

Contributions of environmental perception to sustainability in the buffer zone of a protected area

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Abstract: The public area currently known as Passo Fundo National Forest was created in 1947 to research and develop timber trees in light of a large amount of logging that had occurred in previous decades. In this study, environmental perception was used as a research strategy to attempt to clarify the subjective aspects of the human-environment relationship evident in the local community in the current conflict with the managers of the protected area. A qualitative approach to content analysis was used. Although they perceive the forest as important for biodiversity and quality of life, they live with conflicts related to their exclusion in the planning of activities at PA and the way controls are implemented to prevent the planting of transgenic crops in the surroundings. Perceptions have the potential to shed light on similar conflicts in other areas and provide managers with ways to improve relationships with surrounding communities.

Keywords: Flona; Content analysis; Social Participation; Social Actors.

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São Paulo. Vol. 25, 2022

Original Article

DOI: <http://dx.doi.org/10.1590/1809-4422asoc20180262r5r1vu2022L4OA>

Introduction

The creation of Protected Areas PAs which form the National System of Conservation Units (SNUC) is intended to reduce anthropic environmental impacts and is in line with the global strategy for the conservation of natural resources in protected areas (BRASIL, 2000). On the other hand, the establishment of PAs can lead to socio-environmental, political, and economic conflicts, involving surrounding communities, educational institutions, and government entities. Even if some community members are favorable to the establishment/implementation of PAs, this is never a consensus in such a pluralistic society (PEREIRA; DIEGUES, 2010).

In this sense, it is necessary to consider that a PA, when created, cannot be considered isolated from the rest of society (MARINELLI et al., 2011). Therefore, we must think about the effectiveness of these areas for an improvement in the relationship of society as a whole, seeking to recognize the importance of PAs in the socio-environmental scope and at its different scales, as explained by Cunha (2014), Jacoby (2014), Teixeira et al (2017) and Morais et al (2018).

Thus, knowing and seeking to understand these conflicts has proved to be a concrete possibility (BEZERRA et al., 2010) to show ways to mitigate them. In this way, the proposal to analyze the environmental perception of a population becomes intrinsic to the understanding of the meaning of the environment for these individuals. Environmental perception has been used in different studies and with different methodological strategies. The way each person reacts to the environment is closely related to the feeling of the constitution of that environment. Understanding it as a dynamic system, where this interaction between the elements can be both positive and negative becomes part of the construction of perception and, consequently, the feeling of belonging and development of environmental responsibility (REIS, COSTA, 2017). The resulting responses or manifestations result from perceptions (individual and collective), of the cognitive processes, judgments, and expectations of each person, being also influenced by cultural elements (VASCO; ZAKRZEWSKI, 2010). One of the tools for initiating environmental awareness is the diagnosis of individuals' perception of the environment, used by other researchers in different areas (TUAN 1980; PEREIRA; DIEGUES, 2010).

Studies on environmental perception have been carried out since the 1990s (GUILMARÃES, 2003) with different social actors and methodological approaches (VASCO; ZAKRZEWSKI, 2010; ALMEIDA; SCATENA; LUZ, 2017). Environmental perception emerges as an alternative to understanding the interrelationships of man and the environment, perceived or interpreted by those who experience it, so that, the environment can be perceived differently by different people (BRANDALISE, et al., 2009; KUHNEN, 2009; KUHNEN, 2009; KUHNEN, 2009). 2011). Thus, studies with an understanding of environmental perception are important for providing tools for appropriation and identification processes of spaces and environments (KUHNEN, 2011).

Studies of environmental perception are fundamental to understanding the interrelationships between man and the environment. They provide subsidies for the establishment of strategies to alleviate socio-environmental problems and for the elaboration

and implementation to ensure social participation and involvement of different actors in environmental management processes (VASCO; ZAKRZEWSKI, 2010).

Therefore, our objective is to discuss the environmental perception of the community residing in the buffer zone of a protected area, having regional sustainability and conservation of the area.

Materials and methods

The study was conducted with residents living in the Buffer Zone (BF) of the Passo Fundo National Forest (FLONA-PF), Rio Grande do Sul state. FLONA-PF is located in the municipality of Mato Castelhano, between coordinates 28°16'43" and 28°20'40" south latitude and 52°12'34" and 52°09'59" west longitude, occupying an area of 1300 ha (Figure 1). It is limited by the road - BR 285, rural and urban properties, including "Orla de Barragem" (MATO CASTELHANO-RS; 2017; ICMBio, 2011). Of the total area of the Buffer Zone located on the outer limit of the PA, a 500-meter margin was defined for the study, which involves the restriction on the planting of transgenics, which was identified as the main reason for conflicts in the surroundings (ICMBio, 2011).

