

# Popular environmental education and social mobilization for Pantanal ecological restoration

## Educação ambiental popular e mobilização social para a restauração ecológica no Pantanal

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### Abstract

This study is an invitation to reflect on the Environmental Education (EA), especially from the activities that seek to promote awareness for the conservation of the Pantanal. The objective is to understand, on one hand, the set of economic activities and degradation processes that affect the biome and, on the other, the role that EA assumes as an instrument of popular and social mobilization in its conservation and ecological restoration as community empowerment. The research is qualitative and, as a method, it was used the action-research participating in the mobilization and social involvement for the conservation of the waters of the Pantanal and its biodiversity. The actions and roles of social actors who politically influence the Upper Paraguay Basin (UPB) were described, particularly because the area has suffered not only from large fires but also from the expansion of economic activities that occur without consulting traditional Pantanal communities. As a result of this process, knowledge dialogues and interventions were developed in the restoration process, as well as pathways for constructing a possible public policy called the Pact for the Restoration of the Pantanal.

**Keywords:** reflections; public policy; popular environmental education; social mobilization.

### Resumo

Este estudo é um convite à reflexão a partir da Educação Ambiental (EA), em especial a partir das atividades que buscam promover a sensibilização para a conservação do Pantanal. O objetivo é compreender, por um lado, o conjunto de atividades econômicas e processos de degradação que afetam o bioma e, por outro, o papel que a EA assume enquanto instrumento de mobilização popular e social na sua conservação e restauração ecológica como empoderamento comunitário. A investigação é de cunho qualitativo e, como método, utilizou-se a pesquisa-ação participante na mobilização e envolvimento social para a conservação das águas do Pantanal e de sua biodiversidade. Foram descritas as ações e a atuação dos atores sociais que incidem politicamente na Bacia do Alto Paraguai (BAP), em especial por ter sofrido, além de com os grandes incêndios, também com a ampliação de atividades econômicas que ocorrem sem a consulta às comunidades tradicionais pantaneiras. Como resultado desse processo, ocorreram diálogos de saberes e intervenções desenvolvidas no processo de restauração, bem como os caminhos para a construção de uma possível política pública denominada Pacto Pela Restauração do Pantanal.

**Palavras-chave:** reflexões; política pública; educação ambiental popular; mobilização social.

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## INTRODUCTION

This is an account of an action-research experience involving ecological restoration in the Pantanal of Mato Grosso, through the engaged work of professionals (higher education teachers, basic education teachers and students), together with grassroots movements in the territory of the Upper Paraguay river basin, which have an impact on the conservation of the biome's biodiversity.

To this end, we sought to engage with the Pantanal community in order to boost the process of developing activities in a context of socio-environmental crisis, which exposes the consequences for the Pantanal biome and the populations around it. The main objective was to understand, in the context of economic activities and environmental degradation processes, the intervention actions as popular Environmental Education practices, which took place during the processes of mobilization and social participation for the conservation of the Pantanal, between the years 2020 and 2024.

In addition, this study is a record of the experience of a group of social actors involved in ecological restoration, and at the same time it is an invitation to reflect on the theme of Popular Environmental Education (PE) and activities that promote people's awareness of the conservation of the Pantanal. In this sense, the inter-institutional cooperative activities registered involve those carried out from March 2020 to March 2024.

## METHODOLOGICAL PATH

### Description of the area of study

The Pantanal is an immense floodplain with specific characteristics that flood periodically, characterized by its flood pulse (Junk; Silva, 1999; Junk et al., 2011). In view of the need for its conservation, due to its global importance and the process of degradation in its ecosystem, it was recognized as a Biosphere Reserve, World Heritage Site and Ramsar Site (Ramsar, 2006; Zhang; Kong, 2019; Leão et al., 2022). In addition to its rich biodiversity, it has natural assets, such as fish, in the rivers of the biome, which are a source of food for traditional populations and communities living in the Pantanal territory (Silva et al., 2015; Façanha; Silva, 2017). The main springs and rivers that supply the wetlands of the Pantanal are located in the upper parts, at about 300-500 meters above the plain of the Upper Paraguay Basin (BAP) biome, with a fragmented landscape, caused by anthropogenic effects transporting water and sediments (Souza et al., 2006). BAP's main tributary is the Paraguay River, which, with its main tributaries, the Jauru, Sepotuba and Cabaçal rivers (Leandro; Souza, 2012), contribute to the formation of the extensive wetland, one of the largest in the world (Wantzen et al., 2005; Cunha et al., 2014).

