



RESEARCH ARTICLE

MOTIVATIONAL FACTORS IN A FOREST GROUP CERTIFICATION PROJECT IN
SOUTHERN MOST BRAZIL

^{*},¹Keitiline R. Viacava and ^{1,2}Eugenio A. Pedrozo

¹Organizations Study Group (GESTOR), ¹Management School (EA), ²Graduate Program in Management (PPGA)
¹Federal University of Rio Grande do Sul (UFRGS), Porto Alegre, Brazil

ARTICLE INFO

Article History:

Received 30th July, 2016
Received in revised form
22nd August, 2016
Accepted 05th September, 2016
Published online 30th October, 2016

Key words:

Motivation,
Decision-making,
Certification,
Forest Management.

ABSTRACT

Purpose: The purpose of this study was to identify motivational factors in the decision-making process of Black Acacia forest producers in face of the need to rethink existing practices at the forest-management-unit level, with participation in a Group Certification Project as a possible catalyst of change.

Design/methodology/approach: Using a systemic approach and having complexity as a background, this paper was based on *Post-normal Science* (qualitative) and made operational through the application of the *Methodology for the Analysis of the Self-Organizing Holarchic Open System - SOHO Systems*.

Findings: The results showed that decisions were based primarily on the maximization of economic results but also included efforts unrelated to this, such as an interest of maintaining family tradition. When the main motivational factor (price-prize) was associated with other factors, such as family tradition, then the aggregate effects of the group certification project varied, dividing the producers into subgroups. The results also revealed that social interactions among producers were effective in gathering qualified information but did not ensure certification.

Practical implications: In conclusion, social interactions that favor the acquisition of qualified information and the formation of smaller coalitions between producers should be encouraged, but motivational differences must be managed in order to promote certification.

Originality/value: The present study is the first to examine motivational factors in the decision-making process of Black Acacia forests in Brazil. The unique contribution of this study is to show how attitudes taken from producers and stakeholders can be integrated to provide qualified information for sustainable forest management.

Copyright © 2016, Keitiline R. Viacava and Eugenio A. Pedrozo. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Citation: Keitiline R. Viacava and Eugenio A. Pedrozo, 2016. "Motivational factors in a forest group certification project in southern most Brazil", *International Journal of Current Research*, 8, (10), 40791-40797.

INTRODUCTION

Motivational Factors in a Forest Group Certification Project in Southernmost Brazil

The environmental destruction promoted by the continued forest devastation process poses serious risks to our ecosystem. Therefore, the *Brundtand Commission* (1987) placed the spotlight on deforestation and the replacement of the *Sustained Yield Timber Management - SYTM* concept with the *Sustainable Forest Management - SFM* concept, which suggests advances in the incorporation of the sustainability paradigm into forest exploitation. According to (Kant, 2003;

Kant, 2004), SFM is different from SYTM because it extrapolates the production conception. It is oriented toward forest management at a global perspective, including a preoccupation with future generations and the integration of social and ecological factors, into a sustainable reforestation approach (Kijazi and Kant, 2010, Kant *et al.*, 2013) As a consequence, buyers of forest products began to demand new sustainability standards in forestation management. This situation, together with the challenges of globalization – increased competitiveness, increased production, the necessity of self-sustainable technology, and a reduction of marginal return – promotes a process of change in the operations of the forest supply chain. To maintain competitive advantage, forest agricultural industries present in the most diverse production segments (e.g., cellulose, furniture, tanneries, construction, charcoal, and many others) have been pressured to respect the principles of sustainable forest management. The consideration of the interrelations between all such activities is

*Corresponding author: Keitiline R. Viacava,
Organizations Study Group (GESTOR), Federal University of Rio Grande do Sul (UFRGS), Porto Alegre, Brazil.

