

Decision Making in the Management of Vineyards Cultivation Systems

Cláudia Brazil MARQUES¹, João Armando DESSIMON², Kelly Lissandra BRUCH³, Carlos HONORATO Schuch Santos⁴ and⁵ Fabrício Moraes de ALMEIDA

¹Universidade Federal do Rio Grande do Sul- UFRGS- Departamento de Pós-Graduação Doutorado em Agronegócios- CEPAN- Av. Bento Gonçalves, 7712 - CEP 91540-000 - Porto Alegre - RS – Brasil. E-mail: cbmarque@yahoo.com.br. Fone: +55-051-9-9515-3574.

²Universidade Federal do Rio Grande do Sul, Faculdade de Ciências Econômicas, Departamento de Ciências Econômicas. Av. João Pessoa, 31 - Sala 11- Centro- 90040-000 - Porto Alegre, RS - Brasil

³Universidade Federal do Rio Grande do Sul, Faculdade de Direito.

Avenida João Pessoa, 80- Centro Histórico. 90040000 - Porto Alegre, RS – Brasil.

⁴Universidade Federal de Rio Grande-FURG, Departamento de Engenharia de Química e Alimnetos. Rua Tomaz Flores, 340. Independência 90035200 - Porto Alegre, RS – Brasil.

⁵PhD in Physics (UFC), with post-doctorate in Scientific Regional Development (DCR/CNPq). Researcher of the Doctoral and Master Program in Regional Development and Environment (PGDRA/UFRO). Leader of line 2 - Technological and Systemic Development, and Researcher of GEITEC — Federal University of Rondônia, Brazil. E-mail: dr.fabriciomoraes001@gmail.com

Abstract— *The objective of this research was to identify the variables that interfere in the winemaker's decision-making during the management of the wine growing system. To characterize the winemaker's decision-making in the management of the vineyard cultivation system, the procedures were: analysis of the selection criteria of the managers before the conventional and biodynamic systems of vinifera cultivation, considering the questions of opportunity costs of production as criterion evaluation of alternatives. It is an exploratory and descriptive study which contains both qualitative and quantitative analysis, from an intentional sample, for convenience and non-probabilistic. It has been discovered that vineyard management is a complex task, which requires information, technical follow-up, and farmers who are willing to realize that production alternatives go beyond the boundaries of the property's gateway. Finally, it was evidenced that management requires the commitment of all the factors, which are part of the productive chain, so the whole production system can remain competitive and attentive to the different opportunities that using the soil can provide.*

Keywords— *biodynamic agriculture; contingency theory; management.*

I. INTRODUCTION

The humanity's concern with the readiness of productive resources, there are some years where it already consists of agronomists' studies, sociologists,

biologists, administrators, economists and professionals of many other study areas. Moreover, this concern can be observed in David Ricardo's thought (1996), which considers that agriculture would be linked to the readiness of the natural resources to the forms of different uses of the earth and his/her working power.

For Ricardo (1996), an economist from the century XVIII, there would only be an advantage in using fertile lands. The nonfertile lands should not be used for agriculture, because they would cause the loss of competitiveness in the market. Moreover, they would demand more investments to make them more productive. Initially, in the century XIX Malthus (1983), for his/her time he/she received attention because of the excessive increase with the population. This attention could also happen due to the lack of foods; therefore, the lands of inferior fertility would also end being explored, to deal with the growing demand for foods. However, Boserup (1987) considers that the capacity of fertility of the soil can be regulated by the independent of natural sanctions human actions. For him, the working power is associated with the agricultural methods. Like this, the subject of limitation of natural resources passed to be overcome with the technical progress. For instance, to the if it introduces new production techniques, it is possible to increase the productive potential of lands that initially were less fertile. Therefore, the introduction of new technologies can contribute to softening the duality: resources scarce versus limitless human needs.

The technological innovation in the production, for Schumpeter (1982), consists of incorporating new techniques, using new combinations of productive systems, promoting, like these changes of habits, habits, and faiths. Rosenberg (1982) also understands that the technical progress is grouped knowledge which makes it possible for the production to begin from a limited amount of resources, and of a larger volume of products or of products superior qualitativamente. However, for this to happen, the administration of the choices, which are considered as great or good for appropriately using the natural resources and of new practices of handling of the soil they demand, at least, two fundamental elements, that are information and knowledge.

Nevertheless, because of the difficulty in finding and implementing the great choices or even sub great, the tomador of necessary decisions to support in a model of decision that contemplates a group of variables. Thus, it is this tomador of decisions, which executes their activities innovatively and strategically, and also in a dynamic and complex atmosphere. Parallel, to this it involves economic subjects and socioambientais, and it did necessarily by using a systemic glance of the possible alternatives. Such care would aid in search of choices you/they provide for the alignment among institutional and empiric subjects, and the conditions that allow to evaluate risks and uncertainties in a scenery globalizado and dynamic, in that the decisions unchain systemic effect in the productive segment.

Before the complex situations and multifactorial are implemented, Simon (1979) demonstrate how the process decisório needs to be built differently from the classical economists, which considers the man as being rational his/her fullness and continuously. For him, the idea of the dynamics of the socket of decision is sustained over time, through a continuous sequence of interrelated decisions. In the case of the socket of the farmer's decision, the complexity is demonstrated prior to the influences as being: the tradition, the learning, the culture, the Etnia, and the subjects as social, environmental, economic, infrastructure, politics and of persuasion, soon it is a process that requests a systemic reading of the atmosphere so much external as the organizational.

In the specific case of the section of the wine growing, the challenges of the new times are related to the shortage of productive (earth, work hand, capital) resources. In some areas of vitivinícolas, a lot of what he/she is due regarding the climatic alterations of the planet, to continuously use the chemical inputs and reduce the planting areas. In this function, the viticulture needs to look for new production systems to make possible for him/her to soften the adversities and to align the subjects economical, social, environmental and cultural in the viníferas production.

However, the adoption of systems of cultivation of *Vitis viníferas* with smaller environmental impact is presenting better results in the vinificação, showing the characteristics of the ecosystem of each location in an accentuated way as having a larger persistence in the identity of the products. These results are waking up the interest of the linked segments to the viticulture, from small producers to great companies vitícolas with production in industrial scale.