### Procedures

The action research plan consisted of studies that began with a literature review for theoretical foundation, followed by qualitative research and participant observation. To build the theoretical foundation, studies were carried out for the literature review, followed by participant observation and, later, participant-action research.

As for the method, participant-action research is a type of knowledge production committed to action and intervention in the social space in which the investigation is carried out.

The experience, which began in March 2020, from the activities of the Graduate Program in Environmental Sciences, at the State University of Mato Grosso, Cáceres/MT, consisted of two distinct moments: one during the Covid-19 pandemic and the other, post-pandemic, after approval by the Research Ethics Committee of the State University of Mato Grosso, according to opinion number 5,271,201 of 03/03/2022, the second moment of the survey was applied.

At first, the field research began with interviews, but, as the moment was unstable, the first contact restrictions were applied, in order to prevent the transmission of the Covid-19 disease, and there was still no provision for vaccines, it was decided to adopt a new schedule, which was made up of virtual connections.

The follow-up carried out during the participatory action research made it possible to record the construction of the methodology of mobilization and collective involvement that occurs

in the hydrosocial territory, for the conservation of the Pantanal, developed and recorded jointly by educators, students and institutions, as well as by social movements.

#### **A look at the Pantanal issue in the context of the worsening socio-environmental crisis**

According to Layrargues and Lima (2011, 2014), the conception of critical EE adds the sociocultural dimension, to better understand the relationship between society and nature. Discussing, therefore, which social differences can facilitate the identification of a certain environmental problem can contribute to the identification of the causes of these effects (Silva et al., 2015) and consequently to social practices for a Popular Environmental Education (Souza, 2018) that transforms the unjust, oppressive and excluding reality into a liberating and decolonial perspective (Alves Pereira; Silva; Ramírez-Sánchez, 2022). Thus, it is understood that there is a relationship between environmental problems, their causes, and their social and ecological effects, for each situation. Necessary measures must be adopted to solve or mitigate socio-environmental damage through a critical and popular Environmental Education for sustainability. From a global perspective, development for a sustainable society involves environmental education in a "broad context with socio-cultural and socio-political factors of equality, poverty, democracy and quality of life" (UNESCO, 2005, p. 46).

In this sense, for example, promoting campaigns for people to save water at home, considering that the greatest waste and the greatest use of this common natural good occur in industries and agriculture, would not be the most appropriate action, however it is what commonly occurs, and this generates a situation of deep distraction from essential problems.

In the case of Brazil, public policies at the federal, state and municipal levels are a way to access the rights and resources to put into practice actions that subsidize the effectiveness of EE. However, such policies are not always effective and reach the populations, since many federated entities (states and municipalities) do not develop such policies very much.

For Sorrentino et al. (2005), it is worth remembering a history of EE policies and programs offered by the Ministry of Education and Culture (MEC), the Ministry of the Environment (MMA), the National Policy for Environmental Education (PNEA), and Law No. 9,795, of April 27, 1999, which provides for EE and institutes the National Policy for Environmental Education, and by the National Environmental Education Program (ProNEA), created to "enhance the rooting of environmental education based on an ecological ethic that promotes empowering transformations of individuals, groups and societies" (Sorrentino et al., 2005, p. 292).

The environmental crisis has been manifesting itself for decades in the Brazilian territory with deforestation, water, air and soil pollution, genetic erosion, carbonization of the atmosphere, among other situations. However, recently the environmental crisis has been intensified with heat waves, an increase in large fires in the Amazon and the Pantanal, water scarcity and water crises in several regions of Brazil – or its opposite, major flooding –, growth in pollution of rivers around cities and industries, erosion of biodiversity and increased emissions of carbon dioxide and other polluting gases, by the use of the fossil matrix. In addition, there is deforestation, mainly for soybean monoculture activities, or even cattle ranching, for the expansion of the agribusiness chain in the Midwest and in the Amazon, which are causing enormous liabilities and socio-environmental problems.

In the Pantanal, multiple forces drive environmental degradation (Silva; Jaber-Silva, 2015, p. 215), among which soybean monoculture, especially on the plateau, sugarcane, extensive cattle ranching, the installation of power plants and small hydroelectric plants, mining, deforestation, large annual fires and droughts, events that cause the reduction of the water mass (Junk et al., 2006; Lázaro et al., 2020). There is also the risk of the implementation of the Paraguay-Paraná Waterway - HPP, which proposes to meet the great economic interests, to the detriment of local populations and economic activities.