The research method was quantitative/qualitative, through semi-structured interviews with questions organized in thematic axes. According to Minayo et al (1994), the approaches complement each other and help in the analysis of results. The quantitative part was presented as a percentage and aimed to present a sample population profile. The qualitative approach, the emphasis of this study, was performed using the content analysis technique described by Bardin (2011). Initially, a pre-analysis of the interviews was carried out with an exhaustive reading. Afterward, four categories were formulated, with clustering identity, which emerged from the reading. Finally, analysis, interpretation, and inference were carried out seeking a reflection.

The interviews were carried out from August to November 2017 with residents who lived in the buffer zone for more than ten years, as they were the group that was affected by Federal Decree 5,950/2006, which restricts the planting of transgenic soybean in a range of 500 m from the PA boundary. The number of subjects was defined using the saturation criterion (FONTANELLA; RICAS; TURATO, 2008). The suspension of inclusion occurred according to the researchers' assessment when repetition/redundancy was verified, coinciding with the absence of new answers in the qualitative part. The interviews were audio-recorded, and before the completion, the respondents were consulted and agreed to participate in the research by signing a Free and Informed Consent Term (TCLE - approved by the Ethics Committee number 2,189,995). Residents, whether or not owners of their properties, were included in the research, both in urban and rural areas, as well as in Orla da Barragem. Respondents from the urban area were randomly chosen for their availability. Those on Orla da Barragem and rural producers were randomly selected from among those nominated by city residents or by FLONA managers.

The interview procedures, preservation of the identity, and location of the participants were following the Health Resolution (510/16). The script used in the interview is in Chart 1.

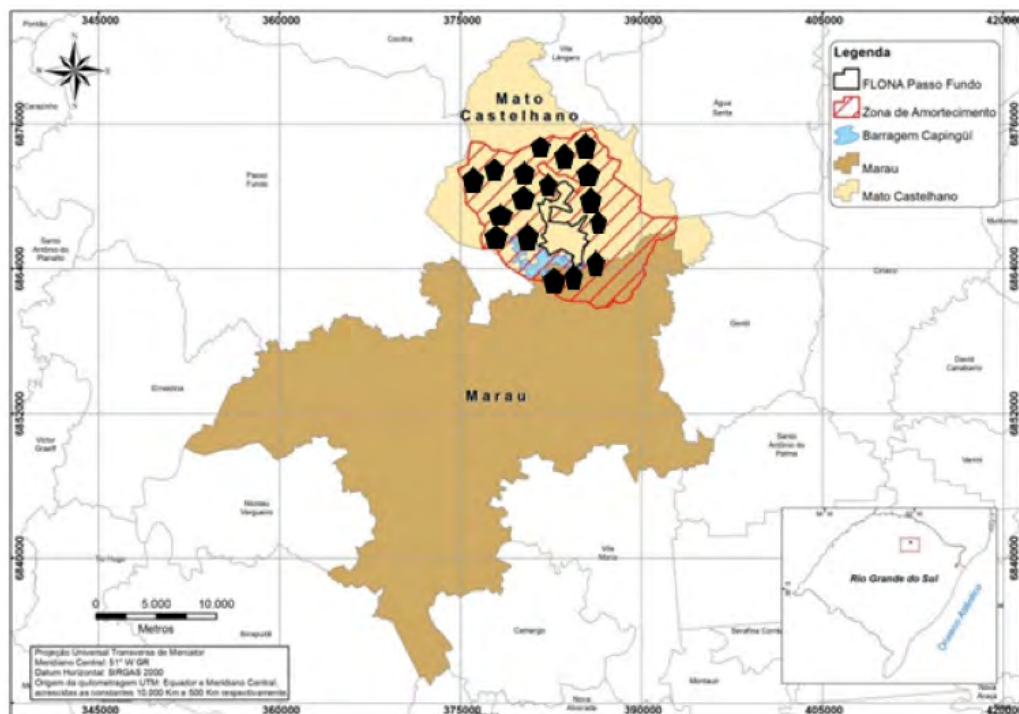
Chart 1- Structure of the data collection instrument used

