

## **Environmental Accounting of the Rice Industry in Southern Brazil**

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### **Abstract**

*From of economic, environmental and social aspects in the organizations, emerges a great concern about the level of commitment of rice industries, which is often low and is characterized by a high waste of natural and energy resources. Industries are confronted with a new reality, due to the concern with the transparent and ethical behavior in relation to the environment. Given this reality, industries have been a greater concern related to the concept of environmental responsibility oriented to the standardization, analysis and disclaim of environmental information. In this sense, environmental accounting emerges as an alternative to show environmental facts and events in industry. However, very little is as yet known how environmental accounting is used to show environmental events. Given these gaps, this study intended to verify how environmental accounting could contribute to show environmental responsibility in rice industries. To perform this study, it was developed an exploratory-descriptive study. The methodological procedures held was literature revision and application of a semi-structured query to accountants and managers of rice industries located in the South extreme of Santa Catarina and in Rio Grande do Sul. An analysis of results of exploratory studies pointed out that industries do not use to separate facts and environmental accounting events from traditional accounts and, due to this, there is a lack of clarity and knowledge about the applicability of environmental accounting. In this sense, this study intends to know why environmental account is not included in traditional accounting. The interviews show that it is possible to apply environmental accounting and the main reason that makes industries not to apply environmental accounting is the lack of knowledge and the non-obligation of the current legislation in Brazil. Therefore, faced with the need of showing environmental accounts and disseminate the information that the industry works in a transparent, responsible way, environmental accounting can be seen as a mean that enables the evidence of environmental responsibility of industries.*

**Keywords:** Agricultural industry. Environmental responsibility. Decision making

### **1. Introduction**

In recent years agricultural industries face a new reality, in which is not enough to focus only on price and quality of their products, but also on the ethical behavior towards environment. Given this scenario, many industries are concerned about the concept of environmental responsibility focused on the standardization, analysis and dissemination of environmental information.

There is a need of disseminate the commitment with the environmental issue by means of financing research projects, including sustainable practices in the production process or encourage other projects related to environment, which is called environmental responsibility.

The environmental responsibility of rice industry takes as a basis the sustainable growth that respects environment. To Trennepohl (2009), environmental responsibility is the set of individual or organizational attitudes towards the sustainable development of the planet. These attitudes should take into account the economic growth together with environment protection for future generations.

It is understood by environmental responsibility the environmental commitment in which the organization works and has transparency and responsibility with their processes (JAMISON et al., 2005); it is also the duty of cover any environmental implications of the organization, maximize the productivity of their assets and practices that minimize the negative impacts (BISSCHOP, 2010; HE; JUAN, 2009).

In this context, environmental accounting was an option that allows the registration of environmental heritage in order to evaluate the economic and financial situation of an organization, as well as forecasts taking into account the effects caused to the environment by the organization (BERGAMINI JÚNIOR, 1999) and as a support for decision making. This environmental accounting is not a new Science, however, it characterizes as a segmentation of traditional accounting and allows inserting and unbundling the environmental events held by the organization (RIBEIRO, 2005). Scholars such as Herbohn (2005) and Chou and Chi (2010) state that environmental accounting can contribute to the reformulation of traditional systems of accounting information, giving subsidies to the environmental discussion and knowledge about environmental externalities. To these authors, from information generated by environmental accounting, it can arise new knowledge related to facts and environmental events of rice industry.

## **2. Research Overview**

### **2.1 Rice Production in Rio Grande do Sul and Santa Catarina States**

Rio Grande do Sul State is the best producer in Brazil, being responsible for 61,0% of the production. Santa Catarina holds the second place, with 8,4%, followed by Maranhão, with 5,8% and Mato Grosso, with 5,7%. It is also important to mention that the states of Rio Grande do Sul and Santa Catarina characterize the predominance of irrigated rice production. Due to this, these states are responsible for the best production levels in Brazil, with 7.050 and 6.700 kilograms per hectare, according to an agricultural informative from CEPA (CEPA, 2009).