The section, as a whole, lived together with new behaviors of the appreciators of the drink, that look for an only wine, that it is capable of surprising and to count history in their smell characteristics, degustation and visual. Before this new behavior of the consumers, the viticultores noticed the importance of their histories and the specific history of the cultivation of the grapevine.

In Serra Gaúcho's area, is one of the most important in the national production vitivinícola, for different reasons. In Garibaldi, is a municipal district in this area, and generally he/she is located where the Wine-producing Cooperative Garibaldi (CVG), which counts with a picture of 400 associated families, being 236 producing of grapes (WINE-PRODUCING GARIBALDI, 2016). In 2018 the planted area was 900 hectares, and the given amount in CVG was of 20 million kilos of grapes. For the current President, Oscar Ló, "the Cooperativa Garibaldi it is constituted of farming families, that the removal of the earth for his/her sustenance and they trust in the wine production to build his/her future and one of the next generations. Our commitment is to work for those people, to offer them more and more and better-growing conditions and development" (WINE-PRODUCING GARIBALDI, 2018).

The Wine-producing Cooperative Garibaldi (CVG) is promoting projects, which are designed to motivate the use of systems of cultivation of low environmental impact with their associates and cooperated. Moreover, he/she will make the information of techniques and handling available, for the contribution of with the appropriate use of the soil and natural resources. One project in environmental sustainability is the system of cultivation *viníferas* biodinâmico Chardonnay for the elaboration of foamy.

Before of that scenery, the subject norteadora of the present study is: What does characterize the socket of the decision of the viticulture in the administration of the system of cultivation of vineyards? To answer this question, he/she decided on the following objective, which was to identify the variables that interfere in the socket of decisions of the viticulture and the administration system for the cultivation of vitícola. For instance, the characteristics of choice are analyzed in systems in conventional cultivation and *viníferas*

biodinâmico. The following discussion accomplished the search for fundamentação theories of "limited rationality" (SIMON, 1979) and in the "empiric administration" (PFEFFER and SUTTON, 2007). Regarding the characteristics of the tomador decision, the information was considered to access the effects in the choices of systems and cultivation practices in the transport of the vineyard and, in matter, to evaluate "what to do" and "as to do", as being part of the structure of Vereijken (1997).

II. LITERATURE REVIEW

The theoretical support is leaning in two themes: the process of the socket of the decision and the administration of the systems of viníferas cultivation.

2.1. Decision Making

Over time, some observe that the process managerial decision making has been studied by several authors, such as Simon and March (1976), Mintzberg,

Raisinghani and Théorêt, (1976), Gontijo and Maia (2004), Fernandes et al. (2007), Albuquerque and Clerk Filho (2005), Shimizu (2001) and Yu (2011). These authors evaluate the individuals who make the decisions inside the organizations in elapsing of the time. Moreover, it has been noticed that the criteria and the process of decision making are dynamic and that, in each discussion or study, they happen new approaches and definitions as being the human that makes the choices.

The majority of the time, in this view, the decisions are passed to be guided by the searching for alternatives, which are sufficiently good, and have no obligation to search for the best alternative. Simon (1979) highlights that, besides the information that is available for us to look for these sufficiently good alternatives, the tomadores in charge of the decisions require knowledge, intuition, and perception, that you join to form what one can call theoretical model.

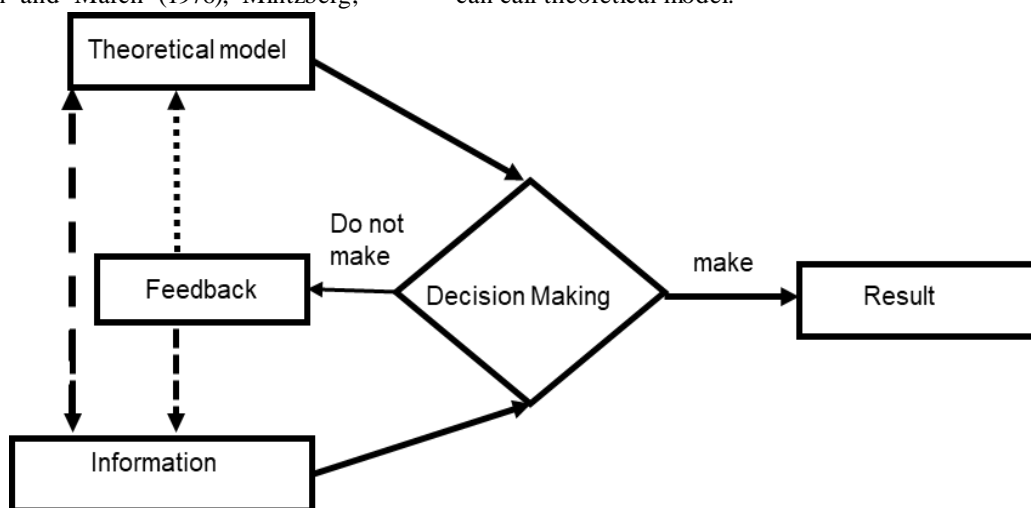


Fig.1: Model Theoretical of Analysis (initial relationships)

Source: Authors (2018).

The model here proposed leans towards a double group of elements. The first is the theoretical model formed by the variables that the decision considers as relevant for that decision. The second is the volume of information you/they feed the own theoretical model and, direct impact during the process of making of the decision, such as previous experiences, habits, habits, and cultures that can aid in their decisions. The model proposes an interconnection between an empiric administration and an administration based on criteria or an institutionalized norm.

The decision maker can often consider intuition, but also his rationality may be limited to a certain field of perception, as well as in the seemingly dual interlocution of that knowledge. Parallel, the proposed model is uncertain and situational, because it considers the theory of the contingency (everything depends). In the functional

atmosphere, the explanations can be looked for in the "cause relationship and effect," therefore, the decisions depend on their causes and of the intended effect and or expected result.

Another characteristic considered in the model is that the process of decision, that results in not to "do" or to "do" something. Moreover, it is generated by his/her own dynamics, an alavancagem of the decision knowledge and, this way, opportunity-him the search of a better future result. In the specific case of "not doing," the feedback of the process (to model more theoretical information) qualifies as their theoretical process (Fig. 1).

