

**SOCIAL INNOVATION ECOSYSTEM AND TROPICAL FOREST: disputes around preservation in southern brazil**

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### **1 INTRODUCTION**

The Araucaria rainforest is an ecosystem included in the Atlantic Forest Biome as recognized by the Brazilian Federal Law 11428/2006. It is also recognized as a tropical forest ecoregion located mainly in the southern states of Rio Grande do Sul, Santa Catarina, and Paraná, and can also be found sparsely in the mountainous region (called “Serrana”) of the states of São Paulo, Rio de Janeiro, and Minas Gerais. The intensive and predatory logging of the Mixed Ombrophillous Forest (MOF), especially in the second half of the twentieth century, resulted in a severe reduction of the area originally occupied by the Araucaria (*Araucaria angustifolia*), symbol species of this ecosystem. The araucaria is considered by the Brazilian Ministry of the Environment as a species ‘threatened with extinction’ and ‘critically endangered,’ since 2006, by the Red List of Threatened Species of the International Union for Conservation of Nature (IUCN). In addition to the araucaria, several other species of this forest are threatened with extinction, according to the Brazilian list of endangered flora species (Ordinance 443/2014 of the Ministry of the Environment), such as the xaxim (*Dicksonia sellowiana*), the canela-preta (*Ocotea catharinensis*) and other canelas, imbuia (*Ocotea porosa*) and many other species of this natural habitat. From the original extension of the Araucaria rainforest (approximately 20 million hectares), only 1% to 3% remains (Fundação CERTI, 2012b). Among the ecosystems of the Atlantic Forest, the MOF can be considered as the one with the most anthropic pressures (de Gasper *et al.*, 2013) and it is one of the most threatened natural ecosystems in Brazil. The timber cycle has boosted a new economy of the soil in the region of the Araucaria rainforest, mainly with extensive cattle production and reforestation with exotic species. Also, the expansion of grain cultivation, which is an economically attractive form of land use, put pressure on the forests, causing the loss of vegetation cover and reduction not only of the Araucaria but of the biodiversity of the entire ecosystem (Vibrans *et al.*, 2011).

The majority of forest remnants in the region are located in private areas, usually in farms, which means that the forest is extremely fragmented and is preserved in different levels according to the management of the soil and the degree of anthropic influence in each farm. Recent studies, such as the Inventário Florístico Florestal de Santa Catarina (IFFSC) (Santa Catarina forest floristic inventory) (Vibrans *et al.*, 2013), found that 85% of the forest fragments in the state have an area of fewer than 50 hectares, and the number of forest remnants species has dropped by half of the original. Less than 0.7% of the original area covered by the Araucaria rainforest ecosystem is protected by conservation units. The forest floristic research conducted by Vibrans *et al.* (2011) on the Araucaria rainforest identified traces of hunters and production of yerba mate (*Ilex paraguariensis*) in public conservation units.

This extractive cycle left a legacy in the Serrana region of Santa Catarina. After exhausting the timber stocks, there was an abrupt change in the economic scenario, generating severe social problems due to the exodus of the entrepreneurial capital to other regions. The municipalities that once had great economic importance based on the timber sector that exploited the Araucaria rainforest went through a breakdown and nowadays has the worst Human Development Index (HDI) of the state (Fundação CERTI, 2012b).

The establishment of the initiative “Araucária+” was a result of a study promoted by the organization Fundação Grupo Boticário (Boticário Group Foundation), which sought to understand the impacts of non-timber production chains involving native species, in the Araucaria rainforest. Two of these chains stand out in the study: the pine nut, which is characterized as a simplified

commercialization chain, with a strong informal nature (with no registration and consequently poor data); and the yerba mate, which is a better-structured chain when compared to the pine nut. Together these chains have a sufficient volume of commerce to cause significant and common impacts in different regions of this natural ecosystem. Once this potential was identified, the initiative Araucária+ focused on strengthening and developing these production chains of pine nut and yerba mate. Thus, CERTI Foundation was the organization responsible for carrying out a diagnosis of the two production chains (Fundação CERTI, 2012a), studying the main impacts of the extraction of these products from the forest remnants. In addition, the foundation has mapped other elements impacting the forest areas that are not directly associated with the production chains, such as cattle production and forests' biodiversity-damaging management practices (such as fires and use of agrochemicals). After understanding the production chains' main impacts, CERTI Foundation developed a conceptual model proposing alternatives for the protection of the Araucaria rainforest, through the reorganization and strengthening of production chains that are associated with the natural habitat.

With regard to the Sustainable Development Goals, the case analyzed here focuses on objective 15 (Life on land). Although SDG 15 clearly mentions the issue of forests, the preservation of the Araucaria Forest in southern Brazil is directly and indirectly related to the other 16 sustainable development objectives (Bukoski, Drazen, Johnson, & Swamy, 2018). The forest preservation actions developed by the Araucária+ Project involve sustainable economic growth, the production and consumption of forest goods, combating climate change, in addition to promoting the sustainable use of forest resources in order to also solve the problem of the income of the forest owners.