Santa Catarina is in the second place as the state with greater production of irrigated rice in South Region of Brazil, as well as in the whole country – Rio Grande do Sul holds the first place. In 2010, Santa Catarina produced 1.041.587 tons of rice (9,2% of Brazil production), in a 150.473 km<sup>2</sup> area (5,4% of rice area in Brazil) (CEPA; EMBRAPA, 2011). Besides, it is important to highlight that in accordance with CEPA and EPAGRI, unlike Rio Grande do Sul, which has a greater concentration of big producers, 64% of rice production in Santa Catarina comes from small family agriculture (EMBRAPA, 2011).

Nevertheless, “nearly all rice produced in Rio Grande do Sul and Santa Catarina presents a high-cooking quality, fine-grained rice, which lays down the characteristics required by the Brazilian market, mostly in South and Southeast regions” (EMBRAPA, 2011). Besides, according to EMBRAPA, “around 12% of the rice produced in Rio Grande do Sul land 30% of the production from Santa Catarina are consumed in the respective states. The remaining production is exported to other consuming centers”.

In accordance with data from EPAGRI (2012), the irrigated rice production in Santa Catarina is distributed into five different regions, accordingly with their geographical and climatic conditions. These regions are: Itajaí Lower, Medium and Upper Valley, Northern Coast and the South region of Santa Catarina.

The south region of Santa Catarina, in its turn, is divided into two specific groups: the Association of the municipalities of the Coal region – Associação de Municípios da Região Carbonífera (AMREC), composed by Cocal do Sul, Criciúma, Forquilha, Içara, Lauro Muller, Morro da Fumaça, Nova Veneza, Orleans, Siderópolis, Treviso and Urussanga; and the Association of the municipalities of Extremo Sul Catarinense – Associação de Municípios do Extremo Sul Catarinense (AMESC), composed by Araranguá, Balneário Arroio do Silva, Balneário Gaivota, Ermo, Jacinto Machado, Maracajá, Meleiro, Morro Grande, Passo de Torres, Praia Grande, Santa Rosa do Sul, Sombrio, Timbé do Sul and Turvo.

### **2.2 Rice Processing Industry**

Rice processing results from the processes of: drying, pre-cleaning, sun drying, artificial drying and rice processing. The rice process begins with cleaning the thickest part of the rice; then, the rice is peeled with two rubber rolls that work in opposite directions and remove the rice shell.

The next steps are: separation of the whole grain from the others; separation of hulled grains from the grains still in the husk; polishing, which is the process in which the whole rice is husked to be transformed into white rice; homogenization: removal of rice bran; and classification: the process that separates the whole grains from the broken grains (BRAGANTINI; VIEIRA, 2004).

According to Bragantini; Vieira (2004), the quality of the grain is influenced by the processes of drying, processing, by storage conditions, as well as by internal factors inherent to climatic factors during the pre-harvest period.

Rice production generates residual waste that can affect environment negatively. The main residual waste of rice industry is its husk. Industries need to find means to properly dispose rice husk in order to minimize the environmental impacts and to raise awareness about offering products that do not affect environment and show their environmental responsibility with the ecologically correct society.

According to Lhamby, Senna and Canes (2010), the main polluting generated by rice processing companies is the rice husk, because of the amount generated together with its low density, or the difficulty of its decomposition in nature, causing problems to companies in this sector.

According to Zanin (2011), Rio Grande do Sul is a reference state in rice processing in Brazil. It is important to mention that the geographical position is a key factor to competitiveness of rice culture, and the state of Rio Grande do Sul, as the main producer in Brazil, plays an important role in the rice processing industry.

### **2.3 Environmental Responsibility**

The maximization of the shareholder is still one of the main objectives in environmental responsibility, however it will be not fully genuine if other goals neither are nor accomplished. Between these goals are the so-called social responsibilities, which are even more part of administration routines and relate to community welfare. Administrators start to concern not only with business management, but also with people and the environment in which they interact.

As Carvalho (2007) states, every activity that causes damage to the environment will generate, as a consequence, the responsibility and the duty of indemnify, by the autonomy and independence between the three responsibility systems: civil, administrative and criminal.

According to Shirmer and Schiefelbein (2011), the Market does not want an entity concerned only with social issues, but also with environmental issues. Society, together with environmental organisms, doctrine a behavior to be followed by this entity, which takes into account these market conditions and does not have alternative not being to apply these new practices. The concern with environment is a key factor to keep the entity on market and prevent damages to the environment and reduce the costs of this entity, which can reduce residual wastes and avoid sanction the environmental legislation.