In the theory of the contingency, for Chandler (1998), the environment influences the organizations, more specifically their strategies, and the dimension of the own organization (Puch et al., 1969; Blau and Schoenherr, 1971) the technology (Woodward, 1958;

Perrow and Schwartz, 1972), the nature of the environmental uncertainty (Thompson, 1967), the structures (Bruns and Stalker, 1961), and the connection interns (Lawrence and Lorsch, 1973). The authors try to analyze the relationships inside of the systems and between the subsystems and the relationship of the involved factors and their characteristics.

The theory of the contingency consists of selecting the choice, which is a better solution for each situation. For this, the environmental analysis is made necessary to understand the dynamics of the production systems and the cultivation subsystems, that are open, interrelated, but are also interdependent amongst themselves. Thus, the proposed model acquires a systemic configuration and to appropriately assist to the theory of the contingency. Moreover, it can be considered that the results of implementing the decisions can feed the own

theoretical model, to validate him/it or to alter him/it, and to feed the bank of information of the decision (Fig. 3).

The healthy farmer's decisions are based, in most cases, by using common sense and in the accumulated empiric knowledge (Troian and Arbage, 2016). Here, Pfeffer and Sutton (2007) propose what call "empiric administration" for making decisions. For them, the model should "be created" starting from the own facts and not of cause-effect relationships with base in theory. On the other hand, Bazerman (2015) it analyzes that the intelligence limitations and of perceptions they restrict the capacity of the decisions to they look for criteria to identify the great solution starting from the information that is available and, still, they consider those limitations impede them of making great decisions that the rational model presupposes.

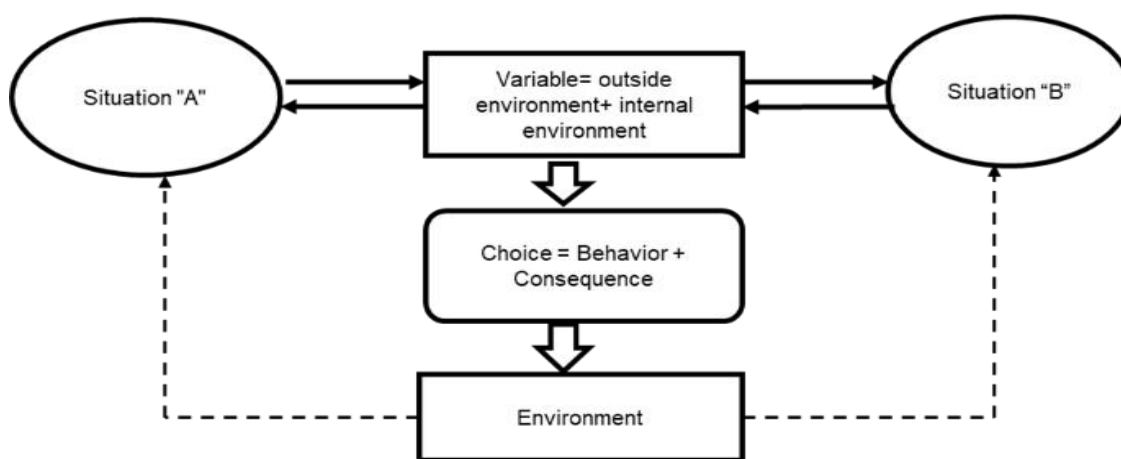


Fig.2: Behavior decisional

Source: Authors (2018).

Remaining on the topic of the dynamics of the proposed systemic model, it is has highlighted behavior can result in an event, that will cause action and reaction. For this to happen, the decision accesses groups of variables activated by a group of indicators, that you/they come in situation form "THE" or situation "B," (or both) and such variables can be lenses or subjective (Fermaud et al., 2016). In those groups, consolidated in situations, the decision looks for an alignment form with their characteristics and his/her perceptive capacity.

In the administration of the farm, the decisions perpassam for the intuitive order of information, faiths, habits, habits that can favor when developing strategies and criteria for functional decisions. Therefore, a circle of formal and informal information that interrelate and are fed by internal (previous decisions to do or not to do) elements and for external elements noticed by the decision maker.

Furthermore, the choice is the consequence of a group of convenient variables that, in some way, reflects what she can summarize in "behavior more foreseen" consequences. Thus, making decisions is represented as the dynamics and processes sustained at the time (Bellman, 1956; Mjelde, 1986; Osman, 2010). Moreover, it means that, in each apprenticeship, the technical coefficients are updated to continue for the next round of behavior, because the decision can choose the group of variables you/they are part of his/her theoretical model, and this choice is a direct function of his/her behavior, that can be, for instance, more or less conservative.

During the decision-making process, the decoder will wait for a certain result, or better alternative: a group of results associates the group of probabilities and objectives. Therefore, the consequences of a decision will affect him/her regarding what to "do" or not to "do," and they can be considered as being "foreseen."

Remembering, for Simon (1979), the decisions, most of the time, are satisfied with a satisfactory alternative in function of available information in that situation (time and place).

After the decision has been made, it is implemented and generates results and impacts in the atmosphere. However, when dictated differently: the decisions are not neutral about the modifications or preservation of the environmental conditions. Still: implementation of decisions will feed the group of variables you/they were used for the own choice, generating a system, which can signal for the success of the choice or that changes can be accomplished for the choice generates a closer result of the wanted situation

(Bazerman, 2015; Tichy, and Bennis, 2009; Ragsdale, 2009).

The force or the influence of information in the decision, in this case, also depends on the characteristics of the farmers' administration. Moreover, in their theoretical models, formal or not. Individuals who have a more conservative profile generally make choices guided by their traditions, habits, and production requirements. Furthermore, it can be argued that they base on the empiricism and in the intuition. Other, less conservative and potentially more innovative individual, tend to make decisions leaning towards theoretical information and to trust in his/her limited rationality, but that is sufficiently satisfactory (Kulikand Baker, 2008).