In addition to all these issues, there are also many economic activities carried out in the Pantanal that follow an unsustainable model, which affect, in particular, the wetlands and their surroundings, causing non-reversible degradation effects on biodiversity, which is why there is a need for public conservation policies, as well as ecological restoration actions (Mamede; Alho, 2006; Cunha et al., 2014; Silva, et al. 2015; Ikeda-Castrillon et al., 2022),

In the first half of 2020, before the Pantanal was taken over by the massive fires of that year, there was monitoring and participation in the activities of the Institute for Research and Environmental Education – Gaia Institute. It was noted that, even in times of pandemic, the threats caused by projects, such as the installation of Small Hydroelectric Power Plants (SHPs) in the rivers of the biome, continued.

Public hearings, meetings and dialogues in public spaces of debate persisted in an act of resistance, even with little representation of the communities of the Pantanal, as these communities did not have access to the *internet*. However, social movements were present, that is, the feeling of belonging to the Pantanal territory kept them convinced of their actions (Sauvé, 2005).

## RESULTS AND DISCUSSION

### **The Gaia Institute and its performance.**

Firstly, this research was dedicated to studying and understanding the Institute of Research and Environmental Education – Gaia Institute of the Pantanal, Cáceres /MT, an institution that was founded in 1997.

The Institute is a non-profit civil social organization, and its headquarters are located in Cáceres, on the banks of the Paraguay River, in the state of Mato Grosso. Its actions, according to information in the public domain, focus on the defense of the Pantanal biome and the Paraguay River, which is the main tributary of the Upper Paraguay Basin.

Throughout its 25 years of existence and socio-environmental activities, the Gaia Institute has established several institutional partnerships with socio-environmental purposes, one with the University of the State of Mato Grosso (UNEMAT) Cáceres Campus in environmental education activities in extension work in the community and monitoring of interns from the biological sciences course.

It is worth noting that both spaces receive different groups and institutions from the local community and students of Basic Education, for activities of technical visits and formal educational processes, strengthening the ties for sustainability between basic education, the university and local society.

Secondly, the focus was on the registration of actions, first, in the period from December 2020 to June 2022, when there was monitoring of both the mobilization and social participation activities in the Upper Paraguay Basin - BAP, as well as the dialogues for the construction of the Pact for the Restoration of the Pantanal. Then, the period from March 2020 to June 2023 represented the moment to learn about the experiences of recovery of springs in the Pantanal of the BAP and the social actors who work in the territory for the conservation of the Pantanal, as well as the application of interviews with those involved in this process. The period from July 2023 to March 2024 served for the synthesis of the data, interpretation and writing production.

It is outstanding that the monitoring carried out during the participant action research made it possible to record the construction of the methodology for mobilization and collective involvement that takes place in the hydro social territory, for the conservation of the Pantanal, developed together with the social movements.

### **Actions of pro-restoration mobilization**

Participatory action research, carried out remotely, involved the participation and monitoring of 30 (thirty) lives, from 2020 to 2023, in which the Pantanal community, in all its diversity, spoke out about what was happening in the Pantanal. The broadcasts took place on the Gaia Pantanal Institute's YouTube channel (Chart 1).

Virtual meetings played an important role in the BAP, during the time when communities were isolated, in the pandemic period, from physical spaces such as the Legislative Assembly and the Municipal Chambers, places previously occupied by communities and social movements, to claim their rights and the protection of the biome.