Studies were held in order to check how concerned and prepared the administrators are in order to show the environmental responsibility of organizations. During these studies, several authors showed some concepts about environmental responsibility.

The Table 1 shows concepts of several authors about their understanding of environmental responsibility.

**Table 1 -Understanding And / Or Concept of Environmental Accounting**

<b>Authors</b>	<b>Understanding and/or concept of environmental accounting</b>
McCloskey and Maddock (1994)	Is the improvement and planning of the organizational structure, as well as its activities and systems with the objective of defining certain behaviors related to environmental variables.
Jamison et al. (2005)	The Canadian pro-environment non-governmental organization (NGO) presented three main subjects: <ol style="list-style-type: none"> <li>1. The environmental commitment in which the organization embraces sustainability and has a positive impact on environment and society;</li> <li>2. The energy management in which the organization operates within the ecological limits of the environment, considering them finite;</li> <li>3. The commitment of an organization is totally transparent and responsible, with a clear process that aims to involve and empower the interested parties.</li> </ol>
He and Juan (2009)	Environmental responsibility is the duty of covering environmental implications of organizations, products and facilities, eliminating wastes and emissions, maximizing efficiency and productivity of resources and practices that can minimize and negatively affect the usage of resources of the country for future generations.
Trennepohl (2009)	Environmental responsibility is the set of individual or organizational attitudes towards the sustainable development of the planet, i.e., these attitudes should take into account the economic growth set to the environmental environment nowadays and for future generations, assuring sustainability.
Bisschop (2010)	The environmental responsibility of organizations is the commitment of the organization taking into account the environmental aspects in their decision processes and involves commitment and environmental awareness, clear information, measuring and audit, which means to go beyond legislation and regulation. Environmental responsibility can be resumed as the responsibility of an organization with respect to the several parties interested in knowing the environmental consequences of activities and long-term needs for the environment in order to avoid influence the sustainability of future generations. It gives information about environmental responsibility of organizations and how it is related with social responsibility and sustainable development.

Source: research data (2012)

Kim, Nam and Kang (2010) analyze how organizations try to use their websites to the accomplishment of environmental responsibility and, consequently, build positive public relationships. The study was held in websites of organizations in Asia, Europe and North America with the objective of compare the differences in the awareness levels of these corporations with respect to environmental concerns and responsibilities. In this study, the authors shown that these environmental concerns include climate changes, ecosystem management, environmental governance and resources of residual waste management. Kim, Nam and Kang (2010) state that the organizations post in their websites with the objective of build positive images, and meet specific obligations established by external regulations and by environmental laws.

He and Juan (2009) studied organizations in China and some multinational organizations in order to discover how Chinese organizations have few corporate environmental responsibility practices. Thus, the concept of responsibility can be seen as a set of individual or corporate attitudes towards the sustainable development of the planet. In other words: these attitudes should take into account the economic growth together with environment protection nowadays and for future generations, assuring sustainability (TRENNEPOHL, 2009).

In this sense, we can mention some examples that involve organizational environmental responsibility: (1) create and implement an environmental management system in the industry; (2) cleaning and reusing water during the process of production; (3) develop products that cause the less environmental impact as possible; (4) give preference to the use of non-polluting or low-pollution transportation systems. Examples: rail and sea transport; (5) create a recycling system of solid residual waste in industry; (6) give training and information to employees about the importance of sustainability; (7) give preference to purchase of raw material from organizations which follow the principles of environmental responsibility; (8) give preference, wherever possible, to the use of clean, renewable energy sources in the process of production; and (9) do not adopt actions which can damage the environment such as pollution of rivers and deforestation. Some sectors are compromised to this new model of development when implemented an environmental dimension in their management models.

In this sense, accounting, as an information system of the situation of the company, as well as its economic and financial evolution, could include in its reports some data related to environment, which would make the access of this information a lot easier to managers and helping them in the decision-making process.

Nevertheless, accounting, as a means of giving information, should try to take this challenge and attend the users interested in how organizations work towards environment, supporting the decision-making process and keeping their obligations with the society with respect to social responsibility and environmental issues (KRAEMER, 2010).