As for the theoretical advances, Chateauraynaud (2011) argues that even with the growing number of publications related to environmental issues since the 1970s, it will still take many years of studies to develop a field of knowledge on environmental issues in the social sciences. For the author, the approaches need to incorporate analytical and descriptive frameworks that separate the research from the content produced by activists, analyzing the issues more technically. In this direction, Chateauraynaud (2011) points out that a 'sociology of controversies' has played a prominent role, because reality, far from being linear, is permeated by actors who do not always agree on the same ideas and, therefore, cannot be analyzed as a black box.

In this perspective, the social innovation ecosystems borrow aspects of the biological concept of 'ecosystem,' which is defined as a network of interactions between organisms and their environment (Schulze, Beck & Müller-Hohenstein, 2005). In this case, human and non-human – forests, animals, places or things – (Cefaï, 2009) interact with each other in a complex and dynamic network, with flows of resources among the actors and consequences coming from a process that is non-regular and permeated by controversies (Chateauraynaud, 2011).

This study looks at the social innovation ecosystem promoted by the initiative "Araucária+" (SIEA+), which involves a diversity of actors in the preservation of the threatened Araucaria rainforest in Santa Catarina, using a pragmatic methodology (Andion *et al.*, 2017) to understand the complexity involved in it. The objective is to explore the controversies between the actors mapped under the Araucária + project in order to understand issues that prevent a faster advance in the preservation of the araucaria forest in southern Brazil. The next sections will present the conceptual axes of the work, introducing a description of the analysis carried out.

## 2 PRAGMATIC VIEW OF SOCIAL INNOVATION (SI) AND SOCIAL INNOVATION ECOSYSTEMS (SIE)

The debate about the dynamics of social innovation process and the conditions under which they occur is strongly emphasized in the literature. This debate highlights the role that institutional forces play in the process of social and behavioral change in society and economy (Howaldt and Schwarz, 2010). The subject started to be theorized in the 1960s and 1970s after the debate about social protests and movements, which could favor or prevent social transformations. In this sense, social innovation refers to the proactive or reactive practices of individuals or communities in the search to satisfy their social needs and "to reconfigure existing social relations" (Mehmood, 2016, p.302).

However, today there are numerous definitions in the literature, with no consensus among scholars on social innovation (Bignetti, 2011; Phillips et al, 2015; Andion et al, 2017). In general, the concepts focus on two main strands (Pol & Ville, 2009; Cajaiba-Santana, 2014). The first, predominant in the English-language literature (Andrew, Klein, & Mohamoud, 2010), uses a more instrumental and functional conception of the phenomenon, adopting a 'neo-Schumpeterian' approach with an emphasis on the process of "creative destruction" and the role of agency of the social entrepreneur as key elements for solving social problems (Andion *et. at.*, 2017). The second strand, predominant in the French-language literature (Andion *et. at.*, 2017), seeks to understand SIs based on institutional forces, with a long-term perspective. SIs are analyzed as processes of changing cultural and institutional patterns, and they can be promoted by creating an environment conducive to the emergence of innovations. In this approach, the SIs offer directions for the promotion of new forms of development (Biggs, Westley & Carpenter, 2010; Lévesque, 2014), taking into account the social and cultural dynamics in territorial development (Moulaert & Nussbaumer, 2008).

Andion, Alperstedt & Graeff (2020) recognize these two strands and advance analyzing SIs adopting a pragmatic view on the contribution of French scholars. The authors study SI based on the consequences (Chateauraynaud, 2011) of its practices, considering not the practices that stem from the entrepreneur in their role as a leader that stands out, but the acts that stem from the engagement of several actors (collectives), aimed at solving public problems and promoting a dynamic of social change. From this point of view, the concept of social innovation ecosystem (SIE) stands out, recognizing the plurality of participating actors coming from the public or private spheres and the civil society as a whole. SIs are, therefore, strongly connected to the characteristics of a territory, including its social, economic and cultural elements. Also, SIE emphasizes dimensions such as ecology, local identities, history, and socio-ecological interactions that are at the foundation of different localities, gathering human and non-human elements in the analysis (Latour, 2012). In this sense, the assumption of replicability of social innovations as a form of ready-made solution can be counterproductive, as it disregards local social, economic, cultural and environmental challenges (Mehmood, 2016).

So, to understand an ecosystem of social innovation, it is necessary to map the roles (formal and informal) played by different actors, as well as a clear notion of the relationships established between them, their practices and their connection with the territory. Considering this set of evidence, it is still unclear how institutions can support the social innovation process. However, a SIE approach may be able to provide a framework for exploring the role of institutions in social innovation (Phillips *et al.*, 2015). Thus, it is assumed that each SIE counts on different types of actors and roles, as well as different inter-organizational arrangements and ways of acting to promote social innovations to address public problems (in this case, the extinction of tropical forest).

### 3 SUSTAINABLE DEVELOPMENT AND TROPICAL FORESTS

Forests play a very important role in providing ecosystem services that are essential for human well-being. They are also important in terms of achieving the 17 Sustainable Development Goals (SDGs) of the United Nations Agenda 2030 (Katila et al, 2017). In this context, it is essential to study what has been done to preserve them, because, despite their importance, little attention has been paid to the theme, in addition to the difficulties encountered in their preservation.

In this regard, Sayer et al (2019) discuss trade-offs between SDG 15 and other SDGs resulting in competition for land, synergies and opportunities. For the authors, the main opportunity brought by the SDG 15 is the integration with the other SDGs. However, in addressing issues of forest sustainability, short-term priorities that hinder synergy are at stake. There is a clear link between the need to conserve life on earth and the limited resources available, which creates enormous challenges. This requires that the intersectoral barriers be broken, requiring not only policies aimed at this end, but integration between sectors.