propelling all elements of forest agribusiness toward professionalization and certification. In southernmost Brazil, more precisely in the Black Acacia Forest System, there is a process that represents the moment when forest producers are invited to rethink the management of their properties. There are around 40,000 small forest producers who, together with two forest agro-industries, account for around 150,000 hectares of Black Acacia forests planted for commercial purposes. More than 90% of the production generated by this system is destined for exportation, meeting 30% of the international market's demand. Aiming at accelerating the replacement of traditional handling practices with sustainable practices, two Brazilian forest agro-industrial companies started the development of a group certification project based on the standards established by the Brazilian Forest Stewardship Council, which is a representative of the FSC (Forest Stewardship Council). Forest producers, suppliers for the two agro-industries, were invited to participate in three seminars/courses and field consultancy. The expectation of the organizers was that the gathering of qualified information about the certification process would motivate the producers to form new structures, in this case a collective organization oriented toward a forest group certification. However, the new structures that emerged from these interactions did not occur as planned. Of all of the forest producers who were invited, 20 showed up to the first meeting, and in the end, only eight remained in the project. These eight producers attended all the meetings, forming a subgroup that organized itself in search of a group certification; in this research they coded as the G8. The other forest producers, not so active as the G8 members but also interested in learning about certification, were coded as the G12. An intriguing issue was the fact that all 20 producers confirmed their interest in the certification, in spite of the frustration of not receiving a price-prize proposal for the certified raw material. This detail, together with the subdivision of the group, inspired the following question: **Does a plurality of motivations or only economic interest drive forest producers in the decision to obtain a forest certification?**

This question is relevant because it concerns decision-making in the context of the forest's ecosystems, where the long production cycles of these plantations demand that the establishment of strategic action is put into practice approximately seven years before the delivery of the goods, increasing uncertainties and risks. Also, given the indications that it is necessary to rethink forest exploitation within a global perspective, the study of the decision-making process within the Black Acacia Forest System, with an emphasis on the production of raw material, becomes relevant when the use of a systemic approach called *Post-normal Science* – PNS – is adopted. PNS is a conceptual framework that attributes a relevant role to group decision-making and is considered an alternative way of treating two central issues in contemporary problems: uncertainties and conflicts of values (Ravetz, 2004, Ravetz, 2006).

Post-normal Science for Sustainable Forest Management

Studies suggest that management issues related to sustainability will only be resolved if their social-economic, cultural, and environmental aspects are considered to be interconnected, part of one system (Hahn *et al.*, 2015, deGraaf *et al.*, 1996, Starik and Rands, 1995, Shrivastava, 1995a, Gladwin *et al.*, 1995). From these discussions, the importance of managers and stakeholders agreeing on how to plan,

monitor, and manage this system emerged (Brown and Dillard, 2015, Munda, 2004, Kay *et al.*, 1999, Mayumi and Giampietro, 2006, Lehtonen, 2004, Ravetz, 2006, Shrivastava, 1995b). Associating these issues with organizational plans and actions, another topic emerges, which is the necessity of advancing from a predominantly economic logic to a logic that considers the consequences of actions in systemic terms. However, this process is not simple, and to understand it, some researchers have suggested an initial comprehension of the systemic repercussions of the operation of organizations, supported by the contributions of Edgar Morin (Cruz, Pedrozo, & Estivaleta, 2006). Morin (2003, p. 133) defines an organization as "a chain of relations between components or individuals that produces a complex unit or system, empowered with unknown qualities as to the components or individuals". The author points out that an organization connects elements, events, or individuals in an inter-relational manner. From that moment on, they become components of one system or one global unit. This system is the Whole. This complex unit of the whole is formed by interrelations between these elements/individuals and the whole. The same organizing or dynamic characteristics of a complex unit can also be observed in a determinable geophysical unit, called an ecosystem (Morin, 2002). Morin (2000) highlights that the organization of a whole generates new properties in relation to its parts: the emergences. In short, emergency comprehends the idea of quality, product, and innovation. Although traditional logic tends to consider only that the whole is larger than the sum of its parts, in other words, gain comes from positive emergences, the system is not only enriched by positive emergences; it can also be impoverished by imposition. For the author, working within a systemic scope assumes the consideration what develops from interactions, even if this also shows the losses caused by the imposition of the system.

