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Conception of Managing Practices as Key Factor to Achieve Rural Development and Sustainability in Southern Brazil

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Abstract
Achievement of rural development under the three pillars of sustainability is a strenuous process that will depend on a set of complex variables. Defining actions to contribute to socioeconomic development requires the diagnosis of current conditions, facilitating the decision-making process by policy makers. In addition, purpose of rural establishments' managers is to build up their future, then the greater their resilience to markets' oscillation and environmental constrains the greater possibilities to achieve sustainability. Consequently, identifying the adopted managing practices by family farmers holding most of rural area is preponderant. Considering that management practices influence and are influenced by strategies that depend on external and internal environment conditions, then, how to understand the wide variety of activities that make up the management practice and the creation of strategies, as well as their perception by farmers? This paper aims to respond to it in a survey conducted in southern Brazil. The study was guided by the principles of qualitative and quantitative research, with exploratory and descriptive nature. It was applied a questionnaire to 232 families and then responses were evaluated under a refined SWOT analysis. Managers recognize the external environment variables as threats and the internal environment ones as a strength.

Keywords: Emerging Countries, Economic Sustainability, Rural Development, Family Farming, Strategies, SWOT Analysis

1. Introduction

At the Paris climate conference (COP21) in December 2015, 195 countries adopted the first-ever universal, legally binding global climate deal. The agreement sets out a global action plan to put the world on track to avoid dangerous climate change by limiting global warming to well below 2°C (United Nations, 2015).
Governments agreed to strengthen societies' ability to deal with the impacts of climate change; provide continued and enhanced international support for adaptation to developing countries. The agreement also acknowledges the need to build resilience and decrease vulnerability to the adverse effects of climate change through smart cooperation through social society.

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According to Villazon et al. (2016), in regards to rural environment, it is described that "In recent years, aspects such as economic trends, regulatory instruments, farm management practices, and trends in the number of ruminant animals have influenced greenhouse gas emissions from agriculture […..]Sources include manure management, rice cultivation, field burning and fuel use on farms. At the farm level, the relative size of different sources will vary widely depending on the type of activities and products grown, farming practices employed, and geographical factors".

Addressing resilience in the rural environment in developing countries will depend on adopting concise and precise decisions by policy makers. These activities are high related to the complexity of achieving rural development under the three pillars of sustainability; and thereof contributing to socioeconomic development. Policy definition requires the diagnosis of current conditions, facilitating the decision-making process by policy makers.

According to Drucker (2012) changes in political, economic, social, cultural, demographic, and technological scenarios inspire transformations in organizational strategies, requiring new organizational forms adaptable to changing reality. Then aspects of rural planning, such as management practice and establishment of strategies arise as key aspects to address sustainability in rural areas.

In regard of Brazilians' agricultural modernization process, Mattei (2007) portrays the fact that public policies for rural areas, especially agricultural policy, favored the most capitalized sectors and producers of commodities geared to the international market, with the objective of counteracting the imbalances in the country's trade balance. On the other hand, for the family producers these policies had a strongly negative bias, since a large part of this segment was excluded from the benefits offered by the agricultural policy, mainly in relation to rural credit, minimum prices and production insurance.

Despite the increases in production and productivity seen in recent decades, numerous are the negative externalities arising from that country's agricultural modernization process, whether social, cultural, environmental, among others. One of the most striking consequences was the rural exodus, with the migration of millions of farmers to the cities.

Buainain et al. (2014) point out that while financing policies have always been prominent among agricultural policies, on the other hand they are always present in the diagnoses that seek to explain the difficulties of rural development.

Since management processes studies are perceived as essential for proper development achievement (Jinpeg, 2014; Cornejo-Ortega et al.,2014; Thebáult et al.,2014) and even though surveys in management process in rural areas studies hardly occur; they use a very restricted and compartmentalized approach that does not give proper support to policy makers (Batalha, 2005).