Baumgartner (2019) discusses the contribution that forestry makes to the achievement of the Sustainable Development Goals, analyzing the negative effects of forestry itself on sustainability and how forest management could contribute to achieving other SDGs. This analysis reveals that forestry plays a dual role, can generate positive, but also negative results. The author then recommends that evaluation approaches be used to verify whether a specific forest-related policy or strategy is contributing to sustainable development. Thus, it suggests not only quantitative but also qualitative assessments.

In this same perspective, Aryal, Laudari & Ojha (2020) show the contribution of local development practices in Nepal's community forestry to the achievement of the SDGs. The authors found that the main objectives and results of the community forestry overlap with the 29 goals of the SDGs. The research findings indicate a convergence between the role of community forestry and the possible institutional arrangements related to the SDGs.

Hiratsuka, Nakamab, Satriadic, & Fauzic (2019) assessed the achievement of the SDGs through a participatory land and forest conservation initiative in South Kalimantan, Indonesia. The studied initiative, which is managed by the local community, seeks to rehabilitate a 410 ha forest. The initiative established, in a participatory manner, a rubber plantation that resulted in opportunities for subsistence, leading to poverty reduction by reducing inequality in the local community. This contributed to the achievement of SDG 1 (poverty) and 10 (Inequality), in addition to SDG 15. The latter resulted from forest recovery and the reduction of forest fires. The results also indicate the importance of cooperation for the results obtained.

Hazarika & Jandl (2019) argue that the success of the SDGs it relates to coordination, governance and awareness among all those involved. In this sense, the search for the preservation of the forest must pay attention to the reach of incentives that benefit everyone. This need for cooperation meets the concept of social innovation ecosystem discussed in the previous section.

The case of the araucaria forest in southern Brazil is related to Abramovay's (2019) analysis of the growth pattern of the Amazon in recent years. According to the author, such growth was based on the economy of the destruction of nature, discouraging the strengthening of a regional economy. Exploratory practices, such as wood and agriculture, which bring faster financial returns are strengthened by the lack of inspection by public agencies, stimulating deforestation and fires.

On the other hand, Nobre et al (2019), in their analysis of the Amazon forest, defend the potential exploitation of a forest biodiversity economy, considering a new economic model based on bioeconomy that values renewable natural resources, environmental services, the biomimetic

assets, molecules and materials from biodiversity. Thus, the products of socio-biodiversity in the forest with Araucarias in southern Brazil have enormous potential for use by the pharmaceutical, cosmetic and food industries, mainly due to the great diversity of ingredients, and, consequently, the potential to generate innovation for these sectors.

#### 4 METHODOLOGY

This research is characterized as a qualitative case study (STAKE, 2005, p.436), descriptive and interpretive. Documents, semi-structured interviews and participant observation were used as data sources, with the help of a field diary.

The case under study was the Araucária + Social Innovation Ecosystem (EISA +), an initiative idealized and developed in a partnership between the CERTI Research Foundation and the Boticário Group Foundation for Nature Protection, aiming at the conservation of the Araucaria Forest and sustainable development of the communities associated with this natural ecosystem in southern Brazil. Its choice is justified by its relevance for the preservation of the Araucaria Forest in this region. For this, the study demanded from the researchers the permanence in the place, making contact with activities and daily operations (STAKE, 2005, p.450) of the landowners, due to the need to investigate the practices in loco, with the researchers submerged in the context in study.

Like Kirillov, Slipenchuk & Zengina (2016), the research took place over a period of two years, rich in incursions into the field with diverse interactions with the different audiences of EISA+, seeking to understand the effective praxis associated with forest conservation, especially by the protagonists of conservation - the forest owners.

The study started with a cartography aimed at mapping the actors of the network promoted by the Araucária + Initiative through a documentary analysis based on secondary data from the foundations involved. In the sequence, the roles of the actors in the conservation of the Araucaria Forest were described from secondary data (documents) and semi-structured interviews with the actors. The next step was to analyze the connections and interactions between the actors, through participant observation and unstructured interviews. Finally, the limits and advances in the articulation process undertaken by the Araucária + Initiative were identified, also based on primary data from the interviews.

The interviews were in person using a semi-structured script, recorded and transcribed in sequence. Initially, six interviews were conducted with rural producers who own forest areas. The choice of the interviewed individuals considered members of families that already had a history of interaction with the Araucária + Initiative. In addition to the interviews, three meetings were held with landowners and two technicians who work for the articulating agent, to systematize and consolidate the analysis of the Araucária + Social Innovation Ecosystem. During the interviews and recorded meetings, field observations were made, as the interviews took place during the development of practices combined with the preservation of the forest by these families.

In these collective spaces, called “fields of experience” by pragmatic sociology, solutions are discussed and forwarded to the problematic situations that emerge during conservation practices. These problematic situations, critical moments or test situations bring up controversies among the actors. The description of these problematic and controversial situations forms the central axis of the analysis of the present research, taking into account the conservation practices exercised by the actors of EISA +. Such analysis was conducted in an interpretative manner, considering the limits and advances of the EISA + project.