Thus, it is possible to understand that the same organizational action may have distinct repercussions, generating benefits for some systems and losses for others. Therefore, actions oriented toward sustainability, if considered as emergences (i.e., goods from the choices made by the organizations), depend a great deal more than a simple broadening of an organization's point of view for a systemic scope. It is fundamental that an organization or system be seen in a more complex way because systems are not only enriched by interrelations. They can also be impoverished, and this impoverishment can be greater than the related enriching. There is also the possibility of tradeoffs between impoverishing and enriching. In this way, the same action (e.g., the non-preservation of APPs – Areas of Permanent Preservation – for example) could increase economic benefits but compromise environmental sustainability. With the aim of contributing via dynamics and operation comprehension (i.e., the self-organization of these systems), (Kay *et al.*, 1999) highlight the importance of interactions between ecological and human systems: The idea of the *Self-Organizing Holarchic Open System* – SOHO. The authors emphasize that the comprehension of a SOHO's operation depends on the perception of open systems as processes with *exergy* (i.e., energy, materials, or high-quality information). Under these circumstances, coherent behavior appears in systems for long periods of time, with the possibility of changing or suddenly disappearing altogether. Such systems are organized by attractors (e.g., motivational factors in the case of human systems). The environment tends to favor certain processes. The established standard in a SOHO can be classified as a set

of behaviors and tendencies that are coherently organized inside the organization or system, i.e., the attractors (Kay *et al.*, 1999). The attractors are phenomena that have the power to pull the other components, individuals, or systems toward themselves, influencing their evolution or regression. Some attractors can be maintained by a SOHO even when faced with external pressure, and ecosystems have multiple ways of articulating attractors, having the ability to suddenly replace one attractor with another. This notion, however, has not been very greatly explored in ecological studies. Another point to which little attention is given is the phenomena of self-organization in human systems, such as social markets and networks.

Accordingly, individuals and their organizations may also show the characteristics of SOHOs (Kay *et al.*, 1999). Therefore, if this is the case, it is important to remember that the context of the analysis may reach complex scales, as well as presenting unexpected non-planned changes. Studies of human systems, within the perspective SOHOs, should begin by identifying the attractors, with the aim of minimizing the variations between perceived situations and purposes. In sum, using the interrelations between human and natural systems, people can demonstrate the ways in which they would like these systems to develop. However, to be effective, this process should be based on PNS (Kay *et al.*, 1999). The PNS approach arises from the necessity of broadening the scope of the facts through the integration of multiple actors in the decision-making process (Ravetz, 2004, 2006). PNS is considered relevant in the attempt to find points of convergence within the diversity of knowledges, values, and acknowledgements of risk among actors (Swedeen, 2006). In spite of the possibility of agreement not being exempt of criticism (Frame and Brown, 2008), the social character of the decision-making process itself seems to justify the approach (Udovyk and Gilek, 2014, Bruna-Garcia and Marey-Perez, 2014, Bredin *et al.*, 2015, Tognetti, 1999). In the scope of PNS, decisions are treated in a more complex form, considering the possibilities and consequences in systemic terms (Udovyk and Gilek, 2014, Kay *et al.*, 1999). Having a structure based on "systemic thinking," the PNS approach may be helpful in the search for a greater balance between ecological and human systems. Thus, in the present paper, PNS was used with the aim of identifying the motivational factors in the decision-making process of Black Acacia forest producers in the face of the need to rethink existing practices at the forest-management-unit level, with participation in a Group Certification Project as a possible catalyst for change.

METHODS

In this study, the principles of PNS (qualitative) were adopted and made operational through the application of the *Methodology for the Analysis of the Self-Organizing Holarchic Open System (SOHO)*, developed by Kay *et al.* (1999). The analysis of the SOHOs requires the mapping of existing interrelations between ecological and human systems as a self-organized institution. It involves the development of narratives and descriptions about the SOHO that are aimed at outlining its possibilities and limitations, as well as a contextualization of the situation. In addition, it involves the identification of the human interest issues or problems and the establishment of which stakeholders are involved in the management of the system, embracing their values, objectives, and views of the future. Therefore, in this study, the narratives were aimed at

the identification of existing variations in the perception of ecological situations versus human purposes, and they were developed in prescriptive form, i.e., including the analysis and criticism of the researcher throughout these processes. The analyses of speeches and narratives were generated from the combination of primary and secondary data, with an emphasis on the characteristics and potential of the ecological system, as perceived by the forest producers and their stakeholders, and how these characteristics and the potential related to their views and preferences exist in relation to the Black Acacia forest ecosystem.