In view of lack of studies aiming to understand the management processes of family-farming production units in rural areas, and their relation to environmental aspects it is necessary searching for alternatives to help small family-farming units to confront challenging new scenarios in view of international agreements. Then this article aims to understand farmer's perceptions from southern Brazil on a set of variables that affect the practice of management and the creation of strategies. In addition, it analyzes the association between the heterogeneity of the economic performance of agricultural

establishments and the perceptions of their managers on the set of internal environment variables, establishing relation between environmental aspects and perceptions.

2. Methodology

2.1 Study Area

Brazilian agriculture sector counts for 1/3 of total commodities exportation, specifically 39% in 2014 (WTO, 2016) and represents a total area of almost 33% of the national territory, around 250 thousand Ha. (FAO, 2016). According to the latest Agriculture Census in 2006, 84% of total establishments are categorized as family farmers, accounting for 74.4% of personal occupation in rural areas (about 12.3 million of people). Regardless of the current economic difficulties in the country and reproductive capacity uncertainties, the Brazilian agricultural family production system is inserted into a delicate socioeconomic context as it has an unquestionable social role for society.

This article refers to the survey conducted in southern Brazil (Figure 1). The Brazilian Southern Region consists in three of Federal units: Rio Grande do Sul, Santa Catarina and Paraná. In this region are situated 19.44% (1,01 million) of total Brazilian agricultural establishments, which account for 28.83% (11.6 billion dollars) of national production and occupy 12.59% (41.52 million hectares) of national agricultural area. In regard of accounting profit for Brazilian Southern Region, based on Contagri's data, the average accounting profit reaches R$23.710,00/WMU, and the economic profit decreases to an average of R$6.121,33/WMU, when capital and labor opportunity costs are considered.

Although the prospects for social reproduction of family farmers are more favorable in this region, compared to the rest of the country, their weaknesses should not be ignored.

In southern Brazil, agricultural production units participating in this research, although comprehending commonalities with each other, as the predominance of family labor and tobacco presence in all of them; they also present some differences in terms of production structure, income composition and profitability, among other factors.

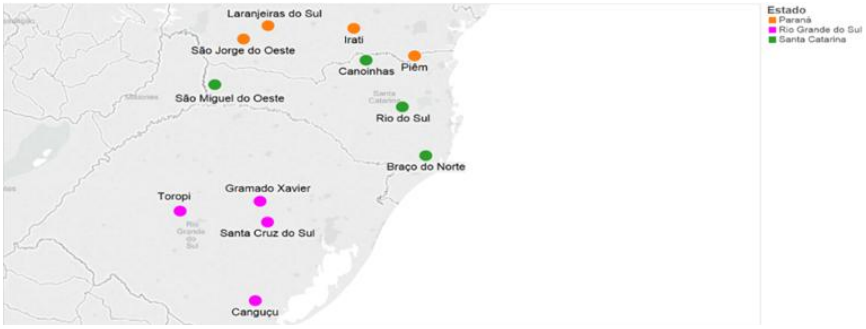

Figure 1 - Location of the municipalities covered by the survey in the states of Rio Grande do Sul, Santa Catarina and Paraná. Source: Prepared by the authors (2017).

2.2 Data Collection and Analysis

Family farmers who took part in this survey belong to a partnership between The Public Agricultural Research and Rural Extension Company of Santa Catarina (EPAGRI), the Federation of Agricultural Workers of the State of Paraná (FETAEP),

the Federation of Agricultural Workers of the State of Santa Catarina (FETAESC), the Federation of Agricultural Workers of the State of Río Grande do Sul (FETAERS) and Souza&Cruz Company. Souza&Cruz commonly monitor family farmers socioeconomic aspects and production factors and yield and data is followed up by EPAGRI's accounting software, Contagri®.