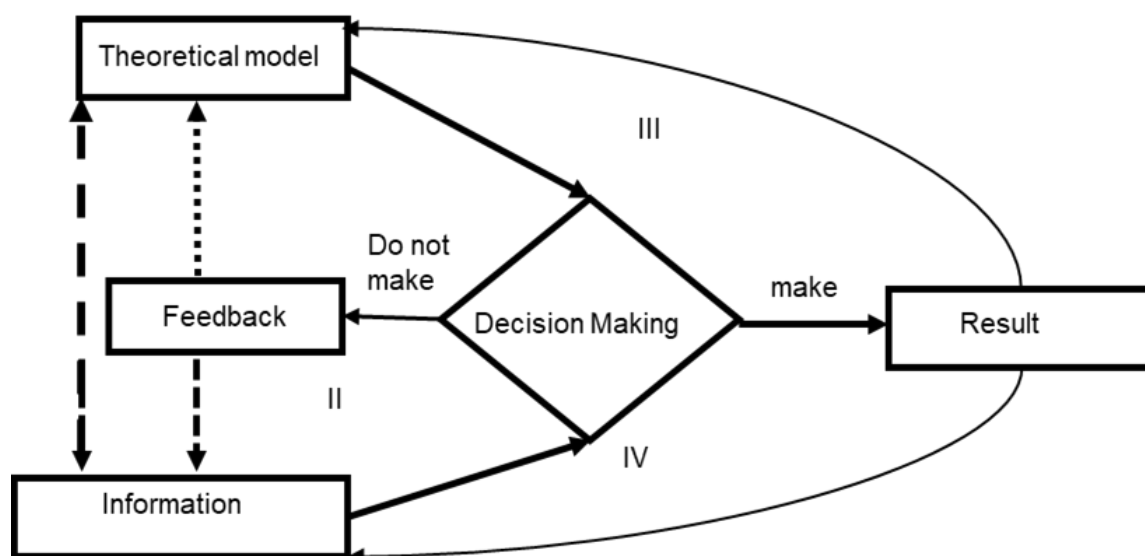


Fig.3: Model Rational of the Making of Decision (cycles reinforcing)

Source: Authors (2018).

- I. Validation Cycle interns in the theoretical model;
- II. Accumulation Cycle interns of information;
- III. Validation Cycle expresses the theoretical model and the function of the results;
- IV. Accumulation Cycle expresses information and the function of the results.

The model proposed decision is structured and consequential (Fig. 3). The decision needs to look for collaborative information for the identification of variables you/they need to be analyzed in agreement with previously criteria established by a group of guidelines of the established administration system by the organization. The results promoted by deciding to generate knowledge that will validate or no his/her theoretical model or I model theoretical of the organization and that, it will supply new information for future choices decisórias. Here, it can be noticed the influence of the theory of Simon's limited rationality (1979), and the ones that base

the decisions based in facts, pieces of evidence and previous experiences (PfeffeR and Sutton, 2007).

In the specific case of the analyzed universe, agricultural organization, Vereijken (1997) he/she gains attention for the capacity of the farmers' adaptation about the processes decisórios of the administration of the property. The behavior in that situation is restrictive because it requests the economic and environmental decisions to involve the use and allocation of scarce resources, which can be optimized to obtain the expected results. They are, still, decisions that involve approaches bio-decisórias, that is, related to the administration of the farm: the tactical choices, what to do" and "as to do."

For the viticultures they be adapted to the new challenges and new systems of cultivation of the vineyard, it is had that the decisions become complex, that, in agreement with Rossing et al. (1997), Romera et al. (2004), Bergez et al. (2010), they ask this for the attention regarding the choices, because the limitations at

the time and costs can lead to uncertainties due to limitations of information available.

In this sense, Martin et al. (2013) understand that it is the organized farm with practices that guarantee the agricultural production which begins from a biophysical context. For Robert et al. (2016), the problem of decision

making at a farm should be modeled using a structure of modelling integrative that includes sequential aspects during the decision making process, including the adaptive capacity, and farmers' reactivity for us to approach changes in his/her atmosphere (Fig. 4).

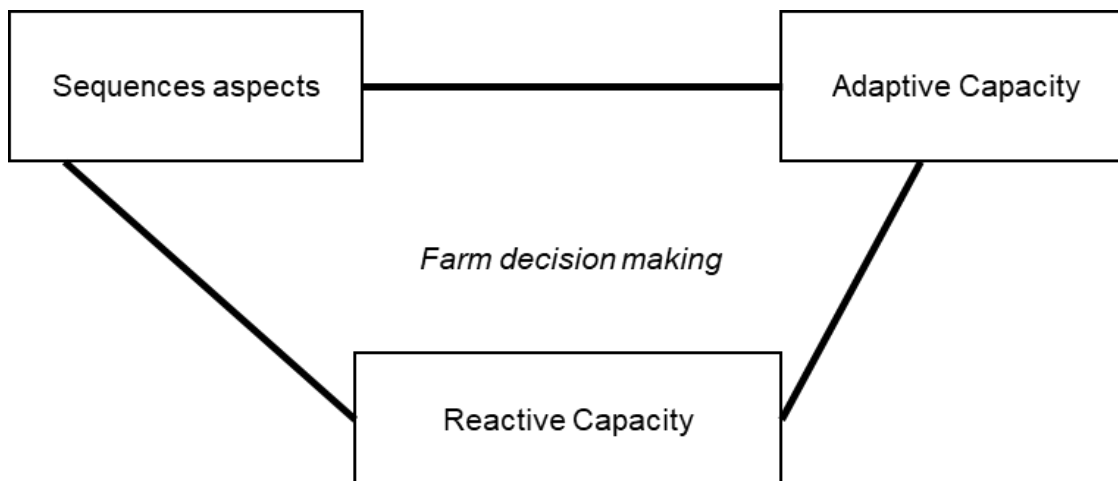


Fig.4: Making of the decision in Finance

Source: Authors (2018), based on Robert et al. (2016).

The systemic configuration of the analysis model here proposes and builds the idea that (Fig. 3) he/she depends on the three elements suggested by Robert et al. (2016), that, and they dynamically participate in the decision-making process (Fig. 4). The first element, being the sequential aspects, is part of the structure which has its systemic model, while the capacities adapt and reactivate to highlight the operative aspects in the model, and more specifically, the stages of the decision.