Sample and Data Collection

The defined ecosystem consisted of the Black Acacia Forest System in the state of Rio Grande do Sul– RS, Brazil. The participants were 20 forest producers and two forest agro-industrial companies that started the Forest Group Certification Project. In addition, stakeholders, such as unions, consultants, departments of agriculture, and technical support organizations, were also interviewed. The selection of the participants was performed via non-probabilistic sampling. The data were obtained via direct observations and interviews. Twenty forest producers who were already included in the process of changing from traditional handling practices to sustainable practices were interviewed in rural properties. Of these producers, eight attended all the lectures, forming a group that organized itself in the search for group certification, which is coded in this research as the G8. The other producers, not so active as the previous ones, were coded as the G12. The 20 producers had, on average, 200 hectares of planted Black Acacia forest, which were made up of their own lands or those of third parties. The two forest agro-industries included were coded as STK1a and STK1b. The secondary data included 1) partnership contracts between producers and agro-industries for the planting of forests; 2) industry manuals, especially the Manual of Good Forest Handling of STK1a; 3) the training material of the group certification program, called FSC Group Forest Certification: Opportunities and Challenges and FSC Group Forest Certification: Self-evaluation Seminar; and 4) recent FSC documents stating the rules for the practice of good forest handling and websites. There were 30 interviews, with an average duration of 1 hour and 30 minutes. In all cases, semi-structured questionnaires were used (Table 1). These contained open questions that were administered by the same researcher and conducted through a directive technique; in other words, the interviewed parties presented their opinions while maintaining the established script of the research instrument. The answers were transcribed by the researcher during the interview with the use of an audio recorder in 87% of the cases. The interviews were finished when the data became repetitive.

Table 1. Questionnaire for the Analysis of Ecosystems using the SOHO System Approach

A. Ecosystem definition

Scale and extension: (horizontal perspective, where do phenomena/elements start and finish?) Definition of parts, systems, and existing relations.

B. The ecosystems a self-organizing institution

What are the attractors (e.g., motivations, ambitions, and desires in the case of human systems)?

In what direction does the ecosystem tend to develop? What are the tendencies?

What are the potential changes in attractors?

What stimulates changes? How can these factors be monitored?

What are the interactions of exergy (e.g., high-quality information) that define the ecosystem?

C. How do we evaluate the integrity of the ecosystem?

(What stages of ecosystem organization are acceptable for us?)

What are the ecological, economic, and other processes we value or need?

Can we identify them? How can we measure the statuses of these processes?

What attractors represent unacceptable conditions for the ecosystems?

D. Can this integrity be threatened?

What are the influences that can affect the system's organizational status?

How do changes leading to unacceptable attractors begin?

E. How can we maintain the system's integrity?

How do we minimize known threats (is this related to changes in the context, and does that promote undesired attractors)?

How do we promote positive influences? (For example, incentives for clean technology)

How do we monitor the ecosystem to detect early changes in terms of undefined influences?

F. How to manage Emerging Complexity...

When everything is said and done, our forecasting ability is severely limited. Unexpected events will happen. Surprises will happen; complexity will emerge. We should support ourselves in terms of anticipation and adaptive management.

Always remember that 'the system is immersed in another system, which is immersed in another system, immersed in another...' and that the challenge is to sustain dynamics, changes, evolutions, and self-organized ecosystems.

Note. Adapted from Kay *et al.* (1999).

Data Analyses

The data were qualitatively analyzed and presented as narratives. To provide a basis for the analyses, we relied on PNS (qualitative), especially the notion of complexity (Morin, 2000, 2003); the SOHO System (Kay *et al.*, 1999); and the need for equality in meeting various stakeholders' interests (Gladwin *et al.*, 1995, Starik and Rands, 1995, Shrivastava, 1995a). More traditional literature related to the motivations of rural producers (Gasson, 1974) was also included.