The survey consisted in a sample of 232 agricultural establishments distributed in 12 different municipalities in the Southern region of Brazil, as shown in Figure 1. The properties studied proffer a variety of products, especially tobacco, milk, soybeans, corn and onions among others. In terms of production structure, these establishments are characterized, on average, by exploiting 14.37 ha of utilized agricultural area; by possessing 2.77 of working man units (WMU), of which 2.54 are familiar; and they own an exploitation capital R$ 143,097.33 per WMU. Data was obtained through the electronic accounting software CONTAGRI, based on the agricultural year 2014/2015.

Questionnaires were applied and it was structured based on the SWOT method, covering three main topics: (1) identification and characterization of the farmer and family members; (2) a set of variables related to the external environment of the production unit; (3) a set of variables related to the internal environment of the production unit.

The variables were combined into dimensions, according to the similarity of subjects dealing, Table1. In the internal environment six dimensions were used: (A) marketing and sales; (B) information management; (C) Personnel management; (D) Finance and costs; (E) environmental management; (F) production management. In the external environment, the following dimensions were used: (A) changes in society; (B) governmental changes; (C) economic changes; (D) technological changes; (E) changes in the markets.

Table 1: Internal & external environment dimensions and variables.

Internal Environment		External Environment
TIC's management: • Management practices. • Computer usage. • Internet usage. • Technical assistance	Marketing and Sales: • Price of products. • Volume of production. • Quality of products. • Diversity of products. • Promotion.	Changes in Society: • Society's consumption patterns • Ageing population • Increasing Urbanization
Personnel management: • Family assistance. • Participative management. • Educational development. • Management Training.	• Technical training. • Availability of workforce. • Succession perspective. • Participation in collective associations.	Technological changes: • New production technologies. • TIC's& Innovation.
Finances and costs: • Cash flow. • Electronic accountability. • Financial planning. • Rural credit. • Global profit knowledge.	• Production cost. • Knowledge. • Activities' gross margin knowledge. • Work remuneration	Economic changes: • World economic growth. • Economic Crisis. • Unemployment rate. • Interest rate. • Exchange rate.

knowledge.		• Global food demand.
Environmental management: • Environmental policy. • Destination of hazardous waste. • Use and manipulation of agro toxics. • Energy consummation.	• Garbage collection and disposal. • Soil conservation. • Environmental education. • Manure waste.	Changes in the market: • Price of agricultural products. • Price of agricultural inputs. • New exchange possibilities. • New production units in the market.
Production management: • Animal existence. • Water quantity and quality. • Climate conditions. • Soil Conditions • Improvements and constructions. • Machinery and equipment. • Size of exploited area.	• Properties' usage percentage. • Technology used. • Production planning. • Access ways. • Media. • Electricity.	Governmental changes: • Responsibility in public accounts. • Tax legislation. • Environmental Legislation modifications. • Agricultural Policy. • Labors legislation. • Social security legislation.

Source: Prepared by the authors (2017).

For each variable, it was asked farmers to rate them as threats or opportunities (in the case of the external environment) and strengths or weaknesses (internal environment). After this classification, it was requested to determine the variable degree of importance, taking into account the management practices developed in the production unit. Therefore, it was presented a scale with four levels: (a) Worthless; (b) Not very important; (c) Important; (d) Very important.

For analysis and graphing, the answers obtained for each variable were weighted by multiplying them by values from 0 to 3 according to the degree of importance attributed by farmers: Worthless (x0); Not very important (x1); Important (x2); Very important (x3). Thus, the graphics presented in this paper indicate the total level of importance of each variable and its composition (threat and opportunity, in the external environment, or weakness and strength in the internal environment). Considering the total number of analyzed questionnaires and the weighting carried out, the maximum score to be obtained in each variable is 696 points, which could be achieved if all respondents attribute the greatest importance to the variable ("very important").

Technicians from partner institutions applied the questionnaires. These technicians received previous training to apply the questionnaire in order to ensure the quality of the data collection process. It is noteworthy that there was the guidance that the whole family was invited to participate during the application of the questionnaire. Contagri® data was used to define the profile of the monitored units and to qualify the information collected through questionnaires.