To assist in the analysis of social innovation ecosystems, pragmatic sociology can be one of the approaches used. From the perspective of pragmatic sociology, phenomena are analyzed

from their specific reality, by observing present or past actions, assuming that an action cannot be deduced by a cause and effect view (Barthe et al., 2016). For the pragmatic approach, action or practice is never devoid of reasons or any reflexivity on the part of individuals. The task of describing is central and aims to increase the empirical rigor of sociology, by offering better traits of the actors' activities in particular situations. [...]. According to Cefaï (2017a), collective actions are employed to deal with a problem that has proportions that transcend the individual.

## 5 SOCIAL INNOVATION ECOSYSTEM FOR THE PROTECTION OF THE ARAUCARIA RAINFOREST

Based on the theoretical analysis about SIEs, some categories were defined to describe the types of actors and roles performed in the SIEA+ using a categorization process that allowed to rebuild this public arena. These are dynamic categories, established in order to portray a picture of the SIEA+ at the time of this research, as shown below.

### 5.1 Types of actors

The different actors that form the SIEA+ were identified based on field trips and immersions carried out together with a member of the HUB. A description of the type of actors and their role and activities are provided below, as well as details on the connections they establish within the network.

The types of actors can be segmented into two major groups according to their role in this SIE: (i) conservation “practitioners,” who perform actions to protect or degrade the forest areas. These types of actors include the owners of forest remnants, actors operating in the extractive chain, and civil society organizations focused on environmental protection; (ii) “support” actors, who create conditions and promote the practitioners' actions toward forest protection or degradation.

**Table 1 – Main characteristics of the actors**

	Actor	Main characteristics
(i) conservation practitioners	<i>Owners of forest remnants</i>	Rural landowners, perform actions to protect or degrade the forest areas
	<i>Extractive actors</i>	Actors working in the extractive chain, whether sustainable or not
	<i>CSOs with focus on environmental protection</i>	Usually research related, some of these CSOs engage in forest conservation practices such as the installation of receptacles for bird
(ii) Support actors	<i>CSOs with focus on social development</i>	Mainly associated with assistance and rural extension, bringing knowledge and resources to rural development
	<i>Companies demanding non-timber forest products</i>	Non-wood products supply chain companies that require products of forest owners
	<i>Scientific, technological and innovation institution (STI)</i>	Source of basic or applied knowledge of scientific or technological nature or the development of new products, services or processes
	<i>Governmental institutions</i>	influences and is influenced by the social innovation ecosystem in the different layers of government
	<i>Financial institutions</i>	Funding to develop properties and of companies that invest in their structure resulting in higher demand for forest inputs

	<i>The HUB</i>	<i>active role in the coordination of all the actors of SIEA+ to create synergy for the development of production chains</i>
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## 5.2 Roles of the actors

The description of the different types of actors shows that there are several roles performed in the SIEA+. In many cases, these roles are performed cumulatively.

**Table 2 – Roles by type of actors**

	Regulation	Coordination	Support	Training	Acceleration	Funding	Communication	Practice
Owners of forest remnants								X
Extractive actors								X
Companies demanding non-timber forest products					X		X	
Civil society organizations with a focus on environmental protection				X			X	X
Civil society organizations with a focus on social issues	X	X	X	X			X	
Scientific, technological and innovation institutions			X	X			X	
Government/governmental institutions	X	X	X	X			X	
Financial institutions						X		
HUB	X	X	X	X	X	X	X	
Society					X			

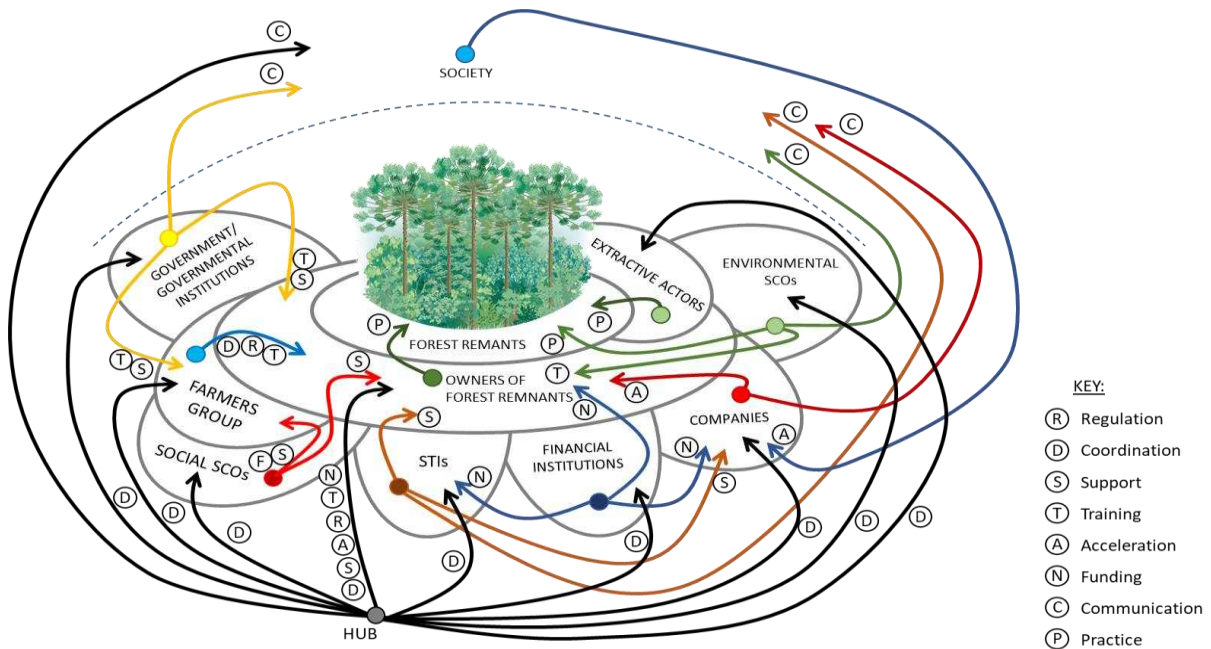
The analysis from secondary data and interviews identified the roles that were separated in categories to better understand the connections and interactions that occur in the network. It is worth mentioning that the roles are extremely dynamic, and were framed here to portray a picture of the SIEA+.