**Chart 1.** Virtual meetings held with the Gaia Institute.

N.	Date	Title	Views until 10/02/2024.
1	23/06/2020	The Day the River Dried Up	538
2	01/07/2020	Agroecological Production in Cáceres-MT	322
3	04/07/2020	The enchanting Pantanal	429
4	06/07/2020	Solidarity in the Pantanal	362
5	07/07/2020	Covid in the Pantanal: what do we need to know?	415
6	08/07/2020	Energy generation alternatives in the Pantanal	159
7	09/07/2020	Restoring Springs	317
8	06/10/2020	Cáceres is Pantanal	112
9	10/07/2020	Experiences of spring recovery and social participation for the conservation of the Pantanal	362
10	22/08/2020	The Cáceres Pantanal and its birds	245
11	04/09/2020	Trees and their uses in the Pantanal	291
12	17/10/2020	Arboviruses: Impacts of environmental changes on the presence of disease vectors	160
13	19/10/2022	Proposal to Build a Pact for the Restoration of the Pantanal	146
14	05/11/2020	Voices from the Pantanal: How we got through the fires in the Pantanal - Day 1	198
15	06/11/2020	In defense of the Springs Pact and Pantanal Restoration - Day 2	182
16	07/11/2020	What do young people think about the future of the Pantanal? - Day 3	129
17	12/11/2020	Today, 12 November, we celebrate Pantanal Day	77
18	17/12/2020	Let's build a Pact for the Restoration of the Pantanal?	536
19	25/03/2021	Life Threatened - Documentary	908
20	25/03/2021	Documentary release: life under threat	456
21	01/07/2021	Cuiabá River is in danger	40
22	19/09/2021	Restoration in the Pantanal - Young people from the Pantanal Biosphere Reserve.	47
23	06/10/2021	Analyses without Borders - South American Socio-Environmental Summit.	35
24	13/11/2021	Pantanal Day - A dialogue with Pantanal defenders	321
25	19/11/2021	Workshop: Escazú Agreement and Convention 169 - What do they have to do with our lives and rights?	62
26	04/07/2022	Pantanal and threatened peoples	4
27	28/04/2022	Public Hearing - Pantanal Biodiversity Restoration and Water Conservation Project	229
28	28/09/2022	Restore the Pantanal Project	270
29	04/05/2023	Strengthening the fight for the conservation of the Pantanal.	44
30	12/11/2023	Ecological restoration in the Pantanal and agroecological production at Baru smallholding - José Aparecido Macedo	153
Total views			7549

**Source:** Instituto Gaia (2023).

Regarding this aspect, moreover, while the population suffered restrictions of popular movement, the licenses for release of ports of the Paraguay-Paraná Waterway (HPP) and hydroelectric projects (Ikeda-Castrillon et al., 2022) had the continuity of their processing, without proper consultation with the populations.

The situation occurred at a time when the federal government, under the presidency of Jair Bolsonaro, was accelerating environmental deregulation, putting at risk Brazilian and Pantanal biodiversity and, consequently, affecting the most vulnerable populations as indigenous communities, quilombolas, riverine and peasants (Pedde et al., 2013; Guerra, 2021). Even so, this situation did not prevent the active participation of people involved in the cause in contrary demonstrations.

In this context, the largest fire ever recorded occurred in the Pantanal in 2020 (Leão et al., 2022). Groups then mobilized and conducted lives, video meetings on the Facebook, YouTube and Instagram channels to show that the Pantanal was on fire during the Covid-19 pandemic19, seeking to draw the attention of government authorities to the destruction caused. As a result, digital and television newspapers reported on national and international networks the fires that occurred that year.

In the context of such ecological and human tragedy, groups of volunteers were created for direct assistance, involving local citizens and even other regions of the state. A first group was responsible for rescuing the animals (Figure 1) that were inside the vegetation burning day and night. The aid ranged from collecting food and water for the wetland fauna, to feeding and transporting wild animals to safe places, in order to enable species perpetuation and non-extinction.

Thus, several veterinarians and technicians were contacted and offered to help rescue animals that have suffered burns. However, despite the awareness of the fires, something was not clear: the reasons and causes of being happening at that time, during the Covid-19 pandemic, while people could not access public spaces, because there were restrictions for claims and social agglomeration. An aggravating factor was that the government responses of both the



**Figure 1.** Dead jaguar near the Transpantaneira highway (Poconé, MT) in the middle of burned areas.  
**Source:** João Paulo Guimarães. Photography provided to the Educare Laboratory (2020).