Therefore, through the identification, measurement and dissemination of information, accounting can contribute to the society and to the government, looking for solutions to social issues. Since, as a means to give information, it should accomplish this challenge by fulfilling the users interested in in how organizations work towards environment and, still, contribute to the environmental management system. The accounting professional should participate in the process of planning, evaluating and controlling social and environmental issues, registering and disseminating all measures adopted and results achieved.

In this context, Kraemer (2010) states that organizations should incorporate the environmental variable in their scenario and in the decision-making process have a responsible behavior with respect to environment. Experienced organizations identify economic and strategic results of their engagement in the environmental cause. These outcomes are not immediately viable, since there is a need of a correct planning and organization of all steps in order to accomplish the environmental variable in industry, in such way that industry can achieve the concept of environmental excellence and have competitive advantage. Nevertheless, it can be claimed that the main challenge to the implementation of an environmental responsibility process is the need of search for new methods and procedures to measure and propose changes in current accounting, including environmental accounts in order to compose an accounting model that includes environmental facts and events. It is understood that environmental accounting can help managers and can show expenditures with environmental control and show in a clear, true way, through accounting reports, the environmental responsibility of an organization, and can be applied as a support tool for the planning and decision-making processes (YAMAGUCHI, 2013).

#### **2.4 Environmental Accounting**

In the current situation, it is not enough that organizations develop activities that help environment conservation. An effective management of all expenses from conservation is required, and environmental accounting plays this role, since accounting shows the relationship between entities and the environment, showing how the patrimony is damaged by environmental injuries, and how the organization needs to act to reduce or eliminate damages to the environment, promoting a sustainable development. In this sense, it can be stated that the awareness from society and small, medium and large organizations interfere in manufacturing processes that can damage environment.

It is known that the object of accounting is the patrimony. It can be defined, however, as an object of study of environmental accounting the accounting information related to environment, considered cultural heritage. Environmental accounting identifies costs, expenses and possible environmental revenues related to the activity of industry, and shows their industrial patrimony: assets and liabilities (MARTINS; BELLO; OLIVEIRA; 2010). This accounting activity use techniques such as bookkeeping, financial statements, audit and balance sheet analysis to a right accounting of environmental facts and events, transforming data into information that will fulfill society needs with respect to environment conservation and, mostly, the industry itself for future investments.

According to Pimenta (2009), there are much information produced by environmental accounting, being between them: risks analysis, creation of financial statements which will help in the decision-making process; and the assessment of environmental contingencies, showed in financial statements and in activities towards society with respect to environment conservation. When using these techniques, organizations will transmit their sobriety to society, making use of a behavior by legal means and, consequently, making better decisions improving its image and competitiveness.

Environmental accounting fulfills industries and society necessities, because it shows monetarily the processes of conservation or destruction of organizations in relation to environment. When one evaluates all actions developed by organizations in this process, this accounting activity can support financial accounting and managerial accounting as a tool to internal decision-making processes. In this sense, according to several studies, environmental accounting is a record of environmental heritage (environmental assets, rights and obligations) of an organization (BERGAMINI JÚNIOR, 1999; ZANLUCA, 2005). To Calixto (2005), it is a Science in constant evolution due to changes in the economic, social and political climate. Again according to this author, the decision-making in an organization needs even more accurate, trustable and fast accounting information. For this reason, environmental accounting can be justified. According to Ribeiro (2005), it is not a new Science, but a segmentation of the traditionally known Science. This author defines as objectives of environmental accounting: to identify, measure and clarify the events and economic and financial transactions related to environmental protection, conservation and recovering in a given time, aiming to show the financial situation of an entity.

Bergamini Júnior (1999) and Zanluca (2005) state that the main objective of environmental accounting is to create conditions so that each user group, being it internal or external to the organization, could be able to evaluate the financial and economic situation of a company, as well as forecast its future behavior, taking into account the effects to the environment. Then, environmental accounting is a result from the need to offer proper information about environmental management. It is important to mention that environmental accounting is not a new kind of accounting, but a set of information related to actions of an organization.