## 5.3 Connections and interactions between actors

The way in which the actors interact directly influences the outcomes of the SIEA+ regarding the public problem, i.e., the protection of the Araucaria rainforest. A visual summary of the interaction logic and the flow of the efforts and roles of the actors, associated to the level of intermediate social forces in the ecosystem is shown in Figure 1.

Figure 1 – Connections and interactions between the actors in the SIEA+, based on field research





Source: Elaborated by the authors

Some actors perform different roles toward various publics or perform several roles directed to the same public. The roles can be separated into those that directly promote forest conservation (roles in the category “practices”), and the roles that strengthen and support the adoption of practices associated with forest conservation.

There is considerable support for training and support in the form of technical assistance, technological transfer, and promotion of agriculture and cattle production, despite the almost absence of support mechanisms and programs, as well as lack of funding toward social innovation and entrepreneurship in the territory. The incentives observed are some government programs to stimulate agriculture, managed by traditional financial organizations offering financing conditions similar to those practiced in the market.

As observed in the researchers’ opportunities for interaction with the farmers of the region, their perception about the support network is somewhat unclear. Despite the history of interaction and support provided in the region – promoting association, environmental education, technical assistance, and rural extension – the perception is of low value and small legacy. Reports of rejection or non-perception of the support offered are common. It is possible to notice a feeling of incompleteness regarding the support offered, which is reflected in an almost universal narrative for the region, associated with the generation of economic results: “they only help from the gate inwards,” meaning that the supply of cultivation practices and technologies, varieties of cultivars, diversity of inputs and the support applicable to care for the property were considered helpful.

However, the farmers pointed out that the support to go to the market was insufficient, resulting in a poor sale or even loss of production, particularly due to the lack of inventory structure. Without having a buying market, the farmers ended up having to transform the production into fertilizer, as explained by a farmer in the city of Urupema, Santa Catarina, when talking about their organic strawberry production. Due to a poor market for the differentiated product, they “lost” part of the production – indicating that they would return to cultivate strawberries in a “traditional”

way. In their words, “I have much more work, and I get the same value per box, and the loss is greater with the organic.”

It is possible to observe when talking to the various actors that, in addition to the lack of market-oriented technical support, there is no support for incubation or acceleration of new ventures, and no financial incentives for the development of new products. This context may be directly related to the low diversity of entrepreneurship, and the lack of leadership in piloting new possibilities of products or market in the communities associated to the forest, which can be a worrying factor for the sustainability of the properties in the long term.

## **6 Limits and advances of the SIEA+**

In order to understand the advances and limits of the SIEA+, the pragmatic research privileges the analysis of the test situations in the different moments of dispute experienced by the actors of this social innovation ecosystem during its constitution, looking at the conservation of the Araucaria rainforest. The conservation of this environment is considered a public problem, because of the history of collective actions and mobilizations of the different publics and collectives, in the confrontation and overcoming of “test situations” related to the forest protection, in the process of collective learning. This learning process is built from the moments of test, which, over time, shaped the perception and resignification of the problem.

Historically, actors duel in public arenas based on the justifications for their actions, and there is learning insofar as the collective in the territory makes a judgment and carries out a solution to the test situation. Thus, the public problem becomes more complex and more rooted in the territory (Cefaï, 2011). A clash occurs mainly in the fields of experiences related to the controversies over the use of the forest, seeking to stop the degradation of this natural environment. The HUB approach coordinating the collective interest – or the different interests related to the collective interest – aims to generate a convergence of action among the different actors of the territory and to expand and enhance practices to protect the Araucaria rainforest.

However, it is necessary to consider the divergence of understanding between the actors of the ecosystem regarding the problem proposed by the HUB, considering the command and control mechanisms used. This is because it is not about actions stemming from a concern of the public involved, but of specialized agents that can be considered as “alert launchers” (Chateauraynaud, 2011).

In this sense, it can be inferred that the initiative “Araucaria+” represents this “alert launcher” (Chateauraynaud, 2011) about the urgency of the conservation of this natural environment. However, the mechanisms used are limited to deal with the degradation practices occurring in the territory, together with the work developed by the CSOs, focused on raising the awareness on the importance and urgency of the forest protection, which is a timid scope with little capillarity. Throughout its development, the partners of the initiative “Araucaria+” have reflected several times about the real contribution to the region. This exercise of self-criticism seeks, based on the local reality, to model strategies and actions to increase its alignment to the needs of the territory.