THEMATIC AXES	SCRIPT
Sociodemographic profile	<p>Municipality</p> <p>Age Group</p> <p>Sex</p> <p>Scholarity</p> <p>How long have you lived in the area?</p> <p>What is the property area?</p> <p>Property status? (Owner, Tenant, Squatter, Partner)</p>
Relationship between the production process and sustainability of residents	<p>What is the property's main function?</p> <p>Is the property your source of income?</p> <p>Does it satisfy your needs?</p> <p>Do you have agricultural machinery implements?</p> <p>What is the property's water source?</p> <p>What is the destination of the property's waste and sewage?</p> <p>Do you use agrochemicals on the property? How often?</p> <p>How do you dispose of packaging?</p> <p>What is the origin of the food consumed? (Own production, purchase)</p>
Relationship between the owners and FLONA	<p>How is the community's relationship with FLONA managers?</p> <p>What are the biggest problems you identify in relation to FLONA?</p> <p>Did you participate in any project with FLONA?</p> <p>Does the community live with restrictions because of FLONA? Do you know any?</p> <p>Since the creation of FLONA, did the property have to change any production process? Which one?</p> <p>Do you know FLONA's objectives?</p>
Community perspective on FLONA	<p>Why do you live in this community?</p> <p>How important is FLONA for you and your family?</p> <p>What is the most striking fact about FLONA that you remember?</p> <p>What worries you about FLONA?</p> <p>In your opinion, is the presence of FLONA positive? Does it have negative effects or is it indifferent? Why?</p>

Source: Research Data, 2018

In addition to the interviews, the analysis of the creation process of FLONA (personal communication during the interviews) and the Dissertation entitled “An Environmental History of the Passo Fundo National Forest: 1946-2011” was used as a research instrument, to better reveal the research object, seeking to analyze, complement and contextualize the processes that took place.

Figure 1- Location of the Passo Fundo FLONA and its Buffer Zone - municipalities of Marau-RS and Mato Castelhanense-RS. At an approximate location of research participants within the Buffer Zone boundary



Source: Adapted by the author- ICMBio map (2011).

Results and Discussion

The interviews were carried out with seventeen (17) (total number of study participants) residents (residents, or who used the residence during periods of the year or only on weekends). Eight respondents are from rural areas, representing 47% of the sample, four from urban areas (24%), and five (29%) from Orla da Barragem. Fourteen respondents were male, corresponding to 82%, and three were female (18%).

The most representative age group was between 61 to 80 years old (53%), followed by the range from 41 to 60 years old (29%) and 20 to 40 years old (18%), with the youngest residing in the urban area. This data represents the rural scenario, in which a significant part of the remaining population is elderly, illiterate ($n=1$, 6%), or with incomplete El-

elementary School (n=7, 41%). This scenario is similar to that recorded by Froehlich et al. (2011), who detected that the rural exodus still occurs, however, in a different way from the 1980s, when entire families migrated to the urban areas. Currently, there is a change in this process, in which younger people migrate more to cities, with the elderly remaining in rural areas. The younger population that remained on rural properties (n=3, 18%) declared that they had completed High School and chose to work with their families instead of going to the city to study or work. Participants who were completing or had already completed higher education (n=6, 35%), residing in urban areas, were included in the younger population of the study.

The rural producers interviewed (n=8) were retired. However, they declared that the income that contributed most to the family's livelihood was generated in agriculture. Another aspect identified is that all producers mentioned producing most of the food they consumed, buying only rice, cleaning products, coffee, and salt. Meat, milk, eggs, vegetables, and fruits were produced on the property, only one of the respondents mentioned producing rice for their consumption.

The time of property acquisition was more than 15 years, and the residents of the rural zone and the Orla da Barragem lived in the place between 20 and more than 50 years (n=14, 83%). Some of them inherited the property, living there since childhood. Residents of the urban area acquired their homes between ten and twelve years ago.

The categories of analysis (BARDIN, 2011) organized for the discussion of environmental perception, below, seek to present contributions from the study to the understanding of the relationship and potential more sustainable paths in the relationship between the UC and the surrounding community.

1. Interaction Social-Relationship of the Community with the Conservation Unit

From the speech of the participants, from the rural area, the lack of dialogue between the community and FLONA was evidenced, which was mentioned by all the respondents.

I think the relationship is still missing. [...], but I think there is persecution, I don't know. (PA)

But what still matters is this relationship with the managers that don't exist, and that keeps us away and prevents greater participation in the forest. (PG)

In contrast, all participants mentioned care for the forest, as most respondents from rural areas followed the implementation process of FLONA, having in the past a more harmonious relationship than the current one (PB and PE). The respondents stated that they feel a lack of communication, social inclusion, participation, and a sense of belonging in the community with FLONA and that currently the community has not been included in the processes involving the PA. The big question that is posed by the community is the fact that the Passo Fundo National Forest- FLONA-PF, initially called José Segadas

Viana Forest Park, was implemented in 1947. The area, owned by the Union, as defined by the Instituto Nacional do Pinho (INP), linked to the Ministry of Labor, Industry, and Commerce, which represented, at the time, the interests of two producers and exporters of Brazilian Pine Tree (*Araucaria angustifolia*) in the south and southeast region of the country. Thus, FLONA was not a PA that was naturally constituted but implemented, from the 1960s, with a new definition of the old Brazilian Forest Code, later passing to the responsibility of IBAMA (created in 1989).