According to Christophe (2003), there are three ways of environmental information: (1) the appreciation of environmental actions by an identification of environmental costs already undertaken and by the evaluation of what will be done in the future; (2) life cycles analysis of the organization, allowing the reduction of pollutant emission in different steps of production of a good or service; and (3) environmental reports, which are essentially a publication of information in physical terms (amount of pollutant from industries) and monetary terms (environmental costs from the industry). In theory, the understanding of environmental accounting by managers and accountants may sound easy, however, in practice, there are many difficulties that prevent the use of this accounting activity. The most important of these activities is the segregation of environmental information from other information from industry, as well as the proper classification and evaluation of environmental accounts and events.

Nowadays, as Ribeiro (2005) states, environmental accounting is not mandatory for organizations and will only exist if they want to show to society that they are concerned and committed to environment conservation, differently from financial (traditional) accounting, in which organization must have their accounting statements disclosed, even only for tax purposes. Spitzer and Elwood (1995) sustain this statement saying that the environmental costs can be hidden and, when classified as expenditures, these costs can be easily forgotten because many organizations which consider them as expenditures does not give them proper attention during the decision-making process. The magnitude of these costs can be difficult to be determined as a result due to be related to expenditure accounts.

Environmental accounting will only exist if organizations want it to exist. In other words, it depends on whether they will adopt it or not. Due to this, Spitzer and Elwood (1995) state that the objective of environmental accounting is to increase the amount of relevant information about what is environmentally done to those that need and can use this information. The success of environmental accounting is also subject to a correct classification of all environmental costs applied in the industry.

Bergamini Júnior (1999) lists other factors that hinder the process of implementation of environmental accounting in the organization, such as: (1) absence of a clear definition of environmental costs; (2) difficulty in calculating an effective environmental liability; (3) difficulty to determine a future obligation due to the absence of an environmental costs history.

With the lack of this information, industry cannot determine an obligation with the environment; (4) Lack of clarity in the treatment given to the “long-lived assets”, such as a nuclear power plant; and (5) little transparency with relation to damages caused by the industry in their own assets, among others.

Despite the difficulties, this study intends to show, in a simple manner, the main concepts of environmental accounting. Accounting assumes, given this contextualization, a key role of support to all agents involved in this process, with a need of helping the administrators regarding the organization management in their relation with environment, because they are considered nowadays one of the main business management tools. Accounting has the role of elaborating and giving information to intern and external users about environmental events that change the financial situation of entities.

Until now, no appropriate tools were found in order to define values of natural resources available on the planet. In accounting point of view, what can be measured and informed in financial statements are the economical-financial events and transactions which reflect the interaction between the organization and the environment. The cultural aspect is directly related to the lack of rigor in environmental and accounting laws in Brazil, which contributes to a scenario of few practical changes in the behavior of organizations (CALIXTO, 2006).

An important concern of organization relates to goals for which information is required, as well as for its use. A potentially pollutant industry will not want to give elements that could be used as pressure tools by the society, government or their competitors. Accounting, as a science, gives conditions, by its systematic way of registration and control, to contribute in a positive way in the field of environmental protection, with economic and financial data resulting from interactions of entities that explore the environment. To Yamaguchi (2013), the organizations need a structure in order to show that they do not harm the environment, by means of acknowledgement, conservation and control of environment protection. It is observed, however, that many organizations do not know the benefits of using environmental accounting and, due to this, there are a lot to do and to investigate about this subject.

Besides accounting is a source of record, interpretation of organizational and governmental data, the environmental accounting has started to have a status of new field of accounting sciences, by means of financial and accounting reports about liabilities and environmental costs. Despite environmental accounting is considered important to show environmental information, it is known that the practical application of this accounting activity does not happen. Bibliographical studies on articles regarding this issue show the different studies held in many countries and allow evaluating the situation of environmental accounting in these countries.

### ***3. Materials and Methods***

The outcome of the study comes from a Project held by IBIC/CNPq/UNESC. The study intended to know the use of environmental accounting in rice processing industries in the states of Santa Catarina and Rio Grande do Sul. The techniques used to obtain the data in Santa Catarina were: interviews made by means of a semi-structured questionnaire, applied to 22 accounting professionals and managers of rice industries located in the micro regions AMREC and AMESC from Criciúma. In Rio Grande do Sul, the first contact was made by phone and then some questionnaires were sent by e-mail to 62 accounting professionals and managers of rice industries located in Rio Grande do Sul. With the support of the organizer of Expoarroz (a rice exhibition of Pelotas – Rio Grande do Sul state), it was obtained responses from 5 rice industries. It was developed a descriptive-exploratory study and the methodological procedures held was: literature review; application of a semi-structured questionnaire, applied to five accounting professionals and managers of rice industries located in Rio Grande do Sul.