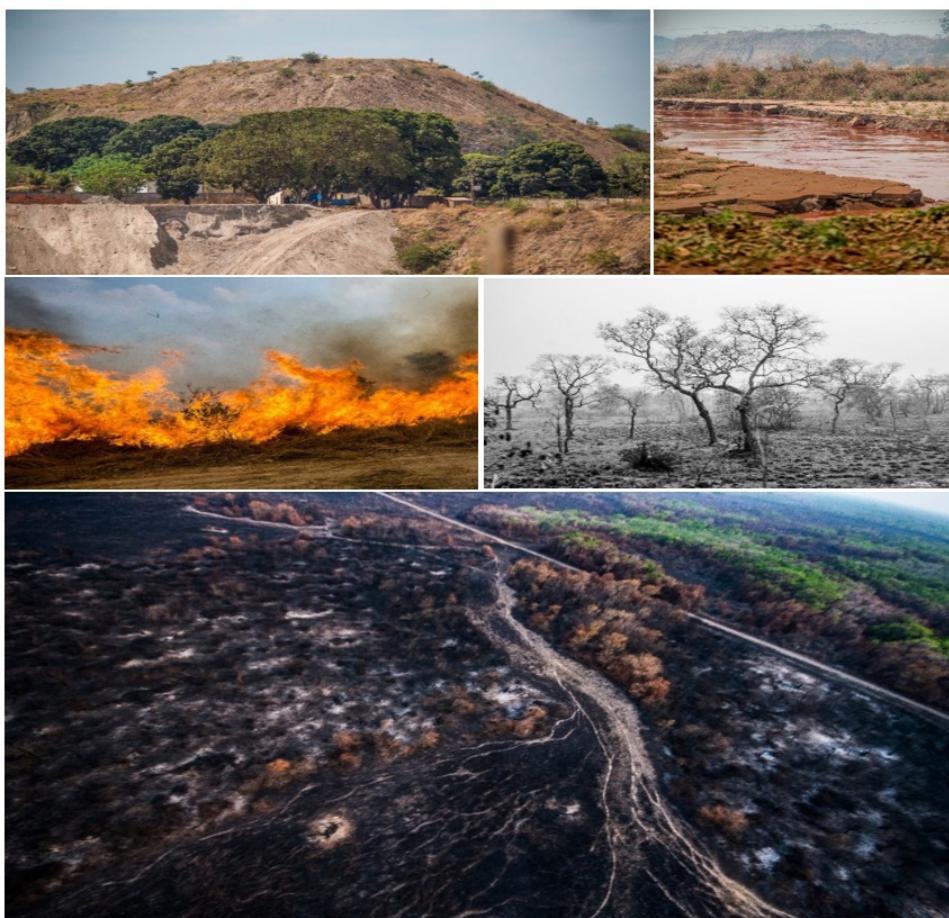
federal and state governments, in the case of the state of Mato Grosso, were slow to happen because the institutions were paralyzed.

In addition, there are projects in the region that also negatively impact the Pantanal, contaminating the waters and local biodiversity due to the economic activity of mining, which is installed in Poconé. Such activities cause siltation and contamination of rivers, soils, waters, fish and people (Veiga; Fernandes, 1991). Therefore, it was not enough for the region already have a history of environmental degradation, due to the negative impacts caused by mining, livestock and commercial agriculture, the fires even aggravated and amplified the effect of degradation.

With all this, the situation in the region, which was already considered serious, became alarming and out of control, because it had its impacts potentiated by the fires. About this, it is worth remembering that, before these fires occurred in the Pantanal in 2020, something similar happened in the Amazon, in the previous year of 2019, which, likewise, won national and international news.

Although it is not possible to affirm the relationship between these fires in different biomes, the way they occurred is similar: environmental degradation advanced by negligence and even by lack of political will to make effective conservation and monitoring policies, especially from the responsible environmental agencies, which were paralyzed, under the domain of perceptions of the extreme right, which is climate change denialist in relation to climate changes, and that manifests that the environmental agenda is only imposed by developed countries to slow Brazilian economic development.

In this sense, the losses become irreparable, especially in Mato Grosso state, which has areas of Cerrado, Amazon and Pantanal, and that houses the areas of springs, responsible for supplying the main tributary rivers of the Pantanal. (Figure 2).



**Figure 2.** Mining activity and fires, both in Poconé. - Pantanal, MT.

**Source:** João Paulo Guimarães. Photography provided to the Educare Laboratory (2020).

In addition to the animals, people and communities were also in the Pantanal and suffered from drought, shortage of drinking water, lack of food, fires, smoke and Covid-19. They also suffered from political negligence, characterized by the lack of assistance (Figure 3) to people in the communities (Leão et al., 2022).



**Figure 3.** Humanitarian aid vessel to the communities of the Pantanal.  
**Source:** Claudia, Sala de Pinho, 2020 - Network of Traditional Pantanal Communities.