RESULTS

For the 20 interviewed producers, the main attractive force that could lead to certification was receiving a price-prize from the agro-industry for the certified raw material. The moment the producers realized that there was a strong possibility of a price-prize not being applied, they began rethinking the benefits of the certification. It is interesting to note, however, that in spite of being apparently equal, when the instrumental attractor (price-

prize) was associated with other motivational factors, such as social, expressive, and intrinsic factors (Gasson, 1974), the summed effects changed, and the perceived outcome in favor of certification varied between the G8 and G12 (Table 2).

Table 2. Motivational Factors and their Summed Effects on the Attractor

| Motivation | Attractors | G8 | G12 |
|--------------|-----------------------|------------------|----------------|
| Social | Social relations | Business network | Family network |
| Instrumental | Financial return | Expansion | Guarantee |
| Expressive | Personal satisfaction | Innovation | Inclusion |
| Intrinsic | Control of risk | Not identified | Consequences |

Source: Developed by the authors.

Producers with a social orientation seemed to participate in the certification project because they had an interest in maintaining good social relations with their family members or with the forest community. Both G12 and G8 members highlighted this interest, though in different ways. While G12 producers appeared more committed to maintaining family traditions, G8 producers showed more interest in preserving the business network.

"[...] If I have to obtain an FSC certification in order to continue planting, then I will strive for it. My family lived for the plantation of Acacia, and I have done the same since I was 13 years old; I wouldn't know how to and I don't intend to do anything else. Even if another kind of plantation came along, offering a better cost-benefit ratio, I wouldn't be able to change, because my family and I have a history planting Acacia." (G12c). "[...] I like reforestation, but what satisfies me more is the fact that my son also plants with me" (G12a). "[...] We plant Acacia and update our practices because we have a tradition to keep. I am not alone. We are three brothers in the same 'boat'" (G12k and G12l).

"[...] It is beautiful to see the coalition that emerged from the certification project. We will maintain the meetings. We will continue with the certification process until the end, even if we are alone in it" (G8b). "[...] Well, if it weren't for that moment when we went through the reduction of the prices, we would have already certified our forests. The G8 would have already obtained the FSC certification because it is a darn good group! We are united and we have started collecting the necessary funds for the group certification" (G8c).

Producers with an instrumental orientation appeared to be attracted by the possibility of economic gain through the certified raw material. The summed effect was the expectation of future economic return. However, while G8 producers expected to gain competitive advantage and increasing future results through certification, G12 producers showed a preoccupation with securing future results. "[...] What leads us to obtaining certification is the possibility of financial benefits" (G8f). "[...] Even if the certification does not generate financial gain, it is important because it can provide safety for me and my son to continue performing the activity in the same conditions we are today" (G12a).

Producers with an expressive orientation looked at the certification project as a chance to execute special abilities. The summed effect was the personal satisfaction inherent to forest activity through the adaptation of the productive unit to the FSC Principles and Criteria. The results showed that some producers seemed to value the opportunity to developing

special abilities, which is typical of an expressive orientation. “[...] Getting involved in this process is important. There are things that we do in forest management that we have not been giving any attention to, but the certification project is helping us to innovate and also to preserve nature”(G8f). “[...] The forest activity will grow a lot in the future. Being part of the certification project generates a feeling of participation in this process” (G12a). Producers with an intrinsic orientation showed an awareness of avoiding future risks, such as the possibility of the market not accepting non-certified raw material. In this case, the summed effect of the attractor was to reduce risky situations. This behavior was only observed in G12 producers. “[...] We negotiate the price to cover the costs of certification. However, the main motivator is not the price itself but the consequences of certification. In the future, certification may be crucial to keep us in this field because it is possible that there will be no markets for non-certified wood” (G12k). In sum, these results are congruent with the idea that an attractor’s power to motivate can increase when associated to another attractor, but it can also decrease due to impositions (Kay *et al.*, 1999). Because neither the price-prize nor the guarantee of raw material purchase was offered by the agro-industry, producers had to rely on other motivational factors, as well as on new information (Table 3) to support their decisions. Although any attempt at interpretation could be seen as mere speculation, there is a chance that these summed effects were not enough to back up a decision leading to certification. It is possible that the lack or low intensity of attractors may have led the G12 producers to rethink engaging in the forest certification group.