In order to verify the association between economic performance and agricultural establishment capacities with sustainability aspects, data analysis was performed by comparing the arithmetic averages of each of the six dimensions surveyed, and then

employing correlation analysis.
For the calculation of the indices, an indicator of each variable in each dimension was first calculated for each observation. That is, 46 variables for each observation, where all of them vary from zero, situation of perception of very important weakness, to seven, situation of perception of very important strengths. The j-th variables will be calculated for the i-th observations in a ratio formula.

$I_{ij} = \sum_{j=1}^{n} I_j$ eq(1)

Subsequently, the relative indexes of each capacity (IRC) were calculated for the observations, using the arithmetic mean between the indicators. That is, the IRC of the k-th dimension in the i-th observation as follow.

$IRC_{ik} = \frac{1}{n} \sum_{j=1}^{n} I_j$ eq(2)

Where n is the total number of variables within each dimension or capacity.
The criteria of classification for the performance of the agricultural establishments was the Income of the Agricultural Operation (IAO) by Work Man Unit (WMU)

3. Results

The weight given by managers to five dimensions that compose the external environment and its perception as a threat or opportunity, is shown in Figure 2. Managers recognize the variables of the external environment mainly as threats, perception representing 54.0% of the total level of importance assigned. The dimensions that obtained the highest average scores were "Changes in markets and suppliers" and "Technological change", this last one perceived almost exclusively as an opportunity. An intermediate position degree of importance come the "Economic change" and the "Government Change". The dimension "Changes in society" got the lowest score.
Furthermore, pointing out some of the variables perceived as a threat are: changes in tax laws (97.1%); input prices (96,5%); changes in pension legislation (93.8%); changes in interest rates (93,8%); changes in labor legislation (87.7%); and entry of new production units (81,6%).

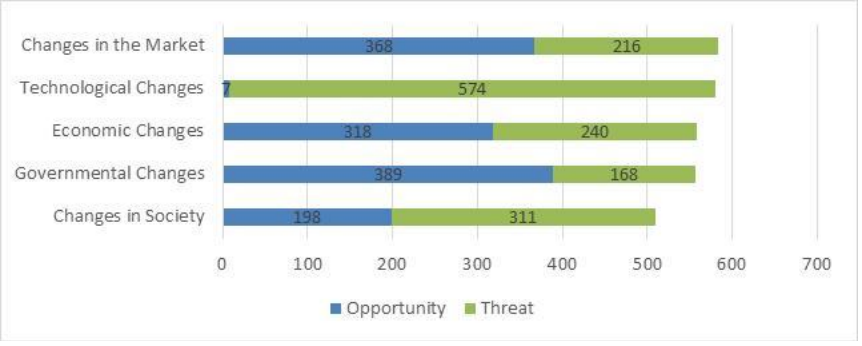

Figure 2 - Average degree of importance, a weighted scale of 0 to 600, for the external environment. Source: Prepared by the authors (2017).

In contrast to the external environment, the internal environment (Figure 3) is perceived

essentially as a strength, perception, representing 81.6% of the weighted answers. Significant weight of this perception is due to the size "Finance and costs". It is important to remember that all participating units of this research make use of Contagri software for its management, which should partially explain this fact.

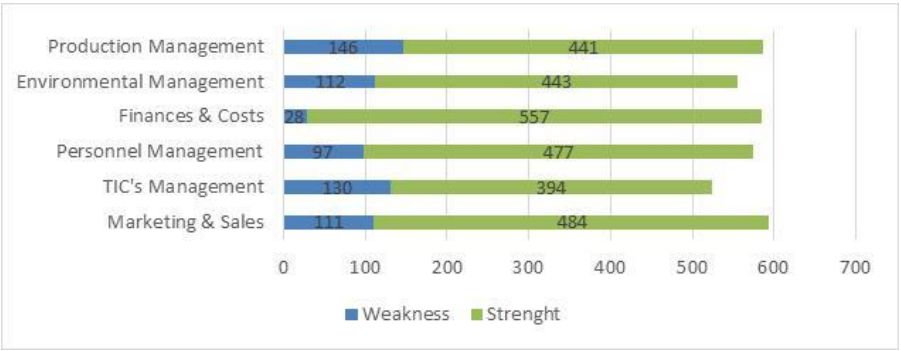

Figure 3 - Average Degree of importance, a weighted scale of 0 to 234, the dimensions of the internal environment. Source: Prepared by the authors (2017).