Therefore, a second group focused on the presence of the human swamp. And, regarding this issue, it makes sense to bring the contribution of the Education and Art Research Group (GPEA), which addresses the exposure and vulnerability in which people are placed, whose impacts become even greater during climatic extremes:

By the absence of ethics, capitalism promotes the worst injustices, forging a pitiless socio-economic abyss. We understand that CLIMATE JUSTICE is an approach that studies climatic phenomena, from the geological, physical, biological or health concepts, which bring more atrocious consequences to the poor layer (Sato; Dalla-Nora, 2021, p. 15).

Nature, with living and non-living beings, is treated by capitalist society as a resource that aims at economic interests and consequently generates environmental problems. On this, Leff (2006) reminds that the economic interests are part of an anti-life logic, which destroys the environmental complexity of the natural systems of the planet and configures a human degradation, according to which nature is seen as an object: "In the capitalist system, the recognition of nature's rights is the only way to ensure human rights for the majority whose access to them has been repeatedly denied" (Ferreira; Seleguim, 2023, p. 22).

From an ethical and ecological point of view, Dussel (2003) points out that since the sixteenth century, the capitalist system, with its eurocentric and patriarchal colonial ideology, sees nature as an unlimited resource and exploits it in an unprecedented way to increase profit. Thus, it is vulnerable to the poorest populations and ecosystems.

In the face of the catastrophic scenario in which the Pantanal was found, 42 (forty-two) entities from the sectors of organized civil society, the private sector and government met to dialogue. All participants were positioned in the face of the inertia of the federal and state governments and the lack of actions to conserve the biome, starting in 2020, the construction of a Pact for the Restoration of the Pantanal (Leão et al., 2022) (Figure 4).

In dealing with man-nature-environmental crisis, Albuquerque (2007) and Pieroni, Branco and Ferreira (2019) point out the different relationships maintained by humans with nature: in prehistory, nature is mother; in ancient Greece, philosophers try to translate *physis* as nature; in the Roman Empire, *physis* is understood as matter; in the Middle Ages, man is a superior being to nature; in the Modern Age, man is the master of nature-machine. For these

authors, the patriarchal culture expanded along with the separation between subject (man) and object (nature).

In order to overcome the crisis in which the Pantanal was found and continue the actions around the proposal of a pact for the restoration of the biome, in 2021 an edict was released by the Global Fund for the Environment - Terrestrial GEF, and the Gaia Institute submitted the Project for Restoration of Biodiversity, Water Conservation and Fire Preservation of the Wetlands of the Pantanal - Ecological Station of Taiamã, which was approved (Leão et al., 2022; Ikeda-Castrillon et al., 2023) (Figure 5).



**Figure 4.** Invitation to build the Pantanal Pact.1.

**Source:** Instituto Gaia (2020).



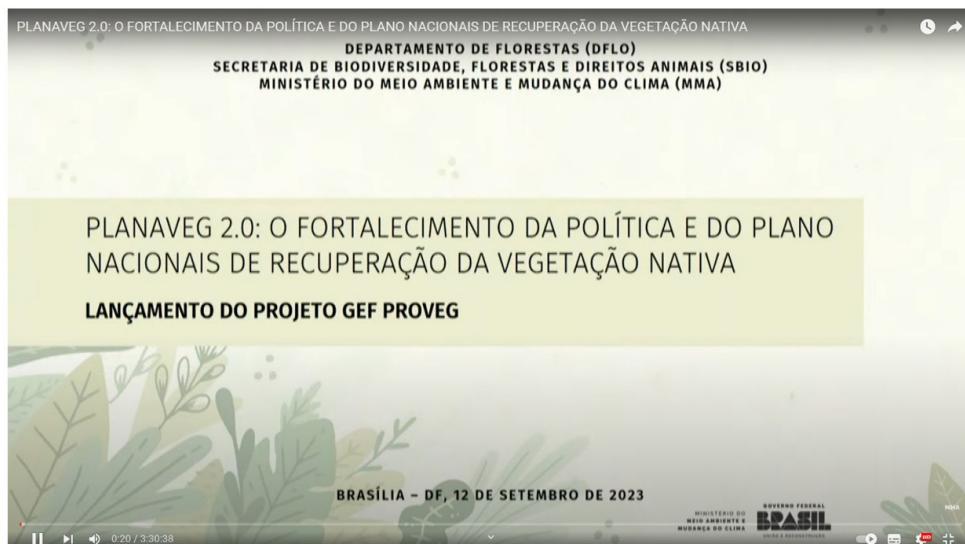
**Figure 5.** Biodiversity Restoration, Water Conservation and Fire Preservation Project of the Wetlands - ESEC Taiamã.

