, near environmental parks. It was observed that two of the mills use the natural conditions of the watercourses and the relief conditions of the place, and by gravity they perform milling, fermentation, distillation and storage, without the use of other forms of energy.

These mills only have the official certification issued by Mapa, the institution responsible for supervising the quality and health of the beverages produced, as well as the industry interactions with the environment and the health and worker safety.

The totality of the managers interviewed testified in their perceptions the importance of environmental sustainability and environmentally correct practices. However, the minority (n = 10%) reported that they have replaced inputs, products or modified practices in the manufacture of the spirits because they did not consider those environmentally correct.

The production systems adopted by managers in general do not directly attack nature, but they also do not carry out larger projects in the sense of greater environmental preservation, either on their property or in other locations.

It was observed during the study that the managers interviewed verified ($n = 4$) that being located in properties with a lot of native vegetation would not need specific care other than those already practiced by them, that the preservation of these green areas would compensate damage related to the burning of fuel from boilers and waste such as ash, however, a great effort is required to maintain these areas as they are. Nowadays, where more and more areas of natural vegetation are being devastated, it is the duty of everyone to care for and maintain these places, especially if they are located in private areas.

It is noteworthy that in the case of legal scenarios, regarding the protection of the environment in relation to private properties and despite the Brazilian constitution ensure that the owner is the one who effectively decides on the destination and how to use it (Brazil, Federal Constitution, Article 182 of the Constitution and article 170), there are other prerogatives to be considered by the same legislation that present a greater degree of judicial relevance, especially as regards the differentiated treatment according to the environmental impact of the products and services in the most varied forms of industrialization. In this context, Brazilian legislation considers that, although located in private property, if the property is for diffuse use, it is therefore essential for society to enjoy an ecologically balanced environment as a prerequisite for a healthy quality of life, despite being located in private property, the manager must obey the prerogatives of preservation while maintaining collective interest above his individual interests.

Therefore, it would be of great value not only to the managers, but to all the stakeholders, a greater deepening in the legal dictates, as far as rights and, mainly, duties, in relation to the protection of the environment correlated with the private property. Since it was observed that, in the perception of the majority of the managers interviewed ($n = 80\%$) that the fact of being in green areas does not need investment in preservation and environmental care.

Referring to what was presented by Maia et al. (2005), regarding the recommendations of use for the waste generated by the production of sugar cane spirit and what was observed in the mills of Paraná Coast region, it was noticed that many methods cited by the author are accomplished by the managers. The vinasse, the head and tail of the spirit and the bagasse of the sugar cane are destined correctly and within the criteria of the good practices in the production of this beverage. Only the water used in the cooling and the sugar cane washing that are simply discarded, without any type of reuse.

Although most of the adopted and structured procedures are not documented in the production units visited, significant impacts on biodiversity and other environmental issues that are being neglected by the plantation managers have not been identified, and the adoption of Solid Residues Management Program (SRMP) formally enforced in accordance with the legislation.

It should be noted that the totality of the companies visited are registered in the environmental protection entities as a permanent preservation area and/or rural environmental cadastre, as well as all the mills have legal reserves regularized, and in the last 3 years none of the visited places received administrative or punitive sanctions of any nature or environmental damage.

FINAL CONSIDERATIONS

The study revealed that the procedures adopted by the interviewed managers fulfill the prerogatives with regard to the law and regulation required in the production cycle of artisanal sugar cane spirit in relation to the environmental issue.

It was concluded that despite the production processes of artisanal sugar cane spirit in Paraná Coast being developed with alternative practices that result in a sustainable environment, with low emission of pollutants, without contamination of rivers and without causing deforestation, and also do not provoke any other harmful practices to the quality of nature in the region. However, they need adjustments in the issues of procedures formalization in what advocates the environmental dimension of CSI.