Throughout the transition process of the INP to the National Forest of Passo Fundo, the residents reported that they were losing ties with the managers, who initially were more friendly and had more space and access to participate in the issues that involved the PA.

We miss the way it used to be. We needed IBAMA, they helped [...]. It used to be better. (PB)

There is no longer such a good relationship, we can take care of the forest, and respect it. The same thing that ended that love we had for it is because they only harm the people around it. [...]. (PE)

In this study, the process of removal and the feeling of not belonging to the place was built from the restriction of planting transgenics in the surrounding area (BRASIL, 2003), because the respondents declared that they perceived the distance between the managers and the community, as a result of the inspections that were carried out frequently (PA and PF).

I think if they came to talk to the producers before they got notified and fine. (PA)

After a while, I don't know what happened, because they separated: you are you and we are us. {...} I think it should be a forest for everyone to help conserve and enjoy. (PF)

Participants A and G reinforce their impressions on this issue by describing that FLONA's management provided this distance from the community.

And we tried to talk to the people there, but there is no conversation, it gets worse every day. (PA)

We began to realize that FLONA's management took place very far from the community. And this position of the managers left the community and the environmental movements in a very delicate situation. (PG)

In the speech of the respondents, feelings, values, thoughts, and attitudes were changing, as they were being treated as aggressors and mainly responsible for the nega-

tive environmental impacts on the forest. In fact, this movement seemed oblivious to the perception and reading of the world that the community had since they did not feel welcomed when they were called to present their demands in the revision of the Management Plan. At that time, education and environmental planning strategies, such as the adoption of more sustainable practices, and alternatives to the current agriculture adopted in the place, could have contributed to the surrounding community, as Reis and Costa (2017) refer.

For Morais, Gontijo, and Piuzana (2018) the inclusion of society in the decision-making processes for the management of PAs is a prerequisite in the elaboration of public policies that consider their demands and visions. This is important in the case of local communities affected by the creation of these protected areas. The Brazilian legislation itself enshrines the Management Councils of the PAs as an official space for society to participate in their management, with important roles in directing and social control.

Public policies must face a dimension that until recently was considered taboo: the clarification of conflicts (MARINELLI et al., 2011). When the conflict is made explicit, it is possible to dialogue, create negotiation arenas and even evaluate this transformation process. What is understood here by social participation is an effective process of sharing political decisions. There is still a long way to go to get there, including the need to assess the effectiveness of management, especially in the buffer zones of the PAs.

Public managers could have attitudes of approximation and involvement with the local community. Teixeira et al., (2017) when defending the existence of factors such as guaranteeing access to the territory, its resources, public policies, and social benefits, in addition to the recognition of the culture and lifestyle of communities that are related to PAs, justify that they are essential for maintaining those for sustainable use.

It is also necessary to consider that although each individual perceives their surroundings through all their senses, at the same time, they do not observe the environment in the same way, but share some perceptions, such as vision, which is often linked to local culture (TUAN, 1980). At FLONA, the most shared and collective perceptions are those linked to legal restrictions, the way inspections are carried out, and, consequently, the relationship with the management. When respondents talk about the conservation of nature, there are more ambiguities, especially when they relate that by conserving/preserving the place, they should be rewarded for these environmental services provided.

The cost of adopting sustainable practices represents the value of an environmental conservation service offered by the farmer (CUNHA et al., 2014), but this is seen by the rural respondents in this study as a penalty, and there should be financial compensation to overcome the restrictions they are experiencing.

Why are we not compensated? Why do those who live beyond 500m have to earn more than us? [...] So if someone imposed that restriction, there should be compensation. (PA)

The hypothesis of compensation for environmental services, although provided in Law 14.119/2021, is not yet regulated, with no prospect of being used in situations like

this, since the farmer is not prevented from producing. Certainly, the demand for compensation could be the object of a public policy to support alternatives such as organic crops or non-transgenic soy, which has also not been implemented.

In the study, it was observed that most residents have an anthropocentric tendency (MARCONATTO et al., 2013), identified with the idea that the growth of markets and technological advances are sufficient to guarantee sustainability. When it comes to the surroundings of the Forest, all individuals showed enchantment for FLONA and for the place where they live, perceiving the presence of the PA in the region as positive and important.

This relationship with the Forest may be because most of the respondents participated in the process of creating the PA (some of them helped/worked in the planting of the first trees, in 1968 (ICMBIO, 2011)). Others highlighted its importance for animals, water, and other native trees, such as Brazilian Pine Tree. Respondents recognize the scarcity of this type of vegetation elsewhere. They also did not use the name FLONA in their speeches, being always related to IBAMA (referring to current managers), an agency that was previously responsible for the management of the PA, as reported by the F participant.