Survey indicates some variables as weakness: environmental education (54%); use of computer for management (53%); access roads (50%); internet use for the management (42%); availability of labor force (40%); selective collection and disposal of garbage (40%); size of the property and explored area (40%); prospects succession (38%); production volume (34%); electricity (31%); and climatic conditions in the rural establishment (30%). Results demonstrate the importance of analyzing the variables, such as the variable environmental education, which should constitute a considerable problem.

Table 2: Correlation between the capacities and economic performance of agricultural establishments in the agricultural year 2015/16.

	Marketing and Sales	TIC's management	Personnel management	Finances and costs	Environmental management	Production management	Agricultural Income/WMU
Environmental management	0,22	0,17	0,37	0,24	1	0,31	7E-3
Agricultural Income/WMU	0,31	0,19	0,13	0,06	7E-3	0,19	1

Table 2 shows the correlation between the six dimensions and the economic performance of agricultural establishments, respectively, for the agricultural year 2015/16. For the agricultural year 2015/16, the results suggest that there is evidence that "marketing and sales capacity" and "production management" are income related because they have a p-value of less than 0,05. For the other dimensions, there is no evidence of association with this indicator of economic performance. It is also observed that dimensions are positively correlated with each other.

4. Final Considerations

Accomplishment of the Paris agreement of 2015 in the rural environment in developing countries is a complex demanding task. It is clear that fulfillment of those

goals will depend in a large set of variables, one of them, undoubtedly would be to effectively put into practice in the field among small farmers and stakeholders around the world better practices of farming. Those "better practices" implicate execution of National policies which should arrive to the local level propitiating rural development and environmental sustainability.

These policies will represent to small farmers managers changes, and they would be characterized by generating greater volatility and risk, especially concerning economic and environmental issues; then family farmer's perceptions about their surrounding environ will play a key role to develop strategies to face these scenarios. There would not be an effective policy if it does not consider perception by farmers managers. In fact, manager's decisions will be more likely to succeed when the greater their adherence to the new realities of the economy are, and especially the greater their ability to interpret the variables that may influence the results of their actions.

In the other hand, conceive new strategies and produce innovations are some of the challenges for each of the 1,010,000 agricultural establishments' managers in southern Brazil, aiming their social reproduction in upcoming years. Create opportunities for knowledge exchange of those who make the practice of management may be interesting so that they can respond to the challenges and strategic opportunities by themselves.

Management is a practice learned from experience and rooted in the context, being determinant to guarantee the sustainability of the units of agricultural production, importance that grows each day, with the increase of the complexity of the markets in which this segment is inserted. However, the decision-making processes in family agriculture are complex and encompass several dimensions, beyond the merely economic character. Management decision-making is permeated by pragmatic issues, but also by the culture and values that the manager carries.

Although it seems to be no correlation between environmental aspects with profitability, we must indicate that the fact that we are dealing with perceptions could mean that most profitable farmers do not attach importance to the environmental issues. Furthermore, this feature reinforces the idea that they do not value enough environmental aspects; then this can be an initial point of departure when planning bottom down strategies for small farmers.

Sustainability will depend on intelligence, creativity and giving due attention to the opportunities and problem formulation by stakeholders, avoiding devote energy into finding a solution to erroneous problems, therefore promoting the social, environmental and economic sustainability of family farming establishments. The theme of environment and business sustainability is complex and positions about it are far from consensus. Notwithstanding the achievement of sustainability is not possible to address within a single variable, it is necessary to consider them in their broader set to effectively understand the processes.

5. Acknowledgements

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