REFERENCES

- Anacleto, A.; Silva, A. L.; Xavier, A. P. S. Santos, A. C. (2013). Análise sensorial de aguardente artesanal no litoral do Paraná. *Revista Varia Scientia Agraria*, 3(2), 9-20.
- Anacleto, A., Silva Junior, F. J. A. D.; Machado, A. (2014). Estratégias de comercialização de aguardente artesanal no litoral paranaense. *Revista de Administração da UEG* 5(1), 91-94.
- Anacleto, A.; Pavilaki, D.; Goncalves, F. M. C.; Carvalho, M.; Nascimento, T. A. (2016). Prospective analysis of production and commerce of the handmade xbrandy sugar cane in litoral of Paraná - Brazil. *Business Management Dynamics*, 5(1), 1-9.
- Amâncio, R; Claro, P. B. O; Claro, D. P. (2008). Entendendo o conceito de sustentabilidade nas organizações. *Revista de Administração - RAUSP*, 43(4), 289-300.
- Barbosa, G. S. O. (2008).Desafio do desenvolvimento sustentável. *Revista Visões*, 4(1), 1-11.
- Coral, E. (2002). Modelo de planejamento estratégico para a sustentabilidade empresarial. Tese (Doutorado em Engenharia de Produção) – Programa de Pós-Graduação em Engenharia de Produção. Universidade Federal de Santa Catarina, Florianópolis. 282p.
- Del Corso, J.; Maia, P. S. J.; Silva, W. V.; Taffarel, M. (2014). Gestão estratégica de recursos humanos: identificando o processo de alinhamento estratégico. *TMStudies*, 10, 49-57.
- Dias, R. (2012) Responsabilidade social: fundamentos e gestão. Ed. São Paulo: Atlas.
- Donaire, D. (1999) Gestão ambiental na empresa. 2. Ed. São Paulo: Atlas.
- Feijo, A.; Maciel, E. (2001) A cachaça artesanal do alambique a mesa. Rio de Janeiro, Senac.
- Freitas, C. C. G. Maçaneiro, M.B; Kuhl, M. R; Segatto, A. P.; Doliveira, S. L. D. ; Lima, L. F. (2012). Transferência tecnológica e inovação por meio da sustentabilidade. *Revista de Administração Pública*, 46(2), 363-384.
- Gil, A. C. (1991) Métodos e técnicas de pesquisa social.3.ed. São Paulo:Atlas,207 p.
- Masson, J.; Cardoso, M G.; Vilela, F. J.; Pimentel, F. A.; Morais, A. R.; Anjos, J. P. (2007) Parâmetros físico-químicos e cromatográficos em aguardentes de cana queimada e não queimada. *Ciência e Agrotecnologia, Lavras*, 31(6), 1805-1810.
- Nunes, J. G., Teixeira, A. J., Nossa, V.; Galdi, F. C. (2010). Análise das variáveis que influenciam a adesão das empresas ao índice BM&F Bovespa de sustentabilidade empresarial. *BASE-Revista de Administração e Contabilidade da Unisinos*, 7(4), 328-340.
- Oliveira, O. J; Pinheiro, C. R. M. S. (2010) Implantação de sistemas de gestão ambiental ISO 14001: uma contribuição da área de gestão de pessoas. *Gestão & Produção*, 17(1), 51-61.
- Pereira, J. V. I. (2009) Sustentabilidade: diferentes perspectivas, um objetivo comum. *Economia Global e Gestão*, Lisboa, 14(1), 115-126.
- Ribeiro, H.; Aquino F., Thomas R. (2010) Queimadas nos canaviais e perspectivas dos cortadores de cana-de-açúcar em Macatuba, São Paulo. *Saúde e Sociedade*, 19(1), 48-63.
- Rosa, A. S.; Martins, Savi, C. P. (2013). Produção mais limpa nas fontes geradoras de poluição da indústria de açúcar e álcool. *RevInter Revista Intertox de Toxicologia, Risco Ambiental e Sociedade*, 6(2), 90-125.
- Rup, Isadora. A velha tradição morretiana. *Gazeta do Povo*, caderno de turismo. Edição de 4 de março de 2011.
- Santos, A. P. T. A (2014) sustentabilidade ambiental dentro das organizações. *RevInter Revista Intertox de Toxicologia, Risco Ambiental e Sociedade*, 7(3), 69-100.