Considering the phenomenon analyzed, some test situations were identified in the research process and the field work. Such interpretations are important because they show that the process is much more complex than the normative models that seek to control illegal forest exploitation explain. Considering that preservation depends on “forest owners”, it remains to understand how they interpret the issue of forest preservation so that it is possible to act on this problem. Based on the situations identified, we explore inflection points and disputes that are present in the field when

analyzing the issue of forest protection. In our analysis two controversies related to the public problem stand out and are described below.

### **6.1 Is the Araucaria rainforest in danger?**

The very definition of the public problem – protection of the Araucaria rainforest – is considered controversial. In the interactions of the members of the HUB of the initiative “Araucaria+” (seeking to promote the expansion of actions to protect the remnants and increase in the biodiversity of this natural ecosystem), it is common for farmers to express that they are already protecting the forest, since they inherited the areas from their ancestors. That is, if the forest was not completely suppressed in the period of logging exploration, in their understanding, they are already acting for forest conservation. However, from the technical point of view of conservation, the ecological quality of the remnants is increasingly compromised due to the simplification of biodiversity (varieties of canelões, imbuías, araucaria, cedars, xaxim), previously frequent and dominant, which have become rare by excessive and disordered exploitation (Vibrans *et al.*, 2011).

There is, in this sense, the challenge associated with valuing conservation practices, that is, how to make communities and society see value in the conservation of the forest. According to discussions in the field of environmental ethics, a living being or a habitat only has value if it is useful to satisfy people’s needs or it alone has sufficient value, thus the importance of its conservation is evident (Florit, 2016). This dialectic brings to light the reflection on how conservation actions are guided by value judgments.

The fact that there is no recognition of the current state of the forest as a public problem by a large part of the actors involved indicates the need to provide mutual engagement in different ways, such as education for conservation and incentives associated with results achieved regarding conservation. If individual actors do not anticipate subjective utilities or private benefits as a result of their actions (low marginal utility and profitability of public commitment), if they cannot have a minimum of trust in each other (prisoner’s dilemma), and if they decide that it is wiser to wait and do nothing (selfish rationality of free rider behavior), there is little chance that the actors will come together to impose the definition of a public problem (Cefaï, 2017a, p.201). The convergence of interests is essential for the strengthening of mobilization and consequently the configuration of a public arena where actors seek public goods, define their problems as public and feel, act and speak about the public problems (Cefaï, 2017a).

In this sense, small entrepreneurs and consumers can get involved in a public arena understood as a market, where their investments in money, time and energy will bring a return that will be worthwhile, as fortunate coincidence between private and public interest (Cefaï, 2017a, p.201). However, Cefaï (2017a, p. 202) reinforces that economic rationality is only one of the possible modalities of human action. The world is not a commodity, and the logic of public problems goes beyond the logic of “market.” Mobilizing around a problem presented as a timely opportunity with specific interests may be weak and does not constitute a public problem since the public mobilized will only be engaged because of the immediate return, mainly associated with the economic dimension.

There is a given dilemma that current economic practices are harmful to the environment. On the other hand, environmental sustainability must be associated with economic sustainability. Since the owners of the forest remnants are responsible for the protection or degradation practices, it is necessary for them to meet their economic needs so that environmental and social practices become sustainable in the long term. This question reinforces the view of Sayer et al (2020) on

forest sustainability issues, since short-term priorities make it difficult to look at preservation. That's because while preserving life on Earth is important, limited resources are available. In this way, the forest territory could be used for other sources of income.

It is in this sense that the A + initiative seeks to develop a market for forest biodiversity products, in view of an economic model based on the bioeconomy, valuing renewable forest resources and services and encouraging innovation in the sectors beneficiaries of such products, such as food and pharmaceuticals. This kind of action deviates from the two opposing views found in the national debate on the forest (Nobre et al, 2019). The first defends the complete isolation of the forest for conservation purposes. The second, defends a development model that says it is "sustainable" but that includes agriculture, livestock and mining. What the A + project seeks is precisely the third way defended by Abramovay (2019) that departs from the first two and not even from a convergence between them, since research shows that the expansion of commodity production, such as beef on an industrial scale, drives deforestation.

## 6.2 Forests with or without cattle?

Among the most iconic controversies, the withdrawal or not of cattle of forest remnants stand out. Diagnoses of various specialists and institutions relevant to environmental protection, particularly the IFFSC, issued warnings about the fact that the creation of large animals is the main reason for deforestation of the Araucaria rainforest. Such warnings motivated commitments to limit the movement of large animals in forest remnants, mainly because of the soil impact (compacting and erosion) and the fact that they are herbivores. Observing these warnings, the initiative "Araucaria+" developed, together with several specialists, the set of environmental commitments (called "standards of sustainable production") that farmers participating in the initiative must adopt.