It wasn't like that, I grew up since I was a boy there, at 12-15 years old, there was the soccer field, we used to go there every Sunday to play, there were their people who played with us, [...] the coexistence was good, it was a community, people from outside participated, [...], the coexistence was harmonious, (...) after a while I don't know what happened. (PF)

This perception about managers may be related to a more bio-centered posture focused on the current context that has more restrictive legislation (MARCONATTO et al., 2013), as is the case of the ban on transgenics. We cannot discard the influence of the legislation implementation, in the community distance from the managers. Participants reiterated that they feel in the PA's management lacks interest in involving the community in environmental education projects, in the decision-making processes, in the rendering of accounts for the resources that are obtained from the sale of wood, and mainly, in the thinning that has been taking place in the forest, provided in the management plan (ICMBio, 2011).

On the other hand, respondents from the urban area recognize this lack of relationship between managers and residents as a conflict, as well as having no involvement in the management processes that involve FLONA, probably because they are not affected by the restrictions imposed on the productive environment, as is the case with rural residents. Urban residents also did not participate in PA activities or projects and seek other options for tourism and leisure activities outside the municipality. However, they reported that they feel a lack of dissemination of information about the PA, projects, and activities carried out by FLONA that involve the community. Respondents reported that they do not know how the UC works, how to visit, or how to participate in tours and

other tourism activities, which attract more people to the municipality, thus moving the local economy.

The respondents from Orla da Barragem, although not having this conflict between farmers and managers due to other land uses, reported knowing the conflict between producers and the PA. Thus, the relationship with the “world” of the local community is a challenge, presented in the way in which they perceive and express their attitudes and values. Participant G reinforces the need to rebuild the relationship and the search for dignified survival alternatives for all.

So this relationship, I believe, needs to be rebuilt, and to seek survival alternatives for these families who are suffering from all these things. (PG)

It is necessary to consider that the way each one reacts to the environment is closely related to the feeling of a constitution (REIS; COSTA, 2017). Understanding it as a dynamic system where this interaction between the elements can be both beneficial and harmful, it becomes part of the construction of perception and, consequently, of the feeling of belonging and development of environmental responsibility.

2. Scientific knowledge and information - concepts and relationship with productive practices

In the interviews, no scientific knowledge was perceived about the environmental impacts resulting from the production process.

Residents stated that they know and adopt preservation practices. This perception appeared most of the time in the speech of participants living in rural areas and others from Orla da Barragem who work with grain production, in many moments, rural producers discarded the possibility of “harming” the environment with their agricultural practices, associating the adoption of no-tillage system management in straw with soil preservation, as well as the use of transgenics with the use of a lesser amount of pesticides.

The information they have corresponds to that acquired on field days, provided by companies and sellers in the agricultural sector.

It was evident that all knowledge of producers is related to the current agriculture model that is maintained by companies that sell inputs, transmitted from field days, visits, and provision of technical assistance to the properties. In these moments, there is interaction, listening and reception of the anguish of producers, “being sold” the idea of greater productivity, profitability and that production with transgenics is less polluting when compared to conventional planting, as reported by PA, PE, PF, and PM.

Because it has been proven that transgenic soy does not harm the forest, these days we were in an interview, the whole process that happens with pesticides, with transgenics, that nothing is harmed, nothing happens, all this has been proven. (PA)

They just keep saying that there's the precautionary law, right, but we don't have a study that says it's harmful, because it's okay, they just want to claim that whoever did the studies is not the body they want, that you're helpin Monsanto. (PE)

And in my point of view, from what we talk to the agronomy people, they say that this is a law that was made without studies, and then I am going to comply with the law. (PF)

And until today, what I know, as far as is proven, is that planting soybeans near the IBAMA forest will interfere with it. I don't know, everyone tells them, but they don't care, but we have to do something. (PM)

Four respondents reported that they tried to talk and discuss, offering areas of their properties so that comparative tests could be carried out between conventional and transgenic soy, but the tests did not occur. In this way, the importance of creating spaces for sharing knowledge, information, and discussion on the subject is evident, so that the community has greater clarity about FLONA's objectives, restrictions, and Management Plan.

It was noticed in this study, as well as in that of Noe, Halberg, and Reddersen (2005), that those producers do not disagree with conservation criteria, but often do not know how to integrate or modify sustainable production measures in their agricultural production methods.

In fact, despite being aware of all the environmental, social, and territorial arguments in which they are inserted, which point to the urgency of seeking sustainability, farmers are subjected to the model of conventional agriculture, dependent on inputs and capital, and end up not adopting other, more sustainable kinds of production. As highlighted by respondents A and H.