The decision making process requests variables to lead toward an appropriate choice. The specificities of the chosen universe show that the most appropriate variables are: the) internal dependent variables: (The one what to produce? How to produce?); and b) the independent external variables (How much to produce? When to produce?). These variables mean that to understand production, he/she needs to know the type and the characteristics of the soil, the resources natural, economic and social available in his/her property. Additionally, he/she needs, has to look for external information to the property, as access to the innovation of cultivation techniques, to the change of experiences, technologies, and market to know as and when it produces.

2.2 Administration of the Systems of Cultivation of Viníferas

The production system is composed by the group of cultivation systems and/or of creation in the extent of rural property, defined starts from the production (earth,

capital and work for hand) factors and interlinked for the administration process (Bertalanffy 1976). The cultivation system consists of the common practices of handling, which are associated to a certain vegetable species, and his/her production begins with a logical and orderly combination of a group of resources, activities, and operations (Sebillotte, 1990).

The system of cultivation of vineyards can be conventional, organic or biodinâmico, for the viticulture to choose which the most appropriate, needs to combine knowledge, functionality, technical capacity and characteristics of the environment allied with the efficiency and productivity. For this, he/she needs to drift and to maintain flexible before the uncertainties and the risks of the viníferas production. Therefore, it is necessary to understand that some practices of cultivation of vineyards demonstrate the significant dualities in his/her practice, as the conventional agriculture with chemical treatments and fitossanitários and the agriculture biodinâmicos with using prepared and fitoterápicos when treating the soil.

The system of cultivation biodinâmico arrived at Brazil in 1973, when the Beneficent Association Tobias, of São Paulo, acquired an area of 169 hectares Botucatu, and one which was 230 km in São Paulo and established the Estância Demétria. The agricultural property returned to the production of vegetables, medicinal herbs, fruits, annual cultures, cattle breeding and production of dairy products. In the system for biochemical cultivation, the

agricultural property is treated as an alive and systemic organism, and he/she is considered that any alteration in which one element will affect all the others. This requests handling to make it possible to strengthen the plants and the present microorganisms in the soil so that the main objective it is the prevention of diseases and ecological unbalances (Ehlers, 2017).

The vineyard biodinâmico, in comparison with the conventional methods, to reduce the use of machines and eliminate the agroquímicos use, the treatments of the soil are accomplished with mixtures produced in the agricultural property, respecting an understanding of a system autosustentável, and it requests a larger contact of the human with the vineyards, it is necessary to involve with the agricultural organism.

On the other hand, White (1995), Hassall et al. (2005), Badgley et al. (2007), Seufert et al. (2012) they get the attention so that, despite the attractive earnings in the commercialization of the wines and in the reduction of inputs, it can happen a significant reduction in the volume of the production of grapes picked in this system. The obtained wines, however, they are of exceptional quality in what says respect to the highest concentration of properties that they accentuate the good quality, and that, parallel, it is configured in an only product.

Studies already accomplished tell that the mixtures biodinâmicos can contribute with the vitality of the soil and of wines with more sensitive characteristics to the environmental influences (Carpenter-Boggs et al., 2000; Reeve et al., 2005). For Villanueva-Rey et al. (2014), the wines obtained with practice biodynamics present peculiar characteristics, that they are resultants of the system of handling of the vineyard, such as the low sulfites concentration and the great quality organoléptica. Even before such benefits, for the practice, the same authors notice that the environmental benefits of applying those techniques, in what concern the climatic alterations or the toxicity levels, they are still uncertain.

The reader needs and to innovate agricultural practices in the wine growing requests effort, information, and constant planning. With this, it can be walked towards the environmental and economic sustainability in the long period (Turinck *et al.* 2009). Provost and Pedneault (2016) they notice that the cultivation of vineyards can provoke a soil loss and water, often causing the erosion, and is considered an agricultural practice of high environmental impact. Therefore, he/she becomes necessary to drift and to analyze strategies to make the choices in the administration of cultivation systems, because the vineyard doesn't just have the function of producing grapes for processing and consumption, but many starts to be part of the landscapes of many areas and to join a patrimonial value for their communities.

In this case, he/she suits to remember that the selection of lands for the wine growing should be made with rigidity and the adoption of practices of conservation of the soil. In agreement with the Instruction Normative no. 10, of June 14, 2005, the soil types recommended for the healthy planting of grapes: the) type 2: soils with clay tenor between 15 and 35% and less than 70% of sand, with depth same or superior the 50 cm; and b) type 3: I) soils with tenor of larger clay than 35%, with depth same or superior the 50 cm; and II) soils with less than 35% of clay and less than 15% of sand (texture siltosa), with depth same or superior the 50 cm, they are considered more efficient for the propensity of the grape of larger quality (Brasil 2005).

Furthermore, the soil should regulate the elements imposed by the climate starting from their properties, such as retention capacity, capillarity, thickness, specific heat, exhibition in the sun, physical properties, and mainly the control of the feeding hídrica, that is the decisive factor for the quality of the cycle of the grape. He/she should be areno-loamy, with pH in the strip of 5 a 6, and inferior steepness to 20%, with a spacing of 2 x 2 or 3 x 3, but could vary depending on the form of the cultivation (Tonietto, 2001). Grant (2010), in this senses, argues that he/she gains the attention for the use of the analysis physicist soil chemistry as a tool of administration of cultivation system because she makes possible that is known the soil type and his/her readiness of nutritious. It is the first step for determining the appropriate dose of treatments and type of cultivation systems, what contributes to minimizing the losses and the environmental contamination of the natural resources.

The making of decision, as for the system of viníferas cultivation, therefore, it's extenuating to determine the characteristics of a vintage and besides the winegrower type, because, the choice of the handling technique can show the profile of the agricultural system and their managers, that finally, they will be shown in the characteristics of the vineyard and the result of the wine. For Sebillotte (1990), the farmer plans their interventions in the time and space of his/her farm, with base in a group of variables you/they draw when making decisions. Before this, it is also of extreme importance an agronomist's orientation, because it allows the viticulture to execute technical interventions in an aligned way to the soil characteristics, climate and environment and, like this, plan results about each particularity of the cultivation system.