Table 3. Synthesis of qualified information identified in this study

| Qualified Information | Source |
|---|--------------------|
| Maintenance of the custody chain seal depends on the handling certificate. | Research |
| A handling certificate is a warranty that a certain area is sustainable, regardless of what is being developed. | Research |
| Sustainability depends on quality, and it starts with choosing the seeding. | (STK2e) |
| Forest producers are solid, responsible people regarding how third parties develop certain activities. | (STK2d) |
| The right choice of seeding, in combination with good handling practices, can enhance productivity, covering the costs of certification. | (STK2e) (STK2f) |
| The main information channel regarding certification has been the certifier; however, they provide information according to their own interests. | (STK2h) |
| Certification costs can be divided into direct and indirect costs. Direct costs come from the evaluation and monitoring process; indirect costs come from handling system adaptation. | (FSC BRASIL, 2006) |
| If the producer does not have the conditions to produce within social, economic, and environmentally sustainable standards, he will be out of the business. | (STK2e) |
| There could even be a higher demand from the agro-industry after only seven years, but if the raw material had to be in line with this policy, there would be no raw material for them today. | (STK1a) |
| The payment of a price-prize is a trend. Some agro-industries pay up to 15% more for raw material. | (STKh) (STK2f) |

Source: Developed by the authors.

As new information is provided, either better or worse, it is interpreted by the participants, who can divide themselves into subgroups of interests, generating conflict and the failure of the

process. Such characteristics, associated with the natural attributes of a forest ecosystem (i.e., long productive cycle + long-term decisions = an increase in uncertainties) impose a challenge to the maintenance of forest ecosystem integrity. Similar values probably facilitated the connection among the G8 producers, supporting them in the attempt at group certification. Also, the attracting forces present in the G8 empowered the group, and together, they imposed pressure on the system. “[...] You (i.e., meaning the companies) do not need to help us, because certification will be for our own good. What we need to know is what you offer in return. That was the critical point and, from there onward, everything stopped” (G8b). In convergence with Morin (2003), this emerged negative outcome could have stimulated the disintegration of the other producers. It is possible that the more stable the interrelations within the G8 became, the more this repelled the other producers. “[...] We decided we would pursue the certification with only eight members (G8b)” That decision reflects the feelings of sympathy and trust that developed during the meetings. If the idea of antagonism inciting disorganization is considered, initially for the repulsion of the twelve producers and ultimately for the interruption of the project progress, then the Black Acacia Forest System, in order to ensure some integrity, must fight against that effect. Morin (2003) suggests some alternatives, two of which seem applicable to this case. The first includes integrating and using, as greatly as possible, the antagonisms in an organizational way. The second includes renovating *exergy* (i.e., qualified information) and regenerating the organization. We must emphasize that all the agents interviewed presented a disposition toward continuing with the search for a path to certification, despite apparent difficulties in identifying which interactions might contribute to or harm the self-organization and the survival of the Black Acacia Forest System.

Final Considerations

The aim of this study was to identify motivational factors involved in the decision-making process of Black Acacia forests’ producers in the face of the need to rethink existing practices at the forest-management-unit level, with participation in a Group Certification Project as a possible catalyst for change. Using a systemic approach and having complexity as a background, this paper was based on PNS (qualitative) and made operational through the application of SOHO systems, developed by Kay *et al.* (1999). The utilization of this approach was suitable for this organizational study. Using PNS-SOHO systems, one can notice that the forest-handling units of Black Acacia have dynamic interactions with their environment, whether they are suppliers, clients, competitors (other producers), unions, communities, or natural systems (forests). Regardless of their disagreements, the organizational environment not only influenced producers but also exerted influence over it. Handling units may be seen as systems inside another larger system: the Black Acacia Forest System. The interactions between handling units and the forest system showed constant interaction and interdependence and were driven towards common objectives, in this case FSC Certification. However, this finding can only be arrived at when analyzed within the perspective of the whole because when the parties were considered separately, different perceptions about the certification were manifested. The organization of the forest system, in addition to being independent of productive units, was interrelated with them, and vice-versa. The changes that were imposed by the