Today the difference is very big. To give you an idea, conventional soybeans produce on average 40 bags/ha, if you harvest well, you harvest approximately 50, 45. And the transgenic, you get to harvest 80 bags per hectare. (PA)

To plant products that are not transgenic, you spend more and use more pesticides, and more polluting herbicides so in transgenic soy, only one type of product controls everything, so the plant becomes more expensive. (PH)

The use of transgenics, according to Dal Soglio and Kubo (2016), is based on the idea of the inexistence of production alternatives that will meet the world demand for food, justified by the motivation of higher productivity in agriculture. Heinemann et al., (2014), found an increase in productivity in different crops without transgenics in Europe.

The respondents from the rural population described the transgenic prohibition as the most pertinent issue related to the conflict in the relationship with FLONA. This situation is repeated in other PAs (FAURO et al., 2014; TEIXEIRA et al., 2017). This conflict, according to the respondents' perception, is not minimized by the PA management, as it does not encourage moments of participation, access to information, and other knowledge. In the involvement with the community, alternatives to the productive mode defended by the participants could be discussed, being a role of society as a whole. It should be remembered that among the objectives of the FLONA-PF Management Plan (ICMBio, 2011), there is the promotion of the socioeconomic integration of the surrounding communities with the PA, as well as socio-environmental education and public use activities to increase the support of the population in its management and implementation and the improvement of environmental conditions in the area.

Os entrevistados da população da zona rural, descreveram a proibição do uso de transgênicos como a questão mais pertinente relacionada ao conflito na relação com a FLONA. Esta situação se repete em outras UCs (FAURO et al., 2014; TEIXEIRA et al., 2017). Esse conflito, de acordo com a percepção dos entrevistados, não é minimizado pela gestão da UC, ao não estimular momentos de participação, de acesso à informação e a outros conhecimentos. No envolvimento com a comunidade poderiam ser discutidas alternativas ao modo produtivo defendido pelos participantes, sendo este um papel, da sociedade como um todo. É preciso lembrar que entre os objetivos do Plano de Manejo da FLONA-PF (ICMBio, 2011), está a promoção da integração socioeconômica das comunidades do entorno com a UC, assim como as atividades de educação socioambiental e uso público para ampliar o apoio da população no manejo e na implementação desta e na melhoria das condições ambientais da região.

Thus, it is possible to perceive that actions that contribute to explanations to the community about the reasons for these restrictions are necessary.

3. Appropriation of the legal context - knowledge of legislation and inspection

The participants from the rural area and Orla da Barragem, unlike those from the urban area, demonstrated knowledge about the legislation, FLONA objectives, as well as the restrictions of the buffer zone. This knowledge may result from legal proceedings to which they were submitted and/or fines they received due to the planting of transgenics, issues related to the demarcation of indigenous lands, or the process of repossession of Orla da Barragem, filed by the Companhia de Energia Elétrica/RS (CEE).

During the interviews, the participants reported that there was an active mobilization of the community when the buffer zone was 10 km (previous legislation), which involved a good part of the population that was feeling harmed (PE). For this reason, they do not believe in the possibility of having more reductions in this current margin.

Because it was already at 10 km and it came to 500m, worse than that they won't be able to because then it involves a lot of people, where it started to involve a lot of people the force increases, and then it

reduced, the people are very disunited, as long as they are not affecting themselves, they do not help each other, they do not participate, it could not be, but that is the reality. (PE)

When the restriction on planting transgenics was reduced to a range of 500 m (BRASIL, 2006), the movement lost strength, especially among farmers. Owners of small rural areas, having been subjected to the legislation, felt doubly affected, either by the weakening of the movement or because they believed they were treated unequally in relation to others since they were all part of the forest surroundings.

The respondents, who were fined, also highlighted that they had not participated in the inspections that collected the seed samples and complained about the way in which inspections are carried out. According to those who were charged, mostly, the inspectors arrived at the properties carrying weapons and were not accessible to dialogue, a fact that ended up intimidating the producers. They felt attacked by the way they were approached, reporting feelings of antipathy and revolt against the supervision (PE and PF).

Another thing that I think is totally wrong, is the inspection, I still haven't had it this year, who accompanied it was my brother, they came in two, three guys, from PATRAM, from the environment, even armed with rifles, it seems they're going to arrest thieves [...], this is an offense to the population, imagine the guys came with guns, rifles, to inspect the producers who are working, producing. (PE)

Before talking, and greeting him, pulling out his gun and putting it on to show that he was armed to take a 70-year-old old man to collect soy up there, what they had to demonstrate authority to a person at that age, without any reaction, without any malice, so we feel this is an authoritarian thing, I think the law exists, but not to be used that way. (PF)

The form of implementation and administration of PAs in Brazil is commonly marked by authoritarian processes (DIEGUES, 2001). It is common for residents not to be previously informed of the objectives of these areas and the changes that accompany the implementation of PAs in their way of life. Thus, inspection becomes the only way to impose a conservation model, without the involvement of local and regional communities, and the real objectives of the UCs are doomed to failure (SILVA et al., 2009; DIEGUES, 2001; MORAIS et al., 2018).