III. MATERIALS AND METHODS

The research was an exploratory and descriptive study which used qualitative and quantitative analysis. Gil (2008), contains an exploratory research study where the main objective to develop, to explain and to modify

concepts and ideas. The sample was intentional, for convenience and not problematic. Whereas, Levine et al. (2008) samples which were problematic can offer certain advantages, such as convenience, speed, and low cost. Initially, it looked for to adapt to the concepts and models of the making of decision and administration.

The stages of the study were: rising of bibliographical data; mapeamento of producers in the mountain gaúcho to identify the systems and types of viníferas cultivation, and selection of the viticulture to participate in the study. The choice criterion was that the producers worked with the vine breed for Chardonnay, due to cultivation method with this vine as part of the experimental project, and for the cultivation system of biochemicals in Wine-producing Cooperative Garibaldi, being this the locus of the research. Obeying this requirement, eighteen vineyards of the system of conventional cultivation and two of cultivation biodinâmico were found, totaling 21 vineyards.

The interviews were accomplished individually in visits to the viticulture at their properties between June 06 on June 28 of 2018. From these interviews, it was possible to accomplish a direct and extensive observation. The structured questionnaire contained 78 closed and open subjects related to the aspects sociocultural, environmental and economical, adapted from the study which was validated by Dalcin (2010).

For Gil (2008), the interview means to make the people's direct interrogation whose behavior is wanted to know. Here, when making decisions relating to what, how, how much and when to produce? By doing it in this way, it was possible to consider the variables related to production possibilities, which illustrate opportunities to the manager for the type of cultivation system can make possible since he considers the factors to be part of his/her production system. Shortly after, the analysis of the data was accomplished by using the Correlation of Pearson (Siegel, 1975), and Software Nvivo's use Plus 11 (Edhlund and Mcdougall, 2016). Moreover, for analysis of qualitative data in the managers' communication that, through triangulation of the results, it was made possible

for the identification of variables that interfere with the choices of the viticulture in the administration of the cultivation.

IV. ANALYSIS AND DISCUSSION

Serra Gaúcho's area, is one of the most important in the national production vitivinícola, for different reasons. The area is classified by the active participation in the specific section vitivinícola the Wine-producing Cooperative Garibaldi promoting projects with permanent investments in types of equipment, technology, training and infrastructure in the improvement of productive processes and the valorization of the viticulture as participant element in the planting and cares with the vineyard. An example is mentioned: the a) motivate new practice of systems for cleaner cultivation; b) systems of cultivation of organic vineyards; c) systems of cultivation biodinâmico.

The cooperation depends on agronomists and agricultural technicians that you/they work and guides the associates in how to do her the conversion of conventional vineyards for systems which use cleaner cultivations and more harmonic ambientalmente with the system. They also suggest that the viticulture use her/its own grapes, adapted for each microrregião, guaranteeing the productivity" potential, he/she attests his/her president. As the vinífera Chardonnay for the production of foamy, that is cultivated in the conventional system, and two vineyards of that breed are part of the experimental project with the cultivation biochemical.

The vineyards with conventional cultivation and biochemical systems are characterized with cultivation areas that vary from a hectare (there be) to 25 there is (total) being with an average of 5,6 there is of the planted area (table 1). The vineyards selected for the study are located geographically in the state of Rio Grande do Sul, and in the mountain gaúcho, in the municipal districts of: Garibaldi, Colonel Pilar, Bento Gonçalves, Farroupilha, Santa Teresa, Beautiful Monte of the South and also in the southeast area of the State, in the municipal district of Caçapava of the South.

Table.1: Characterization of the properties of viníferas of the selected sample

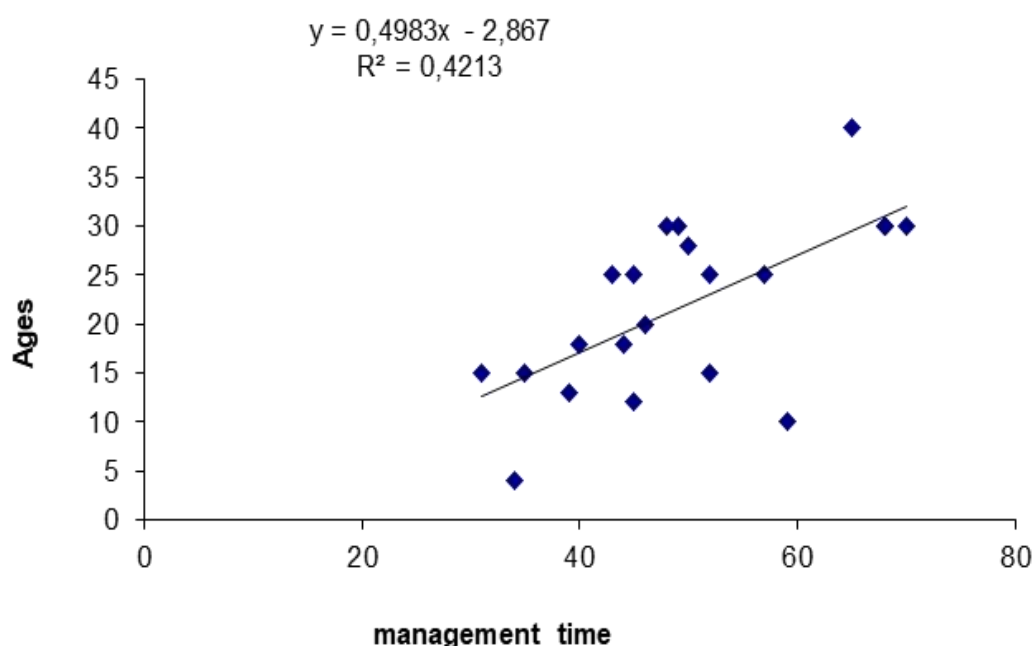
	Minimum	Maximum	Mean	Std. Deviation
The total area of the Property (hectares)	7	40	16,95	9,452
Time of residence (years)	0	65	30,81	15,648
The managers' of the vineyards age	31	70	49,52	11,457
Time of Administration (years)	4	40	21,81	8,796
Area planted with grapes viníferas (there be)	1,0	25,0	5,643	5,6660
Age of Viníferas Chardonnay (years)	0	20	9,10	5,691
Valid N	21			

Source: Data of the research (2018).