environment (certification) and necessary for maintaining the integrity of the forest system (i.e., economic, social, and environmental sustainability) caused impacts across handling units. This process, however, included some singularities. The forest producers' behaviors were barely predictable in that they responded to the stimuli imposed by the system in different ways. In this context, unexpected re-configurations from a system organization stage to another stage were manifested, such as the formation of the G8. The narratives presented in this study suggest that the initial group of producers (20 members) presented itself as efficient in the collection and apprehension of qualified information. This might derive from the fact that a large group may be capable of providing more contributions, experiences, and aspirations, thus enhancing the group's heterogeneity. Despite those advantages, the large group consumed a great deal of time during the process. This slowness in the large group's development occurred partly because of the pressure for conformity inside the group itself. During this process, there was a coalition among members with similar characteristics, leading to the formation of two subgroups. In relation to the subgroups, additional qualitative data could be taken into consideration. The G8 (the group with the smallest number of producers) included members with average to high levels of education. This low number of members and their high level of education may have contributed to the group being more motivated to keep up with implementation tasks for certification-oriented strategic actions. The G12, unlike the G8, contained members with low to average levels of education. The low educational levels of the members of G12, as well as self-perceptions inside this lower-social-status group, may have inhibited the members' participation and harmed the group's development. Adopting a more managerial standpoint, the Black Acacia Forest System organization must continue promoting certification, even though it must rethink its means, replacing former incentives with new incentives through a self-adaptation process. Being a dynamic system, whose survival depends, in part, on the *exergy* supply (in this case, qualified information), in the light of Morin (2003), the maintenance of social interaction practices between the members is encouraged. This should decrease the number coalitions among producers and, consequently, promote group certification. Lastly, if forest agro-industries are truly willing to invest in the development of producer interaction groups as a way of promoting group certification, they must be aware of the risks involved. If, on the one hand, the initial group gathers a large amount of qualified information, on the other hand, the non-management of differences may favor the groups' division and even make the obtaining of a certificate for the newly formed groups impractical. However, the adaptative management of decision-making processes may help managers to monitor the group development, identify rupture signals and implement strategic actions that are better for each producer's newly formed group.

Acknowledgments

The authors gratefully acknowledge the financial support from the National Counsel of Technological and Scientific Development (CNPq).