Among the commitments, there was a strong stance by the initiative on the total withdrawal of cattle from the forest area, even if gradually (providing for the establishment of an adaptation plan), which generated resistance on the part of the producers. The different experiences that HUB had to engage farmers in adopting best practices in the use of forest areas led to numerous situations of resistance and incompatibility of a conservation imperative. Given the impasse and mediating characteristic of the initiative, the HUB issued an alert for the actors to present the different justifications in a test situation within this public arena, with the intention of collectively finding a direction, "where are we going?" This initially triggered a series of interactions with experts and, finally, an immersion with different publics – farmers, government agencies, CSOs, experts from different areas – to discuss alternative ways to reduce the impact of cattle on the Araucaria rainforest, in a public investigation considering the various possibilities, and the different perspectives on this problematic situation.

This immersion was promoted by the initiative "Araucaria+" in a two-day workshop on "Reducing the impact of cattle on the Araucaria rainforest," involving a day field trip to a farm with high performance in cattle production associated to sustainable management of Araucaria rainforest remnants. The event brought together farmers and several well-known experts on topics such as cattle raising in adverse situations; traditional systems (*caívas* and *faxinais*); and biodiversity protection. Representatives of funding agencies also participated, following the discussion and verifying the viability of the investments. The workshop allowed to gather some conclusions: (i) the cattle only enter the remnants in search of thermal comfort, water and food (which is usually grasses). Thus, if it is possible to supply these elements outside the remnants, the tendency is for the herd not to enter the forest area; (ii) despite the instinct to seek shelter (and consequently the establishment of routines of circulating around the property), there is viability for animal husbandry in situations of extreme low temperatures (e.g. in Canada and Argentina),

reaching  $-20^{\circ}\text{C}$ . Therefore, the forest, despite generating thermal comfort, is not essential for the prosperity of the herd, if the necessary conditions for the cattle, as mentioned before, are met; (iii) the profile of cattle production in the Serrana region is of low technological sophistication and extremely extensive, presenting low density of animals per hectare. It is worth mentioning that there are no consolidated studies that present a support capacity of the forest for integration models between native forest and cattle production (e.g., hypothetically it is possible up to 1 animal per hectare without compromising the equilibrium of the natural ecosystem).

During the workshop, the different publics presented their points of view. Farmers and CSOs with a focus on social issues justified the view that economically the farmers of the territory depend on the income from the cattle production. They stressed that the current model (low investment and easy management) presents conditions that make the activity viable in the territory, which has adverse geographic and climatic characteristics if compared to the large cattle production regions of Brazil (Central-West and North). Among the factors limiting the activity are: (i) excessive cold during winter, which compromises natural pastures, and requires investments in growing cold-resistant grass species (usually a few hectares for the most critical periods); (ii) stony soil; (iii) rugged terrain. Researchers and institutions focused on environmental protection justified the risks of cattle production, based on current data and trends, in terms of biodiversity loss in the forest, stressing the ecological imbalance that large animals cause inside the forest. Specialists in the integration between crop cultivation, silviculture, and cattle production presented information about the benefits, mainly related to the comfort and higher animal production, of this integrated model (which is more commonly practiced with exotic timber species, grass, and some crop cultivation that support the circulation of large animals). The debate around the multiple views led to an agreement on best practices to reduce the impact and balance the different perspectives, reconciling the environmental, social and economic dimensions. Forest conservation, which at first is the “great public problem,” unfolds in another: “the challenge of the small farms’ sustainability,” which depends on income from the forest area, but also from cattle production.

The main results of this immersion promoted by the HUB is a collective learning that involves: (i) a clarification and deeper research on the impacts and consequences of cattle production in native forest areas; (ii) an in-depth understanding of the limits and needs of the different profiles of property in the territory; and (iii) the potential and opportunities of a more ecological cattle production. For the SIEA+, this learning opportunity brought a better understanding of the reality of the territory, a reconciliation of interests, and sharing of knowledge. It strengthened the initiative “Araucaria+” expanding strategies for mobilizing and adding value to the territory. The evolvement of the initiative over the years, and the numerous test situations related to the SIEA+, each time with a more situated performance, justified the continuity of the pilot project and the start of a process of institutionalization of the Initiative.

Currently, there is a growing association movement motivated by an alert launched by the SIEA+, with the involvement of the HUB in partnership with local leaders. The alert came in response to a radical increase in the cultivation of mushrooms that grow in areas of an exotic forest species (*Pinus*), whose seedlings were imported containing strains of “noble” fungi (such as *Porcini* and *Lactarius*). The possibility of cultivating this product started with the stimulation from important actors in the states of Rio de Janeiro and São Paulo, demanding these mushrooms.

The HUB, through various interactions on several occasions (since 2016) has mobilized leaders of the region to create a local association, focusing on products of native species of the forest. The opportunity of cultivating mushrooms has brought a new motivation to create the

association, gathering farmers who seek the sustainability – in its different dimensions – for their properties and consequently for the region. The involvement of farmers that own areas with *Pinus* may seem contradictory, in a first look, considering the conflict of exotic wood production over the native forest areas along the last decades. However, it is the way to diversify the production in the property .

Parallel to the opportunity of cultivating noble mushrooms, this association does not intend to be exclusive to mushroom producers but includes farmers producing yerba mate, pine nuts and many other products directly associated with native species of the *Araucaria* rainforest, thus contemplating the diverse interests of the actors involved. A group of farmers has unsuccessfully tried to create, in Urupema, Santa Catarina; an association focused on the sale of pine nuts. In a short time (after formalization, coordination with the market and producers, and logistic organization) there was a significant – and perverse – engagement of poorly aligned producers who provided low-quality pine nuts (immature and with the presence of fungi) which, in turn, compromised the established sales channels. One of the leaders who participated in the endeavor that took place in 2008 commented on this experience saying that it did not last more than one harvest. Regarding the current situation in 2018, one of the farmers says: “it has to be a commitment of the whole group if one supplies and another gives up, we lose strength.” In their point of view, the engagement and alignment of all members are crucial when it comes to working in association.