Regarding the managers' age, the average is 49 years, and one of the residents is 31 years old; and the time of administration of the property is in on average 22 year-olds. The results show the many assumptions regarding the administration of the property after they constitute his/her family or in their predecessors' absence (Table 2), this is in the origin of the property, and 57% are inherited. The decision, then, went to give continuity to the family tradition. Therefore it can just extenuatefactor the percentile of 67% with the fundamental teaching. With secondary teaching, they are 24%, and the ones with a superior formation accompany the same percentile of the ones that they have leased property: 9,5%. The with formation academic, same being a percentile one low, they show a possible configuration

of new incoming in the production system. The viticulture that you/they use leasing lands act: 9.5%. This figure means that the choice of opportunities for production possibilities. The global results show the importance and the technical support need, in function of the low education of some and also in function of the identified ones as new incoming.

To confirm the relationship between the time of administration and age, it was made the use of the test parametric correlation of Pearson (Siegel, 1975). The result was a moderate correlation of $R^2 = 0,4213$, positively perfect, in other words, the managers' age explains 42,13% of the time in the administration of the vineyard. (Graphic 1).



Graph 1. Correlation between the time of administration and the age of the managers amostrados

Source: Data of the research (2018).

The origin of the property shows that 58% are inherited, that 32% are bought and that 10% are leased, it also shows that already happened a family succession. The medium time in the administration of the property is of 23 years. As for the process of decision, it is had that 86% of the interviewees confirmed that the decisions are made in the way shared with the other members of the family, with the technicians of CVG, and with the change of information with the neighbors. These answers evidence the sociocultural factor of the area, that leans on in the different social actors' permanent social interaction.

As the objective of the study was the decision-making process for the administration of systems of viníferas cultivation, to identify what characterizes the way of choice of the viticulture, the subjects of

production possibility were applied: The something? How much? How? When to produce? They are establishing combinations of internal and external variables aligned with factors economic, environmental and sociocultural that allow the dynamics of the system of the agricultural property.

The interviewees confirmed, in their speeches, the concern in their choices with: the) cares with soil; b) concerns with the climatic conditions and, c) technical support. Another concern of the detected viticultures was that the vinífera type and the technique of adopted production need to assist the market demand, according to display the cloud of words. (Cloud 1; Cloud 2; Cloud 4; and Cloud 5)

Cloud 1. Internal Variables: What to Produce



Source: Data of the research (2018).

As for the subject "the one what to produce? ", they can meet shreds of evidence of the search for orientations for best to do the use of their experiences (Cloud 1). In the subject "as to do?" It was possible to identify a concern with climatic conditions, I sole, family tradition, financial resources, and the technical support. It was possible to identify 52% of the respondents decide in agreement with the one that the market is asking, and or,

with the needs of the Wine-producing Cooperative Garibaldi, being his/her main one receiving of his/her production of grapes viníferas (Cloud 3). This shows the profile adaptation of the viticulture, and the existence executes of the cycles of the model decision making (FIG.4)

Cloud 2. Internal Variables: How to Produce



Source: Data of the research (2018).

For the behavior of the decision maker, they were noticed aspects sequential, operative and of decision that you/they can be influenced by internal and external variables to the property. In the administration of vineyards, the choices of the decision (as and when) are aligned the group of external factors his/her property. The external variables are evident in the process decisório, where market, climate, and demand if they stand out concerning the others (Cloud 3; and Cloud 4). In the subject of "how

much to produce? ", the considered criteria are related to the climate, to the fertility of the soil, to the market and the demand. In the subjects that involve factors related to the "when to produce? ", even the grapevine of a long cycle of life, the relevant factors repeat. These factors as being the propellers for changing the subjects, such as the) when it innovates in techniques and systems; and b) when it invests in new cultivation areas and or new breeds.

Cloud 3. How much to Produce?

Cloud 4. When to Produce?



Source: Data of the research (2018).

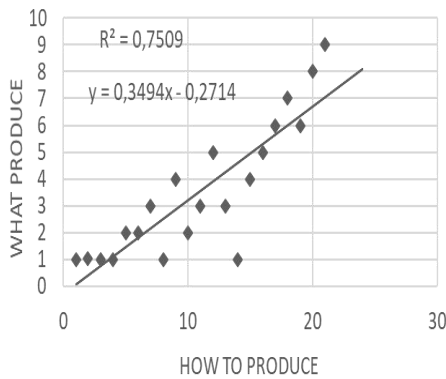


Source: Data of the research (2018).

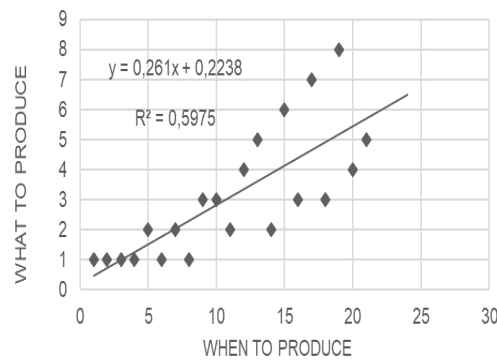
Finally, the relationship degree was tested among the internal and external variables. Did the results identify the significant relationship of the variable interns "him/it what to produce?". Moreover, was his/her relationship significant with the external variables "how much to produce?" and "when to produce?".

Graph 2. Correlation among what to Produce

Graph 3. Correlation among what to Produce and "How to Produce" and "When it Produces."



Source: Data of the research (2018).



Source: Data of the research (2018).

Graph 2, in that R^2 of 0,7509 display that the external variable "as to produce" it is related - directlywith the variable interns what to produce." The correlation is direct and strong. However, 25% of the choices regarding what they produce is influenced by other factors. How the tests for to the relationship "of when, how and the one what to produce?" R^2 0,5975 also showed a strong correlation, and 40% of the farmer's

choices consider another varied of when it produces about the that to produce.

Finally, the decision making occurs when there are action and choices for alternatives, which provide a better adapt to the characteristics of the business and the manager's profile, that he/she brings in their perceptions factors cultural, social, economical longings and concerns with the natural resources.