### ***4. Results and Discussions***

It will be presented below the results and the interpretation of the exploratory study, by which it was sought to study the use of environmental accounting by rice processing industries.

The results show that the organizations are not used to separate accounting environmental facts and events from traditional accounts. Due to this, there is a lack of clarity and knowledge about the application of environmental accounting. There are many doubts and little interest in implementing this accounting activity in the organization. The study about the existence and use of environmental accounting in rice processing industries, as verified with accountants of the industries studied, resulted in the indicators mentioned below. The first point raised was to identify whether the organizations have environmental managerial indicators, as showed in Table 1.

Investigation of the use of environmental accounting by industries

The results and the interpretation of exploratory study are showed below and through them it is possible to investigate the level of knowledge about the environmental effects of processes in rice industries.

Results show that industries have processes that pollute during the rice processing and that there are regulatory controls of pollution. The first question raised was: how to identify the environmental aspects and effects of rice processing, as showed in Table 2.

**Table 2: Environmental Aspects e Impacts in the Process**

Environmental Aspects and Impacts in the Process	Santa Catarina			Rio Grande Do Sul		
	Yes	No	Does Not Know	Yes	No	Does Not Know
Is there any pollution control during the rice processing?	95,4%	4,6%	0,0%	100,0%	0,0%	0,0%
Is there a high waste of water during the rice processing?	90,9%	9,1%	0,0%	20,0%	80,0%	0,0%
Is there some reuse of water during the rice processing?	59,0%	36,4%	4,6%	40,0%	60,0%	0,0%
Are the legal standards related to the process fully reached?	95,4%	4,6%	0,0%	0,0%	80,0%	20,0%
Is there some reuse of solid waste during the rice processing?	95,4%	4,6%	0,0%	80,0%	20,0%	0,0%

Source: research data

Taking into consideration the rice processing industries, for which accountants provide services, 95,4% in Santa Catarina and 100% in Rio Grande do Sul state that regulatory controls of pollution and also a high consumption of water in rice processing. 59% of industries in Santa Catarina state that there is reusing of water in this process, and 40% in Rio Grande do Sul. It was observed that 90,9% of industries in Santa Catarina claim that rice processing consumes high amounts of water and energy.

It is understood that the industries studied are committed to environmental management and environmental responsibility, know the levels of pollution and of water used in their processes, however, they do not have coherent, systematized managerial indicators, because the responses are not uniform in this regard, i.e., the industry works with environmental costs for prevention and makes systematic investments in environmental protection.

Table 3 shows the results related to environmental indicators of assets, rights and obligations.

**Table 3: Environment Indicators of Assets, Rights and Obligations**

Environment Indicators of Assets, Rights and Obligations	Santa Catarina			Rio Grande Do Sul		
	Yes	No	Does Not Know	Yes	No	Does Not Know
Does the company have assets in use in the process of environmental protection, control, preservation and recovering?	81,8%	18,2%	0,0%	60,0%	40,0%	0,0%
Does the company have expense with research and development of environmental technologies?	22,7%	72,7%	4,6%	20,0%	80,0%	0,0%
Does the company have specific wages and charges for environmental specialists?	27,3%	72,7%	0,0%	20,0%	80,0%	0,0%

Source: research data

With respect to environmental indicators of assets, rights and obligations, 81,8% of industries in Santa Catarina have assets in use in the processes of protection, control, conservation and recovering of environment. It is important to mention that in Santa Catarina and in Rio Grande do Sul industries have expenditures with research and development of environmental Technologies and pay specific wages and charges for environmental specialists.



It can be ensured that high management is empirically committed to the environmental issues, however, there was no appropriate monitoring and disclosure of environmental accounts separately from other indicators of traditional accounting.