For the community, the restriction on the use of its properties is due solely and exclusively to the PA and its management, and not to the laws created before the PA. Similar situations of controversy reinforce the idea that ways of including communities in decision-making must be adopted, since the way of living in these places is profoundly changed (DOWIE, 2009; JACOBY, 2014). Policies opposed to community interests can displace populations, especially when there are no alternatives to the imposed restrictions.

Paragraph 1 of Article 25 of the SNUC (BRASIL, 2000) establishes specific rules

regulating the occupation and use of resources in the buffer zone of a PA. Article 28 establishes the prohibition in the UCs of “[...] any alterations, activities or modalities of use in disagreement with their objectives, their management plan and their regulations” (SNUC, 2000, p. 23). This means that the PA also has limits.

Although Calandino (2016) argues that management effectiveness is an essential condition for meeting the objectives of creating PAs, it cannot be said that this is sufficient to solve problems related to the surrounding communities, as this stems from personal interests. In any case, even not accepting the reasons for banning the cultivation of transgenics, the respondents stated that they comply with this determination, justifying this option as a result of the inspections, tests, and assessments that the community has been suffering through FLONA managers.

In fact, it is extremely important that informative processes take place before the punishments, and this was recognized in several moments that involved the community (ICMbio, 2011). It remains to be identified if what is missing is the transmission of information by the managers or if the producers deny having received information with any intention.

4. Regional sustainability - sustainability vision

The perception of sustainability showed a certain contradiction among the participants, since, at the same time that the respondents justified the planting of transgenic soy because it is more economically viable and environmentally “less” polluting than the non-transgenic variant, they declared that they produced their own food in the reason for their safety and food quality.

However, they declared to be careful with the environment, especially with FLONA, informing that they conserve both the space and the fauna and flora that depend on the forest for survival. For Marra (2011), the participation and inclusion of peoples neighboring the protected areas in decisions regarding the activities to be carried out are fundamental, as these peoples know the place is determined to be preserved. The habits of the animals, the most fragile areas, and other important information for the protection of nature are part of the routine of people who depend on the existing resources in the area to survive.

Respondents also recognize the importance of environmental actions so that future generations can know and live in a natural environment. Farmers, who earn their income from soybean crops, did not mention other possibilities for earning income (other conventional crops or organic crops).

It is necessary to consider, that sustainable development requires the interdependence between various social issues, which requires a multidisciplinary approach, including cultural, environmental, territorial, economic, technological, and political-institutional aspects (MARQUES; SANTOS, 2011, SIQUEIRA; ZUÑIGA, 2016). To achieve sustainability in production systems, it is necessary to combine the preservation of local knowledge, the appreciation of culture and the heterogeneity of rural populations, and the conservation of natural resources, with income generation. The implantation of a

protected area should not be the object of exclusively ecological public policies, but also social ones, so that they can take care of the people who depended on the raw material acquired within the limits of the area to survive and who now have to resort to other alternatives of subsistence (MARRA, 2011), promoting the compatibility between improving the quality of life and conservation (DIEGUES, 2003).

We agree with Morais, Gontijo, and Piuzana (2018), who reiterates that the creation of a UC must include in its actions the improvement of the quality of life for the community, providing opportunities for the creation of new sources of income, and alternative uses of resources, respecting, above all, their culture and social values. It is about enabling activities that seek to build and strengthen the family, work, income, and the bonds that build citizenship.

Farmers themselves must seek new ways of using agricultural practices around the PAs, always taking care to relate them to the needs of nature, because this natural environment is essential to maintain the quality of water and biological diversity, in addition to performing other environmental services whose importance goes beyond the monetary aspect (FAURO et al., 2014).

Specifically, in the rural area population, the study highlighted the need to strengthen agriculture, promoting sustainable development in the region based on new forms of production.

Strengthening agriculture will be an alternative for community participation in regional development, as well as in building a new relationship with PA management. This process does not need to be created exclusively for the communities of Mato Castelhana and Marau, as there is a great diversity of strategies and activities involved in family farming around the world, and the knowledge of all significant experiences with models of production systems adapted to local realities and that have the potential to considerably expand food production and availability.

In most of the interviews in this study, sustainability was exclusively related to the economic issue. This concept is linked to the fact that the community, especially the rural one, has suffered from the restriction of the use of transgenics, not envisioning alternatives for family support. In this sense, the prospects for regional development may be fragile in these areas, reinforcing the challenge of articulating public policies with the communities residing in the buffer zones of the Protected Areas.