Like the research conducted by Aryal, Laudari & Ojha (2020), the A + project showed its contribution to preserving the *araucaria* forest in southern Brazil, as it seeks local partners to develop a market for forest products, convincing the land’s owners to preserve their properties. Additionally the data reveals the importance of cooperation between actors for the preservation of the forest obtained. This experience adds to the research by Nakamab, Satriadic, & Fauzic (2019) whose achievement of SDG 15 occurred through a participatory land and forest conservation initiative in southern Kalimantan, Indonesia. In this sense, the results of the A + project also demonstrate the importance of cooperation for the results obtained.

## **FINAL CONSIDERATIONS**

This research described and analyzed the social innovation ecosystem promoted by the initiative “*Araucaria +*,” using a theoretical-methodological approach that coordinates the perspective of the sustainable territorial development and the findings of recent research on social innovation ecosystems, adopting a pragmatic point of view with an ethnographic position.

The analysis was focused on the dynamics established in the interaction among the actors of the SIE. The analysis identified the different types of actors, the roles performed and the way they relate to each other. The dialogue with the actors showed that there is a lack of market-oriented technical support, and lack of support for the development of new ventures, which results in low diversity and entrepreneurship, and low level of leadership in the development of new products and solutions to problems in the territory, which may jeopardize the long-term sustainability of the properties.

Structural changes happen only when the social and environmental dimensions are treated in an integrated way since they are naturally inseparable. Given that practices of protection or degradation are carried out by the forest owners, with or without the influence of other actors, it is important to emphasize that engaging and raising awareness among forest owners must always be one of the priorities of the SIEA+, keeping in mind that they are the most significant connection between the forest and society. However, their minimum economic conditions must be met so that there are real mobilization and sufficient commitment to generate structural and permanent changes regarding the public problem of protecting the *Araucaria* rainforest. The STeDe presents an

appropriate path for the development of a collective strategy for consistent support to address the demands of the territory seeking the establishment of a model of sustainable development connected to the biodiversity protection.

The consequences of a potential failure of this SIE are directly connected to the loss or not of collective wealth, although it is not possible to observe consequences in the short term. The study represents only a picture of the current situation of the SIEA+ in 2018, and however dynamic it may be, can be identified as a limitation of this study. A better understanding of the outcomes in the long-term depends on longitudinal follow-up, revealing opportunities for future research.

No matter how “new” or “radical” a social innovation may be, it will always face resistance and constraints due to existing solutions, and economic, political and technological imperatives that can facilitate or pose difficulties. The SIEA+ has provided learning opportunities and evolved in favor of forest protection. The CA has the role of assisting the diversity of actors engaged in the construction of collective learning, in the process of mediation and convergence of interests. This process of knowledge construction in practice seeks to promote the engagement of different publics in the process of research and action to face the problematic situations of the daily lives (Andion, Aperstedt, & Graëff, 2020). This process of evolution of the CA, and consequently of the initiative, will reflect on the building and strengthening of the SIEA+.

There is a search for regularity for more control in all sciences, but if the challenges of society become increasingly complex, systemic and global, we must find innovative solutions that require approaches considering aspects not necessarily measurable, controllable or predictable. Moreover, considering that the world is extremely complex, we will always have enormous challenges in controlling this diversity and adversity.

In this sense, it seems that the conception of science must be reconsidered, “the role of the science of administration and its consequences, whether in the public or private sphere or in civil society organizations must be discussed” (Alperstedt & Andion, 2017, p.626), because the current data models no longer account for the changes the world goes through. The authors of the field of classical management are in constant conflict in the academic sphere because of the worldview from which we are trained to assume a “given world.” However, acting on the world must take into account the reality of the situation. Thus, a pragmatic approach leads to accepting that the test situations (in which we are suppressed and suffocated) is where we show our true being (talk versus action). Moreover, this way may be fruitful to understand the different realities, their ills, and blessings, understanding that in the fields of experiences there are unusual situations, and our role as researchers, is to use lenses and perspectives that help to see the world as it is: rich and plural. This is one of the contributions of this paper.

Theoretically, based on pragmatic sociology arising from the theories of action, this study contributes to a more complex view of the discussion around the achievement of sustainable development objectives, revealing dependence on real practices and understanding of social actors, in contrast to a normative or social regularity. Likewise, it clarifies the existing controversies around preservation, as there is not even an understanding among practically about this need.

This finding also makes a contribution to practitioners and government officials about the increasing needs for clarification around the importance of preserving the forest and support the initiatives of preservation once the study showed a lack of funding for social innovation and entrepreneurship in the territory. As Bukoski, Drazen, & Johnson (2018) says, “researchers must continue to demonstrate the wide-ranging ecological and socioeconomic benefits of tropical forests

in order to motivate governments and other organizations to prioritize the conservation, restoration and sustainable use of tropical forests for generations to come” (p.80).

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