Table 4 shows the results related to environmental indicators in result accounts

**Table 4: Environmental indicators in result accounts**

Environmental Indicators In Result Accounts.	Santa Catarina			Rio Grande Do Sul		
	Yes	No	Does Not Know	Yes	No	Does Not Know
Does the company obtain in comesrelated to environment valuing?	18,1%	72,8%	9,1%	0,0%	100,0%	0,0%
Is there a consumption of resources for environmental control, preservation and protection?	81,8%	13,7%	4,5%	60,0%	40,0%	0,0%
Does the company pay any commission for specialized environment professionals?	72,7%	22,7%	4,6%	20,0%	80,0%	0,0%
Does the company pay any taxes, contributions and other expenses related to environment?	95,4%	0,0%	4,6%	100,0%	0,0%	0,0%

Source: research data

Regarding environmental output indicators, industries do not have revenues related to appreciation of environment, corresponding to 72,8% in Santa Catarina and 100% in Rio Grande do Sul. It is highlighted that in Santa Catarina 72,7% of industries pay commission for specialized environment professionals in contrast with 80% of Rio Grande do Sul that does not pay this commission. Industries have expenses with environmental control, conservation and protection and have rapid loss due to the exposure of assets to pollution.

It is verified that in tables of environmental output indicators which the industries studied has certain revenues related to the appreciation of environment. As can be observed, they have expenditures with environmental control, conservation and protection, besides other expenditure related to environment. .

It is concluded that self-employed accountants, as well as accountants employed by companies, know the accounting environmental facts and effects in the organizations in which they operate. However they do not apply the environmental accounting separately from the traditional accounts due to the lack of clarity and/or knowledge about this accounting activity. The respondents complemented in the questionnaire that there is no legal requirement for the application and illustration of such data. We can see that managers of the industries know the environmental laws and obey these laws, however, they do not require that accountants a proper accounting in order to know the facts. On the other hand, the accountants do not try to apply their technical knowledge and state that this accounting would be more labor-intensive. Nowadays, accounting does not know the environmental expenditures and revenues because these expenses are added to other traditional accounting expenses and revenues, creating a single totalizer.

By means of this initial diagnosis, it was possible to verify the lack of use of environmental accounting by the industries. Based on such statement, the study was held in the sense of elaborating a new structure for environmental accounting with the inclusion of environmental data, as the Figure 1 shows.


From this new structure, it is observed that accounting could be responsible for the communication between industry and the society, and also could show the measures adopted in the financial statements and the results obtained in the process of environment conservation. The illustration of these investments can minimize possible harms to the environment, showing their assets and liabilities in the reports.

With the reclassification of the traditional accounts and showing the environmental accounts, the industry has clear and transparent information of environmental variables.

Table 5 shows that environmental accounting can be a means of show the environmental variable from the moment in with environmental transactions made in the industry are showed. Due to this, it is important to develop a structure that allows the inclusion of conventional national accounts in environmental accounting accounts.

**Table 5: The Structure of Environmental Accounting**

<b>Environmental Accounting</b>	
<b>ASSETS</b> Current Assets Environmental Current Assets Non-current Assets Non-current financial assets Long-term assets Investments Fixed Asset Intangible  Environmental Non-current Assets Long-term assets Investments Fixed Asset Intangible	<b>LIABILITIES</b> Current Liabilities Environmental Current Liabilities Non-current Liabilities Non-current financial liabilities  <b>SHAREHOLDERS' EQUITY</b> Social Capital Capital reserves Adjustments of equity Profit reserves Treasury shares Accumulated losses Environmental Balance Sheet Reserves for Environment Preservation
Incomes Revenues Financial incomes Service fee income  Environmental income Revenues from recyclable waste Revenues from environmental recovery	Expenditures Financial expenditures Operational expenditures Costs with product/services  Environment expenditures Expenditures with environmental management Expenditures with environmental conservation Expenditures with RPPN (Natural Heritage Private Reserve)



Source: research data

Table 5 shows new structures of the balance sheet and DRE (Statement of Income for the year).

Taking as a basis the adaptation of the new structure of the environmental chart of accounts, three questions were made to accountants and industry managers.

Table 6 describes the result summary of questions made during the interview, as per the perceptions of the interviewees.