REFERENCES

- Bredin, Y. K., Lindhjem, H., Van Dijk, J. & Linnell, J. D. C. 2015. Mapping value plurality towards ecosystem services in the case of Norwegian wildlife management: A Q analysis. *Ecological Economics*, 118, 198-206.
- Brown, J. & Dillard, J. 2015. Dialogic Accountings for Stakeholders: On Opening Up and Closing Down Participatory Governance. *Journal of Management Studies*, 52, 961-985.
- Bruna-Garcia, X. & Marey-Perez, M. F. 2014. Public participation: a need of forest planning. *Iforest-Biogeosciences and Forestry*, 7, 216-226.
- Brundtland Commission 1987. "World Commission on Environment and Development: Our common future," Oxford University, New York.
- Cruz, L.B. Pedrozo, E.A., & Estivaleta, V.F.B. 2006. Towards sustainable development strategies: A complex view following the contribution of Edgar Morin. *Management Decision*, 44, 871-891.
- Degraaf, H. J., Musters, C. J. M. & Terkeurs, W. J. 1996. Sustainable development: Looking for new strategies. *Ecological Economics*, 16, 205-216.
- Frame, B. & Brown, J. 2008. Developing post-normal technologies for sustainability. *Ecological Economics*, 65, 225-241.
- FSC - Forest Stewardship Council 2007. available at: <http://www.fsc.org/en/> (accessed 07 January 2007).
- FSC BRASIL (2006), Conselho Brasileiro de Manejo Florestal, available at: <http://www.fsc.org.br/> (accessed 15 December 2006).
- Gasson, R. 1974. Socioeconomic status and orientation to work: The case of farmers. *Sociologia Ruralis*, 14, 127-141.
- Gladwin, T. N., Kennelly, J. J. & Krause, T. S. 1995. Shifting Paradigms for Sustainable Development: Implications for Management Theory and Research. *Academy of Management Review*, 20, 874-907.
- Hahn, T., Pinkse, J., Preuss, L. & Figge, F. 2015. Tensions in Corporate Sustainability: Towards an Integrative Framework. *Journal of Business Ethics*, 127, 297-316.
- Kant, S. 2003. Extending the boundaries of forest economics. *Forest Policy and Economics*, 5, 39-56.
- Kant, S. 2004. Economics of sustainable forest management. *Forest Policy and Economics*, 6, 197-203.
- Kant, S., Wang, S., Deegen, P., Hostettler, M., Von Detten, R., Howard, T., Laband, D., Montgomery, C., Robert, N., Sekot, W., Valatin, G. & Zhang, D. 2013. New frontiers of forest economics. *Forest Policy and Economics*, 35, 1-8.
- Kay, J. J., Regier, H. A., Boyle, M. & Francis, G. 1999. An ecosystem approach for sustainability: addressing the Challenge of complexity. *Futures*, 31, 721-742.
- Kijazi, M. H. & Kant, S. 2010. Forest stakeholders' value preferences in Mount Kilimanjaro, Tanzania. *Forest Policy and Economics*, 12, 357-369.
- Lehtonen, M. 2004. The environmental - social interface of sustainable development capabilities, social capital, institutions. *Ecological Economics*, 49, 199-214.
- Mayumi, K. & Giampietro, M. 2006. The epistemological challenge of self-modifying systems: Governance and sustainability in the post-normal science era. *Ecological Economics*, 57, 382-399.
- Morin, E. 2000 "O Pensamento complexo, um pensamento que pensa." In: Morin, E. and Le Moigne, J.L, *A Inteligência da Complexidade*, Petrópolis, São Paulo.
- Morin, E. 2002. "O Método II: A Vida da Vida," Sulina, Porto Alegre.
- Morin, E. 2003. "O Método I: A Natureza da Natureza," Sulina, Porto Alegre.
- Munda, G. 2004. Social multi-criteria evaluation:
- Bredin, Y. K., Lindhjem, H., Van Dijk, J. & Linnell, J. D. C. 2015. Mapping value plurality towards ecosystem services in the case of Norwegian wildlife management: A Q

- Methodological foundations and operational consequences. *European Journal of Operational Research*, 158, 662-677.
- Ravetz, J. 2004. The post-normal science of precaution. *Futures*, 36, 347-357.
- Ravetz, J. R. 2006. Post-Normal Science and the complexity of transitions towards sustainability. *Ecological Complexity*, 3, 275-284.
- Shrivastava, P. 1995a. Ecocentric Management for a Risk Society *Academy of Management Review*, 20, 118-137.
- Shrivastava, P. 1995b. The role of corporations in achieving ecological sustainability. *Academy of Management Review*, 20, 936-960.
- Starik, M. & Rands, G. P. 1995. Weaving an integrated web - Multilevel and multisystem perspectives of ecologically sustainable organizations. *Academy of Management Review*, 20, 908-935.
- Swedeen, P. 2006. Post-normal science in practice: A Q study of the potential for sustainable forestry in Washington State, USA. *Ecological Economics*, 57, 190-208.
- Tognetti, S. S. 1999. Science in a double-bind: Gregory Bateson and the origins of post-normal science. *Futures*, 31, 689-703.
- Udovyk, O. & Gilek, M. 2014. Participation and post-normal science in practice? Reality check for hazardous chemicals management in the European marine environment. *Futures*, 63, 15-25.