As an alternative, rural residents and some residents of Orla da Barragem suggest that further studies be carried out, either by the Universities that carry out research at FLONA or by contracted companies, to examine the possible damage caused by the cultivation of transgenics, as well as, by conventional planting, cited by most as more polluting and degrading to the environment.

Conclusions

This study reinforced the principles present in the literature regarding aspects related to the importance of using environmental perception as a subsidy for the planning

of socio-environmental projects in communities residing in the surroundings of Protected Areas. Environmental perception studies may contribute to the minimization of conflicts, by the creation of more sustainable policies and strategies.

The relationship between FLONA-PF management and the community was the most striking aspect highlighted by the respondents. In the community's perception, there is currently a gap between the PA managers and the residents of the rural and urban areas of the municipality. This distance was identified by both affected and non-affected respondents by the restrictions imposed by legislation.

In this study, it was evidenced that the causes of the conflict go beyond the restrictions imposed by the Management Plan and the inspections carried out by the management of FLONA. The reports point out that the conflict is amplified by the lack of reception, involvement, and especially empathy of managers with the local community, which claims to be concerned with Forest conservation, preserving it, and avoiding the deposition of waste. It was even mentioned that the community collects waste left by visitors and tourists on the roads that exist in the forest.

It is necessary to expand the dialogue and social inclusion of the community in the processes of PA management. It is also essential to seek subsidies for local sustainability since the availability and interest of producers in replacing their production processes with more sustainable alternatives for the surroundings was evidenced. To be effective, it is suggested that both the Empresa de Assistência Técnica e Extensão Rural do Distrito Federal (Emater), the Agriculture Department, and the FLONA-PF Management area itself, create spaces for training and training the residents who live in the vicinity of the forest, bringing alternative sustainability practices, specialized technical assistance.

This process must be accompanied by these institutions, ensuring that the transition from conventional agriculture to more sustainable practices for both the population and the environment in which it is inserted occurs gradually and has the participation of the community at all stages. We emphasize that this perception is shared in other UCs in Brazil, as indicated in the discussion and we point to the need for specific actions/policies for the community surrounding the PAs. The advance that this case study represents can be extrapolated to other contexts and regions.

Agradecimentos

We thank CAPES for the master's scholarship, Universidade de Passo Fundo, and PPG-CiAmb for logistical support.

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Submitted on: 22/01/2019

Accepted on: 16/05/2022

2022;25e:02625

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Contribuições da percepção ambiental para a sustentabilidade na zona de amortecimento de unidade de conservação

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Resumo: A área pública, atualmente denominada Floresta Nacional de Passo Fundo, foi criada em 1947 com o objetivo de pesquisar e desenvolver árvores madeiráveis, tendo em vista a grande exploração madeireira nas décadas anteriores. Neste estudo utilizou-se a percepção ambiental, como estratégia de investigação para tentar aclarar aspectos subjetivos da relação homem ambiente, evidenciada na comunidade local, em atual conflito com os gestores da unidade de conservação. Utilizou-se a abordagem qualitativa a análise de conteúdo. Apesar de perceberem a Floresta importante para a biodiversidade e qualidade de vida, convivem com situações conflitantes, relacionadas a sua exclusão no planejamento de atividades da UC, bem como a forma pela qual as fiscalizações são realizadas para evitar o plantio de transgênicos no entorno. A percepção tem potencial para elucidar conflitos semelhantes em outras áreas, indicando aos gestores das unidades caminhos para melhorar o relacionamento com a comunidade do entorno.

São Paulo. Vol. 25, 2022
Artigo Original

Palavras-chave: Flona; Análise de Conteúdo; Participação Social; Atores Sociais.

Aportes de la percepción ambiental a la sustentabilidad en la zona de amortiguamiento de una unidad de conservación

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Resumen: El área pública, actualmente denominada Bosque Nacional Passo Fundo, fue creada en 1947 con el objetivo de investigar y desarrollar árboles maderables, en vista de la gran tala en décadas anteriores. En este estudio, la percepción ambiental fue utilizada como estrategia de investigación para tratar de esclarecer aspectos subjetivos de la relación hombre-ambiente, evidenciados en la comunidad local, en conflicto actual con los gestores de la unidad de conservación. Se utilizó un enfoque cualitativo para el análisis de contenido. A pesar de percibir el Bosque como importante para la biodiversidad y la calidad de vida, viven situaciones conflictivas, relacionadas con su exclusión de la planificación de actividades en la UC, así como la forma en que se realizan las fiscalizaciones para evitar la siembra de transgénicos en los alrededores. La percepción tiene el potencial de dilucidar conflictos similares en otras áreas, indicando a los gerentes de unidad formas de mejorar la relación con la comunidad circundante.

São Paulo. Vol. 25, 2022

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