**Source:** Ikeda-Castrillon et al. (2023).

Popularly known as Restore Pantanal, the project had as one of the objectives to strengthen the sustainability and continuity of projects for the recovery of degraded areas through a Pact for the Restoration of the Pantanal (Ikeda-Castrillon et al., 2023). To meet this objective, the project used methodologies for mobilizing and articulating social actors working in BAP, including state and municipal governments, communities, civil society organizations and the private sector of Mato Grosso and Mato Grosso do Sul.

The actions and articulations of the Pact for the Restoration of the Pantanal were presented at the launch of the project "Expanding large-scale recovery in Brazil through the National Policy for the Recovery of Native Vegetation" (GEF PROVEG), held by the Ministry of the Environment (MMA), on September 12, 2023, in Brasília (Ministério do Meio Ambiente, 2023).

The project is a public policy that supports restoration commitments in Brazil, whose main objective is to recover degraded land on a large scale. The National Policy for Recovery of Native Vegetation, known as PROVEG, is part of the update of the National Plan for Native Vegetation (PLANAVEG), launched in 2017, which, without support from the Bolsonaro government, was archived and prevented from being executed, until the moment of resumption of actions in the current government. After updates, PLANAVEG 2017 was presented at the launch event of the GEF PROVEG project as PLANAVEG 2.0: Strengthening Policy and the National Plan for Native Vegetation Recovery (Figure 6).



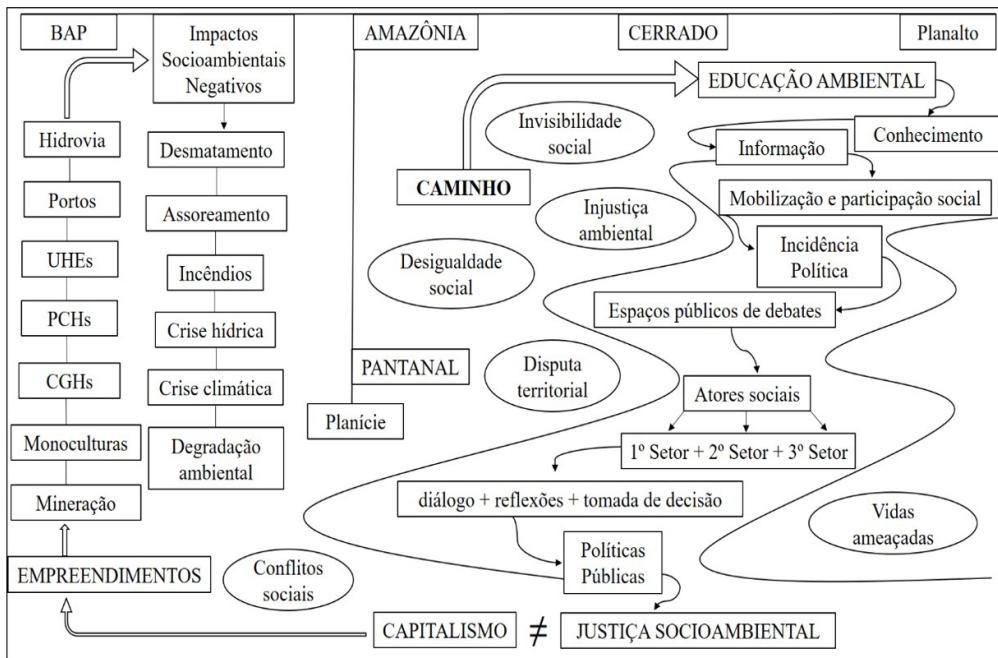
**Figure 6.** Presentation of the GEF PROVEG Project Launch.

**Source:** Ministério do Meio Ambiente (2023).

Thus, the reflections linked to the different events that negatively impacted the Pantanal and its surroundings became indispensable, because there was a neglect of all environmental degradation, causing environmental injustice (Sato; Dalla-Nora, 2021), with serious consequences regarding the violation of natural commons, people's lives and biodiversity as a whole, since while a minority owns the profits, a majority remains exploited and in unequal conditions (Sauvé, 2005; Shiva, 2006; Pinto; Zacarias, 2010).