**Table 6: Perception of the Interviewees with Respect to the Application of Environmental Accounting in Industry**

<p><b>Question 1:</b> In their perception, would environmental accounting bring some benefit in order to increase competitiveness and stand out in the Balance Sheet?</p>	<p><b>Answer 1:</b> 40,9% of the interviewees believe that environmental accounting would bring some benefit because it shows that industries are committed to the environment, and it would bring environmental information to finance institutions, against 40,9% that believe that it environmental accounting would not bring benefits. 18,2% of the respondents does not respond or could not answer.</p>
<p><b>Question 2:</b> Although industries adopt environmental management, they do not use environmental accounting. Why?</p>	<p><b>Answer 2:</b> Of all respondents, 54,5% state that there is not an obligation and the evidence of environmental facts and events is little disseminated; 31,8% of the respondents does not know the subject enough or could not figure the answer; 13,7% of the respondents does not respond or could not answer.</p>
<p><b>Question 3:</b> Do you believe that the balance sheet model presented could be applied in your industry? What is (are) the pros and cons of its application</p>	<p><b>Answer 3:</b> Of all respondents, 72,7% state that the balance sheet model presented could be applied in their your industries. It would not be difficult, since a control of environmental expenditures already exists. The adjustment and creation of accounts would be necessary. 27,3% of all respondents state that this term is little known and there is a lack of knowledge to apply this term.</p>

Source: research data

The results show that industries do not use to separate environmental accounting facts and events from traditional accounts, which was confirmed by the literature revision. Due to this, the study shows that there is a lack of clarity and knowledge about the application of environmental accounting. There are many doubts and little interest in implementing this accounting method in industries. Bebbington & Gray (2001) shows that environmental accounting has not always complied due to the lack of a practical application of problems and resistance of managers. Information and data availability need complete information of impacts, reliability of data, suitability of estimates and non-intentional use of social and environmental information. Tensions between business interests and usual constraints of managers and researchers' environmental sustainability agenda lead to resistant from managers.

### 5. Conclusions

The results of the exploratory study held in the Southern of Santa Catarina and in Rio Grande do Sul, are in accordance to the previews studies and researches. It was found that, by means of results obtained by the questionnaire applied, that the organizations studied develop several actions towards environmental issues and know environmental laws; however, they do not require that accountants a proper accounting in order to know the values related to environmental accounts and actions. There is no practical application in the accounting of the rice industries studied with respect to the illustration and quantitative recording of expenses and environmental revenues created.

This study pointed that the accountants responding to the questionnaire recognize the existence of environmental accounting facts and events in the rice industries in which they operate, but do not apply the environmental accounting to separate environmental accounts from traditional accounts. It is believed that one of the probable reasons for this is the lack of clarity and/or knowledge about this accounting activity. This reason was pointed by other researchers such as Calixto (2010), Catalisa (2010), Gale (2006) and Herbohn (2005). In addition, the fact that there is no legal requirement to the use of environmental accounting in industries is a relevant aspect to be considered, i.e., since there is no legal mechanisms to determine the use of accounting of environmental accounts, the accountants do not try to apply their technical knowledge and state that this accounting would be more labor-intensive.

None of the industries participating in this study used environmental accounting in their management. In addition, it is known that most of accountants do not know the benefits of this accounting activity. Between the main reasons to the low level of knowledge about environmental accounting, the accountants indicated the incipience of this subject in Brazil, the lack of academic studies, the lack of legal debt collection by competent organisms and the fact of considering that it is not necessary to apply the environmental accounting.

From the early investigations held in this study, it is important to mention that the accounting in rice industries cannot be limited to quantitative recording and measuring of the assets. It is crucial that this subject takes part of scientific studies and in practical applications in the organizations with the objective of creating effective accounting structures with useful environmental information to organizational management. It is also considered that the challenges related to environmental responsibility, which comes from society demands, has required that industries are aware of their obligation with the careful use of natural resources, so that these resources can be available for future generations. Such challenges still need that organization concern with the requirements of environmental responsibility and the participation of the accountant to support the decision makings toward sustainable development.

As a conclusion, it was observed that environmental accounting plays an important role in structuring the chart of accounts accordingly to the characteristics of rice industry. In this sense, the context of the environmental chart of accounts application together with observing the current legislation is essential factors.

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