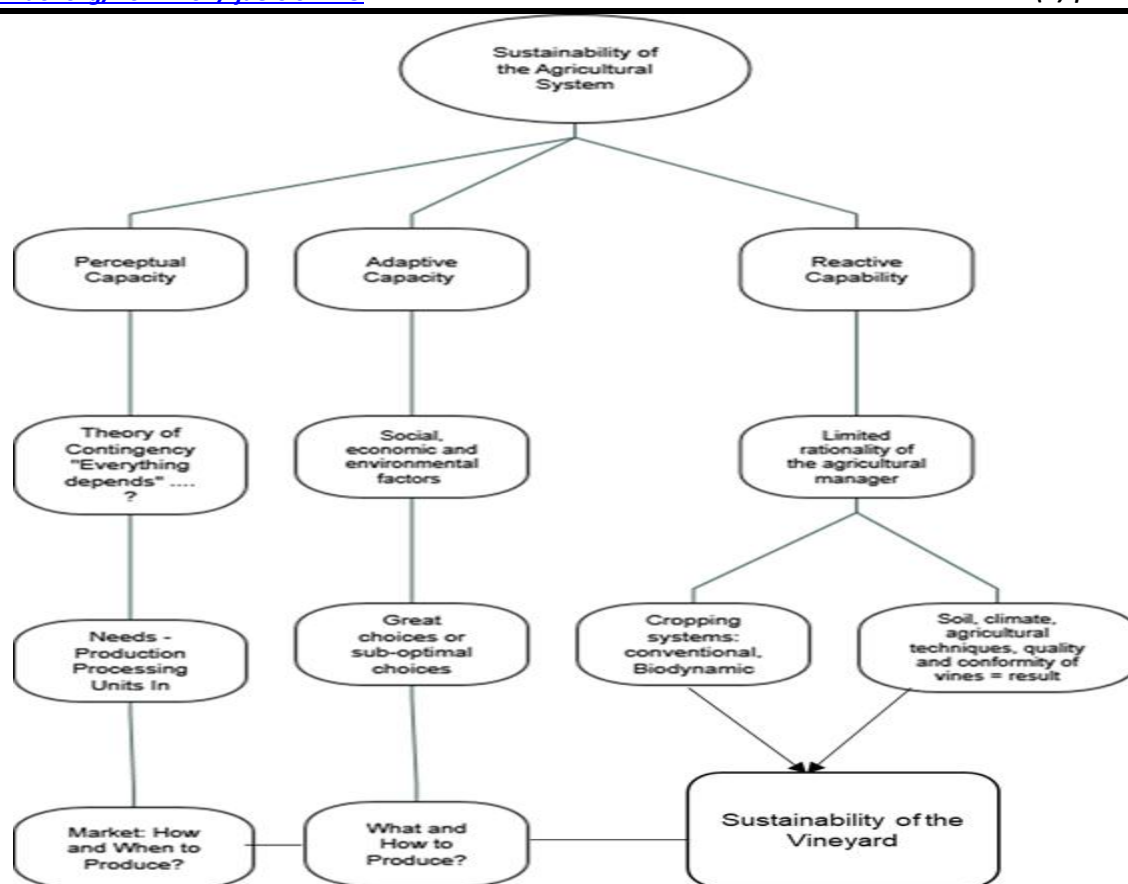


Fig.5: The model of decided- the Interface of the Sustainability of the System

Source: Authors (2018), based on Robert et al. (2016).

The illustration 5 display the choice process considering the theory of Simon's limited rationality (1979), and the ones that base the decisions based in facts, evidence and previous experiences (Pfeffer and Sutton, 2007). As with the case of the agricultural unit because the group of information that needs to be considered in making decisions, often he/she comes complex because of the knowledge absence or of the technical attendance that can aid the viticulture, what can develop a capacity reactivates dual to the result wanted by the system, causing bottle mouths and restrictions of capacity adaptative.

In this sense, it passes the pertinent being the use of tools as using the soil analysis, that makes possible technical and practical information of handling and that you/they allow making choices in agreement with the needs of the agricultural soil for the transport of the production system. As well as in agreement with Robert et al. (2016), the decision needs to understand and to adapt their choices in a structure integrative with the macroambiente of the productive chain.

The alignment of the perceptive capacities reactivates, and adaptative harmonically and dynamically makes it possible to reach the sustainability of the agricultural organism. However, he/she calls himself attention for the manager's limited rationality, but this

will depend on the atmosphere in that it will be predisposed to information it makes possible him/her the "great" choice in the transport of the vineyard, taking to wanted results and a better use of the natural resources, humans and economical.

In this sense, the internal and external variables become factor influenced, and they will receive influences in the transport of the administration of the rural property, but, for this, it is necessary to work systemically with the other agents part of the production chain.

V. FINAL CONSIDERATIONS

In synthesis, in making decisions as the viticulture, is characterized of form holística in the choice of systems of cultivation of grapevines, internal factors act to the property and external, independent of the cultivation system to be conventional or biodinámico. On the other hand, the environmental subjects are just considered to assist the expectations of the commercialization and demand, following by the sociocultural subjects, that win significância to allow to access information also to make possible economical results.

Therefore, the administration of vineyards is a complex task it requests information, technical

attendance, for instance, using a tool, that can be considered in the biophysical subject of the agricultural unit that is the decision of soil analysis. The same can be a starting point to organize, to drift and to verify the needs of the cultivation system and to evaluate the handling results and of chosen agricultural practice.

Also, it was verified that the farmers in his/her majority, will notice and practices and cultivation systems that allow a balanced conviviality with the environment to discuss, with the social and economic subjects. What identified as the managers' of vineyards profile, it is that their making of decision characterize with a larger concern with more maintainable handling of the natural resources, but also, the market disputes at the moment. Besides, he/she noticed, the tendency in looking for practices of treatments and cares with the plantations of less conventional and more traditional viníferas, as using agriculture biodynamics for production of grapes.

However, the found difficulties and the concerns in adapting in a system of less conventional cultivation, he/she is due to the climatic conditions and of the soil of the areas vitícolas in the study. However, the reduction of chemical treatments in the grapevines is happening gradually in the participant properties of this study considered in the transition process for the cultivation biodinâmico. On the other hand, the vineyards of conventional cultivation, still, dependent on chemical products for the control of cures and of the cleaning among lines of the grapevines.

It concluded that, for deciding it is necessary to manage information and for this, it requests compromising and alignment of objectives and results of the productive chain.

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