In this sense, critical EA becomes an instrument to be used in processes that involve people in decision-making processes, planning, governance and construction of public policies that take into account the potential and socio-environmental vulnerabilities related to the conservation of Pantanal waters and all its biodiversity. It can be said, therefore, that EA involves people in order to generate strategic actions, knowledge and conservation actions (Jodelet, 2018) (Figure 7).

These actions, built by organized civil society, are not enough to contain the amplified dimension of degradation put in discussion, nor to achieve the restoration of the Pantanal, because they are actions with limited scope, in particular in the face of the macro process



**Figure 7.** Path for the conservation of the Pantanal waters.

**Source:** The authors, 2024.

that materializes in the Pantanal and is the result of the global capitalist development mode (Loureiro, 2012).

Thus, despite studies on the social and environmental impacts throughout the BAP over the last decades (Calheiros et al., 2012; Zanatta; Maciel, 2020; Ikeda-Castrillon et al., 2022), and the consequences caused to the Pantanal communities by the enterprises installed in the territory and by the large fires (Guerra, 2021; Neves, 2023), the BAP's social-environmental movements act in defense of rivers, waters and that resist in search of solutions for the conservation of the biome, of which are examples the pacts and the alliances that are built (Ikeda-Castrillon et al., 2022; Leão et al., 2022).

In this sense, it is possible to perceive the concern in the speech of scientists, militants, peoples and traditional communities, recorded in the documentary *Life Threatened* (Instituto Gaia, 2021):

The path of solutions planned by this macroeconomic model is the path of false solutions [...] it's all in the name of money, in the name of development, which they call, in case for us Guarani development is not that, for us all this is a great destruction [...] The Pantanal is a unique system and it needs an adequate environmental policy to be preserved. It needs the opportunity to hear the voice of the people of this place and a sensitivity to conserve this system, this vastness of unique wetland in the world and that maintains this biodiversity that is also differentiated from the rest of the world [...]. If we gather these factors and add it, we will be able to have a Pantanal preserved in the future and being used economically and the population existing here and everyone thinking that we will have a Pantanal to last 500 years [...]. Water is not sold, it defends itself [...]. This is the struggle for human life, for the ecosystem (Instituto Gaia, 2021).

In the documentary it is evident that water is the main concern, because in the Pantanal it is the unifying element of life, since all living species depend on it, besides the that has a peculiar way of dealing with the pulse of the waters and biodiversity.

Thus, the experience of people and their wisdom, as well as other forms of knowledge in a transdisciplinary way, added to the scientific results should be an alert for the tragedies announced, which become more close and constant every day, if remedial and preventive measures are not taken by governments and civil society, in a form of participatory governance that carries out the construction and implementation of public environmental policies for the Pantanal. It is thus a high responsibility of the governments of Brazil, Bolivia and Paraguay,

which shelter the wetlands of the Pantanal and, in the case of Brazil, the governments of the states of Mato Grosso do Sul and Mato Grosso.

## FINAL CONSIDERATIONS

The actions followed in this study contribute, with the realization of activities, for the conservation of waters and biodiversity of the Pantanal, actions that can be continued and associated to the construction of public policies, in a participatory way, involving the whole with respect to the Pantanal populations in their diversity and biodiversity of each space.

Thus, for society to commit itself to treat nature as a natural common good, and not as a resource or object for capitalist use only, profound transformations are necessary.

Therefore, engaged Popular Environmental Education can be a path that guides to care for life and the common good, through the process of dialogue of knowledge and actions of environmental care, ecological restoration and overcoming socio-environmental vulnerabilities, from the environmental pedagogy and direct action of restoration. For this, it is essential the social involvement and public policies built between the different parts of society, democratically respecting the interests of individuals and collectivities.

It is necessary, therefore, that studies investigate, for example, the relationships between environmental impacts, such as fires, and large economic interests, since it is not feasible to restore and conserve the Pantanal, without, on the one hand, government monitoring and oversight, and, on the other, governments continuously maintain policies.

In addition to the record of environmental degradation in BAP, there is also a history of social and environmental conflicts and resistance by social movements that defend environmental conservation, against the form imposed by capitalism in the Pantanal. Although the results of studies show the damage that degradation by fires and developments have caused, there is still a lack of conservation and restoration policies that meet the demands of all sectors of society and the maintenance of life in the biome.

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#### Contributions of the authors

DSL: Summary, review of scientific literature, Introduction, methodology, results and conclusion. SKIC: Introduction, methodology, results.

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